EPA's Responses to Public Comments on EPA's *National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units*

December 2011

Volume 1 of 2

Comments, letters, and transcripts of the public hearings are also available electronically through h*ttp://www.regulations.gov* by searching Docket ID *EPA-HQ-OAR-2009-0234*.

FOREWORD

This document provides the EPA's responses to public comments on the EPA's Proposed *National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units*. The EPA published a Notice of Proposed Rulemaking in the Federal Register on May 3, 2011, at 76 FR 24976. The EPA received comments on this proposed rule via mail, e-mail, facsimile, and at three public hearings held in Chicago, Illinois; Atlanta, Georgia; and Philadelphia, Pennsylvania, in May 2011. Copies of all comments submitted and transcripts for the public hearings are available at the EPA Docket Center Public Reading Room. Comments, letters, and transcripts of the public hearings are also available electronically through *http://www.regulations.gov* by searching Docket IDs *EPA-HQ-OAR-2009-0234* (NESHAP action) and *EPA-HQ-OAR-2011-0044* (NSPS action).

This document contains responses to comments on the NESHAP only; responses to comments on the NSPS action are in a separate Response to Comments document. Due to the size and scope of this rulemaking, the EPA summarized a limited amount of major comments in the preamble of the final rule. This document contains a summary of all significant comments provided by each commenter extracted from the original letter or public hearing transcript.

Appendix A of this document provides a list of public hearing speakers and their affiliation. Appendix B of this document provides a list of commenters and their affiliation along with the associated document control number (DCN). For each comment, the DCN is provided along with the comment summary. For purposes of this document, the text within the comment summaries was provided by the commenter(s) and represents their opinion(s), regardless of whether the summary specifically indicates that the statement is from a commenter(s) (e.g., "The commenter states" or "The commenters assert"). The comment summaries do not represent the EPA's opinion unless the response to the comment specifically agrees with all or a portion of the comment. In some cases the same comment was submitted by two or more commenters through submittal of a form letter prepared by an organization, by the commenter incorporating by reference the comments in another comment letter, or by the commenter providing identical or similar language independently. Rather than repeat these comment excerpts for each commenter, the EPA has listed the comment excerpt only once and provided a list of all the commenters who submitted the same form letter or otherwise incorporated the comments by reference in Tables 9A-1 through 9A-21 and 9B-1 through 9B-5 of section 9 of this document and Table 10-1 of section 10 of this document, respectively.

Several of the EPA's responses to comments are provided immediately following each comment summary. However, in instances where several commenters raised similar or related issues, the EPA has grouped these comments together and provided a single response after the last comment summary in the group. In some cases, the EPA provided responses to specific comments or groups of similar comments in the preamble to the final rulemaking. Rather than repeating those responses in this document, the EPA has referenced the preamble or the appropriate technical support document for a description of the analysis included in the final rule.

As both the NESHAP and NSPS actions were included in the same proposal package, many commenters submitted comments to this rulemaking docket that were specific to the NSPS action. Some commenters submitted a single DCN with comments on both rules, while others submitted a separate DCN specific to each action. Many commenters submitted identical comments to both dockets. In order to reduce

duplicative comments, we have removed from this document comments associated with the NSPS action. For this reason, the EPA encourages the public to read the Response to Comment document prepared for the NSPS action.

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CHAPTER 1: LEGAL – GENERAL/APPROPRIATE AND NECESSARY FINDING/REQUEST FOR EXTENSION OF COMMENT PERIOD/OTHER

1A - Legal: General legal comments not related to the Appropriate and Necessary Finding that use case law and CAA statutory text to recommend a fundamentally different approach to the rulemaking

Commenters: 17383, 17620, 17623, 17648, 17689, 17702, 17723, 17725, 17728, 17732, 17751, 17754, 17756, 17758, 17768, 17775, 17799, 17813, 17820, 17838, 17848, 17851, 17855, 17867, 17873, 17877, 17878, 17880, 17904, 17930, 18014, 18019, 18024, 18033, 18421, 18424, 18425, 18432, 18487, 19121, 8443, 19536/19537/19538, 18932, 18023

1. Support for a health-based alternative standard under CAA section 112(d)(4).

a. General support.

Comment 1: Multiple commenters (17702, 17775, 17623, 17799, 17877, 17904, 18023, 18443) state that to avoid setting MACT limits that are far more stringent than necessary to protect public health the EPA has discretion and should have set an alternative health-based emission limit for the acid gas HAP's under the authority of section 112(d)(4). According to the commenters, health-based standards can be established for only those HAPs for which a "health threshold" has been established and the EPA has defined that threshold to be "the level of concentration of a chemical under which no health effects are expected from exposure" over a lifetime. *See* Chlorine and Hydrochloric Acid Emissions From Chlorine Production, 68 Fed. Reg. 70,948, 70,951 (Dec. 19, 2003); Mercury Emissions From Mercury Cell Chlor-Alkali Plants, 68 Fed. Reg. 70,904, 70,915. The commenters state that the second criteria that must be satisfied to set a health-based alternative is that the standards must be set at levels that are not expected to cause adverse health effects with an ample margin of safety. The commenters state that HAP acid gases emitted by EGUs are all non-carcinogens and have defined health thresholds in the form of reference concentrations ("RfC") and the RfC's for these HAPs are protective of public health with an ample margin of safety.

Comment 2: Several commenters (17623, 17867, 18424, 18425, 17820) encourage the EPA to set health based standards for HCl and other threshold pollutants as provided for in CAA section 112(d)(4) for which the agency can determine a level that avoids adverse health effects with an ample margin of safety. According to the commenters, a health-based standard can avoid unnecessary costs.

Comment 3: Commenter 17728 states that the EPA should set health based limits for acid gases under section 112(d)(4) "since Congress added section 112(d)(4) to avoid the situation where the unthinking application of MACT limits to a given source category results in emissions standards that are far more stringent than necessary to protect public health."

Comment 4: Commenter 17855 states that because there were no "plausible health risks to the public associated with emissions of non-mercury (Hg) HAPs" the EPA should establish health based standards under CAA section 112(d)(4). According to the commenter, non-Hg risk assessments for a number of facilities demonstrated that these facilities have impacts of non-Hg HAP "much lower than health threshold levels with an ample margin of safety." The commenter asserts that the EPA's MACT limits are not justified or cost-effective.

Commenter 17775 states that modeling conducted by both the EPA and this commenter has consistently shown that all offsite exposures to HAP acid gas emissions for coal-fired EGUs are well below the reference concentrations ("RfCs") or reference exposure levels ("REL") for those HAP acid gases. As a result, states the commenter, the EPA should set alternative health-based emission limits for those HAPs under CAA section 112(d)(4). A properly constructed alternative health-based limit would avoid unnecessary and inefficient regulation that yields no public health benefits from reduced HAP acid gas emissions.

Comment 5: Commenter 18023 states that the EPA has sufficient information to establish health-based emission limits. The commenter refers to the 1998 Report to Congress as well as the refined modeling of 16 plants that was performed to support the proposed rule. According the commenter, a standard can be developed using only (1) the health threshold, and (2) the Chi/Q value for a plant known to have poor dispersion characteristics. The commenter states that division of the RfC or REL by the Chi/Q value produces the emission rate Q, corresponding to concentrations equal to the RfC, and this Q result is a health-based emission limit (in g/s) that could be used in place of a conventional MACT standard.

Commenter 18024 states that the EPA should use its authority under CAA section 112(d)(4) to provide a health-based alternative to demonstrate compliance with mathematically derived HAP standards for uncontrolled liquid oil-fired boilers if an applicant can demonstrate that such emissions do not exceed established air toxics thresholds. According to the commenter, relatively few liquid oil-fired EGU boilers exist in the U.S.; of those, many fire primarily natural gas but retain liquid fuel as backup. The commenter states that due to the present and projected economics of competing with higher efficiency natural gas combined cycle generating units, older natural gas-fired steam-electric EGUs increasingly operate at low annual capacity factors and most have excellent dispersion characteristics. At best, states the commenter, existing No. 6 oil-fired EGUs may be equipped with ESPs for particulate control; however, no known No. 6 oil-fired or dual-fuel fired EGUs operate with any Hg or acid gas add-on control technology. According to the commenter, the proposed MACT Floor limits do not reflect any emission control technology or strategy, but rather simply reflect natural variations and data limitations in the available stack test data. According to the commenter, this is not a useful way to establish numerical emission limits, since existing EGUs have no demonstrated air pollution control retrofit strategy to achieve continuous compliance.

Commenter 18024 suggests that for oil backup that the EPA provide an alternative to the numerical number if it can be demonstrated that such alternative limit would result in no significant incremental health risk to the community. According to the commenter, a health-based demonstration alternative would provide a safety valve such that if a given existing EGU that could not demonstrate compliance with one particular MACT Floor limit, the owner could propose an alternative limit based on a demonstration of lack of adverse health impacts on a case-by-case basis.

Commenter 17656 states the EPA uses health concerns as the rationale for further regulation of the utility sector. Thus, the commenter is confused as to why the EPA declined to simply adopt health-based emissions standards, in lieu of MACT emission limits, for EGUs. The commenter states that the agency has the flexibility to do so under CAA section 112.

Commenter 18428 states that the EPA has not provided any rationale for regulating HCl, and they should proceed to develop appropriate health-based thresholds under section 112(d)(4) in addition to subcategorizing by coal rank.

Several commenters (17705, 17812, 17821) state the EPA should use the agency's discretion to set an alternative health-based emission limit for acid gas HAPs. According to the commenters, as an alternative to the currently proposed NESHAP for acid gas HAPs, the EPA should set an alternative health-based emission limit under CAA section 112(d)(4). The commenters state that section 112(d)(4) provides an alternative to establishing limits for a given source category that are more stringent than necessary to protect public health. Section 112(d)(4) states:

> "With respect to pollutants for which a health threshold has been established, the Administrator may consider such threshold level, with an ample margin of safety, when establishing emissions standards under this subsection."

According to the commenters, this section provides the EPA with a mechanism to avoid standards based on application of MACT that produce no public health benefits but require large compliance expenditures by the affected industry.

The commenters state that the EPA has substantial information to support setting alternative health-based limits for the acid gas HAP under CAA section 112(d)(4). As the EPA notes in the preamble to the proposed rule, state the commenters, two factors must be met in order for the EPA to set alternative HAPs limits under section 112(d)(4): first, the pollutants under consideration for a section 112(d)(4) limit must have established health thresholds and, second, any section 112(d)(4) standard must provide an ample margin of safety when considering the health threshold.

The commenters state that the HAP acid gases emitted by EGUs are non-carcinogens having defined health thresholds. For compounds, like the acid gases, that affect public health as a result of inhalation, these thresholds take the form of a reference concentration ("RfC"). Although not defined in the CAA, state the commenters, the EPA interprets a health threshold to refer to "the level of concentration of a chemical under which no health effects are expected from exposure" over a lifetime.

Commenters 17705 and 17774 note that the EPA's analyses indicate that acid gases from coal-fired power plants do not result in exceedances of any RfC. The commenters state that the EPA references a specific study the agency used to determine whether to use health-based standards for the acid gas HAPs. In this study, the EPA defines RfC to mean "an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." The study focused on 16 coal-fired facilities as worst case test cases in order to determine whether health-based standards were appropriate. According to the commenters, this study did not find potential for coal-fired utilities to exceed any RfC and therefore provides justification for the EPA to set health-based standards.

Commenter 17705 states that in the preamble to the proposed rule, the EPA discusses its consideration of a section 112(d)(4) limit for the acid gas HAPs. According to the commenter, that discussion adds three factors that do not appear anywhere in section 112(d)(4) that the agency states are "directly relevant to the health and environmental outcomes at which CAA section 112 is fundamentally aimed." These factors are: (1) the potential for cumulative adverse health effects due to concurrent exposure to other HAPs with similar biological endpoints, from either the same or other subcategories, where the concentration of the threshold pollutant emitted from the given source category is below the threshold; (2) the potential impacts on ecosystems of releases of the pollutant; and (3) reductions in criteria pollutant emissions and other co-benefits that would be achieved by a MACT standard.

According to the commenter, considerations of cumulative effects, impacts on the environment, and the co-benefits of a MACT standard should not be deciding factors of whether or not to establish health-based emission limits under section 112(d)(4) because standards under section 112 should be focused on HAP emissions from the regulated source category that impact health. Commenter strongly encourages the EPA to remove the current standards for acid gas HAPs and set health-based standards for these pollutants as provided for in section 112(d)(4).

Comment 6: Commenter 17821 states that selenium (Se), mainly in the form SeO_2, emitted from utility units, are only a tiny fraction of HCl and HF, and therefore make a *de minimis* contribution to acidification. The commenter states that compared to acidification due to SO_2 and NO_X emissions, Se emissions are even less significant, and work performed by EPRI shows the adverse health effects due to air emissions of Se are insignificant. Therefore, states the commenter, the EPA should consider setting a health-based standard for Se and remove it from the list of regulated non-Hg metals, and furthermore, because there is no significant correlation between Se and condensable PM, there is no justification for a total PM standard. The commenter states that thus regulation of non-Hg metals can be accomplished through use of filterable PM as a surrogate.

b. The CAA requires a health-based standard.

Comment 7: Several commenters (17754, 17838, 18023) state that the emission limits for non-Hg HAPs should not be technology-based standards (i.e., MACT standards) but rather health-based standards. According to the commenters, the CAA does not authorize the EPA to effectively substitute a technology-based analysis for the health-based evaluation expressly required by the statute.

c. The EPA impermissibly declined to establish a health-based standard under CAA section 112(d)(4).

Comment 8: Commenters 17775 and 18023 state that in the preamble discussion of establishing health-based emission limits for acid gas HAP the EPA added three factors that do not appear in section 112(d)(4). According to the commenters, the EPA added the following factors: (1) the potential for cumulative adverse health effects due to concurrent exposure to other HAP with similar biological endpoints, from either the same or other subcategories, where the concentration of the threshold pollutant emitted from the given source category is below the threshold; (2) the potential impacts on ecosystems of releases of the pollutant; and (3) reductions in criteria pollutant emissions and other co-benefits that would be achieved by a MACT standard. To the extent that concurrent impacts are considered, the commenters suggest this could be addressed by using an additional margin of safety.

Comment 9: Commenter 17799 states that the EPA has set health-based standards in other MACT proceedings and that the EPA should set health-based standards because the analysis demonstrates that risks from non-carcinogens from EGUs are well below threshold levels. According to the commenter, the EPA declined to set health based standards "based on reasoning irrelevant to the source category." According to the commenter, the EPA reasoned that coal-fueled units are likely to be in areas where other sources of HAPs exist, thereby creating a significant risk of harmful exposure. Based on utilities' presumed proximity to other HAP sources, states the commenter, the EPA concluded that health-based standards would not apply in this case. Furthermore, states the commenter, the EPA focused on the $PM_{2.5}$ co-benefits of reducing hydrogen chloride (HCl), hydrogen fluoride (HF), and other acid gases with a conventional MACT standard rather than considering whether HCI or HF would need a health-

based standard. Finally, states the commenter, the EPA also focused on the environmental effects of HCI, HF, and other acid gas HAP when deciding not to set a health-based standard.

Comment 10: Several commenters (17848, 17848, 17930, 18033) state that CAA section 112(d)(4) allows health-based standards provided they are protective of public health with an ample margin of safety and that the EPA has used this approach in the past. The commenters note that the EPA declined to exercise this authority because of the potential for cumulative health effects, impacts on ecosystems, and reductions in criteria pollutants and other co-benefits that would be achieved by the proposed MACT. According to the commenters, co-benefits of SO_2 and $PM_{2.5}$ reductions should not override the discretion to establish health based standards.

Comment 11: Several commenters (17813, 18014, 18033, 17725) state that the EPA's failure to set section 112(d)(4) standards "runs counter to the CAA." According to the commenters, none of the acid gases are listed as carcinogenic and they have defined health thresholds. The commenters state that the EPA does have the tools and expertise to establish section 112(d)(4) standards as evidenced by 2004 boiler MACT. Additionally, state the commenters, the EPA has already established a precedent for addressing HCl as a threshold pollutant in promulgating the Pulp and Paper NESHAP (1998) and the Lime Manufacturing NESHAP (2002) where the agency wholly exempted HCl from the MACT requirement. According to the commenters, citing the loss of co-benefits from criteria pollutants is not a permissible use of discretion under section 112(d)(2); there is a prohibition on the addition of any criteria pollutant to section 112 HAP list (with a single exception for certain precursor pollutants not relevant for this case) and this extends to any rule that in effect treats a criteria pollutant as a HAP.

Comment 12: Commenter 17813 states that the EPA takes the position that establishing a section 112(d)(4) HCl standard is inappropriate because information is not available to show acute exposures will not pose health concerns. According to the commenter, the EPA's analysis and preamble discussion that it believes that health risks due to acids gas exposures including HCl is minimal.

Comment 13: Commenter 18019 states that the EPA rejected establishing health-based standards for acid gases but statements such as "in the case of HCl, this means that chronic inhalation of HCl can cause tissue damage in humans" without putting it into the context of the of the actual contributions of EGUs to ambient concentrations and whether there are any expected effects at those levels are inflammatory.

Comment 14: Although HCl emissions meet the statutory requirements for the establishment of a health-based emission limit under section 112(d)(4), commenter 17774 notes that the EPA did not propose such standards. According to the commenter, the agency's reasons for doing so are flawed and considered impermissible factors. The commenter states that the EPA explained that coal-fired units are likely to be located in areas where other sources emit HAPs and that overall HCl exposure levels would be harmful. The commenter states that the EPA did not provide any factual background for this assertion but, based on utilities' presumed proximity to other HAP sources, concluded that health-based standards would be inappropriate in this rulemaking. Furthermore, states the commenter, the EPA focused on the co-benefits of reducing HCl and other acid gases with a conventional MACT standard rather than considering whether HCl could be adequately controlled using a health-based standard. Finally, states the commenter, the EPA cited the environmental effects of HCl and other acid gas HAP as reasons for not setting a health-based standard.

Commenter recognizes that the EPA has broad discretion when deciding whether to set a health-based standard, but the EPA may not decline to set a standard based on considerations beyond the source category and purview of section 112. The commenter states that the EPA should only base its determination on emissions from EGUs, not emissions of other sources, such as those emitting HAPs "likely" to be located near EGUs. Similarly, states the commenter, the EPA should not consider environmental effects or co-benefits and should focus solely on EGU emissions before declining to use health-based standards. According to the commenter, if the EPA had done so in the first place, it most likely would have found health-based standards appropriate because coal-fired utilities do not have the potential to exceed any RfC. As a result, the commenter strongly urges the EPA to reconsider its decision and set health-based standards for HCl and other threshold pollutants.

2. Support for EPA's approach to not use section 112(d)(4) to establish a health-based alternative (HBA) standard.

a. General support that there is insufficient information to establish an HBA.

Comment 15: Commenter 17648 states that "EPA has no information available to support health-based regulations under section112(d)(4) for HCl or other acid gases, including HF, SeO_2, and HCN. According to the commenter, the agency has not adopted health-based standards for HF, SeO_2, and HCN in any NESHAP, and there is no evidence upon which the agency reasonably could base a decision to implement such standards in the Toxics Rule." The commenter states that it would be inappropriate to exercise the discretion to establish health-based standards under section 112(d)(4) "in light of several relevant factors, including the potential for cumulative and synergistic adverse health effects from concurrent exposure to other HAPs and criteria pollutants with similar biological endpoints and the potential environmental impact from HCl."

Comment 16: Several commenters (17620, 18421, 18487) state that they support the rejection of alternative compliance limits under section 112(d)(4) where there is insufficient scientific information to establish a safe threshold for the HAP at issue.

Comment 17: Several commenters (19536, 19537, 19538) state that if the EPA invokes section 112(d)(4) authority to consider setting a health-based alternative standard, the agency must conduct that evaluation on a pollutant-specific basis with respect to pollutants for which a health threshold is already established. *See* Fed. Reg. 25,049. According to one commenter, even if HCl could reasonably serve as a surrogate for the other acid gases in setting MACT floors (a point which the commenters do not concede), it cannot be a surrogate in health-based standard setting, because the EPA must base any section 112(d)(4) health-based standard on a NOAEL threshold for the toxic pollutant in question. The commenters note that the EPA properly concluded that it is not accurate or technically correct to select one acid gas (HCl) with one health endpoint to serve as a surrogate for another acid gas (HF or HCN) with a different health endpoint in health-based standard setting "with an ample margin of safety," as the resulting surrogate-based health threshold simply does not address or relate to the adverse health effects of the other HAP. 76 Fed. Reg. 25,049. According to the commenters, the effects of acid gases vary significantly. Commenters state that Cl_2, HF, and HCN present in lower amounts as compared to HCl but are more toxic.

Comment 18: Several commenters (19536, 19537, 19538) state that the "ample margin of safety" language in section 112(d)(4) means at the very least that any standard that is set under this authority must be sufficient to protect against significant unforeseen consequences, particularly where the agency

is aware that those consequences may occur, but simply does not have enough evidence about them. *See, e.g., EDF v. EPA*, 598 F.2d 62, 81 (D.C. Cir. 1978)(holding that the phrase 'ample margin of safety' in the Clean Water Act's toxic provisions required the EPA to protect against as yet unidentified risks to human health, including those "which research has not yet identified.").

Comment 19: Several commenters (19536, 19537, 19538) state that the "established health threshold" under 112(d)(4) must be based on a NOAEL and not the RfC for the acid gases. According to the commenters, even if an RfC approach is used, the EPA noted that no RfC is available for Cl_2 and HF is not one of the 504 substances within the IRIS so no RfC is available for that gas. Additionally, according to the commenters, the EPA has "low confidence" in the RfC values for HCl and HCN.

Comment 20: Several commenters (19536, 19537, 19538) state that short-term exposure and effects are important when considering whether a section 112(d)(4) standard is appropriate. According to the commenters, based on Cal EPA standards, Cl_2, HF, and HCN are approximately 10-fold more toxic than HCl on a weight-standardized basis for short-term exposures. The commenters state that additionally, respiratory effects are likely after short to exposure to high concentrations of acid gases.

Comment 21: Several **c**ommenters (19536, 19537, 19538) state that none of the four acid gases (HCl, CL_2, HF, or HCN) has undergone a complete evaluation and determination of human carcinogenic potential under the IRIS program. The commenters state that the absence of information does not provide evidence that there is an absence of risk. According to the commenters, because section 112(d)(4) requires any alternative to a MACT standard to be based on both "no adverse effects" and an "ample margin of safety," the incomplete nature of this evaluation makes a section 112(d)(4) standard unavailable for these pollutants.

b. Section 112(d)(4) standards include requirement to consider environmental impacts.

Comment 22: Several commenters (19536, 19537, 19538) state that, as the EPA has previously indicated and the legislative history supports, the Administrator must evaluate the potential for environmental impacts when considering whether to exercise her discretion under section 112(d)(4) and cite the proposed Industrial Boiler MACT, 75 Fed. Reg. 32,006, 32,031 (June 4, 2010)(S. Rep. No. 228, 101st Cong., 1st Sess. (1989) at 171).

c. Section 112(d)(4) standards require consideration of synergistic effects.

Comment 23: Several commenters (19536, 19537, 19538) state that section 112(d)(4) requires consideration of synergistic effects and the EPA cannot disregard the fact that there are other sources of air toxics in the vicinity. The commenters note that the EPA discusses the use of a hazard index (HI) to account for the interactions of the HAPs. However, the commenters disagree with the EPA's assumption that all endpoints can be assumed to interact additively. The commenters state that HCN is a known neurotoxin and therefore its health effects are not additive with the other acid gases. In addition, one commenter notes the wide variety of HAP and other pollutants emitted in close proximity to EGUs makes predicting and assessing the possible mixtures is all but impossible.

Response to Comments 1 - 23: The EPA is not adopting an emissions standard based on its authority under CAA section 112(d)(4) in the final rule. The EPA first notes that the agency's authority under CAA section 112(d)(4) is discretionary. That provision states that the EPA "may" consider established health thresholds when setting emissions standards under CAA section 112(d). By the use of the term

"may," Congress clearly intended to allow the EPA to decide not to consider a health threshold even for pollutants which have an established threshold. As explained in the preamble to the proposed rule, it is appropriate for the EPA to consider relevant factors when deciding whether to exercise its discretion under CAA section 112(d)(4), and the language of that provision does not prevent the agency from considering factors not specifically enumerated. To interpret the statute as some commenters suggest would effectively require the agency to establish CAA section 112(d)(4) standards whenever there is an established health threshold for a HAP. The EPA has considered the public comments received and is not adopting an emissions standard under CAA section 112(d)(4) for the reasons explained below and in the proposed rule.

First, as explained in the preamble to the proposed rule, the EPA continues to believe that the potential cumulative public health and environmental effects of acid gas emissions from EGUs and other acid gas sources located near EGUs supports the agency's decision not to exercise its discretion under CAA section 112(d)(4). The EPA did not receive information regarding facility-specific emissions of all the acid gases from EGUs as well as sources which may be co-located with EGUs or nearby such sources. Additional data were also not provided during the comment period, and the data already in hand regarding these emissions are not sufficient to support the development of emissions standards for any of the EGU subcategories under CAA section 112(d) that take into account the health threshold for acid gases, particularly given that the CAA requires the EPA's consideration of health thresholds under CAA section 112(d)(4) to protect public health with an ample margin of safety. Commenters' assertions that the EPA has sufficient data, even for HCl, are incorrect, and it appears that they believe that the EPA can establish a CAA section 112(d) standard for HCl and ignore the other acid gas HAP. In addition, the concerns expressed by the EPA in the proposal regarding the potential environmental impacts and the cumulative impacts of acid gases on public health were not assuaged by the comments received.

As explained in the preamble to the proposed rule, the EPA also considered the co-benefits of setting a conventional MACT standard for HCl. The EPA considered the comments received on this issue and continues to believe that the co-benefits are significant and provide an additional basis for the Administrator to conclude that it is not appropriate to exercise her discretion under CAA section 112(d)(4). The EPA disagrees with the commenters who stated that it is not appropriate to consider non-HAP benefits in deciding whether to invoke CAA section 112(d)(4). Although MACT standards may directly regulate only HAP and not criteria pollutants, Congress did recognize, in the legislative history to CAA section 112(d)(4), that MACT standards would have the collateral benefit of controlling criteria pollutants as well and viewed this as an important benefit of the air toxics program. *See* S. Rep. No. 101–228, 101st Cong. 1st sess. at 172. The EPA consequently does not accept the argument that it cannot consider reductions of criteria pollutants, for example in determining whether to take or not take certain discretionary actions, such as whether to adopt a risk-based standard under CAA section 112(d)(4). There appears to be no valid reason that, where the EPA has discretion in what type of standard to adopt, the EPA must ignore controls which further the health and environmental outcomes at which CAA section 112(d) is fundamentally aimed because such controls not only reduce HAP emissions but emissions of other air pollutants as well.

Thus, the issue being addressed is not whether to regulate non-HAP under CAA section 112(d) or whether to consider other air quality benefits in setting CAA section 112(d)(2) standards – neither of which the EPA is doing – but rather whether to make the discretionary choice to regulate certain HAP based on the MACT approach and whether the EPA must put blinders on and ignore collateral environmental public health benefits when choosing whether or not to exercise that discretion. The EPA knows of no principle in law or common sense that precludes it from doing so.

The EPA properly listed EGUs pursuant to CAA section 112(n)(1)(A) and the EPA must establish CAA section 112(d) standards for all HAP emitted from EGUs. *See* CAA section 112(c)(2) (requiring listed sources be regulated pursuant to section 112(d)); *see Sierra Club v. EPA,* 479 F.3d 875, 883(D.C. Cir. 2007) (finding that "EPA has a 'clear statutory obligation to set emission standards for each listed HAP'") (quoting *National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000).

The EPA is not adopting the one commenter's suggestion that the EPA not regulate Se based on the allegedly low levels of SeO_2. The EPA agrees that SeO_2 emissions from EGUs generally represent significantly less mass than emissions of HCl or HF from EGUs, but disagrees with the commenter's assertion that emissions of SeO_2 from all EGUs are well enough characterized to support the claim that they contribute minimally to either environmental acidification or adverse chronic human health effects. The analysis conducted by EPRI did not include an adequate amount of SeO_2 emission measurement data to support this claim, and the commenter provided no additional data in this regard. As a result, the EPA does not have the information needed to support the development of a health-based standard for selenium.

3. Alternative approach including cap and trade.

Comment 24: Commenter 17723 states that the EPA's approach to the Appropriate and Necessary Finding was to determine that controls were available. According to the commenter, the "mere existence and availability" of controls is not sufficient to mandate universal deployment. The commenter notes that when CAA section 112 was enacted Congress was aware of the availability of certain controls for power plant emissions. According to the commenter, Congress recognized that applying these controls at all existing EGUs would be a "cost prohibitive" way to achieve emission reductions. Instead, Congress required controls through title IV on a limited basis. The commenter states that basing the decision to require universal controls merely on their existence does not satisfy the original intent of Congress.

Response to Comment 24: Congress specifically directed the agency to evaluate "alternative control strategies" for regulating HAP emissions from EGUs in the Utility Study. *See* CAA section 112(n)(1)(A). The EPA considered in the Utility Study pre-combustion controls, combustion controls, post-combustion controls, and alternative mechanisms to reduce HAP emissions from EGUs (e.g., energy efficiencies). The EPA reasonably interpreted this direction as Congress's interest in understanding whether standards under CAA section 112 would be achievable for EGUs. In fact, there are controls available that allow sources to comply with the standards in the final rule and, based on the data available, at least 180 existing EGUs are able to comply with one or more of the final Hg, PM, and HCl limits under their current control configuration using a variety of control technologies and at least one EGU is able to comply with all three of the new-source limits.

The EPA reasonably considered the availability of controls when determining whether it was appropriate and necessary to regulate EGUs under CAA section 112 consistent with CAA section 112(n)(1)(A). However, the EPA did not state in the proposed rule that it based its finding only on the availability of controls or that the finding could be based solely on the availability of controls.

Comment 25: Commenter 17723 states that the "manipulation of power markets does not justify a finding of necessary and appropriate." According to the commenter, the EPA's rationale for including non-Hg HAP is the desire to alter the economics of electrical generation to favor lower emitting technologies. *See* 76 Fed. Reg. 24979. The commenter does not believe that raising the cost of coal-fired

power would have ranked high on the list of criteria for a finding of necessary and appropriate. The commenter points to title IV of the CAA noting that cost-efficiency was the hallmark of that program and that Congress could have mandated natural gas but chose not to and maintained coal as the primary generating fuel. Second, the commenter notes that the Power Plant and Industrial Fuel Use Act of 1978 had as its purpose "to encourage and foster the greater use of coal and other alternate fuels, in lieu of natural gas and petroleum, as a primary energy source." (42 U.S.C. section 301(b)(2)).

Response to Comment 25: The EPA does not agree with the commenter's interpretation of CAA section 112. We maintain that our interpretation of the statute and our authority there-under is reasonable for the reasons set forth in the proposed rule. We specifically disagree with commenter's interpretation as it relates to the title IV Acid Rain program, because we do not believe the manner in which EGUs were regulated under that program alters the agency's responsibility when regulating EGUs under CAA section 112.

The commenter incorrectly characterizes the agency's legal rationale for the EGU NESHAP. The basis for listing and regulating EGUs under CAA section 112 was in 2000, and remains today, that HAP emissions from EGUs pose a hazard to public health and the environment. A consequence of the rule will be that uncontrolled EGUs that Congress believed would retire decades ago will have to install controls to keep operating.

Further, the commenter's assertion that the title IV Acid Rain program currently requires pollution controls for all EGUs is not accurate. The acid rain program is a trading program that allows some sources to run uncontrolled for NO_X and SO_2 if they purchase emission allowances.

Comment 26: Commenter 17768 states that the EPA has the legal authority to use a market based cap-and-trade program under section 112. According to the commenter, while section 112(d) does not explicitly grant the EPA the authority to establish such a program, the "measures, means or techniques" of section 110(a)(2)(A) include market mechanisms therefore it is reasonable for the EPA to interpret the "measures, processes, methods systems, or techniques' language of section 112(d)(2) to include them as well. The commenter states that this is especially true because of section 112(d)(2)'s grant of discretion to the EPA to choose an appropriate method for control.

Comment 27: Commenters 17880 and 18432 state that they strongly support the EPA's decision to not include a cap-and-trade program in the proposed rule. Commenters note that they also opposed the 2004 CAMR rule as it would have a disproportionate negative impact on communities close to power plants.

Comment 28: Commenters 17383 and 17689 note that the *New Jersey court* decision vacated the Clean Air Mercury Rule (CAMR) on procedural grounds. According to the commenters, the continuous application of existing Clean Air programs with the addition of a Section 111 program (e.g., the commenter suggest a cap and trade based program) aimed at Hg emissions would meet the requirements of the act in a more cost effective manner while guaranteeing health and environmental benefits substantially similar to that likely achieved under this proposal.

Response to Comments 26 - 28: The EPA is not establishing a trading program in lieu of CAA section 112(d) standards or as a beyond-the-floor control. The EPA maintains that it must regulate EGUs under CAA section 112(d) unless the agency delists such sources consistent with CAA section 112(c)(9)(B), and the facts do not support delisting of EGUs. *See New Jersey v. EPA*, 517 F.3d 574, 583 (D.C. Cir. 2008). Further, even if the EPA determined it had the authority to require a trading program as a

beyond-the-floor option, the agency would still be required to consider whether the program was achievable considering the costs, non-air quality health and environmental impacts and energy requirements of such a program in order to impose it. The EPA does not have sufficient information to evaluate at this time whether the costs and other impacts of a trading program for the HAP emissions remaining after compliance with the MACT floor limits are reasonable.

The EPA is authorized to consider in the beyond-the-floor analysis alternative mechanisms for regulating HAP emissions to levels lower than those required by the MACT floor. But the EPA must establish the MACT floor based on the emissions limits achieved by the best performing source (for new sources) or sources (for existing sources) for each HAP or surrogate emitted by the source category.

4. Miscellaneous comments.

Comment 29: Commenter 17648 states that "no section of the Clean Air Act requires a benefit-cost analysis of rules under section 112 of the Clean Air Act." According to the commenter, it is legally impermissible to consider cost in establishing the MACT floor because by basing the floor on what is already achieved Congress has included legally permissible cost considerations in establishing MACT standards. Further, the commenter points out that while cost is a factor in the beyond-the-floor analysis, the consideration of that factor is limited to "cost-effectiveness" and not "benefit-cost."

Response to Comment 29: The EPA agrees that costs may not be considered in establish MACT floor limits pursuant to CAA section 112(d)(3), and that costs must be considered when evaluating whether standards should be beyond the floor pursuant to CAA section 112(d)(2).

Comment 30: Commenter 17732 states that, to the extent allowed by existing law, the EPA should implement emissions reductions under the NESHAP Rule on a regional basis, or in phases that take into categories of EGUs and regional rulemakings. In particular the commenter states that the rule should take into account the geographic and spatial differences between the western and eastern regions of the U.S. In addition the commenter notes that the western states are subject to Regional Haze glide path. According to the commenter, the agency must consider that few power plants in either region are as critical to the economies of their states as the FCPP and NGS are to the Navajo Nation economy, and the Navajo Nation, a sovereign government, which derives two thirds of its general operating revenue from coal mining.

Response to Comment 30: The EPA is authorized to provide up to 3 years to comply with NESHAP pursuant to CAA section 112(i)(3)(A). The agency has provided the maximum compliance period in the final rule. To the extent the EPA could provide for a regional approach, the approach would have to require sources to comply in less than 3 years in some regions and provide sources in the last region the full 3 years to comply. We need not determine whether this approach would be legal because the agency has provided the maximum available time for all sources. While the EPA cannot extend the compliance period in this rule, the agency is mindful of the importance of FCPP and NGS to the Navajo Nation and other Tribes that rely on those facilities, and we will work with the NGS and FCPP after the rule is promulgated to address any compliance related issues associated with complying with the final rule.

Comment 31: Commenter 17867 states that the EPA should consider the life of the plant when establishing the MACT standard.

Response to Comment 31: The EPA is unable to respond to this comment because the commenter has not provided a legal theory for considering plant age, and we do not believe plant age alone is a sufficient basis to subcategorize.

Comment 32: Commenter 17751 states that one alternative that was not considered was no regulation. According to the commenter, the no regulation alternative is supported by the fact that Hg emissions have been declining over time as a result of a variety of forces, including the effects of replacement of aging plants with new, cleaner ones, changes in the mix of fuels used for electricity generation, and the effects of previously implemented Federal and State regulations. The commenter states that this trend (reduction of emissions by 7.6% per year) suggests that by the year 2029, total EGU emissions of Hg will be only 9.4 tons per year – below the 10 ton annual threshold for a source group to be subject to the MACT provisions of the CAA. According to the commenter, without regulatory intervention, Hg emissions from the EGU sector will reach by 2034 the 6.8 tons per year target set by the proposed rule for 2016.

Comment 33: Commenter 19121 recognizes that due to the nation's long and proud history of advanced industrialization and power development, and the fact that most power plant sites are not as fortunately designed as the commenters' there have been concerns about health impact due to power plant-specific Hg emissions. According to the commenter, what is striking is that given the immense number of power plants in the U.S., lowering Hg from the power sector will lower the overall atmospheric Hg concentration by about 1%. Commenter believes this reflects that although NESHAPS will be effective, other regulatory methods would have been valuable and more timely.

Response to Comment 32 and 33: The EPA determined that it was appropriate and necessary to regulate HAP emissions from EGUs and added such units to the CAA section 112(c) list of sources subject to regulation under CAA section 112. Listed sources must be subjected to regulation under CAA section 112(d) unless the Agency delists such sources consistent with CAA section 112(c)(9)(B). *See New Jersey v. EPA*, 517 F.3d 574, 583 (D.C. Cir. 2008). As the EPA stated in the proposed and final rules, the agency's analyses indicate that EGUs do not satisfy the statutory requirements for delisting. Furthermore, we determined it was necessary to regulate HAP emissions from EGUs, in part, because implementation of the requirements of the CAA will not address the hazards to public health identified in our risk analysis. We are not sure how commenter estimated future Hg emissions from EGUs and we believe our estimates are reasonable based on the available information.

Comment 34: Commenter 17751 states that one alternative that was not considered regulation of just Hg. According to the commenter, as part of that analysis the EPA should estimate costs and benefits for limits that would achieve reduction of annual Hg emissions to a level just below 10 tons per year, because that is the threshold that, if already achieved, would exempt the EGU sector from the MACT provisions of the CAA. The commenter states that the agency should also examine the alternative of a regulation limiting only total PM to the levels proposed in the current rulemaking for the various categories of EGUs to determine whether achieving the forecast results in terms of $PM_{2.5}$ reductions could be achieved at a lower cost alone than in concert with Hg reduction.

Response to Comment 34: The EPA determined that it was appropriate and necessary to regulate HAP emissions from EGUs and added such units to the CAA section 112(c) list of sources subject to regulation under CAA section 112. Listed sources must be subjected to regulation under CAA section 112(d) unless the agency delists such sources consistent with CAA section 112(c)(9)(B). *See New Jersey*

v. EPA, 517 F.3d 574, 583 (D.C. Cir. 2008). As the EPA stated in the proposed and final rules, the agency's analyses indicate that EGUs do not satisfy the statutory requirements for delisting.

The EPA also must regulate EGUs under CAA section 112(d) and that provision requires the EPA to regulate all HAP emitted from EGUs. *See* CAA section 112(c)(2) (requiring listed sources be regulated pursuant to section 112(d)); *see also Sierra Club v. EPA,* 479 F.3d 875, 883(D.C. Cir. 2007) (finding that "EPA has a 'clear statutory obligation to set emission standards for each listed HAP'").

Comment 35: Commenter 17851 states that the EPA's MACT floors for new sources are unlawful because although section 112(d) may allow new sources floors to be based on emission levels, those emission levels must be the product of control. According to the commenter, since Congress expressly changed the MACT floor benchmark for new sources from "emission levels" to "emission control," it is obvious that not only did they eschew emission levels as being the preferred benchmark, they wanted to ensure that whatever benchmark the EPA uses for new sources, it must be the product of control. As the agency knows, states the commenter, emission levels can be achieved by intentional control, unintentional control, or no control ("happenstance" as the agency often calls it). Thus, states the commenter, if the agency chooses to use emission levels as the benchmark for new source floors, it can only use those emission levels achieved in practice by control (whether it is intentional control, or as *National Lime Association v. EPA,* 233 F.3d 625 (D.C. Cir. 2000). The commenter states that consequently, establishing new source MACT floors by examining emission levels, without determining which ones were achieved by control, is unlawful. According to the commenter, since the EPA has not examined the emissions in its database to see if the emission levels are based on technological control, its proposed MACT floors for new sources are unlawful.

Response to Comment 35: The D.C. Circuit Court precedent is in conflict with commenter's assertion concerning the consideration of non-technology factors in establishing MACT floors. *See Sierra Club v. EPA,* 479 F.3d 875, 882-83 (D.C. Cir. 2007).

Comment 36: Commenter 18932 states that energy efficiency is an available resource that can facilitate timely compliance with the proposed rule. According to the commenter, the southeast states have an enormous untapped energy efficiency potential that would displace a significant amount of fossil-fuel-generated electricity. The commenter states that in a 2009 study, Professor Marilyn Brown and her colleagues at the Georgia Institute of Technology explained that the combination of heavy reliance on fossil-fuels and weak or totally lacking energy efficiency programs presents enormous energy efficiency potential in the southern U.S.

Commenter 18932 states that based on a review of 19 separate reports comprising more than 250 estimates of energy efficiency potential, the Georgia Tech study "conclude[d] that a reservoir of cost-effective energy savings exists in the South." According to the commenter, by exploiting readily available, cost-effective energy efficiency resources, southeast states "could largely offset the growth in energy consumption forecast for the region over the next decade" and reduce "energy consumption in 2020 down nine percent below projected levels, which would bring future consumption to slightly less than present levels...This would entirely offset the need to expand electricity generation capacity in the South through the year 2020."

The commenter states that Professor Brown and other experts at Georgia Tech and Duke University's Nicholas School have reaffirmed the potential for significant energy savings in this region in subsequent research. According to the commenter, a 2010 report describing in-depth primary research examined the

impact of nine cost-effective energy efficiency policies and concluded that implementation of these policies would create a flat energy consumption trajectory over the next 20 years, representing a 16% decrease in energy consumption in 2030 as compared to the reference case (Marilyn Brown, et al., *Energy Efficiency in the South*, Southeast Energy Efficiency Alliance, at 124 (April 12, 2010), *available at* http://www.seealliance.org/se_efficiency_study/full_report_efficiency_in_the_south.pdf. *See also* Marilyn Brown, et. al., *Myths and Facts about Energy in the U.S. South*, Working Paper #51, Georgia Institute of Technology (July 2011), *available at* http://www.spp.gatech.edu/faculty/workingpapers/wp64.pdf (concluding that energy efficiency and renewable energy resources could entirely satisfy energy demand growth in the South)).

Commenter 18932 concludes that these findings support the EPA rule and the findings in the preamble that encourage deployment of energy efficiency-promoting strategies and initiatives to safeguard system reliability and, especially, to curb cost increases that might otherwise result from implementation of the Toxics Rule. According to the commenter, there are compelling legal and factual reasons to finalize and implement the Utility Air Toxics Rule according to the 3-year compliance schedule mandated by CAA section 112(d)(3)(A). The commenter states that the record also demonstrates that there is no justification warranting further delay in finalizing the rule and no justification for a compliance extension under CAA section 112(d)(3)(B) or a Presidential exemption under CAA section 112(d)(4).

Response to Comment 36: The EPA appreciates the support of the commenter.

1B - Legal aspects of Appropriate and Necessary Finding

Note: Many legal comments on the Appropriate and Necessary Finding are contained and addressed in the preamble to the final rule.

1. Interpretation of "appropriate and necessary."

Commenters: 17775, 18500, 17774, 17696, 17840, 18033, 17391, 17718, 17623, 17732, 17716, 17712, 17723, 17765, 17886, 19114, 17884, 18023, 19536/19537/19538

Comment 1: Commenter 18023 states that the EPA must give the terms "appropriate" and "necessary" their plain meaning under section 112(n)(1)(A) and not expand these terms simply to justify greater regulation.

Response to Comment 1: The EPA disagrees with the commenter's contention that the EPA's interpretation of the terms appropriate and necessary are not consistent with the plain meaning of section 112(n)(1)(A). We direct the commenter to the preambles to the proposed and final rules for the agency's rationale for its interpretation of the statute.

Comment 2: Commenter 17736 states that the EPA lacks the legal and factual support necessary to follow through with a rule regulating Hg and other HAP from EGUs under CAA section 112. According to the commenter, but for the EPA's improper interpretation of "appropriate and necessary" under section 112(n)(1)(A), the proposed rule would never have left the drawing board, deemed unjustified for incorporation into the scheme of CAA provisions already regulating this source category.

Response to Comment 2: The EPA disagrees with the commenter that the EPA's interpretation of the statute is flawed. We further reject the commenter's assertion that the agency lacked a factual basis for our appropriate and necessary determination that supports the regulation of EGUs under section 112. We provide a detailed discussion of the legal interpretation of the statute and the factual bases for our appropriate and necessary determination in the preambles to the proposed and final rules.

Comment 3: Several commenters (17696, 17774, 17775) state that the fact that coal-fired EGUs may be the largest, or near largest emitters, of certain acid HAP is irrelevant to the Appropriate and Necessary Finding under section 112(n)(1)(A). According to the commenters, the quantity of emissions seems to be a deciding factor for the EPA.

Response to Comment 3: The EPA determined that HAP emissions from EGUs pose a hazard to public health and the environment as explained in the preamble to the proposed rule and confirmed in this final action. For acid gas HAP, the EPA did note that EGUs are the largest emitters of HCl and other acid gas HAP and that such HAP contribute to already high atmospheric levels of other chronic respiratory toxicants and to environmental loading and degradation due to acidification. We reasonably concluded that EGUs' emissions of acid gas HAP contribute to health and environmental impacts based on this fact.

Comment 4: Several commenters (17840, 18033, 17931, 17718) state that the EPA's interpretation of the term "appropriate" is so broad that it renders the entire analytical exercise required by Congress utterly meaningless. Commenters agree that the EPA has the discretion to define the contours of the inquiry within the bounds of reasonableness but claim the EPA is ignoring the fact that throughout this

process the agency has maintained that "[s]ection 112(n)(1)(A) therefore sets an important and unique condition precedent for regulating Utility Units under section 112..." According to the commenters, the EPA has not heeded this Congressional direction in the proposed rule as its interpretation of "appropriate" effectively overrides the primary congressional command to analyze "hazards to public health reasonably anticipated to occur" from EGUs.

Response to Comment 4: The EPA disagrees with the commenters' assertion that our interpretation of section 112(n)(1) is inconsistent with the statute for all the reasons set forth in the preambles to proposed rule and this final action. We also disagree that the fact that section 112(n)(1)(A) creates a unique condition precedent to listing and regulating EGUs under section 112 in any way undermines our interpretation of that provision. To the extent the commenters are relying on interpretations of the statute set forth in the 2005 action, that reliance is misplaced as we have provided a reasoned basis for revising our interpretation of the statute.

Comment 5: Commenters 17623 and 18500 state that when evaluating the "necessary" prong of section 112(n)(1)(A) the EPA should focus on national impacts. According to the commenters, when Congress intended for the agency to address international air pollution issues, it clearly specified a process and procedure for doing so (s*ee* CAA Section 115).

Response to Comment 5: In the preamble to the proposed rule, the EPA indicated that we may find it necessary to regulate EGUs if we determine that our ability to argue effectively for global reductions in Hg emissions will be impaired without such regulation. 76 FR 24490 and 25018. Nothing in section 112(n)(1) or section 115 prohibits such a consideration and the commenters have not explained how it does. In any case, the EPA stated in the preamble to the proposed rule that there were several independent determinations that supported the necessary finding, including the conclusion that imposition of the requirements of the CAA will not address the identified hazards to public health posed by HAP emissions from EGUs. The necessary finding is consistent with the EPA's interpretation as set forth in the preamble to the proposed rule and we maintain that interpretation of section 112(n)(1)(A) is reasonable for the reasons stated in the preambles to proposed rule and this final action.

Comment 6: Commenter 18500 states there is no authority under CAA section 112 to support regulation based on the EPA's statement that the regulation will make "the market for electricity in the U.S. . . . more level and no longer skewed in favor of higher polluting units."

Response to Comment 6: The EPA's Appropriate and Necessary Finding in the preamble to the proposed rule is fully supported for the reasons set forth therein and in this final action. The EPA also did not state that it was appropriate and necessary to regulate EGUs to make the market for electricity more level and not skewed toward higher polluting units. Instead, the EPA indicated that one result of the final rule would be that all EGUs would be required to control their emissions to the same level and that will mean that the currently skewed electricity market will no longer favor higher emitters that can pollute without paying the costs of control. This factual statement in no way undermines our finding that it is appropriate and necessary to regulate EGUs under CAA section 112.

Comment 7: Commenters 17731 and 17716 state that the EPA's stated objectives of forcing older EGUs into retirement and taking advantage of co-benefits are not objectives of CAA section 112(n)(1).

Response to Comment 7: The EPA did not state as the commenters allege that the objectives of the final rule are to force older EGUs into retirement or take advantage of co-benefits of EGUs under CAA

section 112. The commenter is confusing the likely results of the final rule with the basis for the final rule.

Comment 8: Commenter 17886 states that the total tons of HAP emissions are not relevant to the "appropriate and necessary" determination. The commenter states that that the "nub of the inquiry" should be health consequences.

Response to Comment 8: The EPA agrees that the hazards to public health are a central consideration for evaluating whether it is appropriate and necessary to regulate EGUs under CAA section 112. We also maintain that adverse environmental effects may be considered. We are confused by the commenter's assertion that total amount of HAP is not relevant to the appropriate and necessary determination, however, because we evaluate the hazards to public health and the environment based on the HAP emissions from EGUs. For acid gas HAP, we determined that the volume of such HAP from EGUs poses a hazard to the environment because they contribute to the acidification of the environment. We maintain that conclusion is supported by the record. In any case, there were multiple independent bases in support of the appropriate finding, including findings associated with the hazards to public health posed by HAP emissions from EGUs.

Comment 9: Commenter 17931 states that in order to ensure that EGUs are regulated under CAA section 112 thereby leveling the market for electricity, the EPA's "necessary" interpretation is so narrow that it precludes consideration of the many measures under the CAA that have proven to effectively reduce Hg and HAP emissions in this country. According to the commenter, this overly narrow interpretation prevents the ability to tailor its regulation of EGUs by investigating other viable regulatory programs on a cost-benefit basis.

Response to Comment 9: The EPA disagrees with the commenter. The EPA determined that HAP emissions from EGUs pose a hazard to public health and the environment that will not be addressed through imposition of the requirements of the CAA. As explained in the preambles to the proposed rule and this final action, the EPA is not required to scour the CAA to find alternative mechanisms for regulating HAP emissions from EGUs in the necessary analysis. Congress provided CAA section 112 for the purpose of regulating HAP emissions from stationary sources and we are reasonably using that authority in this case.

Comment 10: Commenter 19114 states that the EPA has turned the statutory language on its head, claiming that the undefined terms in the statute both vest it with broad discretion to exercise its regulatory authority, and are so prescriptive that they compel the regulatory results set forth in this proposed rule. According to the commenter, the EPA cannot have it both ways.

Response to Comment 10: The EPA disagrees with the commenter that our interpretation of the statute is in error for the reasons set forth in the preambles to the proposed rule and this final action.

Comment 11: Several commenters (19536, 19537, 19538) state that there is no statutory support for any suggestion that Congress meant to require the EPA to make specific health-based or risk-based findings before determining that it was "appropriate and necessary" to regulate HAP emissions from EGUs under CAA section 112(d)(2) and (3). According to the commenters, other sections of the CAA and other provisions in CAA section 112 do contain such health- and risk-based language as a regulatory (or deregulatory) predicate, and it is instructive that the key final sentence of CAA section 112(n)(1)(A) lacks any such language.

Response to Comment 11: The EPA maintains that its interpretation of CAA section 112(n)(1) is reasonable for the reasons stated in the preambles to the proposed rule and this final action. We need not address whether the EPA could find it appropriate and necessary absent a finding that HAP emissions from EGUs pose a hazard to public health or the environment that will not be addressed through imposition of the requirements of the CAA because we made such a finding in 2000 and confirmed that finding in this action.

Comment 12: Several commenters (19536, 19537, 19538) state that because EGUs are the largest emitters of several HAP that pose hazards to the public health and environment, it would be unreasonable to determine that regulation is not necessary. According the commenters, the meaning of the term "necessary" can only be determined by looking at the context of the term. With respect to CAA section 112(n)(1)(A), this was added in 1990 when Congress was "unhappy with the pace" of the EPA's efforts to secure large scale reductions of HAP. The commenters note that when Congress employs capacious and judgment-laden language like "appropriate and necessary," it is surely within the EPA's discretion and authority to conclude that it is reasonable and justified to regulate HAP emissions from the single largest industrial source of those toxic emissions

Response to Comment 12: The EPA agrees that it has considerable discretion to determine whether it is appropriate and necessary to regulate HAP emissions from EGUs and we maintain we have reasonably exercised that discretion through our interpretation of the statute and our Appropriate and Necessary Finding as explained in the preambles to the proposed rule and this final action.

Comment 13: Commenter 17712 states that the EPA has not met the CAA section 112(n)(1)(A) necessary and appropriate requisites to listing EGUs under CAA section 112(c). According to the commenter, the *New Jersey* decision never ruled on the appropriateness of the EPA listing including whether it met the procedural and substantive requirements under CAA section 307. The commenter asserts that to date the EPA has not adequately explained it's interpretation of appropriate and necessary in the context of CAA section 112(n)(1)(a) and listing under CAA section 112(c), unless it is contending that a mere "plausible link" between all man-made mercury emissions and methylmercury (MeHg) in fish makes it appropriate and necessary to regulate EGU emissions under CAA section 112. The commenter notes that the EPA's interpretation of CAA section 112(n)(1)(A) in this proposal is almost completely opposite its interpretation in the 2005 final rule and would render that subparagraph a meaningless addition to CAA section 112. According to the commenter, the EPA repeatedly takes the position that no language in CAA section 112(n)(1)(a) prevents it from interpreting the subparagraph in the manner that nullifies any special meaning to the appropriate and necessary requisites to CAA section 112 EGU HAP regulation. The commenter states that CAA section 112(n) was added to address EGU emissions is a unique manner as compared to the other provisions of CAA section 112. No other language in CAA section 112 references the regulation of a source category of emissions if "appropriate and necessary." The commenter states that as the EPA pointed out in its 2005 rule, its 2000 listing decision did not provide an interpretation of appropriate but instead focused on "facts and circumstances" of EGU emissions themselves. According to the commenter, this 2011 proposal, then, is the EPA's first attempt to explain how it finds it appropriate and necessary to regulate EGU emissions under CAA section 112.

Response to Comment 13: The EPA disagrees with the commenter. We established our interpretation of CAA section 112(n)(1) in the preamble to the proposed rule, and we are not revising that interpretation in this final action except as discussed in the preamble to the final rule. We have fully

addressed this comment in the preamble to the proposed rule and response to comments contained in the preamble to the final rule.

Comment 14: Commenter 17723 states that the availability of controls does not justify a finding of appropriate and necessary. According to the commenter, if public health concerns provide an inadequate impetus for HAP regulations, the EPA turned to the availability of controls as a justification to find it was appropriate and necessary to regulate EGUs under CAA section 112.

Response to Comment 14: The EPA did not rely on the availability of controls as an independent basis for regulating HAP emissions from EGUs. The EPA maintains that the availability of controls supports the finding, however, because CAA section 112(n)(1) provides evidence that Congress considered such availability relevant to the agency's determination, as we explained in the preambles to the proposed rule and this final action.

Comment 15: Commenter 17765 states that the EPA has not properly analyzed or satisfied the regulatory prerequisite required pursuant to CAA section 112(n)(1)(A) for regulating Hg and other HAP under a maximum achievable control technology (MACT) standard and therefore lacks the necessary regulatory foundation for doing so in this proposed rule.

Response to Comment 15: The EPA disagrees with the commenter. We maintain that the 2000 finding was valid at the time it was made based on the information available to the agency and we confirmed that it remains appropriate and necessary to regulate EGUs based on our new analyses, as explained in the preambles to the proposed rule and this final action.

Comment 16: Commenter 17686 states that, citing the *New Jersey* decision, the EPA contends that it has properly listed EGUs under section 112(c) and that EGU HAP emissions do not meet requirements of section 112(c)(9) for delisting. The commenter states that the EPA misreads the court's decision and that the *New Jersey* court never ruled on the appropriateness of the EPA listing including whether it met the procedural and substantive requirements under section 307. According to the commenter, the EPA must show that it is appropriate and necessary to regulate EGU emissions following the requirements in section 112(n)(1)(A). The commenter states that the EPA has never adequately explained its interpretation of appropriate and necessary in the context of section 112(n)(1)(A) and listing under section 112(c), unless it is contending that a mere "plausible link" between all manmade mercury emissions and MeHg in fish makes it appropriate and necessary to regulate EGU emissions under section 112.

Commenter 17686 states that the EPA's re-interpretation of section 112(n)(1)(A) in this proposal is almost completely opposite its interpretation in the 2005 final rule, and this reinterpretation would render that subparagraph a meaningless addition to section 112. The commenter states that throughout this 2011 proposal, the EPA repeatedly takes the position that no language in section 112(n)(1)(A) prevents it from interpreting the subparagraph in the manner that nullifies any special meaning to the appropriate and necessary requisites to section 112 EGU HAPs regulation. According to the commenter, it is clear that section 112(n) was added to address EGU emissions in a unique manner as compared to the other provisions of section 112; no other language in section 112 references the regulation of a source category of emissions if "appropriate and necessary." As the EPA pointed out in its 2005 rule, states the commenter, its 2000 listing decision did not provide an interpretation of appropriate but instead focused on "facts and circumstances" of EGU emissions themselves. According to the commenter, this 2011 proposal, then, is the EPA's first attempt to explain how the EPA finds it

appropriate and necessary to regulate EGU emissions under section 112. The commenter states that there are numerous flaws in this attempt.

The commenter further asserts that the EPA has sought to lump all HAP emissions from sources in addition to EGU emissions when determining whether it is appropriate and necessary to regulate EGU emissions. According to the commenter, section 112(n)(1)(A) specifically references hazardous of utility emissions, not all emissions as the EPA does here. The commenter states that in the 2005 final rule, the EPA assessed the health effects of EGU Hg emissions and found no appreciable health risk. For this 2011 proposal, states the commenter, the EPA evaluates health risk based on total worldwide Hg inventory. According to the commenter, evaluating individual source category emissions under the all worldwide emissions approach, however, means that all sources of any particular HAP no matter how small the relative contribution are subject to section 112 regulation in the EPA's view. The commenter states that this position is logically not sustainable, and, additionally, the EPA includes environmental effects in addition to health hazards in its determination, even though section 112(n)(1)(A) "necessary and appropriate" requirement is directed exclusively at EGU emission health hazards.

Response to Comment 16: The EPA disagrees with the commenter and directs attention to the preambles to the proposed rule and this final action for the factual and legal basis for this final rule and responses to these comments.

In addition, the commenter incorrectly interprets the methods and conclusions of the Hg Risk TSD. The EPA used two risk metrics to identify watersheds with populations potentially at risk due to U.S. EGU-attributable Hg deposition: (1) watersheds where Hg deposition from U.S. EGUs alone exceeds to reference dose (RfD) for MeHg (MeHg), and (2) watersheds where total Hg deposition exceeds the RfD and U.S. EGUs contribute at least 5% of that deposition. The first metric reflects public health hazards caused by U.S. EGUs, and the second metric reflects the fact that any contribution of Hg to watersheds where potential exposures to MeHg exceed the RfD poses a public health hazard and U.S. EGUs contribute to that hazard. In addition, the non-Hg inhalation risk case studies identified cancer risk exceeding 1 in a million at several facilities based on HAP emissions from U.S. EGUs alone. The results of these risk analyses confirm that it remains appropriate and necessary to regulate U.S. EGUs under CAA section 112.

2. Consideration of both public health and environmental effects.

Commenters: 17383, 17608, 17648, 17681, 17716, 17731, 17775, 17798, 17834, 17855, 17877, 18033, 18502, 19114, 19536/19537/19538, 18023

a. Commenters supporting the EPA's interpretation that CAA section 112(n)(1) allows consideration of both public health and environmental effects.

Comment 17: Commenter 17648 states that EPA properly considered both health and environmental effects in determining that it is appropriate to regulate EGUs. According to the commenter, the health hazard derives directly from the deposition of Hg emissions from EGUs into the environment where it is converted to MeHg and bioaccumulates in fish through the food chain. The commenter states that humans who consume fish with elevated Hg levels are exposed to the risks attendant to such elevated concentrations, and any interpretation excluding consideration of environmental effects would be absurd.

Comment 18: Commenter 17648 agrees with the EPA with respect to evaluating whether HAP emissions from EGUs have environmental effects. The commenter states that the agency appropriately measures the impact in light of the statutory definition of "adverse environmental effect" in CAA section 112(a)(7). According to the commenter, that definition reflects clear Congressional intent to allow the agency to consider a wide range of effects, noting that it includes "any" enumerated effect "which may reasonably be anticipated." The commenter states that Congress reinforced this intent in requiring the EPA to consider additional standards within 8 years of promulgation of standards under CAA section 112(d), both to assure "an ample margin of safety to protect public health" and to prevent an "adverse environmental effect." *See* 42 U.S.C. CAA section 7412(f)(2)(A).

Comment 19: Several commenters (19536, 19537, 19538) state that the EPA correctly interprets CAA section 112(n)(1)(A) to allow consideration of environmental effects in making an Appropriate and Necessary Finding. According to commenters, although CAA section 112 certainly allows the agency to find regulating EGUs is appropriate and necessary based on health or environmental findings, it does not require a "hazard" finding at all. Rather, state the commenters, it simply provides that the EPA must regulate EGUs if, after "considering" the Utility Study, it finds that doing so is appropriate and necessary; thus, it leaves the agency broad discretion to make the appropriate and necessary finding so long as the agency has reasonably "consider[ed]" the results of the study. According to the commenters, the agency could have reasonably concluded that Congress wanted emissions of all listed HAP reduced by the maximum achievable degree, and thus regulation of EGUs which are the most significant emitter of virtually every HAP listed in CAA section 112(b) is both appropriate and necessary regardless of whether it was possible for the agency to fully assess all of the risks that toxic emissions from EGUs present.

Comment 20: Several commenters (19536, 19537, 19538) state where the CAA provides that EPA's action must be "based on" a study—more limiting language than the "considering" language found in CAA section 112(n)—the agency is not required to base its action exclusively on that study unless Congress has expressly stated so. *See Sierra Club v. EPA*, 325 F.3d374, 377 (D.C. Cir. 2003) (holding that CAA section 202(l) of the CAA -- which requires the EPA to conduct a "study of the need for, and feasibility of, controlling emissions of toxic air pollutants" and then requires the EPA to promulgate standards for mobile source air toxics "based on" that study—does not require that the standards be based exclusively on the required study).

Comment 21: Several commenters (19536, 19537, 19538) state that nowhere in CAA section 112(n)(1)(A) or elsewhere has Congress expressly stated, or even implied, that the EPA must base its Appropriate and Necessary Finding exclusively upon the study prescribed in the first sentence of that CAA section. Moreover, state the commenters, the HAP emitted by EGUs are associated with adverse environmental impacts on wildlife, including endangered species, and ecosystem health. According to the commenters, the body of scientific evidence referenced in the preamble to the proposed rule clearly supports the agency's assessment and information provided by the commenter build on that scientific knowledge.

Comment 22: Several commenters (19536, 19537, 19538) state that the EPA's reliance on environmental effects as additional support for the finding that it is appropriate to regulate EGUs is supported by the rest of CAA section 112, which contains many examples of language evincing Congressional concern about the adverse environmental effects of HAP. For example, state the commenters, the EPA can add a substance to the list of HAP based solely on its adverse environmental effects. 42 U.S.C. CAA section 7412(b)(2)–(3) (authorizing the EPA to add a pollutant to the CAA

section 112(b) list based on "a threat of adverse human health effects...or adverse environmental effects…"). Furthermore, state the commenters, an industry may be listed as containing major sources, and sources within that industry thus made subject to MACT regulation, based solely on HAP that have adverse effects on the environment. *See id*. CAA section 7412(b)(2).

Comment 23: Several commenters (19536, 19537, 19538) state that it would be unreasonable to assume that Congress required the EPA to conduct an assessment of Hg's environmental effects under CAA section 112(n)(1)(B), but at the same time forbid the agency from considering these effects in its subsequent decision-making process.

Response to Comments 17 - 23: The EPA agrees with commenters that the Appropriate and Necessary Finding may be based on a finding that HAP emissions pose a hazard to public health or the environment. The EPA also agrees that it may consider information other than the Utility Study in making the appropriate and necessary determination. We further agree that it is reasonable to look to the definition of "adverse environmental effect" and the delisting criteria for guidance on determining whether HAP emissions from EGUs pose a hazard to public health or the environment.

b. Commenters disagreeing with the EPA's interpretation that 112(n)(1) allows consideration of both public health and environmental effects.

Comment 24: Several commenters (17716, 17731, 18803) state that the EPA erred by including environmental effects in the "appropriate" deliberations. These commenters do not agree with the EPA's position that "inclusion of environmental effects in CAA section 112(n)(1)(B) indicates Congress' interest in protecting the environment from HAP emissions." *Id*. at 24988/2. According to the commenters, the inclusion of "environmental effects" in subparagraph (b) of CAA section 112(n)(1) does not show an intent to incorporate by reference the same term "effects" in other subparagraphs. To the contrary, state the commenters, when a term is included in one part of statute, but excluded in a different part, it is assumed Congress intended a differentiation. *E.g., Russello v. United States*, 464 U.S. 16, 23 (1983) ("'[W]here Congress includes particular language in one CAA section of a statute but omits it in another CAA section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.'") The commenters note that given that the disparate language is found in two subparagraphs of the same CAA section, the presumption is especially strong here.

Response to Comment 24: The EPA disagrees with the commenters for the reasons set forth in the preambles to the proposed rule and in this final action. Further, we do not think *Russello* in any way undermines our interpretation of CAA section 112(n)(1). Commenters have not explained why our interpretation of CAA section 112(n)(1) should be analogized to the statutory provisions of Organized Crime Control Act at issue in *Russello,* and we do not believe the comparison is reasonable or that the holding in that case is applicable to our interpretation of section 112(n)(1).

Comment 25: Commenter 17716 also states that further evidence of Congress' intended disparate treatment is found in the CAA section (n)(1)(B) limitation of considering environmental effects only of Hg emissions while under CAA section (n)(1)(A) all HAP emissions are to be studied.

Response to Comment 25: The EPA disagrees with commenter's characterization of the statute as limiting the Agency to only considering hazards to public health, and we direct attention to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 26: Commenters 17716 and 18502 disagree with the EPA's statement that CAA section 112(n)(1)(A) "is not written in a manner to preclude consideration of other information when determining whether it is appropriate and necessary to regulate EGUs under CAA section 112, and that includes consideration of all hazards, both health and environmental, posed by HAP emitted by EGUs," 76 FR 29488/3. According to the commenters, this position relies on the proposition that "'based upon' does not mean 'solely.'" The commenters note that the term "Based on" is not found in CAA section (n)(1)(A), thereby undercutting the proposition. The actual language of (n)(1)(A) refers to a finding made "after considering the results of the study required by this subparagraph." According to the commenters, the referenced study results did not include any environmental effects, demonstrating that they were not to be considered in the "appropriate" finding.

Response to Comment 26: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 27: Commenter 17775 states that where Congress expected the EPA to take account of environmental effects in regulating under CAA section112, it said so explicitly on the face of the statute. According to the commenter, in CAA section 112(n) Congress required that the EPA (i) "assess the hazards to public health and the environment resulting from the emission of hydrogen sulfide associated with the extraction of oil and natural gas resources;" and (ii) "study...the potential hazards of hydrofluoric acid...in industrial and commercial applications to public health and the environment." *See* CAA section 112(n)(5), (6).

Response to Comment 27: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. Further, we disagree with commenter's implication that Congress did not specifically require consideration of environmental effects as evidenced by CAA section 112(n)(1)(B).

Comment 28: Commenters 17775 and 18023 state that the EPA has inherent discretion to consider "other information" that the agency may have derived from sources other than the Utility Study, including the Mercury Study and NAS Study[1] in making the "appropriate and necessary" finding. However, commenters state that the information that can be considered is limited to "hazards to public health" that are "reasonably anticipated to occur as a result of emissions by EGUs."

Response to Comment 28: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 29: Commenters 17775 and 18023 do not believe that the EPA explains how the language in subparagraph (n)(1)(B) to "consider the...environmental effects" of emissions from both EGUs and other sources authorizes the EPA to consider "environmental effects," and the effects of HAP emissions from non-EGU sources, in making its "appropriate and necessary" finding under subparagraph (n)(1)(A). According to the commenters, it is contrary to congressional intent to construe the provisions of subparagraphs (n)(1)(A), (B), and (C) to provide in their totality a framework for the Agency's determination of whether to regulate HAP emissions from EGUs under CAA section 112.

[1] National Academies of Science(NAS). 2000. *Toxicological Effects of MeHg*. National Research Council. Washington, DC: National Academies Press.

Response to Comment 29: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 30: Commenter 18023 states that the EPA's interpretation allowing environmental impacts to be considered "flip-flops and rejects its 2004 interpretation" of the same provision. According to the commenter, by the EPA's logic they could consider any factors not expressly excluded from its consideration by Congress. The commenter notes that prior attempts to find statutory authority for such consideration absent an expressed congressional prohibition have been rejected by the courts and cites as an example *Ethyl v. EPA*, wherein the court stated, "To suggest, as the [agency] effectively does, that Chevron step two is implicated any time a statute does not expressly negate the existence of a claimed administrative power..., is both flatly unfaithful to the principles of administrative law...and refuted by precedent." *Ethyl Corp. v. EPA*, 51 F.3d1053, 1060 (D.C. Cir. 1995).

Response to Comment 30: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 31: Several commenters (17383, 17798, 17877, 17885, 17681) state that the CAA section 112(n)(1)(A) "necessary and appropriate" requirement is directed exclusively at EGU emission health hazards.

Response to Comment 31: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 32: Commenter 17608 states that the EPA's interpretations of the statute on the meaning of "appropriate" are inconsistent and unnecessarily limit the EPA's statutory discretion. According to the commenter, the EPA argues that silence should be interpreted as a prohibition but then states that the term "appropriate" is extremely broad and nothing in the statute suggests that the agency should ignore environmental effects in determining whether to regulate EGUs under CAA section 112.

Response to Comment 32: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 33: Commenters 17731 and 18033 state the timing created by Congress in establishing the structure of CAA section 112(n)(1) shows an intent to base an "appropriate" finding solely on the hazards to the public health data that would have existed at the time the determination was to have been completed. The commenters state that the Utility Study ((n)(l)(A)) and the NAS Study ((n)(l)(C)) both were to be completed "within 3 years after November 15, 1990," and neither refers to environmental effects. In contrast, state the commenters, the Mercury Study ((n)(l)(B)) was to be completed "no later than 4 years after November 15, 1990" and was to consider environmental effects. According to the commenters, had the Utility Study and the NAS Study been completed in a timely fashion, neither would have had any environmental effects data. Consequently, such data would not have become available until a year later with the issuance of the Mercury Study. According to the commenters, Congress intended that the Administrator make an "appropriate" finding under (n)(l)(A) concurrently

with issuance of the Utility Study and the NAS Study, or a year before any environmental effects data were available for consideration.

Response to Comment 33: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. In addition, we note that Congress did not provide a time limit on the appropriate and necessary determination as commenters suggest, except that the agency was constrained to wait until after the Utility Study was issued and considered. The CAA provided the agency the authority to make the appropriate and necessary determination based on the Utility Study alone if the facts warranted such action, and it also provided the agency with the flexibility to wait and consider all the information generated pursuant to CAA section 112(n)(1) and elsewhere if the agency determined it was appropriate to consider additional information. In fact, the EPA completed the Mercury Study prior to completing the Utility Study, notwithstanding the statutory mandates.

Comment 34: Commenter 17731 states that the EPA's view that if "Congress intended to prohibit EPA from considering adverse environmental effects in the 'appropriate' finding, it would have stated so expressly" stands administrative law on its head. According to the commenter, "EPA's view that it has inherent power to act unless Congress prohibits such action contravenes the fundamental principle that agencies are statutory creatures whose only powers are those expressly delegated by Congress." ***E.g., Louisiana PSC v. FCC***, 476 U.S. 355, 374 (1986) ("an agency literally has no power to act...unless and until Congress confers power on it"); ***Bowen v. Georgetown Univ. Hospital***, 488 U.S. 204, 208 (1988) (same).

Response to Comment 34: The EPA disagrees with the commenter's conclusion as it relates to the EPA's interpretation of CAA section 112(n)(1) and we note that we did not determine it was reasonable to consider adverse environmental effects based only on the statement cited above by commenter. 76 FR 24988. We maintain that our interpretation of the statute is proper for the reasons set forth in the preambles to the proposed rule and this final action.

Comment 35: Several commenters (17731, 17716, 17834) state that the EPA takes inconsistent positions regarding how the statute should be interpreted. The commenters state that on one hand the EPA contends that the limited reference to "environmental effects of such [i.e., mercury] emissions" in (n)(l)(B) can be transformed into a general requirement that environmental effects of all HAP emissions can be considered under the (n)(l)(A) "appropriate" finding, while on the other hand, the EPA contends that costs cannot be considered in making that finding because "nowhere in CAA section 112(n)(l) does Congress require the consideration of costs in assessing health and environmental impacts. The commenters state that the only reference to costs is in CAA section 112(n)(l)(B) and that reference required the agency to consider the costs of emission reduction controls for Hg." 76 Fed Reg. at 24987. According to the commenters, the only reference to "environmental effects" is in CAA section 112(n)(l)(B), and that reference requires the EPA to consider those effects only for Hg. Thus, the EPA's explanation does not justify treating costs one way (excluded) and environmental effects another way (included).

Comment 36: Commenter 17834 states that the EPA utilizes an illogical approach to the "appropriate and necessary" determination. On the same page of the proposed rule, states the commenter, the EPA first reasons that, with respect to CAA section 112(n)(1)(A), the absence of language expressly precluding the consideration of environmental effects provides the EPA with discretion to take such effects into account; however, the absence of language expressly authorizing the consideration of costs

prohibits the EPA from taking costs into account. Regarding both environmental effects and costs, the EPA draws its authority, or lack thereof, from 112(n)(1)(B).

Response to Comments 35 and 36: Commenters are correct that CAA section 112(n)(1)(B) references both environmental effects and costs of controls, but we maintain it was reasonable to consider adverse environmental effects and not costs in determining whether it is appropriate and necessary to regulate HAP emissions from EGUs under CAA section 112. The agency is not required to and does not consider costs in any listing decisions and we maintain that approach is consistent with the purpose of CAA section 112. Congress also did not authorize the agency to consider costs in any delisting decisions. On the other hand, protection of the environment is a goal of the CAA generally and CAA section 112 specifically, see CAA section 112(a)(7) ("defining adverse environmental effects"), such that it would be unreasonable to ignore environmental hazards associated with HAP emissions from EGUs when assessing whether to regulate EGUs under CAA section 112. Congress also specifically called for the EPA to assess environmental impacts in deciding whether to delist source categories and thus it is reasonable to consider such impacts in assessing whether to regulate EGUs under CAA section 112. Commenters do not and cannot state that the agency must consider costs in determining whether regulation of EGUs under CAA section 112 is appropriate and necessary, especially where, as here, hazards to public health and the environment are at issue.

Thus, although the EPA could have interpreted the term "appropriate" to allow for the consideration of costs, it reasonably declined to do so. Its approach is wholly consistent with the structure of CAA section 112, which does not contemplate consideration of costs in either listing or delisting decisions. Moreover, once listed, Congress precluded the agency from considering cost in setting MACT floors, which are technology-based standards. It is hard to imagine that Congress wanted the agency to consider costs in assessing whether to regulate EGUs, but then to ignore such costs in setting emission standards. We continue to believe that had Congress sought to require the consideration of costs in CAA section 112(n)(1)(A), it would have so stated.

Comment 37: Commenter 18033 states that the EPA's invocation of the U.S. Supreme Court's decision in *Massachusetts v. EPA* for the proposition that even if the benefits of regulating are negligible, the EPA still must promulgate standards under CAA section 112 is inapposite of the facts at issue in this rulemaking. According to the commenter, whereas in *Massachusetts* the Supreme Court rejected the EPA's use of "policy considerations" as a shield to deny a rulemaking petition urging the agency to regulate GHG emissions from new automobiles, the agency in this setting is attempting to use the very same "policy considerations" as a sword for regulating HAP emissions from EGUs. In rejecting the EPA's then-position, states the commenter, the Court emphasized that the agency may not rest its decision to regulate or not to regulate on "reasoning divorced from the statutory text."

Response to Comment 37: The EPA disagrees with the commenter's assertion that the agency does not have a reasoned basis under CAA section 112(n)(1) for regulating HAP emissions from EGUs. We maintain that the 2000 finding was reasonable at the time it was made based on the information available and our recent analyses confirm that it remains appropriate and necessary to regulate HAP emissions from EGUs.

Further, the agency cited *Massachusetts v. EPA* in relation to the necessary prong of the finding as support for our conclusion that we may find it necessary to regulate EGUs under CAA section 112 even if such regulation will not fully resolve the identified hazards. 76 FR 24991. Commenter has not explained why the EPA was wrong to rely on *Massachusetts v. EPA* for support of that proposition.

3. Impacts of EGUs alone or with other sources in Appropriate Finding.

Commenters: 17383, 17623, 17648, 17712, 17774, 17799, 17834, 17877, 17885, 18425, 18443, 19114, 19536/19537/19538, 18023

a. Comments generally supporting the EPA's approach looking at EGUs along with other sources in deciding "appropriate."

Comment 38: Commenter 17648 supports the EPA's interpretation that limiting consideration solely to the impact of emissions from EGUs without considering the cumulative impacts of other sources is unfounded. According to the commenter, nothing in CAA section 112(n)(1) specifically constrains the EPA to assessing whether only the emissions from EGUs independently present a risk to human health and the environment, and neither does CAA section 112(n)(1) evince any intent to restrict the agency from considering whether HAP emissions from EGUs, when combined with other HAP emissions, present a risk to public health and the environment.

Comment 39: Commenter 18425 states that the EPA was correct in considering the results of the Mercury Study and the NAS study when making its determination. The commenter states that the EPA was also correct in considering risks of HAP in terms of emissions from EGUs alone or in conjunction with other sources. According to the commenter, the text of the CAA does not require causation as the basis for an appropriate and necessary determination. Therefore, states the commenter, it is appropriate to list EGUs for regulation even though they may not be the only source of these HAP and that regulating EGU emissions alone will not end the threat posed to public health from HAP. Consequently, the commenter supports the EPA's determination to list EGUs for regulation under CAA section 112 even though there may be other sources of HAP contributing to current levels in the atmosphere.

Comment 40: Several commenters (19536, 19537, 19538) support the EPA's interpretation that CAA section 112(n)(1)(A) allows for an "appropriate and necessary" finding regardless of whether the hazard posed to public health or the environment results from either HAP emissions from EGUs alone or the harm is in conjunction with HAP emissions from other sources. According to one commenter, the EPA's 2004 finding that the statute limits consideration "solely on whether the utility HAP emissions themselves are posing a hazard to public health" (70 FR 15,998) is unreasonable and "inconsistent with case law, as well as a misuse of the science." The commenter states that "the remainder of CAA section 112 confirms that Congress did not intend any industrial category to avoid regulation because EPA might not have exacting proof of the harm caused by that category in isolation." The commenter provides three specific reasons for this conclusion. First, the commenter notes that it would be "highly unlikely that Congress would have required EPA to conduct an assessment [under 112(n)(1)(B)] of the cumulative effects of these various source categories, but then prohibited that assessment from being considered in any decisions regarding regulation of one of them." Second, the phrase "result of emissions," used in CAA section 112(n)(1)(A), is also found in CAA section 112(k)(3)(B) with respect to developing a national strategy for area source HAP emissions. Interpreting that language, states the commenter, the EPA has said that determining which HAP pose the greatest threat to human health "as the result of emission from area sources," does not require that "such threats must be exclusively the result of emissions from area sources." *See* National Air Toxics Program: The Integrated Urban Strategy, 64 Fed. Reg. 38,706, 38,716 (July 19, 1999). Finally, the commenter notes that CAA section 112(c)(3) requires that the EPA list for regulation sufficient source categories so that, in the aggregate, ninety percent of emissions for the thirty most hazardous air pollutants are regulated. 42 U.S.C. CAA section 7412(c)(3). According to the commenter, this requirement illustrates that Congress was aware

that the cumulative emissions from different industries have cumulative adverse effects on public health and the environment.

Response to Comments 38 - 40: The EPA agrees that the statute authorizes consideration of HAP emissions from EGU in conjunction with HAP emissions from other sources when evaluating whether HAP emissions from EGUs pose a hazard to public health for the reasons set forth in the preambles to the proposed rule and in this final action.

b. Comments generally disagreeing with the EPA's approach of looking beyond just EGUs in evaluating whether it is "appropriate" to regulate EGUs.

Comment 41: Commenter 17623 states that under the "appropriate" prong of CAA section 112(n)(1)(A), the statute does not specifically authorize the EPA to make its determination based on sources of HAP emissions other than EGUs and that regulation of EGUs would be "most legally defensible" if the determination was based only on HAP from the EGU source category. According to the commenter, looking at HAP emissions beyond the source category does not fit with the EPA's approach of considering the availability of controls to address HAP emissions from EGUs, which is one of the justifications the EPA provides for regulating EGUs under CAA section112.

Response to Comment 41: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. Further, we are unsure why our consideration of the availability of controls conflicts with a determination that HAP emissions from EGUs and other sources should be considered. In any case, the availability of controls was not an independent basis for regulating EGUs under CAA section 112.

Comment 42: Commenter 18023 states that the EPA's conclusion that "nothing in CAA section 112(n)(1)(A) prohibits consideration of HAP emissions from EGUs in conjunction with HAP emissions from other sources of HAP," 76 FR 24,989, is inconsistent with basic rules of statutory construction and the court's *Ethyl v. EPA* decision. *See Ethyl Corp.*, 51 F.3d at 1060. According to the commenter, the EPA cannot rely on informational studies commissioned by Congress elsewhere under the CAA to broaden the scope if this particular regulatory mandate.

Response to Comment 42: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 43: Several commenters (17834, 19114, 17774, 17799, 18443) state that the plain language of CAA section 112(n)(1)(A) only allows for the consideration of emissions by EGU and not in conjunction with other emission sources. According to the commenters, the EPA's determination to include multiple sources is arbitrary, capricious and otherwise not in accordance with law.

Response to Comment 43: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 44: Several commenters (17383, 17712, 17885, 17877) state that CAA section 112(n)(l)(A) specifically references hazardous utility emissions, not all emissions. According to the commenters,

under the EPA's total worldwide Hg inventory approach means all sources of any particular HAP no matter how small the relative contribution are subject to CAA section 112 regulation.

Response to Comment 44: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. We also do not understand the commenters' conclusion that the Appropriate and Necessary Finding for EGUs affects other source categories. We do not believe that this finding affects our regulation of other sources categories.

4. Finding for all HAP to be regulated.

Commenters: 17608, 17623, 17648, 17681, 17771, 17799, 17840, 17855, 17864, 17868, 17871, 17886, 17931, 18033, 18421, 19114, 18443, 19536/19537/19538, 18023

a. Comments generally agreeing with the EPA's interpretation that once the EPA makes the determination that it is appropriate and necessary to regulate HAP emissions from EGUs and lists EGUs pursuant to CAA section 112(c), all HAP emitted by EGUs must be regulated under CAA section 112.

Comment 45: Commenter 17648 states that once the EPA makes the determination that it is appropriate and necessary to regulate HAP emissions from EGUs, all HAP emitted by EGUs must be regulated under CAA section112. According to the commenter, the EPA is not required to make a separate 112(n)(1) determination for each HAP emitted by EGUs. The commenter states that the statute provides unambiguously that the EPA must promulgate emission standards for each of the HAPs listed for regulation. *Nat'l Lime Ass'n*, 233 F.3d at 633-34. According to the commenter, neither statutory text, legislative history, nor case law supports a position that CAA section 112(n)(1) exempts EGUs from this requirement applicable to other source categories listed for regulation under CAA section 112(c); CAA section 112(n)(1) simply requires various studies of HAP emissions from utility units, and includes the requirement that the EPA "shall regulate electric utility steam generating units under this CAA section, if the Administrator finds such regulation is appropriate and necessary after considering the results of the study required by this subparagraph." 42 U.S.C. CAA section 7412(n)(1)(A). According to the commenter, in requiring that EGUs be regulated "under this CAA section," Congress expressed its clear intention that EGUs be regulated under CAA section 112, not under subparagraph (A) of CAA section 112(n)(1).

Comment 46: Several commenters (19536, 19537, 19538) state that MACT standards must be adopted for all HAP emitted by a listed source category. The commenters further note that it would not be arbitrary and capricious had the EPA determined it was appropriate and necessary to list EGUs based upon Hg emissions alone, considering that the Congressionally established, performance-based approach of CAA section 112 has proven effective in reducing Hg and all other HAP from other industrial source categories; EGUs are the largest remaining uncontrolled sources of industrial Hg emissions in the country; and other statutory programs are less suited toward reducing Hg emissions than CAA section 112(d).

Comment 47: Several commenters (19536, 19537, 19538) state that there is no statutory support for any of the suggestions "sometimes advanced by utility industry representatives" that (1) Congress considered the same listed HAP less harmful and less worthy of regulation from power plants than from other industrial sectors emitting far less of those HAP than EGUs; (2) Congress wished the EPA to

return to the discredited, abandoned risk-based approach that existed prior to the 1990 amendments, or to apply that approach just to EGUs; or (3) the Administrator's determination that MACT regulation of EGUs is appropriate and necessary could not be based (in part) upon the appropriateness of treating the power sector equitably and similarly relative to other industrial sectors covered by MACT; upon the appropriateness of maintaining uniform regulatory treatment of HAP emissions from EGUs under CAA section 112(d)(2) and (3); and upon the appropriateness of applying the proven, performance-based HAP reduction approach of CAA sections 112(d)(2) and (3) to EGUs.

Comment 48: Commenter 18421 states that they support the EPA's decision to regulate the source category based on emissions of a single HAP. According to the commenter, making an "appropriate" determination on the basis of a source category's emissions of a single HAP rests on a reasonable interpretation of the Act. CAA sections 112(c)(1) and (2) respectively require the Administrator to list and regulate "major sources...of [HAP]," which are defined as sources emitting 10 tons per year or more of even a single HAP. Further the commenter notes that CAA section 112(c)(9) contemplates the addition of a source category to the CAA section 112(c) list because of its emissions of a single air pollutant.

Response to Comments 45 - 48: The EPA appreciates the support. We agree that our interpretation of CAA section 112(n)(1) as set forth in the preambles to the proposed rule and this final action is consistent with the statute and supports the regulation of all HAP from EGUs.

b. Comments generally disagreeing with the EPA's interpretation that once the EPA makes the determination that it is appropriate and necessary to regulate HAP emissions from EGUs and lists EGUs pursuant to CAA section 112(c), all HAP emitted by EGUs must be regulated under CAA section 112.

Comment 49: Commenter 17623 disagrees with the EPA's interpretation that the statute and judicial precedent require regulation of all HAP emitted by a major source listed pursuant to CAA section 112(c) of the CAA, referred to as the "in for one, in for all" requirement. According to the commenter, this is not the only interpretation that the EPA could adopt. The commenter's interpretation is that unlike other categories of HAP sources, Congress treated EGUs differently. Under this interpretation, states the commenter, it would be appropriate for the EPA to exercise its regulatory discretion if the agency determines that the HAP emitted by EGUs do not pose a hazard to human health. The commenter states that the EPA already made the determination in the 2000 Finding that regulation of HAP emissions from coal and oil-fired EGUs under CAA section 112 is "appropriate and necessary" due to Hg emissions and that other HAP may pose a potential concern to public health and emissions of these substances "may be evaluated further during the regulatory process." 65 Fed. Reg. 79,825, 79,827 (Dec. 20, 2000). According to the commenter, CAA section 112(n)(1)(A) does not require the EPA to set MACT standards for all HAP emissions from EGUs because at the point of the original listing the EPA made no regulatory finding that these additional HAP posed a risk to public health.

Response to Comment 49: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. In addition, we disagree that the 2000 finding was limited to a finding that only Hg emissions from EGUs pose a hazard to public health and the environment, and the new analyses confirming it remains appropriate and necessary do not focus only on Hg emissions. In addition, the commenter appears to take the position that the EPA should assume that HAP emissions from EGUs do not pose a hazard to public health or the environment unless the agency makes a finding that specific HAP

emissions from EGUs do pose a hazard to public health and the environment. The lack of an affirmative finding should not be interpreted as finding of no hazard to public health or the environment. EGUs are a listed source category and the EPA has regulated the category consistent with the requirements of the CAA and case law interpreting the establishment of standards for regulating listed source categories.

Comment 50: Commenter 17871 states that there are no grounds in either the law or the record before the agency for requiring regulation of all HAP emitted by area sources. Contrary to assertions made by the EPA in the preamble to the proposed rule, states the commenter, an "appropriate and necessary" finding for one HAP does not authorize the EPA to regulate all HAP emitted by EGUs. 76 FR 24,988. Rather, states the commenter, it militates in favor of a more narrow focus on only those particular HAP that the EPA finds-after consideration of existing CAA controls-are a hazard to public health. According to the commenter, the EPA acknowledges that the holding in *National Lime* is limited to "major sources" of HAP, 76 FR 24,989, and does not support a position that all HAP emitted from area source EGUs should be regulated.

Response to Comment 50: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. In addition, Congress defined EGUs in CAA section 112(a)(8) in a manner that includes both major and area sources and we maintain it is reasonable to regulate the source category consistent with that definition. Nothing in the CAA prohibits the EPA from regulating major and area source EGUs together.

Comment 51: Commenter 18443 states that the EPA's conclusion that it must set emission standards that address all HAP is legally incorrect. According to the commenter, EGUs are treated uniquely and CAA section 112(n)(1)(A) requires the EPA Administrator to decide if regulation is appropriate and necessary. According to the commenter, in December 2000, the EPA Administrator found that regulation of coal- and oil-fired EGUs was appropriate and necessary under CAA section 112 and proceeded to list those units under CAA section 112(c), but the EPA's 2000 regulatory determination only gave it authority to set MACT limits for Hg emissions from EGUs. The commenter further notes that in the 2004 proposed rule the EPA went to great lengths to explain why it only had legal authority to set Hg MACT limits for coal-fired EGUs. According to the commenter, the EPA has offered no explanation or legal analysis for its abrupt shift in its interpretation of its legal authority to regulate HAP emissions from EGUs under CAA section 112.

Response to Comment 51: The EPA disagrees with the commenter. The agency did explain why it was regulating all HAP from EGUs, and we direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 52: Commenter 17608 strongly supports the EPA's previous interpretations of CAA section 112 to allow for only control of Hg emissions. The commenter disagrees with the EPA's argument that it is legally obligated to establish MACT floors for all HAP. According to the commenter, in order to avoid requiring substantial resources to be devoted to non-Hg emissions without a benefit to public health or the environment, an "appropriate and necessary" finding should be required for each HAP before regulating EGUs for that HAP under CAA section 112. The commenter notes that the EPA's reliance on *Sierra Club v. EPA* (479 F.3d 875, 883 (D.C. Cir. 2007)) is distinguishable because in *Sierra Club* the agency already had the authority to regulate under CAA section 112 without the "appropriate and necessary" finding.

Response to Comment 52: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. We also disagree with commenter that there is no health or environmental benefit to regulating non-Hg HAP. We also disagree that we stated we were legally obligated to set MACT standards for all HAP from area sources; however, we exercised our discretion to regulate both major and area sources together consistent with the statutory definition of EGU in CAA section 112(a)(8). Concerning *Sierra Club*, commenter has not explained why CAA section the 112(n)(1)(A) listing provision excuses the EPA from complying with the D.C. Circuit's interpretation of the CAA section 112(d) standards setting provisions.

Comment 53: Commenters 17771 and 19114 state that the EPA exceeded its authority in proposing emissions standards for non-Hg HAP. According to the commenters, the EPA's own analysis did not find that it was "appropriate or necessary" to regulate emissions of all HAP.

Response to Comment 53: The EPA disagrees with the commenters. We direct commenters to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 54: Commenter 17799 states that an affirmative finding for Hg does not automatically trigger regulation of non-Hg HAP. The commenter states that the EPA's interpretation of the CAA as requiring control of all HAP from power plants regardless of the health hazard they might or might not pose would read these phrases out of the statute. According to the commenter, this would be unreasonable under established rules of statutory construction where Courts "are obliged to give effect, if possible, to every word Congress used." *Reiter v. Sonotone Corp.*, 442 U.S. 330, 339 (1979).

Response to Comment 54: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. Commenter has not explained how the EPA failed to give meaning to all of CAA section 112(n)(1). Nothing in that provision requires the EPA to make an independent finding for individual HAP before finding that it is appropriate and necessary to regulate EGUs under CAA section 112, nor does the statute require or authorize the EPA to regulate only those HAP from EGUs once the source category is listed under CAA section 112(c).

Comment 55: Commenter 17868 states that the utility study and the related Great Lakes Study along with an assessment of CAA section 303(d) waterbody segments listing of noncompliant waterbodies in the Clean Water Act justified only Hg reduction through the MACT program. According to the commenter, the utility study did not justify proposed MACTs for non-Hg metals or acid gases.

Response to Comment 55: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. In addition, we are unclear how the Great Lakes Study and 303(d) of the Clean Water Act affect our decision to regulate all HAP from EGUs after the source category is listed.

Comment 56: Several commenters (17840, 17855, 17931, 18803) state that the EPA has not performed the necessary analysis for any other non-Hg HAP it is proposing to regulate. According to the commenters, the EPA mistakenly believes it is obligated to regulate all HAP "if the Agency determines that the emissions of *one or more* HAP emitted from EGUs pose an identified or potential hazard to public health or the environment at the time the finding is made." 76 FR 24987.

Response to Comment 56: The EPA disagrees with the commenters. We direct commenters to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 57: Commenter 17864 states that CAA section 112(n)(1)(A) and CAA section 307(d)(1)(C) together require that the EPA go through notice and comment rulemaking to determine whether it is "appropriate and necessary" to regulate EGUs under CAA section 112, and require that this determination be based on the Final Report to Congress. According to the commenter, the EPA lacks the authority to promulgate a final rule that regulates HAP not indentified in the Final Report.

Response to Comment 57: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 58: Commenter 18033 states that the EPA's reliance on *National Lime,* 233 F.3d 625 (D.C. Cir. 2000) to support proposed regulation of "all HAP" is "unavailing" because that case turned on the language of CAA section 112(d)(1) rather than the sub-CAA section at issue in this rulemaking.

Response to Comment 58: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 59: Commenters 17681 and 17886 state that the EPA's conclusion that it can regulate all HAP based on a finding for a single HAP is contrary to the CAA.

Response to Comment 59: The EPA disagrees with the commenters. We direct commenters to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

c. Comments disagreeing with the regulation of acid gases or other non-Hg HAP.

Comment 60: Several commenters (17757, 18014, 18242, 19121) state that the EPA has not provided a sufficient basis for its determination that it is "Appropriate and Necessary" to regulate emissions of acid gas HAP from EGUs.

Comment 61: Commenter 17885 states that for acid gases, especially HCl and HF, the EPA identified no study or rational basis to demonstrate concrete health concerns associated with these types of emissions. The commenter states that the fact that the EPA Administrator "remains concerned" about potential effects of these acid gases falls far short of any reasonable appropriate and necessary basis to regulate them under CAA section 112.

Comment 62: Commenter 18477 states that the EPA's decision that it is appropriate and necessary to regulate oil-fired EGUs is based on outdated information. According to the commenter, more recent analyses show that the risks posed by oil-fired units are even less than the EPA previously estimated (*see* Frank Huggins et al., *Determination of Nickel Species in Stack Emissions from Eight Residual Oil-Fired Utility Steam Generating Units*, ENVIRONMENTAL SCIENCE & TECHNOLOGY, 2011, at 6188-6195). As a result, states the commenter, the EPA should rescind its finding that oil-fired EGUs should be regulated under CAA section 112.

Comment 63: Commenters 17702 and 17767 state that the EPA fails to provide evidence of any risk to the general population from non-Hg metal HAP and acid gases. The commenters add that it is only appropriate to develop regulations under CAA section 112 for the two hazardous air pollutants (Hg and nickel (Ni)) for which the EPA has provided evidence of a significant risk to the public

Comment 64: Commenter 17723 states that the proposed emission limits for acid gases, and trace heavy metals other than Hg, together with work practice standards for organic combustion products are not supported by the legislative language of the CAA, prior agency findings and actions, or significant public health concerns. According to the commenter, the EPA ignored specific direction from Congress "fell into the trap" of treating EGUs like other CAA section 112 source categories. According to the commenter, the treatment of EGUs apart from other source categories was intentional as Congress imposed title IV requiring reductions in SO_2 and NO_X. The commenter states that the 2000 health study found it necessary to regulate Hg and found "no health-based rationale for controlling acid gases" or other non-Hg HAP.

Comment 65: Commenter 17774 states that the EPA's reliance on CAA section 112(c)(9) to analyze risk is misplaced. According to the commenter, CAA section 112(c)(9) is irrelevant to whether regulation of EGU emissions of non-Hg HAP is necessary and appropriate. The commenter states that Congress clearly instructed the EPA, in CAA section 112(n)(l)(A), to conduct a study and determine whether regulation of EGU s was appropriate and necessary based on the results of that study.

Comment 66: Several commenters (17772, 17816, 18020 and 17718) state that the 1998 Utility Study confirmed that even with the assumed increase in emissions and exaggerated modeling data (e.g., HEM model overestimates impacts), the EPA determined that Hg was the only HAP emission that warranted regulation.

Comment 67: Commenter 18428 states that the EPA has presented no justification to control HAP other than Hg, and in particular HCl, and the weak health-based justification for controlling Hg emissions could be addressed through other more-flexible and less costly mechanism as provided for under CAA section 112(n). According to the commenter, "Potential concerns" and "plausible links" between emissions and health concerns, as expressed by the EPA, are not adequate reasons to find it "appropriate and necessary" to list and regulate EGU emissions under CAA sections 112(c) and (d), respectively.

Comment 68: Commenter 17696 states that the EPA has offered only generalized concerns regarding the health and environmental effects of non-Hg trace metals, acid gases, and organics. According to the commenter, these are inadequate to support an "appropriate and necessary" finding as required by the CAA for regulation of EGUs under CAA section 112.

Comment 69: Commenter 18034 states that under 112(n)(1)(A) the CAA requires the EPA to regulate utilities only if the EPA finds that utility emissions pose a hazard to public health after imposition of the requirements of the CAA. According to the commenter, based on the EPA's own inhalation risk assessment and their own admission in the preamble to the proposed rule, public health risks are well within acceptable ranges for all non-Hg HAP and therefore regulation is not "appropriate." For example, states the commenter, maximum chronic impacts of HCl emissions noted in the case study were less than 10% of the reference concentration developed by the EPA. Similarly, states the commenter, the EPA's risk assessment for non-carcinogen risks are generally considered to be at an acceptable risk level, by both the scientific community and the EPA itself, in other MACTs and in the proposed rule.

Response to Comments 60 - 69: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to these comments. We also direct attention to the new analyses conducted in support of the Appropriate and Necessary Finding. See also response to comment 72 in this CAA section and responses to comments in CAA sections 1B and 1G.

Comment 70: Several commenters (18014, 17627, 17725) state that because the RIA indicates that "EPA was unable to quantify or monetize all of the health and environmental benefits associated with the proposed Toxics Rule" the EPA has not met the statutory requirements associated with the "appropriate and necessary" determination. According to the commenters, the current rule contradicts Carol Browner's 1998 statement that "there will be health benefits to addressing mercury, but no health benefits associated with addressing the other hazardous air pollutants (HAP)."

Response to Comment 70: CAA section 112 does not require the EPA to quantify benefits as commenters imply and the commenters do not cite any support for the contention that benefits must be quantified.

Comment 71: Commenter 17696 states that despite the acknowledgement that organic HAP from coal-fired EGUs are below the minimum detection level (76 FR 25023, 25040, 25046) and absent a finding of health hazard, the EPA has proposed a work practice standard for organic HAP. According to the commenter, the work practice is unjustified and inappropriate.

Response to Comment 71: The EPA determined that it was appropriate and necessary to regulate HAP emissions from EGUs in 2000 and added such units to the CAA section 112(c) list of sources subject to regulation under CAA section 112. Listed sources must be subjected to regulation under CAA section 112(d) unless the agency delists such sources consistent with CAA section 112(c)(9)(B). *See New Jersey v. EPA*, 517 F.3d 574, 583 (D.C. Cir. 2008). As the EPA stated in the preambles to the proposed and final rules, the agency's analyses indicate that EGUs do not satisfy the statutory requirements for delisting.

The EPA also must regulate EGUs, a listed source category, under CAA section 112(d) and that provision requires the EPA to regulate all HAP emitted from EGUs. *See* CAA section 112(c)(2) (requiring that listed sources be regulated pursuant to CAA section 112(d)); *see also Sierra Club v. EPA,* 479 F.3d 875, 883 (D.C. Cir. 2007) (finding that "EPA has a 'clear statutory obligation to set emission standards for each listed HAP...'") (quoting *National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000)).

The EPA maintains that the Appropriate and Necessary Finding is not required for all HAP before the EPA may list and regulate HAP emissions under CAA section 112(d). In any case, the EPA's finding included a finding that non-Hg metal HAP and acid gas HAP emissions from EGUs pose hazards to public health and to the environment.

5. Considering cost in Finding.

Commenters: 17648, 17681, 17768, 17775, 17834, 17840, 17884, 17930, 18033, 19536, 19537, 19538, 18023

a. **Agreement with the EPA's interpretation that cost is not considered under the "appropriate" analysis.**

Comment 72: Several commenters (19536, 19537, 19538) state that the CAA makes clear that cost may not be considered at this stage. According to the commenters, the Supreme Court has held Congress has expressly granted authority to consider the costs of implementation only in circumstances that are specifically indicated. According to the commenters, that Congress has been so clear in those cases in which consideration of costs is allowed or required shows that implementation costs may not be relied upon by the EPA when making decisions under CAA sections that do not expressly provide for their consideration. *Whitman v. Am. Trucking Ass'ns,* 531 U.S. 457, 467 (2001); *see also Am. Textile Mfrs. Inst. v. Donovan*, 452 U.S. 490, 510 (1981) (finding a general presumption in all statutes that "[w]hen Congress has intended that an agency engage in cost–benefit analysis, it has clearly indicated such intent on the face of the statute"). The commenters note that CAA section 112(n)(1)(A) only requires that the EPA "consider" the Utility Study in making its finding, and the Utility Study in turn is only required to cover "hazards to public health reasonably anticipated to occur." 42 U.S.C. CAA section 7412(n)(1)(A). According to the commenters, there is no statutory language or legislative history that renders unlawful or arbitrary the EPA's conclusion that costs may not be considered when determining whether regulation of EGUs is appropriate and necessary.

Comment 73: Commenter 17648 states that the EPA rightfully excluded costs in assessing whether hazards to public health or the environment are reasonably anticipated to occur from HAP emissions from EGUs. According to the commenter, CAA section 112 does not permit the EPA to consider costs in deciding whether to list source categories for regulation under CAA section 112(c), in deciding whether to de-list source categories under CAA section 112(c)(9), or in setting MACT emission floors under CAA section 112(d)(3) for sources in listed source categories. The commenter states that even if it were appropriate to consider cost at the listing stage the Toxics Rule will produce annual benefits at least 7 to 17 times as great as any costs, and probably more.

Response to Comments 72 and 73: The EPA agrees that costs should not be considered when evaluating whether it is appropriate and necessary to regulate HAP emissions from EGUs as explained in the preamble to the proposed rule and response to comments set forth in the preamble to the final rule.

b. Disagreement with the EPA's interpretation that cost is not considered under the "appropriate" analysis.

Comment 74: Commenter 17775 does not agree with the EPA's interpretation that the term "appropriate" does not allow for consideration of cost. Specifically the commenter finds the the EPA's reliance on the fact that under CAA section 112(c) Congress does not "permit the consideration of cost" to be misplaced. The commenter notes that while this may be true, given that Congress, through the mechanism of CAA section 112(n)(1), explicitly excluded EGUs from the automatic listing process of CAA section 112(c), the treatment of "costs" under CAA section 112(c) cannot support the agency's position under CAA section 112(n)(1). Similarly the commenter did not agree with the EPA's reliance on the delisting provisions under CAA section112(c)(9) where the EPA noted "Congress did not permit the consideration of costs in evaluating whether a source category could be delisted pursuant to the provisions of CAA section 112(c)(9)." 76 FR 24,989/1. The commenter states that the process by which sources may get "delisted" under CAA section 112(c)(9) sheds no light on the circumstances under which it may be "appropriate" to regulate EGUs in the first instance.

Response to Comment 74: The EPA disagrees with the commenter. We direct the commenter to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 75: Commenter 17681 states that in determining whether regulation is "appropriate," the EPA concludes that it cannot consider costs. According to the commenter, this conclusion is contrary to the CAA.

Response to Comment 75: The EPA disagrees with the commenter. We direct the commenter to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 76: Commenter 17775 states that CAA section 112(n)(1)(A) requires the EPA to "consider the results" of the Utility Study and in that study the agency is to "develop and describe...alternative control strategies" for those "emissions which may warrant regulation under this CAA section." According to the commenter, the cost of a given emission "control strategy" is a central factor in any evaluation of "alternative" controls therefore the EPA is expected to consider cost under CAA section 112(n)(1)(A).

Response to Comment 76: The EPA disagrees with the commenter. We direct the commenter to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. We note specifically that the CAA does not require the EPA to consider the costs of alternative control strategies in the Utility Study and the EPA did not in fact consider such costs in that study.

Comment 77: Several commenters (17775, 17884, 18033, 18023) state that CAA regulatory provisions should be read with a presumption in favor of considering costs, with the D.C. Circuit having found that "[i]t is only where there is 'clear congressional intent to preclude consideration of cost' that we find agencies barred from considering costs." *Michigan v. EPA*, 213 F.3d 663, 678 (D.C. Cir. 2000) (quoting *NRDC v. EPA*, 824 F.2d 1146, 1163 (D.C. Cir. 1987)). According to the commenters, the legislative history of CAA section 112(n)(1)(A) confirms that Congress intended the EPA to consider costs. *See* Oxley Statement at 1417 ("[T]he conference committee produced a utility air toxics provision that will provide ample protection of the public health while avoiding the imposition of excessive and unnecessary costs on residential, industrial and commercial consumers of electricity.").

Response to Comment 77: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. The EPA did not conclude that we were absolutely precluded from considering costs, but instead that better reading of the statute is that the EPA may not consider costs when making the appropriate and necessary determination.

Comment 78: Commenter 17768 states that one of the factors that the EPA uses in determining whether or not to regulate EGUs is the availability of effective pollutant control technologies. The commenter notes that the availability and effectiveness of control technologies can be interpreted as "a sort of threshold-based consideration of costs" and therefore it is unclear that this part of the determination excludes the consideration of costs.

Response to Comment 78: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. Further, we specifically disagree that the availability of controls should be equated with a consideration of costs. The EPA did not issue many HAP regulations prior to the 1990 CAA amendments and it was unclear at that time how or if certain HAP, particularly Hg, could be controlled. Thus, we interpret the direction to consider available control technologies as an expression of Congressional interest in whether EGUs would be able to control HAP emissions from EGUs if such sources were regulated under CAA section 112.

Comment 79: Commenter 17768 states that the EPA should consider both costs and benefits more explicitly in the determination of appropriate. According to the commenter, in *Entergy v. Riverkeeper,* 129 S. Ct. 1498, 1509 (2009), the Supreme Court found that broad statutory language allows the EPA to weigh the social costs and benefits of regulation unless doing so is directly contrary to the statute.

Response to Comment 79: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. The EPA maintains that the better reading of the statute is that it does not allow the consideration of costs, and the statute does not require a consideration of costs.

Comment 80: Commenter 17768 states that because the proposed Utility MACT is expected to provide very significant benefits, and an interpretation of "appropriate" that incorporates cost-benefit analysis would clearly demonstrate that the agency is following a reasonable regulatory path. According to the commenter, even if the current interpretation varies from the 2000 Finding, the current interpretation regarding cost, provided it is neither arbitrary nor capricious, is acceptable under *Chevron*. *See Nat'l Cable & Telecommunications Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 981 (2005) (discussing the deference provided to an Agency when changing interpretations the Court stated "change is not invalidating, since the whole point of Chevron deference is to leave the discretion provided by ambiguities of a statute with the implementing agency.")

Response to Comment 80: We agree that we reasonably declined to consider costs in evaluating whether it is appropriate and necessary to regulate EGUs under CAA section 112.

6. Considering requirements of the CAA in "necessary."

Commenters: 17383, 17623, 17648, 17656, 17702, 17715, 17730, 17736, 17740, 17774, 17775, 17799, 17834, 17840, 17871, 17877, 17885, 17886, 17909, 17930, 18018, 18020, 18033, 18034, 18421, 18428, 18500, 19041, 19114, 19536/19537/19538, 18023

a. General agreement with the EPA interpretation limiting the number of programs that are considered under the "after imposition" provision of CAA section 112(n)(1).

Comment 81: Several commenters (17648, 19536, 19537, 19538) agree with the EPA's interpretation of CAA section 112(n)(1) finding it appropriate and necessary to regulate U.S. EGUs under CAA section 112 if their HAP emissions pose a hazard to public health or the environment "at the time of the Finding, rather than only after consideration of the other requirements of the Clean Air Act." According to the commenters, given the November 1993 deadline Congress set for the EPA to complete the Utility Study it would be unreasonable to read CAA section 112(n)(1)(A) as mandating that the EPA predict the impacts many years down the road from certain aspects of the CAA, such as imposition of new or

revised NAAQS standards. According to the commenters, a more reasonable interpretation of CAA section 112(n)(1)(A) is that Congress intended the agency to determine whether it is necessary to regulate EGUs after accounting for the statutory requirements that unambiguously applied to EGUs at the time the Utility Study was intended. Further, the commenters note that when Congress added CAA section112 to the CAA it also added the Acid Rain Program and that it is reasonable to interpret CAA section 112(n)(1) to evaluate whether it was necessary to regulate U.S. EGUs after imposition of the [Acid Rain Program] ARP.

Comment 82: Commenter 17648 states "[i]t is clear that CAA section 112(n)(1)(A) does not require the Agency to account for other requirements of the Clean Air Act that may affect EGUs but do not currently target EGU emissions." The commenter explains that future modifications of the NAAQS could eventually result in reductions of Hg, however the EPA could not adequately assess those reduction in part because the Hg co-benefits associated with PM and SO_2 controls vary widely. Similarly, states the commenter, states implementing the NAAQS employ different mechanisms for achieving reductions in criteria pollutants making it unreasonable for the agency to assess with confidence the impact to HAP emissions from EGUs from enforcing those standards.

Comment 83: Commenter 18421 states that the EPA reasonably interprets the phrase "imposition of the requirements of this chapter" to mean those requirements that Congress directly imposed on EGUs in 1990 and not preexisting requirements of the CAA that might be applied at some point in the future. *See* 76 Fed. Reg. 24,991. According to the commenter, this is the most natural reading of the CAA section 112(n)(1)(A) and one that obviates the EPA's having to look "two to three decades" into the future.

Comment 84: Commenter 17648 states that even if the EPA is required to consider the impact from other requirements of the CAA in assessing the public health or environmental risk from HAP emissions from EGUs, the agency has sufficiently has done so. According to the commenter, the EPA "went well beyond its obligations under CAA section 112(n)."

Response to Comments 81 - 84: We agree with commenters that we went well beyond what the statute requires for evaluating the HAP emissions from EGUs after imposition of the requirements of the CAA.

b. General disagreement with the EPA interpretation limiting the number of programs that are considered under the "after imposition" provision of CAA section 112(n)(1).

Comment 85: Several commenters (17383, 17877, 17885) state that the language of the CAA is clear and unambiguous that "requirements of the act" cannot be read to include only acid rain control.

Response to Comment 85: The EPA did not state that we were only required to consider the Acid Rain program when evaluating the hazards to public health remaining after imposition of the requirements of the CAA. We direct commenters to the preamble to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment.

Comment 86: Commenters 19041 and 19114 state the combination of the pollution control equipment installed or to be installed in response to existing CAA regulations and the final CSAPR have already achieved or will achieve the emissions reductions purported to be achieved by the HAP Rule.

Response to Comment 86: The EPA does not agree that imposition of the requirements of the CAA, including CSAPR, will address the hazards to public health and the environment posed by HAP emissions from EGUs for the reasons stated in the preambles to the proposed rule and this final action.

Comment 87: Commenter 17930 states the CAA does not forbid the EPA from looking at state HAP requirements in determining historical emission reductions and the need for regulation. According to the commenter, these reductions are real and, as evidenced by historical emissions data, are the trend. The commenter states that since 1990, emissions have significantly reduced, and the conditions that, if they did support this rule two decades ago, no longer exist. Further, states the commenter, state limits on emissions are perpetually recognized by the EPA, and many of these emissions reductions are incorporated into many of the states' federally approved SIP provisions. The commenter states that these emissions limits are as permanent as any federally required restriction, even though they may not have the direct oversight of the EPA.

Response to Comment 87: The EPA disagrees that it may consider state only requirements on Hg or other HAP in evaluating the hazards to public health and the environment that exist after imposition of the requirements of the CAA for the reasons set forth in the preamble to the proposed rule. The EPA is not aware of any state Hg requirements that are incorporated into state SIPs, but the EPA agrees that SIPs are federal requirements. Finally, while the EPA did not consider state requirements for the necessary analysis, those requirements are reflected in current Hg emissions estimates because we based those estimates on emissions data from the EGU information collection request (ICR) conducted in support of this rule and on current plant configurations.

Comment 88: Commenter 18033 states that the EPA's "necessary" finding is overly narrow and contravenes the purpose of the sub-CAA section. According to the commenter, Congress knew that the 1990 amendments would result in numerous regulations potentially eliminating the need to regulate EGUs under CAA section 112. The commenter states that even though CAIR and CSAPR may have been promulgated later in time, they stem from statutory authority in place as of or before the 1990 amendments and therefore qualify even under the EPA's necessary analysis. Additionally, states the commenter, the EPA's doubts about the implementation of the NAAQS program is an unpersuasive basis for not including the results of these measures because compliance with the NAAQS is a legal obligation and is why the EPA promulgated first CAIR and then CSAPR.

Response to Comment 88: The EPA disagrees with the commenter to the extent they suggest the agency must or should consider CAA requirements not considered by the EPA in the necessary analysis. We direct the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to this comment. Further, the EPA did reflect the Hg emission reductions anticipated from CSAPR, a Federal Implementation Plan, in the necessary analysis because we determined we could reasonably estimate the HAP reductions attributable to that regulation. NAAQS are distinct because states, not the EPA, are directly responsible for assuring compliance with those rules, and the EPA cannot reasonably estimate the extent to which EGUs will be regulated.

Comment 89: Multiple commenters (17623, 17730, 18023, 17702, 17799, 17774, 17656) state that CAA section 112(n)(1)(A) requires the EPA to consider the hazards to public health anticipated to occur as a result of emissions by electric utility steam generating units … after imposition of the requirements of this CAA and that it would be appropriate for the EPA to consider the emission reductions achieved through the full range of currently applicable and future CAA programs. According to the commenters, if the EPA takes into account the emission reductions that will be achieved through the Transport Rule

and the revised NAAQS for PM and ozone a different conclusion might be reached due to the co-benefit HAP reductions achieved by the implementation of emissions controls for these various programs.

Response to Comment 89: The EPA disagrees with the commenters to the extent they suggest the agency must or should consider CAA requirements not considered by the EPA in the necessary analysis. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. Further, the EPA did not consider co-benefit reductions in determining whether it was appropriate and necessary to regulate HAP emissions from EGUs as the commenters appear to imply.

Comment 90: Commenters 17702 and 18018 state that the EPA has the capability to estimate the additional air toxic reductions from implementing other CAA programs. The commenters further note that during the rulemaking process the EPA demonstrated that emission reductions from implementing CAIR and CAMR were sufficient to meet CAA requirements and were protective of human health. The commenters believe that these reductions and other reductions from CATR II and the revised NAAQS could likely reduce air toxic cancer risk to below the "one in a million" criteria for delisting.

Response to Comment 90: The EPA disagrees with the commenters to the extent they suggest the agency must or should consider CAA requirements not considered by the EPA in the necessary analysis. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We note further that commenters have provided no analysis to support their beliefs.

Comment 91: Commenters 17656 and 18020 state that programs that should be considered include GHG regulations; revised SO_2 and NO_X NAAQS revisions; and the Cross-State Pollution Control Act; Regional Haze requirements. Commenter 17730 identifies the requirements of CAA section 110(a)(2)(D) regarding the achievement of the NAAQS, the Prevention of Significant Deterioration of air quality, and the protection of visibility under CAA section 169A of the CAA. According to commenters, failure to include these programs inappropriately imposes regulatory burdens on the coal fired electric generation sector when other programs required by the Act to be considered will clearly provide a substantial public health and environmental benefit.

Response to Comment 91: The EPA disagrees with the commenters to the extent they suggest the agency must or should consider CAA requirements not considered by the EPA in the necessary analysis. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. The EPA does not agree that we should consider requirements that are not currently imposed on EGUs absent a clear understanding of if and how EGUs will be affected. The commenters did not provide specific information that would suggest a mechanism for considering such requirements or that identified specific sources that will be subject to such requirements.

Comment 92: Commenter 17775 states that the EPA's position that it can only take account of those "requirements" that Congress "directly imposed" on EGUs, and "for which the EPA could reasonably predict HAP emission reductions at the time of the Utility Study," makes no sense on its own terms. According to the commenter, the Acid Rain Program itself does not "directly" regulate EGU HAP emissions though the Agency identifies it as one of the "requirements" that Congress had in mind.

Response to Comment 92: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We did not, as commenter suggests, state that the CAA regulations must directly regulate HAP emissions, only that the agency must be able to estimate HAP emissions reductions from the requirements considered.

Comment 93: Commenter 18023 states that the EPA improperly interprets "necessary" in a manner inconsistent with its "plain meaning." According to the commenter, the plain meaning of the term as defined by Webster's Dictionary is (1) "compulsory" and (2) "absolutely needed," And another dictionary defines the term as "needed to achieve a certain result; requisite." According to the commenter, this directive makes clear that the EPA's authority under CAA section 112(n)(1)(A) is limited to the regulation of HAP from EGUs only to the extent needed to achieve specific public health goals, and no more.

Response to Comment 93: The EPA disagrees with the commenter's interpretation of the term "necessary" as it directly conflicts with our interpretation. We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 94: Commenters 17736 and 17871 state that the EPA's interpretation is incorrect in so far as it limits consideration of only those requirements that Congress directly imposed on EGU s through the CAA as amended in 1990 and for which the EPA could reasonably predict HAP emission reductions at the time of the Utility Study. According to the commenters, the legislative history supports the interpretation that the EPA must consider all requirements that may result in HAP reductions from EGUs. The commenters point to the House version of CAA section 112(n)(1)(A) that provided that the EPA take into account compliance with all provisions of the act and any other federal, state, or local regulation and voluntary emission reductions - have been demonstrated to cause a significant threat of serious adverse effects on the public health. *See* Representative Oxley, 136 Cong. Rec. H12934 (daily ed. October 26, 1990).

Response to Comment 94: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 95: Commenters 17736 and 17740 state that the EPA's revised interpretation is based on a logical disconnect between the EPA's stated definition of "requirement"- something that is obligatory- and the conclusion that only CAA obligations which are directly imposed on EGUs constitute requirements which may be considered when determining whether regulating EGUs under CAA section 112 is "necessary." According to the commenter, whether a requirement to reduce emissions is directly or indirectly imposed on a particular unit is not relevant- an obligation is an obligation and the EPA did not provide an explanation for employing such a narrow interpretation.

Response to Comment 95: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We further note that commenters do not explain which requirements of the CAA the EPA should have considered and did not. To the extent the commenters are referring to NAAQS, we note that the EPA cannot reasonably estimate if or how EGUs will be subject to such provisions because states are responsible for implementing the NAAQS.

Comment 96: Commenter 17736 states that the EPA's rationale for considering only ARP would apply equally to the rationale for the CSAPR. According to the commenter, the EPA explained that the purpose of the ARP program was to reduce "SO_2 and NO_X emissions primarily from EGUs." Similarly the Transport Rule has the same stated purpose. The commenter notes that substantial reductions of HAP emissions from EGUs have already been achieved through several post-1990 CAA requirements, and will continue to be achieved through additional EPA initiatives. Therefore, states the commenter, regulating coal and oil-fired EGUs under CAA section 112 is not "necessary."

Response to Comment 96: The EPA disagrees with the commenter. We direct the commenter to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We note that we did consider the proposed CSAPR in our analysis.

Comment 97: Commenter 17799 states that the EPA cannot determine it is "necessary" to regulate EGUs in order to support international HAP reduction efforts when CAA section 112 authorizes a purely national regulatory scheme.

Response to Comment 97: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 98: Commenter 17799 states that the agency cannot, without explanation, depart from the rationale supporting the 2000 finding where the EPA stated that the regulation of EGUs is necessary because "the implementation of other requirements under the CAA will not adequately address the serious public health and environmental hazards arising from such emissions identified in the utility RTC and confirmed by the NAS study, and which CAA section 112 is intended to address." *See* Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Steam Generating Units, 65 Fed. Reg. 79,825, 79,830 (Dec. 20, 2000). The commenter notes that in contrast with the 2000 finding the current proposal, the EPA states that even if other CAA programs or requirements reduce the hazards associated with EGU HAP emissions, the regulation of EGUs still would be "necessary."

Response to Comment 98: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We do not agree there is any conflict between the 2000 Finding and the interpretation set forth in the preamble to the proposed rule. Further, the EPA did not state, as commenter implies, that we could find it necessary to regulate EGUs if we determined that imposition of the other requirements of the CAA will fully address the identified hazards to public health and the environment.

Comment 99: Commenter 17799 states that the EPA's reliance on more recent HAP emissions data is internally inconsistent with reliance on the 2000 finding and the refusal to consider emission reductions from CAA programs that have been and will be implemented since that time. According to the commenter, if recent data on HAP emissions are used to justify the need for regulation, then the EPA also must consider recently-implemented CAA programs that have or will reduce HAP emissions even further.

Response to Comment 99: The EPA disagrees with the commenter. We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment. We also do not understand commenter's complaint in this regard. The EPA stated that the 2000 finding was valid at the time it was made based on the information available to the agency at

that time. In addition, in conducting the new analyses in support of the Appropriate and Necessary Finding, the EPA did consider recently implemented CAA programs as explained in the preamble to the proposed rule.

Comment 100: Commenter 17834 states that the EPA cannot "tout" the co-benefits of regulating EGU HAP emissions under the proposed rule and at the same time refuse to consider the co-benefits derived from regulatory programs adopted since 1990 in determining the need to regulate EGUs under the proposed rule.

Response to Comment 100: The EPA does not understand the commenter's complaint. In any case, the EPA did not base the Appropriate and Necessary Finding on co-benefits of HAP emissions control.

Comment 101: Commenter 17840 states that the EPA's "necessary" interpretation precludes consideration of the many measures under the CAA that have proven to effectively reduce Hg and HAP emissions in this country and this interpretation "infects" the ability to consider the regulation of EGUs under other programs on a cost benefit analysis.

Response to Comment 101: The EPA maintains that it considered more CAA requirements than contemplated under CAA section 112(n)(1)(A) when determining whether it is necessary to regulate EGUs under CAA section 112. To the extent the commenter is asserting that the EPA should look for alternative mechanisms for regulating HAP emissions from EGUs, we do not think such an interpretation is consistent with the CAA for the reasons set forth in the preambles to the proposed rule and this final action.

Comment 102: Commenter 17877 states that the EPA's rationalization that CAA section 112 regulation is needed because there is no guarantee that EGU existing and forecast reductions of these emissions under these other program will continue is unfounded. According to the commenter, the many programs that will reduce $PM_{2.5}$, and therefore metal HAP emissions, include Acid Rain Control, Clean Air Transport Rule and supplementals in response to new $PM_{2.5}$ and O_3 NAAQS, Regional Haze and Visibility, and updated state SIPs in response to new NAAQS.

Response to Comment 102: The EPA disagrees with the commenter's assertion that the EPA's interpretation of the term necessary and our determination that it is necessary are not consistent with the CAA. We considered CAA requirements far in excess of the requirements contemplated in CAA section 112(n)(1)(A) and commenters have provided no data or other information that causes us to conclude that imposition of the requirements of the CAA will address the identified hazards to public health and the environment posed by EGUs.

Comment 103: Commenter 18034 states that state programs, such as those contained in the Texas SIP, are an appropriate and effective means to address HAP emissions and that PM emissions are regulated directly by NAAQS and under enforceable federal and state programs, such as PSD and NSR. According to the commenter, the EPA's data demonstrate that these and other rules have caused Hg emissions to plummet since 1990 even without CAA section 112 regulation of EGU emissions. Accordingly, such regulation is not "necessary."

Response to Comment 103: The EPA disagrees with the commenter that regulation of HAP emissions from EGUs is not necessary for all the reasons set forth in the preambles to the proposed rule and this final action. The commenter refers to state SIP programs that reduce HAP emissions, but does not

indicate that these programs directly regulate HAP emissions. To the extent the commenter is referring to co-benefit HAP reductions, we have accounted for such requirements in that our 2016 emissions estimates were projected starting with current control configurations for U.S. EGUs.

Comment 104: Commenter 18033 states that in the preamble to the proposed rule the EPA found that ARP fell within the necessary analysis because it "contained very specific emissions reduction requirements to be completed during a tight compliance timeframe." According to the commenter, CAIR, and its successor CSAPR, establish a similar program as ARP and that in 2005 the EPA recognized the similarity. The commenter states that given the similarity and the acknowledgement in 2005 the EPA does not adequately explain why these programs were not considered in this proposed rule.

Response to Comment 104: In the technical analyses supporting the proposed rule, the EPA did consider emission reductions anticipated from the proposed CSAPR as well as other federal promulgated rules, settlements, consent decrees, and closures. In the National-Scale Mercury Risk Assessment (Hg Risk TSD), the EPA found potential exposures associated with increased risk to be from emissions from U.S. EGUs, even after accounting for these emission reductions.

Comment 105: Commenter 18033 states that the EPA's conclusion that the NAAQS program cannot be factored into the necessary analysis because "EPA cannot predict with any certainty precisely how states will ensure that the reductions needed to meet the NAAQS will be realized" is suspect. The commenter notes that the EPA has the legal authority under CAA section 110 to issue a SIP Call to states that fail to adequately attain the NAAQS. In addition, states the commenter, if the state fails to respond to the SIP Call, the EPA can impose sanctions and is obligated to impose a FIP.

Response to Comment 105: The commenter is correct that the EPA may issue a SIP call if states fail to implement NAAQS in a timely manner, but that authority does not alter the fact that states are primarily responsible for implementing the NAAQS. The EPA does not know how states will implement NAAQS nor do we know if we will have to issue a SIP call or a FIP so we maintain it was reasonable not to attempt to project how NAAQS requirements might in the future lead to HAP emission reductions from EGUs.

Comment 106: Commenter 17909 states that the EPA's goals related to HAP emissions reductions are being achieved, and will be further achieved, by other regulations (i.e., those leading up to CSAPR), and there is no need for the EPA to further complicate the matter with its proposed rule.

Response to Comment 106: The EPA disagrees with the commenter to the extent the commenter is asserting that this rule is not necessary for all the reasons set forth in the preambles to the proposed rule and this final action.

Comment 107: Commenters 17715 and 18500 state that in the preamble to the proposed rule the EPA states that it will only take into account the imposition of requirements of the CAA that were in place when the 2000 determination was made to regulate utility HAP. However, the commenters state that the EPA should include in modeling the Hg emissions reductions anticipated and already achieved from major rulemaking initiatives.

Response to Comment 107: The commenters are incorrect that the EPA stated it only considered CAA requirements that were in place in 2000 when evaluating whether it is necessary to regulate HAP emissions from EGUs as part of our new technical analyses.

Comment 108: Commenter 18428 states that the EPA is attempting to render CAA section 112(n) of the CAA meaningless, as 112(n) requires the EPA to consider reductions from other programs such as NAAQS, Acid Rain, NSPS and NO_X Budget programs before listing of EGUs could occur under CAA section 112(c) and subsequent regulation under CAA section 112(d).

Response to Comment 108: The EPA disagrees with the commenter that our interpretation of the term necessary renders CAA section 112(n)(1) meaningless for the reasons set forth in the preamble to the proposed rule and in this final action.

Comment 109: Commenter 18018 states that during the rule making process [in 2005], the EPA demonstrated that emission reductions from implementing CAIR and CAMR were sufficient to meet CAA requirements and were protective of human health and, therefore, the EPA should delist Hg and nickel.

Response to Comment 109: The EPA explained in the preamble to the proposed rule that the interpretation of the CAA section 112(n)(1)(A) in the 2005 action was in error. We also explained in the preamble to the proposed rule that our conclusions concerning the hazards to public should consider HAP emissions from U.S. EGUs in conjunction with HAP emissions from other sources of HAP and that the determination should not consider other factors such as costs.

7. Eliminate or reduce risk under "Necessary" Finding.

Commenters: 17648, 17766, 18500, 19536/19537/19538

Comment 110: Commenters 17648 and 17766 agree with the EPA's recognition that it is still "necessary" to regulate HAP emissions from EGUs under CAA section 112 even if doing so will not be sufficient to eliminate entirely the risk to public health or the environment from those constituents. According to the commenters, there is no basis for concluding that that regulation can be necessary only if it can entirely eliminate a hazard, rather than if it would reduce the risk or blunt the impact of a hazard. *See Massachusetts v. EPA*, 549 U.S. 497, 525-526 (2007).

Response to Comment 110: We agree with the commenters.

Comment 111: Several commenters (19536, 19537, 19538) state that it is reasonable for the EPA to conclude that it must take steps to reduce the hazards that Hg poses to human health and the environment, even if those steps do not or cannot fully solve the problem. One commenter notes that in *Massachusetts v. EPA*, 549 U.S. 497, 525 (2007) the Supreme Court found that "[a]gencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop." *Id*. at 254. The commenter also finds support for the EPA's position from *Ethyl Corp. v. EPA*, 541 F.2d 1, 29–31 (D.C. Cir. 1976) where the D.C. Cir. agreed that in addressing the regulation of lead in gasoline the cumulative impact approach was the best method for determining public health hazards posed by lead. According to the commenters, the same considerations that applied to lead apply to Hg. One commenter points out the 2005 interpretation would allow EGUs to avoid regulation even if the total emissions of a particular

HAP from all sources posed a human health or environmental hazard so long as EGUs themselves emitted just below levels required to pose a human health or environmental hazard.

Response to Comment 111: We agree with commenters that our proposed rule is consistent with the statute and that we erred in our 2005 determination.

Comment 112: Commenter 18500 states that the EPA has also chosen to assert that, even if regulation of EGUs cannot remedy an environmental or health problem, regulation is still "necessary." According to the commenter, the EPA's proposed controls will impose significant costs but reduce total Hg deposition by less than 1% and provide minimal societal benefits. The commenter questions why Congress would have given the EPA discretion to determine whether regulation is necessary if regulation is required regardless of the remedy provided by the regulation.

Response to Comment 112: The EPA's interpretation of "necessary" set forth in the preambles to the proposed rule and this final action addresses this comment and we maintain the interpretation is reasonable for the reasons stated therein. 76 FR 24991 (citing *Massachusetts v. EPA*, 549 U.S. 497, 525 (2007)).

Comment 113: Commenters 17716 and 17723 state that no benefits will be derived from the non-Hg HAP emission reductions associated with the proposed rule because no non-Hg HAP health risks were proven. Commenter 17716 states that only benefits concerning Hg and criteria pollutants unregulated under CAA were quantified by the EPA. The "unquantified benefits" of regulation address environmental matters, not public health concerns and mostly involve criteria pollutants. Yet, the commenter points out, the regulation of non-Hg HAP is proposed because "emissions of these HAP from some EGUs pose a cancer risk greater than one in one million to the most exposed individual," a risk metric which determines whether listing EGUs as a major source is "appropriate." However, the commenter states that the metric does not answer the question of whether the regulation is necessary because other CAA regulation will not fully resolve the identified hazard. The commenter goes on to note that no showing was made that EGU non-Hg HAP emission levels reach levels associated with adverse health effects despite multiple assessments of 14 HAP identified as "priority HAP that would be further assessed." The commenter quotes a 2000 finding that stated that only "dioxins, HCl and HF were of potential concern" warranting further study and the "remaining [14] HAP evaluated in the Utility Study did not appear to be a public health concern.

Response to Comment 113: Commenters appear to argue that the EPA's Appropriate and Necessary Finding is not valid because the EPA has not quantified benefits of HAP emission reductions. However, CAA section 112 does not require the EPA to quantify benefits of regulation. Commenters are also incorrect in their suggestion that non-Hg metallic HAP were not discussed in the 2000 finding or this action. See 65 FR 798727 and 76 FR 25016. The commenter is also incorrect in asserting that the EPA did not find it necessary to regulate non-Hg HAP emissions from EGUs. 76 FR 25017. The EPA maintains that its Appropriate and Necessary Finding is valid for the reasons set forth in the preambles to the proposed rule and this final action.

8. Listing EGUs under section 112.

Commenters: 17623, 17728, 17765, 17774, 17775, 18033, 19114, 19536/19537/19538, 17383, 17620, 17648, 17702, 17731, 17768, 18033

a. General agreement with the EPA approach establishing MACT under CAA section 112(d) following listing of the source category.

Comment 114: Several commenters (19536, 19537, 19538) state that the EPA's statutory duty to regulate HAP emissions under CAA section 112(d) springs from its listing decision and as the D.C. Circuit has held cannot be "undone" until the showings of CAA section 112(c)(9) are made. *See* 42 U.S.C. CAA section 7412(c)(9) (requiring for pollutants, like Hg, that cause non-cancer health effects, "a determination that emissions from no source in the category or subcategory concerned...exceed a level which is adequate to protect public health with an ample margin of safety and no adverse environmental effect will result from emissions from any source").

Comment 115: Commenter 17648 notes that the EPA properly applied these standards in reconsidering its 2000 Finding both on the basis of information available in 2000 and available today, and correctly determined that regulation is both appropriate and necessary. The commenter states that the scientific literature and evidence support the conclusion that regulation is both appropriate and necessary. According to the commenter, the failure to regulate any source category, which was responsible for so significant a share of emissions of toxic pollutants, would be arbitrary and capricious.

Response to Comments 114 and 115: The EPA agrees that it was appropriate to list EGUs under CAA section 112(c) after determining that regulation of EGUs under CAA section 112 was appropriate and necessary.

b. General disagreement with the EPA's approach of establishing MACT under CAA section 112(d) following listing of the source category.

Comment 116: Commenter 17728 states that should the EPA conclude that regulation is appropriate and necessary, CAA section 112(n)(l)(A) does not require regulation of EGUs under the traditional approach of CAA sections 112(c) & (d).

Response to Comment 116: We direct the commenter to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 117: Commenters 18033 and 17774 state that statutory phrase "under this CAA section" evinces the intent of Congress that a positive finding for Hg does not automatically subject EGUs to a MACT standard under CAA section 112(d). According to the commenters, nowhere in CAA section 112(n)(1)(A) is the EPA directed or compelled to do this. By comparison, CAA section 112(c)(2) does specifically compel that "the Administrator shall establish emissions standards under sub-CAA section (d) of this CAA section." The commenters conclude that had Congress wanted EGUs to be specifically regulated under CAA section112(d) following the appropriate and necessary determination, it would have so directed.

Response to Comment 117: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 118: Several commenters (18033, 17886, 17774) state that the CAA directs the EPA to develop and describe "alternative control strategies for emissions which may warrant regulation under

this CAA section." According to the commenters, this plain language demonstrates that Congress contemplated other regulatory options other than the 112(d) MACT option.

Response to Comment 118: The EPA disagrees with the commenters. We direct commenters to the preamble to the proposed rule and responses to comments in this RTC and in the preamble to the final rule for responses to this comment.

Comment 119: Commenter 19114 states that the EPA's authority to regulate EGUs under CAA section 112(d) of the CAA is directly at issue during this rulemaking.

Response to Comment 119: The EPA agrees that the listing of EGUs may be challenged once the final rule is issued, pursuant to CAA section 112(e)(4).

Comment 120: Commenter 17765 states that the EPA has provided no reasoned justification to revert to a mechanistic application of the regulatory development process in CAA section 112(d).

Response to Comment 120: The EPA disagrees with the commenter that the EPA did not explain why we are regulating EGUs under CAA section 112(d). In addition, the EPA must regulate EGUs under CAA section 112(d) because the EPA listed EGUs under CAA section 112(c), and CAA section 112(c)(2) requires the EPA to establish standards for listed sources pursuant to CAA section 112(d).

c. Agreement that EGUs were properly listed under CAA section 112(c)(1) and may not be delisted because they do not meet the delisting criteria in CAA section 112(c)(9).

Comment 121: Commenter 17648 states that it is reasonable for the EPA to look to the de-listing criteria in CAA section 112(c)(9) as a basis for evaluating the hazards that warrant regulating HAP emissions from EGUs. According to the commenter, any health hazard greater than the criteria set out in the de-listing criteria is an appropriate basis for determining that there exists a hazard to public health from EGU emissions.

Comment 122: Commenter 17620 notes that the Court concluded that, having determined in 2000 that regulation of EGUs was necessary and appropriate, the only procedure available to the EPA to reverse that decision is delisting under CAA section 112(c)(9)(B). According to the commenter, that CAA section requires a demonstration that no source in the category emits carcinogens at a level that would increase the cancer risk to the most exposed population by more than one in one million, that no source in the category emits at a level that exceeds that needed to protect public health with an adequate margin of safety and that there will be no adverse environmental impact from the source's emissions. The commenter notes that no such showing has been made or attempted.

Comment 123: Commenter 17768 believes that EGUs were properly listed under CAA section 112(c)(1) and do not meet the delisting criteria in CAA section 112(c)(9). According to the commenter, the "necessary after imposition of the requirements of the CAA" prong of the "appropriate and necessary" determination raises the issue of the appropriate regulatory baseline to use in evaluating the effects of a regulation. However, states the commenter, in the context of regulating electric generating units under CAA section 112, the benefits of regulation are so great that the regulatory baseline issue is not significant. The commenter notes that combined appropriate and necessary standard only occurs in sub-CAA sections (m) (Great Lakes HAP deposition provision) and (n) (EGUs provision) of CAA section 112. The commenter states that this determination does, however, highlight the importance of

the EPA's interpretation of the statutory term "appropriate." The commenter states that the EPA should revise the way in which it makes this determination.

Comment 124: Several commenters (19536, 19537, 19538) state that following the 2005 delisting, states, tribes, and environmental and public health groups challenged the EPA's 2005 Delisting rule and CAMR in the D.C. Circuit as unlawful and arbitrary and capricious. *New Jersey v. EPA*, 517 F.3d 574, 582–83 (D.C. Cir. 2008). The commenters state that although the EPA admitted that it had listed EGUs in 2000 and that this listing otherwise would require the agency to set MACT standards for EGUs, the agency claimed wrongly that it had authority to delist EGUs at any time just by reversing the Appropriate and Necessary Finding and without making the delisting showing required by CAA section 112(c)(9). *Id.* at 580; *see also* 70 FR 16,032. The D.C. Circuit disagreed. The Court stated that the plain text of CAA section 112(c)(9) "governs the removal of 'any source category' from the CAA section 112(c)(1) list, and nothing in the [Clean Air Act] exempts EGUs from CAA section 112(c)(9)." *New Jersey v. EPA*, 517 F.3d at 582. Accordingly, state the commenters, the Court held that the EPA could not delist EGUs and avoid regulation without first satisfying the requirements of CAA section 112(c)(9). *Id*. According to the commenters, because the EPA conceded that it never made the findings required to satisfy CAA section 112(c)(9), the Court held that the delisting was flatly unlawful and that EGUs remained listed and subject to MACT regulation under CAA section 112(c).

Comment 125: Commenter 17648 states that having made the Appropriate and Necessary Finding and listed EGUs as a source category under CAA section 112(c), the only way the agency could possibly avoid promulgating regulations is to make the showing required by CAA section 112(c)(9) to de-list EGUs. The commenter goes on to note that after *New Jersey*, the de-listing criteria provide the minimum standards for declining to regulate EGUs (*New Jersey v. EPA*, 517 F.3d at 582-83). That is, the Court's decision in *New Jersey* implies that it must be necessary and appropriate to regulate EGUs if the EPA cannot meet the standard for de-listing set forth in CAA section 112(c)(9). The commenter states that when objectors attempted to challenge the 2000 Finding, their appeal was dismissed as unripe and the Court held that the decision to list could only be challenged in the context of a challenge to the promulgation of a NESHAP. (*Utility Air Regulatory Group v. EPA*, 2001 WL 936363, No. 01-1074 (D.C. Cir. July 26, 2001). According to the commenter, the EPA's decision in 2005 to reconsider the 2000 Finding and listing and to delist EGUs was effectively a voluntary decision by the EPA to reconsider its earlier determination, rather than to wait for a judicial challenge and a remand. According to the commenter, the Court's decision in *New Jersey* invalidating that action and determining that the de-listing criteria in CAA section 112(c) govern the agency's voluntary reconsideration of its listing decision necessarily means that it must be proper for EPA to have listed EGUs if it could not de-list them. If a court determines otherwise, states the commenter, then a litigant may be able to invalidate the EPA's determination through the courts more easily than the EPA itself could reconsider its own decision.

Commenter 17648 goes on to note that, therefore, before the EPA could decline to promulgate the Toxics Rule, at a minimum the agency would need to demonstrate that (1) no carcinogenic HAP is emitted from any EGU in quantities that may cause a lifetime risk of cancer of greater than one in one million in the most exposed individual, and (2) that no HAP is emitted from any EGU at a level exceeding that adequate (a) to protect public health with an ample margin of safety or (b) to assure no adverse environmental effect. *See* 42 U.S.C. CAA section 7412(c)(9)(B). Scientifically, states the commenter, the EPA cannot do this; the Utility Study showed that HAP emissions from several EGUs cause a lifetime cancer risk greater than one in one million. Further, states the commenter, the EPA's recent case studies on data collected for the Toxics Rule reflect that at least four EGUs present a lifetime

cancer risk in excess of one in one million. As a result, the commenter concludes that even without considering the adverse environmental effects and non-cancer health risks from EGU HAP emissions, the EPA must promulgate the Toxics Rule.

Response to Comments 121 - 125: The EPA agrees that EGUs were properly listed and that the agency may not remove them from the CAA section 112(c) list without complying with the delisting provisions of CAA section 112(c)(9). The EPA also agrees with the commenters that state the delisting provisions provide a reasonable guide for determining whether HAP emissions from EGUs pose a hazard to public health or the environment. We decline to revise our interpretation of the term "appropriate" as suggested by one commenter.

d. Disagreement that EGUs were properly listed under CAA section 112(c)(1) and may not be delisted because they do not meet the delisting criteria in CAA section 112(c)(9).

Comment 126: Commenter 17702 states that the EPA should initiate the CAA delisting procedure for Hg and other HAP and follow CAMR rule structure. The commenter believes that the EPA's Air Toxics Rule should require Hg reductions commensurate with the CAMR rule.

Response to Comment 126: The EPA cannot delist EGUs because our analyses demonstrate that EGUs do not meet the CAA section 112(c)(9) delisting criteria as explained further in the preamble to the final rule.

Comment 127: Commenter 17731 states that for non-Hg HAP in general, "EPA acknowledged that the risk assessments for these HAP indicated that cancer risks were not high, but the Agency could not conclude the potential concern for public health was eliminated," 76 FR 24984/3, and with regard to specific HAP, only "dioxins, HCI, and HF were of potential concern" warranting further study, while "the remaining HAP (from the original 14) evaluated in the Utility Study did not appear to be a public health concern." The commenter goes on to note that the EPA justified the regulation on non-Hg HAP because emissions from some EGUs pose a cancer risk greater than one in one million to the most exposed individual. According to the commenter, this finding relates, however, to whether to delist under CAA section112(c)(9)(B)(i), or, looked at from the other side, whether listing EGUs as a major source category is "appropriate." *See* 76 FR 24993/1 (it shows what "Congress thought warranted continued regulation"). But, states the commenter, that does not answer whether regulation is "'necessary" because other CAA section 112 regulation "will not fully resolve the identified hazard." 76 FR 2499112.

Commenter 17731 continues, stating that despite an expansive view of "identified hazard," *id* at 24992-93, no specific hazard to public health resulting or anticipated to result from the current EGU emission levels of non-Hg HAP has been identified. The commenter states that the EPA makes a very general statement that "exposure to high levels of the various non-Hg HAP emitted by EGUs is associated with a variety of adverse health effects," 76 FR 25003/1, but, states the commenter, that begs the relevant hazards question: are the emissions from EGUs sufficiently high to result in adverse effects? According to the commenter, unless this question has been answered affirmatively, and it has not, no EGU emission hazard has been identified to necessitate regulation. The commenter states that nothing in the proposed rule established this critical answer; instead, states the commenter, the EPA merely gives an overview of problems that might occur at high doses of non-Hg HAP without demonstrating either that U.S. concentrations approach those high-dosage levels or that EGU emissions are high enough to cause such problems. *See generally* 76 FR 25003-05.

Response to Comment 127: The EPA disagrees with the commenter's assertion that the EPA did not make an Appropriate and Necessary Finding in 2000 and that we did not confirm that finding was reasonable in the preambles to the proposed rule and this final action. The commenter is incorrect that the Appropriate and Necessary Finding in 2000 was limited to specific HAP. In addition, the new analyses considered HAP other than Hg. In any case, the agency listed EGUs under CAA section 112(c), and source categories listed for regulation under CAA section 112(c) must be regulated under CAA section 112(d). The D.C. Circuit Court has stated that the EPA has a "clear statutory obligation to set emission standards for each listed HAP." *See Sierra Club v. EPA*, 479 F.3d 875, 883 (D.C. Cir. 2007), *quoting National Lime Association v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000). The EPA disagrees with the commenter for all the reasons set forth in the preambles to the proposed rule and this final action.

In addition, the EPA disagrees that emissions from U.S. EGUs do not result in a hazard to public health. Based on the results of the revised Hg Risk TSD and the non-Hg inhalation risk case studies, Hg and non-Hg HAP continue to pose hazards to public health, and U.S. EGU emissions cause and contribute to these hazards.

Comment 128: Commenter 18033 notes that the EPA claims it is still appropriate to regulate non-Hg HAP because "emissions of these HAP from some EGUs pose a cancer risk greater than one in one million to the most exposed individual." The commenter states that the EPA is attempting to use the delisting criteria in CAA section 112(c) to obfuscate the proper statutory analysis. According to the commenter, for EGUs, the delisting criteria are not applicable until the agency has actually made the proper requisite factual finding for the HAP EPA is proposing to regulate. To date, states the commenter, the EPA has not done this, especially for the non-Hg HAP. Consistent with the 2005 Revision that "EPA has neither discovered information on hazards to public health arising from Utility Unit emissions of acid gases based on its own efforts, nor received such information…," the agency still does not have the requisite data to conclude that non-Hg HAP should be regulated under CAA section 112(d).

Response to Comment 128: The EPA disagrees with the commenter. The EPA directs the commenter to the proposed rule and the response to comments in this RTC and the preamble to the final rule for responses to this comment. In addition, the EPA explained in the preambles to the proposed rule why our action in 2005 was in error and we provided a reasoned explanation for revising our legal interpretation and our evaluation of the available information.

Comment 129 Commenter 17383 states that since EGUs were improperly listed under CAA section 112(c), the standard for regulating them is not delisting criteria under CAA section 112(c)(9), instead it is whether CAA section 112(n)(l)(A) mandates a different standard be applied.

Response to Comment 129: The EPA disagrees that EGUs were improperly listed as explained in the preambles to the proposed rule and this final action.

9. Consideration of criteria pollutants under Appropriate and Necessary Finding.

Commenters: 17383, 17608, 17620, 17656, 17689, 17696, 17712, 17716, 17723, 17724, 17725, 17731, 17753, 17754, 17771, 17805, 17813, 17820, 17838, 17842, 17868, 17876, 17884, 17885, 17886, 18014, 18024, 18034, 18428, 18443, 18488, 18498, 18500, 19114, 19506, 18023

Comment 130: Several commenters (17724, 17731, 17876) state that rather than following the requirements of the CAA, the EPA used PM emissions from all sources to justify MACT controls and to show an economic benefit under the cost benefit analysis under CAA section 112(d)(2). The commenters state that no pollutant may be added to the HAP list under CAA section 108 unless the pollutant independently meets the listing criteria in CAA section 112 or is in a class of pollutants listed under CAA section 112. According to the commenters, while Congress added a technology-based component to HAP regulation in 1990, it did not abandon the chemical-by-chemical risk-based approach of listing and delisting particular chemicals, nor did it abandon regulating HAP based upon carcinogenic and other adverse impacts as defined in CAA section 112(b)(2). According to the commenters, PM, in general, does not independently meet the listing criteria of CAA section 112(b). As such, according to the commenters, the EPA's attempt in the preambles to the proposed rule to regulate PM as an individual HAP must fail for lack of statutory authority to do so.

Response to Comment 130: The EPA did not regulate PM as a HAP in the proposed rule. Instead, PM is a surrogate for non-Hg metallic HAP. The EPA is authorized to establish surrogate standards for HAP emissions as long as the surrogate is reasonable. *See Sierra Club v. EPA*, 353 F.3d 976, 984-985 (D.C. Cir. 2003).

Comment 131: Multiple commenters (17656, 17696, 17754, 17771, 17805, 17731, 17868, 17723, 17813, 17886, 18428, 18498, 18024,17753, 17838) state that the EPA's substantial reliance on the projected co-benefits of controlling $PM_{2.5}$ and other non-HAP emissions to support the proposed MACT is inconsistent with CAA section 112 in that criteria pollutants are subject to regulations under the NAAQS.

Response to Comment 131: The EPA did not rely on co-benefit reductions to support the Appropriate and Necessary Finding as commenters suggest.

Comment 132: Commenter 18488 states that the CAA section 110 process described in the CAA has been the anchor of air quality management since the promulgation of the CAA Amendments of 1970 and, based on the dramatic improvement in air quality since 1970, has worked well for more than 40 years. According to the commenter, the proposed rule is inconsistent with the CAA section 110 process since it would utilize CAA section 112 MACT controls for the purpose of reducing emissions of $PM_{2.5}$, which is a criteria pollutant.

Response to Comment 132: The EPA disagrees with the commenter that this rule is inconsistent with CAA section 110. The EPA determined that PM is a viable surrogate for non-Hg metallic HAP. The EPA is authorized to establish surrogate standards for HAP emissions as long as the surrogate is reasonable. *See Sierra Club v. EPA*, 353 F.3d 976, 984-985 (D.C. Cir. 2003).

Comment 133: Commenter 18034 states that regulating total PM under CAA section 112 as a surrogate for HAP metals is circumventing the CAA's structure of cooperative federalism, which gives states the authority to regulate criteria pollutants under the NAAQS program in a flexible manner taking into account local needs and state prerogatives. The commenter states that the state's participation in the regulation of total PM under CAA section 112 is essentially limited to a notice and comment opportunity, where as the states' role in the regulation of total PM under CAA section 108(a) is a much broader cooperative partnership between the EPA and states which includes preparation of state implementation plans (SIP) and the solicitation of greater public participation. According to the commenter, the effect of regulating total PM through CAA section 112 for EGUs instead of regulating it

through the NAAQS program deprives states of their lawful authority to regulate PM emissions as a cooperative partner with the EPA through their SIPs and "to make the many sensitive technical and political choices that a pollution control regime demands." *NRDC v. Browner*, 57 F.3d 1122, 1124 (D.C. Cir. 1995).

Response to Comment 133: The EPA disagrees with the commenter that this rule is inconsistent with CAA section 108. The EPA determined that PM is a viable surrogate for non-Hg metallic HAP. The EPA is authorized to establish surrogate standards for HAP emissions as long as the surrogate is reasonable. *See Sierra Club v. EPA*, 353 F.3d 976, 984-985 (D.C. Cir. 2003).

Comment 134: Commenter 17716 states that "other benefits and co-benefits" cannot be used to support the rule. According to the commenter, the stated objectives for imposing MACT regulation (retire old units/criteria pollutant co-benefits) do not match what Congress intended under CAA section 112(n)(1), which is to protect the public health from EGU HAP emissions that create a risk. Absent this finding the commenter believes the EPA relied on other benefits and co-benefits to support the proposed rule.

Response to Comment 134: The EPA did not rely on co-benefit reductions to support the Appropriate and Necessary Finding. The commenter is confusing likely outcomes of the rule, such as retirement of older units and criteria pollutant co-benefits, with the basis for the rule, identified hazards to public health and the environment that will not be addressed through imposition of the requirements of the CAA.

Comment 135: Commenter 17724 does not object to the use of surrogates to measure compliance with HAP standards when the presence of the HAP in the flue gas stream is too small to be accurately measured by existing monitors. However, the commenter notes that it does not follow that the surrogates can be substituted for the HAP in determining risk-based HAP standards for each HAP, or the technology-based MACT for each category or subcategory of sources covered by the MACT.

Response to Comment 135: The EPA disagrees that there are not measurement methodologies available to measure Hg, non-Hg metallic HAP, and acid gas HAP. The EPA also disagrees with the commenter that we are not authorized to set surrogate standards. The EPA determined that PM is a viable surrogate for non-Hg metallic HAP. The EPA is authorized to establish surrogate standards for HAP emissions as long as the surrogate is reasonable. *See Sierra Club v. EPA*, 353 F.3d 976, 984-985 (D.C. Cir. 2003).

Comment 136: Several commenters (17608, 19114, 17820, 18443, 19114) state that because much of the public health and environmental benefits to this rule are derived from limits on criteria pollutants, the EPA could assert that regulation of HAP other than Hgis not appropriate.

Response to Comment 136: We do not agree that the existence of criteria pollutant co-benefits provides a justification for not regulating EGUs consistent with the provisions of CAA section 112(d).

Comment 137: Several commenters (17689, 17383, 17712, 17885, 18443) state that the EPA seems to believe that regulating EGU emissions under CAA section 112(c) and (d) is justified because existing emissions control technologies such as FGD systems, SCR systems, fabric Filters, ESPs and wet ESPs are all demonstrated technologies for controlling $PM_{2.5}$ emissions, acid gases, and in many cases Hg. According to the commenters, this is precisely a reason not to regulate under CAA section 112 as there are many programs already regulating particulate.

Response to Comment 137: The EPA disagrees with the commenters' conclusion. The EPA reasonably considered the availability of controls for HAP emissions from EGUs in evaluating whether regulation of such units is appropriate and necessary.

Comment 138: Several commenters (17842, 17725, 18500, 19114) state that the ultimate goal of CAA section l12 is to reduce Hg emissions from EGUs. However, state the commenters, the proposed rule relies "overwhelmingly" on PM-related benefits to justify its costs. According to the commenters, the EPA estimates that only $450,000 to $5.9 million of proposed rule's estimated benefits are attributed to Hg reductions, while $53 to $140 billion may be derived from PM reductions.

Response to Comment 138: The EPA is not required to, and did not, justify costs before listing EGUs under CAA section 112 as the commenter suggests. We also disagree with commenters' characterization of the goal of the rule.

Comment 139: Commenter 19506 states that the rule should be reconsidered under the absurd results doctrine that the EPA used to justify the applicability thresholds in the Tailoring Rule. According to the commenter, the base case scenario used in the model run included state Hg regulations and voluntary emission reduction programs and the co-benefits for $PM_{2.5}$ can be attributed in part to the $PM_{2.5}$ NAAQS, the Clean Air Interstate Rule and the Regional Haze Program. The commenter states that if the calculated annual Hg reduction benefits from this proposed regulation (the only identified HAP reduction benefits) of $5,000 to $6,000,000 per year are compared to the estimated annual rule cost of $10,900,000,000, this rule requires U.S. society to spend between $1,211 and $2,180,000 per dollar of mercury reduction benefit.

Response to Comment 139: The EPA is not required to consider benefits when determining whether to list and regulate HAP emissions from EGUs under CAA section 112. The EPA does not agree with commenters' that the regulation of EGUs under CAA section 112 leads to an absurd result because the primary quantifiable benefits of the rule stem from co-benefit reductions.

Comment 140: Commenter 17884 states that the EPA lacks authority to adopt a rule under CAA section 112, the section of the CAA addressing HAP, in order to reduce SO_2. According to the commenter, the EPA has not been able to quantify any benefit from reducing acid gas emissions, thus the EPA is regulating acid gas emissions without being able to show any benefit from doing so in order to regulate SO_2 emissions, which it has no authority to do under CAA section 112.

Response to Comment 140: The EPA is not required to consider benefits when determining whether to list and regulate HAP emissions from EGUs under CAA section 112.

Comment 141: Commenter 18014 states that the presumed co-benefits from PM and acid gas reductions should not be part of the "appropriate and necessary" determination. According to the commenter, the EPA's logic that "although NESHAP may directly address only HAP, not criteria pollutants, Congress did recognize, in the legislative history to CAA section 112(d)(4), that NESHAP would have the collateral benefit of controlling criteria pollutants as well and viewed this as an important benefit of the air toxics program" seems "backward." The commenter notes that NESHAP rules are intended to address HAP and Congress simply acknowledged that by addressing the HAP issues there would be coincidental reductions in other emissions. The commenter states that the EPA's objective "seems aimed at the 'collateral benefits.'"

Response to Comment 141: The EPA disagrees with the commenter. The EPA's appropriate and necessary determination does not rely on co-benefit reductions of criteria pollutants. Commenter is also wrong that the agency's objective was to obtain criteria pollutant co-benefits.

Comment 142: Commenter 18023 states the EPA "purports" to find authority to consider criteria pollutants in reading of the legislative history of the Senate Bill, S. 1630. According to the commenter, the Administrator's reliance on reduction of SO_2 emissions and the associated reduction in ambient PM concentrations, however, is in conflict with the statute itself. The commenter states that CAA section 109(b)(1) directs the Administrator to establish NAAQS at levels "requisite to protect the public health" with "an adequate margin of safety," And similarly, CAA section 109(b)(2) directs her to establish secondary standards "requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." According to the commenter, the Supreme Court held that requisite means "sufficient, but not more than necessary." *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 475–76 (2001). If changes to ambient levels of SO_2 and PM are "requisite" to protect public health, states the commenter, those changes should be required under the NAAQS established under CAA section 109 and achieved through the state implementation plan process of CAA section 110. If, on the other hand, these changes to ambient levels of SO_2 and PM are not requisite to protect public health, states the commenter, those changes are "more than necessary." According to the commenter, reliance on those changes as a basis for additional emission regulations conflicts with the statutory mandate of CAA section 109. In either case, states the commenter, the reliance on such changes as a basis for implementing CAA section 112(d)(4) is inappropriate and inconsistent with CAA section 109.

Response to Comment 142: The EPA's appropriate and necessary determination does not rely on co-benefit reductions of criteria pollutants.

10. General comments on Appropriate and Necessary Finding.

Commenters: 12050, 14115, 17383, 17627, 17638, 17689, 17696, 17702, 17716, 17718, 17723, 17725, 17731, 17753, 17757, 17765, 17766, 17767, 17774, 17789, 17810, 17816, 17817, 17838, 17840, 17854, 17871, 17877, 17880, 17882, 17885, 17903, 18014, 18018, 18020, 18033, 18034, 18039, 18424, 18425, 18428, 18435, 18444, 18450, 18477, 18488, 18498, 19101, 19121, 19210,

a. Comments supporting the EPA's decision that it is appropriate and necessary to regulate EGUs.

Comment 143: Commenter 17789 states that the proposed rule is very appropriate and necessary, and must be finalized this year. The commenter believes that the public health hazard, especially through bioaccumulation from eating fish, necessitates the EPA to act. The commenter notes that the 2005 action was not reasonable and that cost should not be a consideration in making such determinations.

Comment 144: Commenter 12050 is in support of the proposed rule and states that with widespread Hg contamination in the nation's lakes and rivers, agencies have issued increasing numbers of fish consumption advisories. The commenter states that all 50 states have issued advisories placing some or all of their waters off limits for those who would eat the fish they catch, and that as of 2008, 43% of lake acres and 39% of total river miles within the U.S. borders are under advisories for Hg. In addition, 100% of Lakes Superior, Michigan, Huron, and Erie and significant stretches of coastal waters are under advisories. The commenter states that the number and extent of advisories have increased steadily for

the past 15 years and that currently, all of Pennsylvania remains under a blanket advisory that recommends limiting consumption of any recreationally-caught fish to one meal per week.

Comment 145: Commenter 17766 states that regulation of EGUs is appropriate based on the numerous studies cited in the preamble to the proposed rule. According to the commenter, the proposed rule protects our most vulnerable populations such as women of childbearing age, children, subsistence fishermen, low-income people, and minorities. The commenter states that low-income people and minorities are also more likely to experience adverse effects of under regulation because they tend to live closer to dirty power plants. According to the commenter, the proposed regulation also levels the playing field and helps reduce hotspots.

Comment 146: Commenters 17810 and 18450 state that the EPA's conclusion that it is not appropriate and necessary to regulate natural gas fired EGUs is reasonable.

Comment 147: Commenter 17880 states that Hg is a bio-accumulative persistent toxic heavy metal that is linked to severe developmental disabilities and cardiovascular disease in humans. The commenter states that MeHg is a bio-accumulative property, meaning that is absorbed by live tissue and never fully leaves the body and works its way through food chain typically through seafood. The commenter notes that in New York that are 63 bodies of water that are under fish consumption advisory because of Hg. Birds and mammals that eat fish are showing effects from Hg poisoning, such as behavioral and reproductive changes. The commenter states that current EPA estimates show that more than 300,000 newborns in the U.S. are born with unsafe levels of Hg in their system every year. According to the commenter, the almost half of all coal and oil-fired power plants in the U.S. are lacking advanced pollution control equipment. The commenter supports the proposed standards for HAPs (NESHAP) from fossil-fuel-fired power plants under CAA section 112(d) and revised new source performance standards (NSPS) under CAA section 111(b). The commenter states that these standards will set numerical limitations for emissions of Hg and other HAPs, and require the use of maximum achievable control technologies (MACT) to reduce Hg emissions by up to 91% by 2016. The commenter states that the current pollution control technology is widely available and proven effective.

Comment 148: Commenter 17882 states coal-fired power plants emit hundreds of thousands of tons of HAPs like these into the air and water every year. The commenter states that these pollutants are linked to cancer, heart disease, neurological damage, birth defects, asthma attacks and even premature death. The commenter states that when coal-fired power plants emit mercury from their smokestacks, rain, snow, and dust particles wash it out of the air, onto land, into waterways, and ultimately into our food chain. According to the commenter, Hg pollution poses particular risks to children, affecting their ability to walk, talk, read, and write, and it is so widespread that at least one in ten women of childbearing age has enough Hg in her blood to put her baby at risk, should she become pregnant. Moreover, states the commenter, low-income and minority communities often bear a greater burden of the effects of toxic pollution from power plants, as they live closer to the polluting facilities than most Americans. Every state has set some sort of fish advisory due to unsafe levels of the Hg. The commenter states that wildlife that is exposed to Hg may die or, depending upon the level of exposure, have reduced fertility or complete reproductive failure, as well as slower growth and development, and other vulnerabilities. The commenter notes that high levels of Hg have been found in species at every level in the food chain, threatening many different species, including the common loon in Maine and the endangered Florida panther.

Comment 149: Commenter 17903 states that the utility industry should be in the position to argue, based on evidence it has produced from its own extensive study and from independent research that these known and suspected toxins are at low enough levels that they need minimal or no controls on the emissions sources. According to the commenter, the opposite is true as evidenced by lack of requirements for HAPs contained in Title V permits. The commenter considers that a forceful regulatory scheme is reasonable and most likely to protect the greater good.

Comment 150: Commenter 18425 states that coal- and oil-fired EGUs are major emitters of HAP that adversely affect public health. The commenter states that non-Hg HAP cause chronic and acute health disorders, and Hg exposure can result in serious cognitive impairment and even death. Because of the negative health effects associated with Hg and other HAP, states the commenter, this regulation is necessary and appropriate under the law to comply with the 1990 amendments to the CAA. The commenter states that by allowing coal- and oil-fired EGUs to emit HAP without the necessary limitations for over 30 years, the EPA has allowed polluters to significantly degrade public health and welfare without any accountability. According to the commenter, this regulation is long overdue, and the commenter urges the EPA to adopt its proposed standards at the earliest possible date.

Comment 151: Commenter 18435 states that they agree with the strong evidence the EPA provides to support their decision that the proposed rule is both appropriate and necessary to protect public health as required under CAA section 112 of the CAA. The commenter states that exposure to likely harm from Hg and MeHg continues, as does strong evidence of exposure to multiple, recognized carcinogens and other toxics that cause or increase risk of cardiovascular, respiratory, and other acute and chronic systemic damage.

Comment 152: Commenter 19101 states that coal is responsible for most of the Hg pollution, along with acid rain, which is a major product of burning coal. The commenter states that the Hg and other contaminants are deposited in Minnesota's lakes, rivers, soil, woods, and ponds where it can accumulate in the food chain. Acid rain leaches Hg from the ground, which adds to problem. According to the commenter, it is not appropriate to continue to let our environment absorb these pollutants indefinitely, without serious long-term consequences. The commenter states that Minnesota is home to the largest number of loons and the most productive lakes systems in America. Hg concentrates in fish, loons, and other birds such as eagles, states the commenter, with resultant damage to their nervous systems. The commenter notes that humans eating fish from Minnesota lakes must check to see the warnings for each body of water for limitations on consumption. The commenter states that it makes sense to limit the pollutants at their source.

Comment 153: Commenter 19210 states that coal-fired power plants are the single largest source of Hg pollution, arsenic and acid gases, and account for 25% of all toxic metal emissions in the U.S. . . Furthermore, coal-fired power plants are responsible for 99% of all Hg emissions from the power sector fin the U.S. According to the commenter, these toxins inevitably and quickly find their way into the environment, as toxic particles are washed out of the air. The commenter states that entering streams, lakes, rivers and land, they become part of the food chain, making fish in particular unsafe to eat. Because Hg is the most common contaminant in fish in the U.S., states the commenter, every state has set some sort of fish advisory due to unsafe levels of the toxic pollutant. The commenter states that mercury-laden fish pose hazards to birds and other fish-eating wildlife, and the Common Loon has some of the highest levels of Hg of any animal in the world. The commenter notes that our national symbol, the American Bald Eagle, just recently removed from the Endangered Species List, is another species that relies heavily on fish, and thus is in jeopardy from contaminated food. Wildlife exposed to Hg may

suffer from reproductive failure, states the commenter, as well as slower growth and development, and other neurological problems.

Comment 154: Several commenters (19536, 19537, 19538) state that they agree with the strong evidence that the EPA provides in the proposed rule to support their decision that regulation of coal- and oil-fired power plants is both appropriate and necessary to protect public health. Not only is there clear evidence that the harm from Hg and MeHg continues, state the commenters, but recognized carcinogens and other toxics that cause or increase risk of cardiovascular, respiratory, and other acute and chronic systemic damage are also emitted by power plants. According to the commenters, the cleanup of toxic air pollution from power plants is necessary for the protection of public health, appropriate for the EPA to undertake, and long overdue.

Comment 155: Commenters 17844 and 17854 state that since 2000 when the EPA determined it was appropriate and necessary to regulate emissions from EGUs there has not been much certainty. According to the commenters, this rule will provide certainty to the electric utility industry allowing the industry to plan and implement necessary actions to curb Hg and other HAP emissions.

Comment 156: Commenter 18039 states that the reductions are necessary to protect the environment and human health from acid gases, dioxins and metals, in particular Hg. The commenter supports the proposed rule as a "great improvement" over the vacated Clean Air Mercury Rule (CAMR). The proposed regulations appropriately address power plant emissions under CAA section 112 of the CAA by requiring MACT, rather than emission trading. According to the commenter, this approach is consistent with the requirements of the CAA, and will achieve more substantial and faster reductions in emissions of Hg and other HAPs than under CAMR.

Comment 157: Commenter 18444 states that New Jersey supports this effort by the EPA to set standards to address its finding in 2000 that it is "appropriate and necessary" to regulate emissions of HAPs from power plants. The commenter states that the proposed EPA standards are achievable. According to the commenter, most of New Jersey's coal-fired power plants already have installed modern air pollution controls that meet these proposed standards, and they are pleased that the EPA is acting to reduce emissions of poorly controlled plants in other states.

Response to Comments 143 - 157: The EPA agrees with commenters that support the Appropriate and Necessary Finding for coal- and oil-fired EGUs and the finding that it is not appropriate and necessary to regulate natural gas-fired EGUs. We also appreciate the general support for this rule.

b. General comments disagreeing with the EPA's decision that it is appropriate and necessary to regulate EGUs.

Comment 158: Several commenters (18023, 17383, 18498), referencing the RIA, state that the EPA must justify, legally and factually, the reversal of its correct prior decisions in 2004 and 2005 that it is neither "appropriate" nor "necessary" to regulate EGUs under CAA section 112.

Response to Comment 158: Commenter's reliance on the RIA is unfounded. The RIA is not a requirement of the CAA generally, or CAA section 112 specifically. The agency's legal and factual bases for this rule are set forth in the preambles to the proposed rule and in this final action.

Comment 159: Commenter 17775 states that the record relied upon by the EPA to support its Appropriate and Necessary Finding to regulate acid gas HAP is conflicting. According to the commenter, on one hand the EPA states that EGUs remain the largest contributors of HCl and HF emissions and among the largest contributors of HCN and that it "is also concerned about the potential impacts of HCl and other acid gas emissions on the environment." However, states the commenter, the EPA acknowledges that "[o]ur case study analyses of chronic impacts of EGUs did not indicate any significant potential for them to cause any exceedances of the chronic RfC for HCl due to their emissions alone." 76 FR 25051.

Response to Comment 159: We do not agree that there is any conflict in finding that acid gas HAPs do not cause an exceedance of the chronic RfC and a determination that acid gas HAP may have potential impacts on the environment.

Comment 160: Commenter 17638 states that because the EPA took the opposite position in 2005 on each of the following points in determining whether it was appropriate and necessary the EPA's current position is not afforded any deference. The specific positions noted by the commenter include (1) consideration of hazards to the environment, (2) consideration of HAP from other sources in conjunction with HAP from EGUs (3) consideration of costs, (4) regulation of all HAP based on a finding for a single HAP, and (5) regulation if controls are available.

Response to Comment 160: The EPA fully explains in the preamble to the proposed rule why the current action is consistent with the CAA. All of commenter's specific complaints are addressed in the May 3, 2011 notice and this final action.

Comment 161: Commenter 17689 states that in 2005, after considering a number of factors including the lack of health effects of EGU HAP and the impact of other CAA programs to further reduce these emissions in a more cost-effective manner, the EPA concluded that EGU regulation under CAA section 112(n)(1)(A) was neither necessary nor appropriate and effectively delisted EGUs as a CAA section 112(c) source category.

Response to Comment 161: The EPA fully explains in the preamble to the proposed rule why the current action is consistent with the CAA and why the 2005 finding was in error.

Comment 162: Commenters 17753 and 18488 state that the EPA's conclusion that it is "appropriate and necessary" to regulate EGUs under CAA section 112 is not supported by either science or economics. According to the commenters, the reduction of Hg, metal HAP, and acid gases is not technically justified and the EPA acknowledges that the MeHg health effects cited in the rule proposal are uncertain. The commenters question the agency's estimates of the benefits of the proposal.

Response to Comment 162: We disagree. The EPA maintains that the Appropriate and Necessary Finding is supported based on the analyses conducted in both 2000 and in support of the final action.

Comment 163: Commenter 17765 states that the EPA has not properly analyzed or satisfied the regulatory prerequisite required pursuant to CAA section 112(n)(1)(A) for regulating Hg and other HAP under a MACT standard and therefore lacks the necessary regulatory foundation for doing so in this proposed rule.

Response to Comment 163: We disagree. The EPA maintains that the Appropriate and Necessary Finding is supported based on the analyses conducted in both 2000 and in support of the final action.

Comment 164: Commenters 17716 and 17731 state that instead of satisfying the statutory test for imposing regulation, the stated objectives that supposedly will be gained from the proposed rule do not match the goals of CAA section 112, and thus cannot justify regulation. According to the commenters, no benefits purportedly attributable to reducing health risks of the identified HAP are included in the monetized benefits analysis. Further, state the commenters, the estimated hazards related to Hg emissions fall well below the EPA-established level for what constitutes a public health risk that would trigger the need for emission reductions.

Response to Comment 164: The EPA does not use the benefits estimates in the RIA to support the Appropriate and Necessary Finding. As shown in the Hg and non-Hg risk assessments supporting the finding, Hg and non-Hg HAP continue to pose hazards to public health and the environment, and U.S. EGU emissions cause and contribute to these hazards.

Comment 165: Commenters 17716 and 17723 state that no benefits will be derived from the non-Hg HAP emission reductions associated with the proposed rule because no non-Hg HAP health risks were proven. Commenter 17716 goes on to point out that only benefits concerning Hg and criteria pollutants unregulated under CAA were quantified by the EPA. The "unquantified benefits" of regulation address environmental matters, not public health concerns and mostly involve criteria pollutants. Yet, the commenter points out, the regulation of non-Hg HAP is proposed because "emissions of these HAP from some EGUs pose a cancer risk greater than one in one million to the most exposed individual," a risk metric which determines whether listing EGUs as a major source is "appropriate." However, the commenter states that the metric does not answer the question of whether the regulation is necessary because other CAA regulation will not fully resolve the identified hazard. The commenter goes on to note that no showing was made that EGU non-Hg HAP emission levels reach levels associated with adverse health effects despite multiple assessments of 14 HAP identified as "priority HAP that would be further assessed." The commenter quotes a 2000 finding that stated that only "dioxins, HCl and HF were of potential concern" warranting further study and the "remaining [14] HAP evaluated in the Utility Study did not appear to be a public health concern.

Response to Comment 165: The EPA does not use the benefits estimates in the RIA to support the Appropriate and Necessary Finding. As shown in the Hg and non-Hg risk assessments supporting the finding, Hg and non-Hg HAP continue to pose hazards to public health and the environment, and U.S. EGU emissions cause and contribute to these hazards.

Comment 166: Commenter 18023 states that the EPA mistakenly views CAA section 112(c)(9)(B)'s on-in-one million risk standard as reflecting "Congress' view as to the level of health effects associated with HAP emissions that Congress thought warranted continued regulation under CAA section 112." 76 Fed. Reg. 24,993. According to the commenter, Congress established CAA section 112(f) as the appropriate level of risk and not the CAA section 112(c) delisting provisions. The commenter states that the D.C. Cir. Court stated that CAA section 112(f) requires the EPA to set standards that "provide an ample margin of safety to protect public health" and that "the 'ample margin' was met if...no person faced a risk greater than 100-in-one-million (one-in-ten-thousand)." *NRDC v. EPA*, 529 F.3d 1077 at 1082. The commenter states that specifically, the Court indicated that "(t)his standard, incorporated into the amended version of the (CAA), undermines petitioners' assertion that EPA must reduce residual risks to one-in-one million for all sources that emit carcinogenic hazardous air pollutant." *Id*. According

to the commenter, the EPA's identical assertion in the preamble to the proposed rule is also inconsistent with the statute for the same reason.

Response to Comment 166: The EPA disagrees with the commenter. The commenter misstates the D.C. Circuit's opinion in the referenced case. The court cited with approval EPA's interpretation of the 1970 CAA that the "ample margin" was met if as many people as possible faced excess lifetime cancer risks no greater than one-in-one million, and that no person faced a risk greater than 100-in-one million (one-in-ten thousand). In its opinion, the court also acknowledge that the one-in-one million risk level was adopted into the 1990 CAA by Congress as an "aspirational goal." Thus, the court upheld EPA's authority to establish risk levels between one-in-one million and 100-in-one million through reasoned decisionmaking.

Comment 167: Several commenters (17772, 17816, 18020 and 17718) state that the 1998 Utility Study confirmed that even with the assumed increase in emissions and exaggerated modeling data (e.g., HEM model overestimates impacts), the EPA determined that Hg was the only HAP emission that warranted regulation.

Response to Comment 167: The EPA does not agree with commenter's characterization of the 2000 listing or the proposed rule for the reasons set forth in the preamble to the proposed rule. The commenter also characterizes the Utility Study and we believe that document speaks for itself. We do note that the commenter makes much of the direction in CAA section 112(n)(1)(A) that the EPA develop and describe alternative control strategies for HAP "emissions which may warrant regulation under [CAA section 112]." Commenter then states that the EPA determined that only Hg emissions warranted regulation. But in the Utility Study the EPA developed alternative control strategies for all HAP so it is clear that the EPA believed at the time it issued the study that all HAP emitted from EGUs may warrant regulation under section 112.

Comment 168: Commenter 17838 states that the proposed Hg reductions do not appear to be appropriate or necessary, as significant Hg emission reductions have already been achieved in recent years through other means. As such, based on current emission rates, states the commenter, it is unlikely that further reductions in Hg emissions as a result of the proposed rule will achieve substantial additional environmental protection.

Response to Comment 168: The EPA does not agree with the commenter. The EPA maintains that the Appropriate and Necessary Finding is valid for all the reasons set forth in the preamble to the proposed rule and in this final action.

Comment 169: Commenter 17838 states that the proposed rule is not appropriate as it fosters the unintended closure of plants including plants with unique environmental benefits like coal-refuse-fired circulating fluidized bed (CFB) units.

Response to Comment 169: The EPA based the Appropriate and Necessary Finding on a determination that HAP emissions from EGUs pose hazards to public health and the environment that will not be resolved through imposition of the requirements of the CAA. The EPA does not agree that the potential closure of certain units undermines the legitimacy of the rule.

Comment 170: Commenter 17877 states that the court in *New Jersey* never ruled on the appropriateness of the EPA listing including whether it met the procedural and substantive requirements under CAA

section 307. According to the commenter, the EPA has not adequately explained its interpretation of appropriate and necessary in the context of CAA section 112(n)(1)(a) and listing under CAA section 112(c), unless it is contending that a mere "plausible link" between all man-made mercury emissions and MeHg in fish makes it appropriate and necessary. According to the commenter, the EPA's reinterpretation of CAA section 112(n)(1)(A) renders meaningless the appropriate and necessary requisites to CAA section 112 EGU HAP regulation. The commenter believes that CAA section 112(n) was added to address EGU emissions in a unique manner as compared to the other provisions of CAA section 112. The commenter states that no other language in CAA section 112 references the regulation of a source category of emissions if "appropriate and necessary." According to the commenter, as the EPA pointed out in its 2005 rule, its 2000 listing decision did not provide an interpretation of appropriate but instead focused on "facts and circumstances" of EGU emissions themselves.

Response to Comment 170: The EPA disagrees with the commenter. The EPA directs the commenter to the proposed rule and responses to comments in the preamble to the final rule for responses to the specific issues raised.

Comment 171: Commenter 19121 is concerned that the proposed rule is on thin legal ground and if promulgated as is there is a possibility for a legal challenge that will yet again delay control of Hg emissions.

Response to Comment 171: The EPA maintains that its legal interpretation of and factual basis for the Appropriate and Necessary Finding are reasonable.

Comment 172: Commenter 14115 states that the EPA's rule is a an extreme form of political advocacy, seeking to limit the already low levels of Hg emissions (relative to other anthropogenic and natural sources of Hg) from U.S. electric power plants. According to the commenter, the agency neglects most other active Hg emission sources and therefore the emission cuts the EPA proposes for Hg in EGUs will be "all pain and no gain" for Americans' public health.

Response to Comment 172: The EPA disagrees with the commenter. U.S. EGUs are currently the largest anthropogenic source of Hg in the U.S. Further, the EPA has not neglected other Hg sources as stated by the commenter. Since 1990, the EPA has promulgated regulations requiring the use of available control technology and other practices to reduce HAP emissions for more than 50 industrial sectors, and U.S. EGUs are the largest source of HAP emissions in the country that remains unaddressed by Congress's air toxics program.

11. 2000 Appropriate and Necessary Finding (and 2005 reversal).

Commenters: 14368, 17383, 17620, 17638, 17648, 17656, 17681, 17689, 17696, 17712, 17724, 17728, 17730, 17736, 17740, 17774, 17789, 17799, 17810, 17819, 17821, 17834, 17840, 17843, 17876, 17877, 17885, 17909, 17931, 18020, 18034, 18421, 18425, 18428, 18477, 18487, 19536/19537/19538, 18023

a. Comments generally supporting the EPA's 2000 Finding.

Comment 173: Commenter 17620 stated that they agree with the EPA's original determination in 2000 that regulating HAP emissions from U.S. EGUs under CAA section 112 is "appropriate and necessary." According to the commenter, they could "think of no reason why Congress would seek to limit

emissions of HAP from dry cleaners, electroplaters and other small businesses and, at the same time, exempt the largest sources of HAP emissions in the country."

Comment 174: Commenter 17620 states that the EPA's 2004 attempted reversal of the 2000 finding was properly rejected by the U.S. Court of Appeals. According to the commenter, Congress believed the regulation of HAP was appropriate and the Utility Study focused on whether the Acid Rain provisions reduced HAP to the point where further reductions would be inconsistent with the risks posed by the other sectors for which standards would be implemented.

Comment 175: Commenter 18421 states that given its focus on the human health effects reported in the Utility Study, the EPA's 2000 "appropriate" finding satisfied the only prerequisite for such a determination – the consideration of the Study.

Comment 176: Commenter 18421 states that although the EPA could justify its 2000 "appropriate" decision on health effects only, the EPA also based its finding on Hg's effects on the environment. This was proper, states the commenter, because CAA section 112(n) does not limit the factors that the EPA may take into account when making its determination.

Comment 177: Commenter 17648 states that the EPA's 2000 finding was well-supported by the Utility Study's conclusions that (1) there was a link between anthropogenic Hg emissions and MeHg found in freshwater fish (relying upon data from the Hg Study); (2) Hg emissions from coal-fired utilities were expected to worsen by 2010 and (3) MeHg in fish presents a threat to public health from fish consumption. The commenter states that this evidence on Hg alone supports a determination that it is appropriate and necessary to regulate EGUs under CAA section 112 to protect human health.

Comment 178: Commenter 17648 states that the EPA's Utility Study supported the finding in 2000 that is appropriate and necessary to regulate EGUs based upon the non-Hg HAP emissions, including nickel emissions from oil-fired EGUs. The commenter agrees with the EPA's conclusion in the finding that the agency lacked sufficient evidence to conclude that non-Hg HAP from U.S. EGUs posed no hazard and therefore, regulating emissions of those pollutants under CAA section 112 was needed. According to the commenter, the Utility Study confirmed that some EGUs had emissions resulting in a cancer risk from inhalation greater than one in one million thus precluding any decision to de-list EGUs from CAA section 112(c).

Comment 179: Commenters 17789 and 17819 state that they concur with the EPA's 2000 finding and the recent conclusion that Hg and other emissions from U.S. EGUs be regulated under CAA section 112. According to the commenters, the findings are unassailable and based on the correct interpretation of the CAA and sound science.

Comment 180: Commenter 17810 states that they support the 2000 Finding that regulation of HAP from natural gas-fired EGUs was not appropriate and necessary because the impacts due to HAP emissions from such units are negligible based on the results of the study documented in the utility RTC. According to the commenter, no additional information makes the 2000 finding invalid.

Comment 181: Commenter 18487 states that the EPA's Appropriate and Necessary Finding and simultaneous decision to list EGUs under CAA section 112(c) were fully justified in 2000. According to the commenter, not only is there clear evidence that the harm from Hg and MeHg continues, but also that increased risk of cardiovascular, respiratory, and other acute and chronic systemic damage is caused

by emissions from this industry of multiple air pollutants, including recognized carcinogens and other toxics.

Comment 182: Several commenters (19536, 19537, 19538) state that the EPA acted reasonably and well within the scope of its statutory authority in its 2000 finding concluding that regulation of EGUs under CAA section 112 was "appropriate and necessary."[2] According to the commenters, the EPA's original 2000 Appropriate and Necessary Finding was fully supported by the science before the agency at the time, and the EPA's reaffirmation of the finding in the preamble to the proposed rule demonstrates that nothing in the years since proves to the contrary. The commenters further note that there has been a great deal of new science in the interim period that provides ample support for the decision that MACT standards for this industry are necessary.

Comment 183: Several commenters (19536, 19537, 19538) note that in the 2000 Finding, although the EPA did not conclusively link Hg emitted from U.S. EGUs to MeHg in fish, nothing in the CAA requires the EPA to establish any such link. According to the commenters, nor does any statutory language require the EPA to make any specific or general health or environmental finding before determining that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs under CAA sections 112(d)(2) and (3); the EPA found that the "appropriate" finding was further supported because numerous control options were available at the time of the finding that would reduce HAP emissions.

Comment 184: Commenter 17843 states that they agree with the EPA's 2000 Finding that regulating HAP emissions from U.S. EGUs is "appropriate and necessary" and agrees with the EPA's current confirmation. The commenter also agrees with the EPA that its subsequent reversal of this finding in 2005 was in error.

Comment 185: Commenter 18425 states that the EPA's 2000 determination was proper under the law. The commenter notes that the CAA grants the Administrator discretion in her determination whether to regulate a point source under CAA section 112, and that discretionary decision should not be overly scrutinized. The commenter states that as one court noted, "where a statute is precautionary in nature, the evidence difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect the public health, and the decision that of an expert administrator, [courts] will not demand rigorous step-by-step proof of cause and effect." *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (Ct. App. D.C. Circ. 1978). According to the commenter, the negative health and environmental effects of Hg and other HAP, the existence and availability of HAP emission controls and the fact that EGUs are the largest unregulated stationary sources of HAP support the EPA's appropriate and necessary determination.

Response to Comments 173 - 185: The EPA agrees with the commenters that the 2000 Appropriate and Necessary Finding for coal and oil-fired EGUs was reasonable. The EPA also agrees with the commenters that noted that reviewing Court's defer to the reasoned scientific and technical decisions of an agency charged with implementing complex statutory provisions such as those at issue in this case. As the EPA stated in the preamble to the proposed rule, the EPA maintains that the 2000 finding was reasonable and based on well-supported evidence available at the time from, among other things, the Utility Study, the Hg Study, and the NAS Study, which all show the hazards to public health and the environment from HAP emissions from U.S. EGUs. New technical analyses conducted by the EPA confirm that it remains appropriate and necessary to regulate HAP emissions from U.S. EGUs.

[2] 65 FR 79,830.

Furthermore, the EPA agrees with the commenters on several points raised, specifically that EGUs were and remain the largest anthropogenic source of several HAP in the U.S., that risk assessments supporting the 2000 finding indicated potential concern for several non-Hg HAP, and that several available control options would effectively reduce HAP emissions from U.S. EGUs.

As asserted by the commenters, the EPA agrees that Congress did not exempt U.S. EGUs from HAP emission limits while simultaneously limiting emissions at other sources with less HAP emissions. Congress simply provided the EPA with a separate path for listing EGUs by requiring that the agency evaluate HAP emissions from U.S. EGUs and determine whether regulation under CAA section 112 was appropriate and necessary before such regulation may occur. Since 1990, the EPA has promulgated regulations requiring the use of available control technology and other practices to reduce HAP emissions for more than 50 industrial sectors, and U.S. EGUs are the largest source of HAP emissions in the country that remains unaddressed by Congress's air toxics program. The EPA listed EGUs in 2000 because the considerable amount of available data supported the conclusion that regulation of EGUs under CAA section 112 was appropriate and necessary. That finding was valid at the time and the EPA reasonably added EGUs to the CAA section 112(c) list of sources that must be regulated under CAA section 112.

In addition, the EPA agrees with commenters regarding the 2005 action. As fully described in the preamble to the proposed rule and supporting documents, the EPA erred in the 2005 action by concluding that the 2000 Finding lacked foundation.

b. Comments generally disagreeing with the 2000 Finding.

Comment 186: Commenter 17728 states that in the 2000 Finding that it was appropriate and necessary to regulate EGUs under CAA section 112, the EPA did not explain the terms "appropriate" and "necessary." According to the commenter, the amount of emission reductions needed was not provided and no alternative control strategies were offered.

Response to Comment 186: The commenter is correct that the EPA did not expressly define the terms "appropriate" and "necessary" in the 2000 Finding, but the finding is instructive in that it shows that the EPA considered whether HAP emissions from U.S. EGUs posed a hazard to public health and the environment and whether there were control strategies available to reduce HAP emissions from U.S. EGUs when determining whether it was appropriate to regulate EGUs. 65 FR 79830. When concluding it was necessary, the agency stated that imposition of the requirements of the CAA would not address the identified hazards to public health or environment from HAP emissions and that CAA section 112 was the proper authority to address HAP emissions. *Id*. The EPA explained in detail in the preamble to the proposed rule the conclusion that the 2000 Finding was fully supported by the information available at the time and the EPA stands by the conclusions in that notice. Furthermore, the EPA provided an interpretation of the terms appropriate and necessary that is wholly consistent with the 2000 Finding. The EPA does not agree with the commenter that a quantification of emissions reductions or a specific identification of the available controls was necessary to support the 2000 Finding and listing. The EPA considered the Utility Study when making the finding and that study clearly articulated the various alternative control strategies that EGUs could employ to control HAP emissions. See Chapter 13 of the Utility Study. As to emission reductions, the EPA cannot estimate the level of HAP emission reductions until the agency proposes a CAA section 112(d) standard after a source category is listed.

Comment 187: Commenter 17736 states that in 2005 the EPA recognized the potential for excessive regulation created by CAA section 112 and determined that the 2000 Finding lacked foundation and concluded that it was neither appropriate nor necessary to regulate coal- and oil-fired EGUs under CAA section 112. With respect to the necessary finding, states the commenter, the EPA stated that "error existed because EPA did not consider CAA sections 110(a)(2)(D) and 111 and that, considering actions under these CAA sections, hazard to public health from EGUs would be reduced."

Response to Comment 187: As fully described in the preamble to the proposal, the EPA erred in the 2005 action by concluding that the 2000 Finding lacked foundation. The 2005 action improperly conflated the "appropriate" and "necessary" analyses by addressing the "after imposition of the requirements of the Act" in the appropriate finding as well as the necessary finding. The EPA also indicated that it was not reasonable to interpret the necessary prong of the finding as a requirement to scour the CAA for alternative authorities to regulate HAP emissions from stationary sources, including EGUs, when Congress provided CAA section 112 for that purpose. The EPA asserts that the 2000 Finding was sound and fully supported by the record available at the time.

Comment 188: Commenter 17638 states that the EPA's 2000 Finding was limited to concerns with Hg emissions from coal-fired EGUs and potentially nickel from oil-fired EGUs and is fraught with misinformation and overestimating assumptions.

Response to Comment 188: The EPA disagrees with the commenter and maintains that the 2000 Finding was sound and fully supported by the record available at the time. The EPA concluded in the 2000 finding that the Utility Study and other information identified are a concern for Hg and potential concerns for several non-Hg HAP. Even though the EPA was not required to do so, the EPA conducted new technical analyses for this rule utilizing the best information available that confirm that risks remain from HAP emissions from U.S. EGUs.

Comment 189: Commenters 17834 and 17821 state the proposed rule is based on the 2000 Finding which is "more than 10 years later," and this delay presents serious concern as to the validity of the findings upon which the decision to regulate is based. According to the commenters, technology, the regulatory environment, and economic climate evolve from year to year and the EPA's reliance on these older studies and a 10 year old decision is not warranted. The commenters state that the Utility Report underestimated the amount of emissions controls that EGUs would install by 2010, and because the EPA just finalized the CSAPR, the basis for the EPA's 2000 Finding has changed.

Response to Comment 189: The EPA disagrees that there is any concern regarding the validity of the 2000 Finding. That finding was valid at the time it was made based on the information available to the agency and, therefore, the listing of EGUs is valid based on that finding alone. However, even though the EPA was not required to do so, the EPA conducted new technical analyses utilizing the best information available in 2010 as several years have passed since the 2000 Finding. These new analyses confirm that risks remain from HAP emissions from U.S. EGUs, even after taking into account emission reductions that have occurred since 2000 from promulgated rules, settlements, consent decrees, and closures.

Comment 190: Commenter 17728 states that following the 2000 Finding, the EPA "address[ed] its §307 responsibilities" and conducted a rulemaking finding that it was not appropriate to regulate HAP from U.S. EGUs because after accounting for reductions made under the CAA (including those being made under CAIR) "no hazards to public health" remained.

Response to Comment 190: As fully described in the preamble to the proposal, the EPA erred in the 2005 action by concluding that the 2000 Finding lacked foundation. The 2005 action interpreted the statute in a manner wholly inconsistent with the 2000 Finding and attempted to delist EGUs without complying with the mandates of CAA section 112(c)(9)(B). See *New Jersey*, 517 F.3d at 583 (vacating the 2005 "delisting" action). The EPA set forth a revised interpretation of CAA section 112(n)(1) that is consistent with the statute and the 2000 Finding, and, as explained in the preamble to the proposed rule, the 2000 finding was sound and fully supported by the record available at the time. The EPA also explained in the preamble to the proposed rule why the 2005 action was not technically or scientifically sound. The EPA specifically addressed the errors associated with the 2005 action in the preamble to the proposed rule and commenter's assertions do not cause us to revisit those finding in the final rule.

Comment 191: Commenter 17656 states that the EPA mistakenly interprets the term "necessary," and inappropriately divorces the terms "appropriate" and "necessary" in its analysis. According to the commenter, the EPA took the exact opposite position on each of these points in its 2005 reversal, underscoring the illegality of and eliminating any deference to its current position.

Response to Comment 191: The EPA disagrees with the commenter for all the reasons set forth in the preamble to the proposed rule. As the EPA explained, the 2005 action interpreted the statute in a manner inconsistent with the 2000 Finding, and the EPA provided a revised interpretation that is fully consistent with the CAA and that finding. The commenter is also incorrect in suggesting that a change in interpretation is per se invalid and the commenter has provided no support for that position. *See National Cable & Telecommunications Ass'n v. Brand X Internet Services*, 545 U.S. 967, 981 (2005) (discussing the deference provided to an Agency changing interpretations the Court stated "change is not invalidating, since the whole point of *Chevron* deference is to leave the discretion provided by ambiguities of a statute with the implementing Agency.") (Internal citations and quotations omitted).

Comment 192: Commenters 17689 and 17712 state that the EPA did not have a rational justification for its 2000 decision that it was appropriate and necessary to regulate EGU emissions as hazardous. The commenters state that addressing non-Hg metal HAP, the EPA found that although cancer risks are not high, they are not low enough to be eliminated as a potential public health concern, and regarding dioxins, HCl, and HF, the agency found them to be of "potential concern."

Response to Comment 192: The EPA asserts that the 2000 Finding was sound and fully supported by the record available at the time. The analysis accompanying this rule fully addresses all of commenters contentions and need not fully revisit the analysis in response to this comment; however, the EPA disagrees that it was not "rational" to determine that it was appropriate to regulate HAP emissions from U.S. EGUs due to the cancer risks identified in the Utility Study or the potential concerns associated with other HAP emissions from U.S. EGUs. The EPA maintains that uncertainty favors a finding that it is appropriate and necessary to regulate HAP emissions because even small amounts of HAP can cause significant harm to human health and the environment. The EPA is charged with interpreting the statute and evaluating the scientific and technical information to determine whether regulation of HAP emissions from U.S. EGUs is appropriate and necessary, and the agency is afforded considerable discretion when making such decisions. In the case of the 2000 Finding, the EPA identified a risk from Hg and some non-Hg metal HAP and a potential concern for other HAP emitted from U.S. EGUs. The EPA considered all the available information and concluded regulation was appropriate and necessary. Based on that valid finding, the EPA listed EGUs for regulation and listed sources must be regulated under CAA section 112(d).

Comment 193: Several commenters (17383, 17689, 17877, and 17885) state that the EPA found a "plausible link" between anthropogenic Hg (from EGU and all other man-made emissions) and MeHg in fish, thus concluding that EGU Hg emissions are considered a threat to public health. According to the commenters, potential concerns and "plausible links" are not adequate reasons to regulate EGU emissions under CAA section 112.

Response to Comment 193: The commenter appears in this comment to be referring to the 2000 Finding and listing of EGUs. The commenter implies that the agency was required to have made a specific finding like those made in this action before making the Appropriate and Necessary Finding. The commenter is wrong. CAA section 112(n)(1)(A) does not require such a finding and the agency reasonably concluded in 2000 that it was appropriate and necessary to regulate HAP emissions from U.S. EGUs based on the considerable amount of information available to the agency. The EPA explained in the preamble to the proposed rule why the 2000 Finding was valid at the time it was made.

Further, the EPA conducted new analyses in conjunction with the development of the CAA section 112(d) standards and found that HAP emissions from U.S. EGUs continue to pose a hazard to public health and the environment. As shown in the revised Hg Risk TSD and the Non-Hg Case Study Chronic Inhalation Risk Assessment, HAP emissions from U.S. EGUs pose a hazard to public health. These peer reviewed assessments, as well as the previous Utility Study, Hg Study, and NAS study, all lead to the same conclusion that HAP emissions from U.S. EGUs pose hazards to public health and the environment.

Comment 194: Commenter 18034 states that the 2000 Finding is questionable because the Hg emissions upon which the finding was made were inaccurate. According to the commenter, in 2000 the EPA estimated that about 60% of total Hg deposited in the U.S. came from U.S. anthropogenic air emission sources, and the EPA further said that of that 60%, approximately 30% was from U.S. EGU Hg emissions, which translated into about 18% of total deposition in the U.S. at that time. According to the commenter, in 2000, the EPA also estimated that EGU Hg emissions would increase from 46 tons in 1990 to over 60 tons in 2010. However, states the commenter, U.S. Hg emissions did not increase, but actually decreased to less than 30 tons a year and that according to the EPA EGUs, on average contribute about 2% of total Hg deposition across the country.

Response to Comment 194: The EPA disagrees that the emissions information provided in the 2000 Finding makes the finding "questionable" as stated by the commenter. The information upon which the EPA based the finding in 2000 was the best information available and the agency must make decisions based on the information they have, not on information that will not be available for many years. The 2000 Finding was sound and fully supported by that record, including the future year emissions projections. Even though Hg emissions have decreased since the 2000 finding instead of increasing as projected, the new technical analyses confirm that Hg emissions from U.S. EGUs pose a hazard to public health. Moreover, Hg emissions from U.S. EGUs also pose a hazard to the environment. The EPA also notes that the commenter's average deposition estimates fail to accurately characterize the Hg deposition problem in the U.S. As shown in Table 2-2 of the revised Hg Risk TSD, the EPA found that U.S. EGUs account for up to 11% of total Hg deposition for the 99th percentile watersheds in 2016.

Comment 195: Commenter 18429 notes that the EPA's decision that it is appropriate and necessary to regulate is based on the 2000 Finding that is over a decade old and since that time there have been decreases in HAP from EGUs.

Response to Comment 195: The EPA maintains that the 2000 listing was valid at the time it was made based on the information available to the agency. Because the EPA is still unable to delist EGUs pursuant to CAA section 112(c)(9)(B), the agency is required to regulate EGUs under CAA section 112(d). Furthermore, the EPA reaffirmed that it is appropriate and necessary to regulate HAP emissions from EGUs in the notice of proposed rulemaking.

c. Comments stating that the 2000 Finding only supports Hg regulation.

Comment 196: Commenters 17696 and 18477 state that, under the 2000 Finding, Hg is the only HAP emitted by EGUs for which the EPA made a specific finding of significant hazards to public health to support a determination that regulation under CAA section 112(n)(1)(a) is "appropriate and necessary." According to the commenters, in the 2000 Finding the EPA noted the uncertainty with respect to HAP emissions from oil-fired units. The EPA later clarified that, based on the record before the agency in 2000, its stated concern with the uncertainties of health impacts from oil-fired HAP emissions from U.S. EGUs emissions was limited to nickel emissions. 69 FR 4652, 4656, 4683-84 (Jan. 30, 2004). Subsequently, based on new information concerning diminished nickel emissions, the EPA decided that regulating nickel emissions from oil-fired EGUs was not warranted. 70 FR 28606, 28611 (May 18, 2005).

Comment 197: Commenters 17724 and 17799 state that the 2000 Final Report concluded that Hg is the HAP of greatest potential concern emitted from coal-based EGUs but never made an affirmative finding with respect to other HAP. According to the commenters, since the Final Report is the factual basis for the proposed rule, the EPA will exceed its statutory authority if it promulgates a final rule regulating HAP not identified in the Final Report. The commenters state that in the event that the EPA determines that it is "appropriate and necessary" to regulate EGUs under CAA section 112 after notice and comment rulemaking, the EPA must amend the proposed rule and limit its scope only to the HAP for which a factual foundation to regulate has been established in the Final Report.

Comment 198: Commenters 17774 and 18020 state that the EPA cannot regulate HAP other than Hg because the 2000 Finding authorizes only the regulation of Hg.

Comment 199: Commenter 18428 states that the EPA's 2000 determination identified health concerns only with Hg emissions from coal-fired power plants and potentially nickel from oil-fired units. Although the EPA did not find health concerns related to non-Hg HAP, states the commenter, the agency has decided to propose regulating a large number of HAP from U.S. EGUs despite the lack of data to support it.

Response to Comments 196 - 199: Nothing in CAA section 112(n)(1)(A) suggests that the EPA must determine that every HAP emitted by EGUs poses a hazard to public health or the environment before the EPA can find it appropriate to regulate EGUs under CAA section 112. In fact, the EPA maintains that it must find it appropriate and necessary to regulate EGUs under CAA section 112 if it determines that any one HAP emitted from U.S. EGUs poses a hazard to public health or the environment that will not be addressed through imposition of the requirements of the CAA. The EPA disputes the commenters' conclusion that the 2000 Finding was limited to Hg and nickel emissions, but, even if it was, the EPA reasonably concluded that EGUs should be listed pursuant to CAA section 112(c) based on the Hg and nickel finding. As stated in the 2000 finding, cancer risks from some non-Hg metal HAP (including arsenic, chromium (Cr), nickel, and cadmium) were not low enough to be eliminated as potential concern. 76 FR 79827. Source categories listed for regulation under CAA section 112(c) must

be regulated under CAA section 112(d), and the D.C. Circuit Court has stated that the EPA has a "clear statutory obligation to set emission standards for each listed HAP." *See Sierra Club v. EPA*, 479 F.3d 875, 883 (D.C. Cir. 2007), *quoting National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000). Therefore, even if the EPA concluded that CAA section 112(n)(1) authorized a different approach for regulating HAP emissions from U.S. EGUs, the chosen course, which is supported by the CAA (i.e., listing under CAA section 112(c)) requires the agency to regulate under CAA section 112(d) consistent with the statute and case law interpreting that provision. In any case, the EPA disputes that the 2000 Finding was limited as commenters suggest for the reasons set forth in the preamble to the proposed rule and, furthermore, the agency has conducted new analyses of HAP emissions from HAP emissions from U.S. EGUs that demonstrate it remains appropriate and necessary to regulate EGUs under CAA section 112.

d. Comments stating that the 2000 Finding was required to go through notice and comment.

Comment 200: Commenters 17840 and 17931 state that the EPA's 2000 determination has never been "fully ventilated" in front of the D.C. Circuit and therefore the EPA's authority to regulate EGUs under CAA section 112(d) is directly at issue in the preamble to the proposed rule.

Comment 201: Multiple commenters (17724, 17728, 17656, 17740, 17876, 17383, 17712, 17877) state that the 2000 Finding that it was appropriate and necessary to regulate EGUs under CAA section 112 failed to go through public notice and comment. According to the commenters, CAA section 307(d)(1)(C) together with CAA section 112(n)(1)(A) requires that any decision made under CAA section 112(n) must go through public notice and comment. The commenters further stated that the failure to undertake this non-discretionary requirement means that final promulgation of this MACT is outside the EPA's statutory authority.

Comment 202: Commenter 17730 states that the 2000 Finding ignored the plain English directive from Congress and the administrative guidance set out in the Clinton Administration's EO 12866.

Comment 203: Commenter 17689 states that the 2000 rule did not provide an opportunity for interested parties to comment on a rule having immense implications on the utility industry from at least cost and reliability standpoints.

Comment 204: Commenters 18034 and 18023 state that in the 2000 Finding the EPA did not allow for public comment and did not define their interpretation of the terms "appropriate and necessary" in making the finding under CAA section 112(n)(1)(A). According to the commenters, the EPA's attempts to provide after the fact support for its 2000 Finding with new legal analysis and new factual information is contrary to *New Jersey v. EPA* which held that the EPA may not revisit its 2000 Finding except through delisting under CAA section 112(c)(9).

Comment 205: Commenters 17885 and 17383 state that interested parties had no opportunity to comment on at least three major and critical issues posed in the 2000 final rulemaking: first, whether the EPA's interpretation of CAA section 112(n)(1)(A) regarding the specific requirements of the mandatory study provisions was correct, or at least not arbitrary; second, whether the EPA's scientific conclusions of the hazardous associated with HAP emissions from U.S. EGUs was correct, or at least not arbitrary; and third, whether the EPA's interpretation of "necessary and appropriate" requisite under CAA section 112(n)(1)(A) to regulating HAP emissions from U.S. EGUs under CAA section 112 was correct; or at least not arbitrary.

Comment 206: Commenter 17909 states that the EPA failed to meet its statutory obligations under CAA section 307(d)(1)(c) in issuing the 2000 Finding and the current proposed rule does not remedy the EPA's failure to provide the public an opportunity to comment on it and the underlying data and methodology. According to the commenter, in contrast to the 2000 Finding, the 2005 Finding concluding it was not "appropriate" to regulate U.S. EGUs under CAA section 112, was reasoned and proper; this proposed rule reverts back to the 2000 Finding without adequate explanation or support.

Comment 207: Commenter 14368 states that the EPA's 2000 Finding should be reviewed once again when the EPA issues actual NESHAP.

Response to Comments 200 - 207: Commenters are incorrect in their assertions of certain procedural requirements associated with the 2000 listing. The EPA did not violate CAA section 307(d) by not providing notice and comment opportunity before making the Appropriate and Necessary Finding. Commenter UARG challenged the EPA's 2000 Finding and listing on the same grounds and the D.C. Circuit dismissed the case because CAA section 112(e)(4) clearly states that listing decisions cannot be challenged until the agency issues final emission standards for the listed source category. *See UARG v. EPA*, 2001 WL 936363, No. 01-1074 (D.C. Cir. July 26, 2001). The EPA provided the public an opportunity to comment on both the 2000 Finding and the 2011 analyses that support the appropriate and necessary determination as part of the proposed rule, and anyone may challenge the listing in the D.C. Circuit in conjunction with a challenge to this final rule. Commenters could have also commented on the CAA section 112(n)(1) studies (e.g., the Utility Study and the Mercury Study) as they were included in the docket, but the EPA is not aware of any comments on those studies. In any case, these studies were peer reviewed and considered the best information available at that time. The EPA fully complied with the rulemaking requirement of CAA section 307(d).

The EPA also disagrees with commenters' characterization of the *New Jersey* case. The D.C. Circuit did not say as one commenter suggested that the EPA is not able to consider additional information that is collected after the 2000 Finding; instead, the Court stated that the EPA could not just revise its Appropriate and Necessary Finding and remove EGUs from the CAA section 112(c) list without complying with the delisting provisions of CAA section 112(c)(9). *See New Jersey*, 517 F.3d at 582-83. The EPA also disagrees with the commenter's assertion that the EPA disregarded EO 12866 when making the 2000 Finding. As stated in the Federal Register notice, the 2000 Finding did not impose regulatory requirements or costs, and the finding was reviewed by the Office of Management and Budget (OMB) in accordance with the EO. 65 FR 79831. In any case, noncompliance with the EO would not invalidate the EPA action under the CAA.

1C - New Technical Analyses: General Comments

1. Agreement that new analyses confirm that it remains appropriate and necessary to regulate HAP emissions from U.S. EGUs under CAA section 112 of the CAA.

Commenters: 17620, 17648, 19536, 19537, 19538

Comment 1: Commenter 17620 believes that the data obtained from the most recent round of industry testing support emissions standards at least as stringent as those proposed by the EPA. The commenter notes that the technology needed to meet these standards has been in use in this sector for 10 to 40 years, and has been shown to be effective and affordable. The commenter also points out that the determination of whether Hg emissions from this sector should be regulated has been the subject of two in-depth EPA reviews, as well as a review by the National Academy of Sciences (NAS).

Comment 2: Commenter 17648 agrees that regulating EGUs under CAA section 112 on the basis of today's facts remains appropriate and necessary. The commenter notes that it is particularly appropriate to regulate EGUs under the facts in existence today because emissions control technology has been further developed. According to the commenter, use of Trona and dry sorbent injection has provided proven and cost-effective control of acid gases, and the stabilization of natural gas prices over the last decade due to the development of abundant shale gas supplies has made fuel switching and switching dispatch to underutilized combined cycle plants more feasible. Moreover, the commenter states, imposition of toxics controls by increasing numbers of stated makes a uniform federal requirement that levels the playing field even more of an imperative today than in 2000.

Commenter 17648 notes that environmental effects from Hg emissions, the creation of "hotspots" from the deposition of Hg in concentrated areas around individual EGUs, and the potential for re-emission of Hg all bolster the basis for regulating HAP emissions from U.S. EGUs under CAA section 112.

Comment 3: Several commenters (19536, 19537, 19538) state that the new technical analyses reaffirm the 2000 Finding that regulation of toxic air pollution from U.S. EGUs under CAA section 112 is appropriate and necessary. One commenter states that the new technical analyses incorporate present and future projections of HAP emissions, modern air pollution modeling tools, current control technologies, and updated pollutant emissions regulations. According to the commenter, the results clearly demonstrate that not only was the 2000 decision justified at the time, but that 11 years later, the science shows that it is even more critical to regulate HAP emissions from U.S. EGUs.

The commenter goes on to state that the EPA's 2000 Finding and contemporaneous listing decision were fully supported at the time they were made, and new studies performed since 2000 provide further support for the decision to regulate HAP emissions from this industry. According to the commenter, because the CAA makes clear that listing a source category is not judicially reviewable until issuance of final CAA section 112 emissions standards (section 7412(e)(4)), the EPA clearly may augment and supplement its original 2000 Appropriate and Necessary Finding with subsequent information, analysis and arguments to support and reaffirm that earlier finding. The commenter states that there is nothing in the CAA that freezes in time the Appropriate and Necessary Finding made in 2000, nor is there any prohibition on the EPA's ability to supplement and update that finding up until the time that it issues final emissions standards for EGUs. Indeed, states the commenter, the natural reading of CAA sections 112(n)(1)(A) and 112(e)(4) together make clear that the D.C. Circuit will review both the Appropriate

and Necessary Finding and the related listing decision based upon the administrative record associated with issuance of final MACT emissions standards for EGUs.

Response to Comments 1 - 3: The EPA agrees that the new technical analyses (e.g., the risk assessments and the technology assessment) confirm the 2000 Appropriate and Necessary Finding. The Hg Risk TSD was peer reviewed by the EPA's independent Science Advisory Board (SAB) during the public comment period, and the panel assigned to review the assessment concluded "the design of the risk assessment [w]as suitable for its intended purpose, to inform a decision-making regarding an "appropriate and necessary finding" for regulation of HAP from coal- and oil-fired EGUs" (U.S. EPA-SAB, 2011)[3]. The risk assessment methodology for the non-Hg case studies was consistent with the methodology that the EPA uses for assessments performed for Risk and Technology Review rulemakings, which underwent peer review by the SAB in 2009[4]. During the public comment period, the EPA also completed a letter peer review of the methods used to develop inhalation cancer risk estimates for Cr and nickel compounds, and those reviews were supportive. The EPA revised both TSDs documenting the two risk assessments consistent with recommendations from the peer reviewers as part of the final rulemaking and has made those revised TSDs available in the rule docket. Although these new analyses were not required, the EPA agrees that it was authorized to conduct additional analyses to confirm the 2000 Finding. The EPA also agrees with the commenters that the 2000 Finding was valid at the time it was made based on the CAA section 112(n)(1) studies and other information available to the agency at that time. The public has been provided a fair opportunity to evaluate both the 2000 Finding and the new assessment, each of which independently support the listing of coal- and oil-fired EGUs.

Comment 4: Commenter 17620 states that the substantial reductions in Hg, HCl, $PM_{2.5}$ and SO_2 that are projected by the Integrated Planning Model (IPM) analyses are needed to protect public health and to improve the environment.

Response to Comment 4: The EPA agrees that the final rule will lead to substantial reductions in HAP emissions from U.S. EGUs and that control of the HAP will lead to public health and environmental benefits as discussed in the RIA.

Comment 5: Commenter 17648 notes that the EPA's Hg Risk TSD confirms that the risk from Hg emitted from U.S. EGUs at 2010 levels that deposits in watersheds, bio-accumulates in fish tissue, and is consumed by humans, thereby threatening public health. The commenter also states that other studies conducted since the Finding confirm that there are serious health risks to the developing fetus from MeHg exposure and that more MeHg is distributed to the fetus than was previously estimated,

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[3] U.S. Environmental Protection Agency – Science Advisory Board (U.S. EPA-SAB). 2011. Peer Review of EPA's Draft National-Scale Mercury Risk Assessment. The EPA-SAB-11-017. September. Available on the internet at http://yosemite.epa.gov/sab/sabproduct.nsf/BCA23C5B7917F5BF8525791A0072CCA1/$File/EPA-SAB-11-017-unsigned.pdf.

[4] U.S. Environmental Protection Agency – Science Advisory Board (U.S. EPA-SAB). 2010. *Review of EPA's draft entitled, "Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing". The EPA*-SAB-10-007. May. Available on-line at: http://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf

increasing the prospect for neurological deficiencies in newborns. According to the commenter, this risk to human health alone justifies regulating EGUs under CAA section 112.

Response to Comment 5: Based on the results of the Hg risk assessment set forth in the Hg Risk TSD, the EPA agrees that Hg emissions from U.S. EGUs pose a hazard to public health that warrants regulation under CAA section 112. The revised Hg Risk TSD provides analyses that increase our confidence in the results presented in the Hg Risk TSD.

Comment 6: Commenter 17648 also states that non-Hg HAP emissions from poorly controlled EGUs present a risk to human health and the environment warranting regulation under CAA section 112. The commenter notes that EGUs are the predominant sources of HCl and HF emissions in the U.S., as well as the leading or a major source of other non-Hg HAP, including arsenic, antimony, Cr, nickel, and Se which adversely affect human health. The commenter also notes that emissions of HF, HCl, and toxic metals such as antimony, arsenic, beryllium, cadmium, Cr, cobalt, lead, manganese, nickel, and Se, which are contained in $PM_{2.5}$, cause severe respiratory problems, cancer, neurological and organ damage, and adverse reproductive effects. In addition, the commenter points out that HCl exposure has been shown to irritate and restrict the airways of asthmatics, and both HCl and HF irritate and damage eye tissue, nasal passages, and lungs; that fine PM, which includes most non-Hg metals emitted by coal-fired EGUs, are smaller than the width of a human hair and, when inhaled, may deposit along the respiratory tract or penetrate deeply into the lungs from where they can enter the bloodstream; that as a result, inhalation of fine PM is recognized to cause cardiovascular effects, including heart attacks, and can cause inflammation of lung tissue; that more generally, studies demonstrate that people living in cities with higher fine particle pollution levels have lower life expectancies than people living in cities with cleaner air; and that studies of individuals exposed to fine PM reflect that exposure to $PM_{2.5}$ correlates with markers of cardiovascular damage, including irregular heartbeat and pulmonary and systemic inflammation. The commenter stated that because of these health effects, the EPA has ample evidence to support a determination that non-Hg HAP emissions present a risk to human health.

Response to Comment 6: Based on the results of the Non-Hg Case Study Chronic Inhalation Risk Assessment and other analyses, the EPA agrees non-Hg HAP emissions from U.S. EGUs pose a hazard to public health that warrants regulation under CAA section 112. Moreover, HAP from U.S. EGUs pose a hazard to the environment.

Comment 7: Several commenters (19536, 19537, 19538) note that three distinct quantitative and qualitative technical analyses were conducted by the EPA that determined HAP emissions from U.S. EGUs contributed to the risk of adverse effects to public health or the environment; these were: (i) EPA's revised Hg Risk TSD; (ii) EPA's case studies of cancer and non-cancer inhalation risks for non-Hg HAP; and (iii) EPA's qualitative assessment of potential environmental risks from deposition of HAP. One commenter states that the results from all three risk analyses conducted indicate that HAP from U.S. EGUs pose hazards to public health and the environment.

Response to Comment 7: The EPA agrees that HAP emissions from U.S. EGUs pose a hazard to public health that warrants regulation under CAA section 112. Moreover, HAP from U.S. EGUs pose a hazard to the environment.

2. Disagreement that new analyses confirm that it remains appropriate and necessary to regulate HAP emissions from U.S. EGUs under CAA section 112 of the CAA.

Commenters: 17712, 17834, 17877, 18443, 18023

Comment 8: Commenter 17712 states that in EPA's 2000 decision they found "plausible links" of health effects of all man-made sources of Hg, and "potential concerns" of health effects of certain metal emissions, dioxins and acid based aerosols. According to the commenter, the EPA may have realized that this finding did not provide justification to regulation EGUs under CAA section 112 and therefore the EPA provided a new analysis. The commenter asserts that none of these evaluations demonstrates that EGU regulation under CAA section 112 is necessary and appropriate.

Response to Comment 8: The EPA disagrees with the commenter's implication that the EPA conducted the new appropriate and necessary analysis because of alleged flaws in the 2000 finding. As explained in detail in the preamble to the proposed rule, the 2000 finding was wholly valid and reasonable based on the information available to the agency at that time. Further, the EPA maintains that had it complied with the statutory mandate to issue CAA section 112(d) standards within 2 years of listing EGUs, no additional analysis would have likely been conducted to support the listing. The EPA conducted the new analyses because the agency recognized that given the considerable lag in time between listing EGUs and proposing standards it was reasonable to confirm that it remains appropriate and necessary to regulate EGUs under CAA section 112. In conducting the new analysis, the EPA corrected errors that affected the 2005 analysis finding that it was neither appropriate nor necessary to regulate EGUs under CAA section 112 and used updated information to support the finding.

Comment 9: Commenters 17712 and 18443 state that for acid gases, especially HCl and HF, the EPA identified no study or rational basis to demonstrate concrete health concerns associated with these types of emissions. According to the commenters, the fact that the EPA Administrator "remains concerned" about potential effects of these acid gases falls far short of any reasonable appropriate and necessary basis to regulate them under CAA section 112. The commenters state that for non-Hg HAP, the EPA produced one study on chronic inhalation risk assessment that identified three sites with cancer risks greater that one in one million for hexavalent Cr; the study was authored by EPA staff, has not been peer reviewed, and raised numerous critical issues fundamental to its validity. For example, state the commenters, surrogate speciated Cr emissions data were used at the study sites instead of actual emissions information, emissions factors were derived where site unit data was unavailable, in some cases the units were assumed to run 100% of the time which is impossible, dispersion modeling was used that is biased towards over-predicting downwind impacts, and estimated ambient concentrations were utilized as substitutes for real exposure concentrations for all people within a census block. In short, state the commenters, the study was nothing more than a rough synthetic attempt at ascertaining the EPA-desired individual risk information.

Commenter 17712 concludes that the EPA's conclusions appear inconsistent with other research efforts and are highly suspect, especially considering the study's shortfalls as cited above. Even if taken as accurate representation, the commenter believes the results hardly demonstrate that it is necessary and appropriate to regulate HAP emissions from coal-fired U.S. EGUs under CAA section 112 because three sites nation-wide show risks greater that one in one million with the highest at eight in one million.

Response to Comment 9: The commenter makes much of the fact that the EPA identified at proposal only three coal-fired EGU facilities that had a maximum cancer risk greater than 1 in a million, the level below which sources may petition to delist under CAA section 112(c)(9)(B)(i), but the commenter fails to note that the finding was based on an analysis of only sixteen case study facilities and the total number of facilities with risks greater than 1 in a million was four. Furthermore, an additional four of the

16 case study facilities showed maximum cancer risks equal to 1 in a million. In these assessments, the EPA only quantified the risk attributable to the EGU facility itself without considering the location of the facility and the other HAP-emitting facilities that may be located in sufficiently close proximity to exacerbate the cancer risks for the exposed population. Cumulative HAP inhalation risks for the population near these facilities could be substantially greater. As stated at proposal, the EPA concludes it is unreasonable and unrealistic to view HAP emissions from U.S. EGUs emissions as if they occur in a bubble because that is not the manner in which the public is exposed to HAP emissions. In sum, the EPA maintains that the level of risk from non-Hg metallic HAP from U.S. EGUs alone makes it appropriate and necessary to regulate such sources under CAA section 112(d) and that is before even considering the total HAP risk for affected populations. This determination is consistent with the valid interpretation of CAA section 112(n)(1) set forth in the preamble to the proposed rule.

Concerning the acid gas HAP, the EPA disagrees with the notion that each HAP emitted by U.S. EGUs requires its own separate Appropriate and Necessary Finding. Furthermore, in the inhalation case studies, the EPA was only able to quantify the portion of the acid gas risks that might be attributable to hydrogen chloride and HF emissions. While these estimated risks (which are associated with chronic non-cancer impacts, but not cancer) by themselves were not very high, the EPA noted that they carry the potential to combine with other respiratory irritants from other nearby sources to create cumulative exposures of concern to nearby residents. The EPA also noted the sheer tonnage of HCl emitted by all EGUs nationally as a potential concern, as there was the potential for these emissions to acidify natural environments. Additionally, the EPA was not able to get quantitative emission information about the other acid gases (including chlorine and HCN), some of which are more potent respiratory irritants than HCl. As a result, the EPA continues to be concerned about the potential impacts of acid gas emissions from U.S. EGUs.

The EPA disagrees that the case study analysis for non-Hg HAP is not valid. The EPA's dispersion modeling of the case study facilities was performed consistent with EPA's Guideline on Air Quality Models,[5] and used:

1) 5 years of recent meteorological data from the weather station nearest to each facility, rather than 1 year of meteorological data. This is more representative of long-term (i.e., lifetime) exposures and risks.
2) Temporally-varying emissions based on continuous emissions monitoring data, rather than assuming a constant emission rate for each facility throughout the entire simulation.
3) Building downwash, where appropriate.
4) The latest version of AERMOD [version 11103]

The EPA's assessment of the case study facilities for the proposed rule concluded that, out of the 16 case studies, three coal-fired facilities and one oil-fired facility had estimated lifetime cancer risks greater than one in a million. For the final rule, revisions were made to the 16 case studies partly based on comments received, and the results indicate that five coal-fired facilities and one oil-fired facility had estimated lifetime cancer risks greater than one in a million.

Regarding peer review, the risk assessment methodology for the case studies was consistent with the methodology that the EPA uses for assessments performed for Risk and Technology Review rulemakings, which underwent peer review by the SAB in 2009. Also, in July 2011, the EPA completed

[5] Appendix W to 40 CFR 51

a letter peer review of the methods used to develop inhalation cancer risk estimates for Cr and nickel compounds, and the reviews were supportive. The EPA also disagrees that units were assumed to operate 100% of the time. The dispersion modeling performed for the case study facilities used hourly heat input as a temporalization factor for estimating hourly emissions, and in some cases hourly heat inputs (and emissions) were zero or very low.

The EPA disagrees with the commenters' assertion that "real exposure concentrations for all people within a census block" must be considered because it runs counter to the long-standing approach that the EPA took to estimate the maximum individual risk (MIR). The MIR is defined by EPA's Benzene NESHAP regulation of 1989 and codified by CAA 112(f) as the lifetime risk for a person located at the site of maximum exposure 24 hours a day, 365 days a year for 70 years (e.g., census block centroids). 54 FR 38044. The MIR is the risk metric associated with the determination of whether or not a source category may be delisted from regulatory consideration under CAA section 112 (112(c)(9)). The MIR is the risk metric used to characterize the inhalation cancer risks associated with the case study facilities. To evaluate the MIR, the EPA used the estimated annual average ambient air concentration of each HAP at each census block centroid as a surrogate for the lifetime inhalation exposure concentration of all the people who reside in that census block. The EPA used this approach to estimate MIR values in all of its risk assessments to support risk-based determinations and rulemakings under CAA section 112 of the CAA to date.

Comment 10: Commenter 18023 questions whether acid gas emissions limits proposed for oil-fired units are "appropriate" or "necessary." The commenter asserts that the EPA's preamble and the health studies referenced in it do not provide any compelling evidence of a health concern arising from acid gas emissions from oil-fired units. Rather, states the commenter, the EPA's entire discussion of the possible health concerns associated with the emissions from oil-fired units focuses solely on nickel emissions, and the EPA admits that significant uncertainty remains as to whether those emissions present a health concern as well. The commenter goes on to say that nickel emissions from oil-fired EGUs contributed most to the potential cancer-related inhalation risks, but those risks were not high. According to the commenter, the non-cancer risk assessment due to inhalation exposure indicated exposures were well below the reference levels. The commenter states that in discussing its findings (in the 2000 Appropriate and Necessary Finding), the EPA also noted that uncertainties remained concerning the extent of the public health impact from HAP emissions from oil-fired units.

Response to Comment 10: The EPA does not agree with the commenter's implication that the EPA must make a separate appropriate and necessary finding for each HAP emitted by U.S. EGUs before the agency may list and regulate EGUs under CAA section 112. The EPA's interpretation of CAA section 112(n)(1) is set forth in the preamble to the proposed rule and it is reasonable. Under that interpretation, the agency concludes that it may list EGUs under CAA section 112(c) if it determines that even one HAP emitted from U.S. EGUs poses a hazard to public health or the environment that will not be addressed through imposition of the requirements of the CAA. 76 FR 24988. Once the agency lists EGUs under CAA section 112(c), it must regulate such units under CAA section 112(d) unless the agency can delist such sources, which the EPA's risk analyses demonstrates is not possible. The D.C. Circuit Court has stated that the EPA has a "clear statutory obligation to set emission standards for each listed HAP." *See Sierra Club v. EPA*, 479 F.3d 875, 883 (D.C. Cir. 2007), quoting National Lime Association v. EPA, 233 F.3d 625, 634 (D.C. Cir. 2000).

Furthermore, the EPA reasonably concluded that it was appropriate and necessary to regulate oil-fired EGUs in 2000 and the EPA confirmed that conclusion was proper with the analysis set forth in the

preamble to the proposed rule. The commenter appears to take issue with the determination based on its view of how the agency can and should exercise its discretion. The EPA disagrees and stands by the determination for the reasons set forth in the preamble to the proposed rule. The EPA's determination that the maximum cancer risks posed by emissions of oil-fired EGUs are greater than 1 in a million, owing primarily to emissions of nickel compounds, is well-founded based on the available information. See discussion of the peer review of the methods for estimating nickel and Cr risks below.

Concerning the acid gas HAP, in the EPA's inhalation case study assessments, the EPA was only able to quantify the portion of the acid gas risks which might be attributable to HCl and HF emissions. While these estimated risks (which are associated with chronic non-cancer impacts, not cancer) by themselves were not very high, the EPA noted that they carry the potential to combine with other respiratory irritants from other nearby sources to create cumulative exposures of concern to nearby residents. The EPA also noted the sheer tonnage of HCl emitted by all EGUs nationally as a potential concern, as was the potential for these emissions to acidify natural environments. Additionally, the EPA was not able to get quantitative emission information about the other acid gases (including chlorine and HCN), some of which are more potent respiratory irritants than HCl. As a result, the EPA continues to be concerned about the potential impacts of acid gas emissions from U.S. EGUs.

Comment 11: Commenter 17834 argues that the EPA does not have the authority to rely on "additional technical analyses." The commenter states that CAA section 112 is clear: the agency is to make the "appropriate and necessary" finding on the basis of the Utility Study alone. The decision to consider additional technical analyses is one of many ways in which the EPA unreasonably stretched the language of CAA section 112. The commenter also points out that the EPA highlights the "very strict deadlines" Congress provided in CAA section 112 as justification for their current imposition of the Utility MACT rule. According to the commenter, the EPA's justification is belied by the fact that the studies upon which the proposed rule relies were ordered more than 20 years ago and were finally completed more than 10 years ago. The commenter states that promptness was necessary not only to get the HAP issue resolved but also to make certain that costly regulation of power generators was undertaken only in light of timely, accurate information. According to the commenter, imposing costly regulation upon the power generating industry on the basis of stale data that does not account for the current regulatory landscape is unreasonable and will not withstand legal challenge.

Response to Comment 11: The EPA disagrees with the commenter's assertion that the EPA may only consider the Utility Study in determining whether it is appropriate and necessary to regulate EGUs under CAA section 112 for the reasons set forth in the preamble to the proposed rule.[6] Commenter provides no legal basis that would cause us to reconsider the conclusion concerning the consideration of information when evaluating whether it is appropriate and necessary to regulate HAP emissions from U.S. EGUs. The EPA also disagrees with the commenter's interpretation of the basis for the Finding to the extent the commenter believes the Finding was at all based on "very strict deadlines" in CAA section 112. The EPA's 2000 and 2011 findings are based on the hazards to public health that HAP emissions from U.S. EGUs pose. The EPA notes the strict deadlines as an indication that Congress expected prompt action to evaluate and, if appropriate and necessary, regulate HAP emissions from U.S. EGUs and that the agency has not fulfilled that directive. The EPA does not agree with the commenter's characterization of why Congress wanted prompt action and it provided no support for its conclusion so the EPA need not address it further.

[6] 76 FR 24988.

As the EPA stated in the preamble to the proposed rule, the 2000 finding was valid at the time it was made based on the information available to the agency at that time, including the Utility Study. The EPA conducted new analyses because over 10 years had passed since the 2000 Finding, and the EPA wanted to evaluate HAP emissions from U.S. EGUs based on the most accurate information available, though the agency was not required to reevaluate the 2000 Finding. This conclusion based on the new data is that it remains appropriate and necessary to regulate HAP emissions from U.S. EGUs. Finally, the EPA disagrees with the commenter's assertion that the agency is not authorized to consider new information and at the same time unable to use the information available because it is "stale." Under this theory, the agency could not ever make an Appropriate and Necessary Finding prospectively, thereby excusing the agency from its obligations to protect public health and the environment because it did not diligently act in undertaking its statutory responsibilities. This is an illogical result that finds no basis in the statute.

Comment 12: Commenter 17877 notes that the 2000 decision only found "plausible links" of health effects of all man-made sources of Hg, and "potential concerns" of health effects of certain metal emissions, dioxins and acid based aerosols. The commenter states that even assuming there is validity in these findings, none of these findings individually or in combination is adequate justification to regulate EGU emissions under CAA section 112. The commenter also states that none of the analyses performed for acid gases, non-Hg HAP and Hg demonstrate that EGU regulation under CAA section 112 is necessary and appropriate.

Response to Comment 12: The EPA disagrees with the commenter's interpretation of the information available that supported the 2000 Finding for the reasons set forth in the preamble to the proposed rule, and the EPA is not revising these conclusions.[7] The EPA has considerable discretion when evaluating hazards to public health and the environment and we decline to adopt commenter's view of the information. The EPA also disagrees with commenter's conclusions to the extent they are directed at the new technical analyses. The Hg Risk TSD and the Non-Hg Case Study Chronic Inhalation Risk Assessment were both peer reviewed during the public comment period and both showed that HAP emissions from U.S. EGUs pose a hazard to public health. Moreover, HAP from U.S. EGUs pose a hazard to the environment. The EPA revised both TSDs documenting the two risk assessments consistent with recommendations from the peer reviewers as part of the final rulemaking and has made those revised TSDs available in the rule docket.

3. Adequacy of data quality and documentation for new technical analyses.

Commenters: 17751, 10167, 10569, 6543

Comment 13: Commenter 17751 states that the proposed rule does not conform to the Information Quality Act (IQA) or the EPA's guidelines implementing the IQA. According to the commenter, objectivity related standards of the IQA require that information relied on by the EPA be accurate, reliable, unbiased, and presented in a complete and unbiased manner. The commenter notes that the report by Willie Soon supports a finding that the data upon which the EPA relies is "incomplete and inaccurate." *See* Willie Soon, PhD, A Scientific Critique of the Environmental Protection Agency's "National Emission Standards for HAP [NESHAP] from Coal- and Oil-fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial- Commercial-Institutional Steam Generating Units" Proposed Rule (March 16, 2011) – Focusing on the Hg Emission Issues, June 2011.

[7] 76 FR 24993- 24998.

Response to Comment 13: The EPA strongly disagrees with the commenter. The EPA used peer reviewed information and quality assured data in all aspects of the technical analyses used to support the Appropriate and Necessary Finding supporting this regulation. In addition, the EPA submitted the Hg Risk TSD to the SAB, which reviewed the analysis and "supports the overall design of and approach to the risk assessment and finds that it should provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs" (U.S. EPA-SAB, 2011). The SAB received the comments from Willie Soon, and had those comments available for consideration in their deliberations regarding the Hg Risk TSD. The SAB provided substantial comments and recommendations, however, none of the comments or recommendations challenged the fundamental information relied upon by the EPA, and in fact, the SAB specifically supported a number of the elements of the analysis that were the subject of criticisms by Willie Soon. Two of these are discussed here as examples. One of Willie Soon's major criticisms is the use of the EPA's RfD for MeHg as a benchmark for risk. On this matter, the SAB specifically "agrees that EPA's calculation of a hazard quotient for each watershed is appropriate as the primary means of expressing risk because it is based on an established RfD for MeHg that reflects a range of potential neurobehavioral effects" (U.S. EPA-SAB, 2011). A second major criticism from Willie Soon is that "EPA proposal neglects key scientific knowledge and many peer reviewed papers that suggest there is no straightforward connection between Hg emissions from power plants or other man-made sources to the Hg level in fish." Again, the SAB specifically "agrees with the Hg Maps approach used in the analysis and has cited additional work that supports a linear relationship between Hg loading and accumulation in aquatic biota. These studies suggest that Hg deposited directly to aquatic ecosystems can become quickly available to biota and accumulated in fish, and reductions in atmospheric Hg deposition should lead to decreases in MeHg concentrations in biota." The EPA thus rejects the commenters' statements that the data used in the Hg Risk TSD is "incomplete and inaccurate" and therefore rejects the statement that the proposed rule does not conform to the IQA.

In addition, the risk assessment methodology for the non-Hg case studies is consistent with the methodology that the EPA uses for assessments performed for Risk and Technology Review rulemakings, which underwent peer review by the SAB in 2009 (U.S. EPA-SAB, 2010).[8] During the public comment period, the EPA also completed a letter peer review of the methods used to develop inhalation cancer risk estimates for Cr and nickel compounds, and those reviews were supportive. For the final rulemaking, the EPA revised both risk assessments consistent with recommendations from the peer reviewers. The EPA relies on the SAB's review of the quality of the information supporting the analytical results. Accordingly, contrary to the commenters' assertions, the EPA acted consistently with the Information Quality Act as well as EPA and OMB's peer review requirements.

Comment 14: Commenters 10167 and 10569 state that the agency has not provided information on risk assessment, which is a key component to the proposal.

Response to Comment 14: The EPA disagrees that it has not provided information on the risk assessments. Although the commenters do not specify which risk assessment they are referencing, both

[8] U.S. Environmental Protection Agency – Science Advisory Board (U.S. EPA-SAB). 2010. *Review of EPA's draft entitled, "Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing"*. EPA-SAB-10-007. May. Available on-line at: http://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf

the Hg and Non-Hg risk assessments were fully documented on the EPA's website and the docket including all underlying datasets.

Comment 15: Commenters 6543 and 10943 state the following files should be provided and then additional time given for review and comment:

From the ICR

a. The original contractor test reports associated with the Part II ICR data;
b. Additional ICR Part III documentation, such as the complete contractor test reports and the laboratory reports appended to the ERT.

Items related to the Hg Risk TSD, the RIA, and the Air Quality Modeling TSD

a. All input and surface layer output files and analyses of all CMAQ simulations performed as part of this rule;
b. Data summaries similar to those presented on pages 31 to 58 of the Hg Risk TSD for the 2005 EGU zero-out case, the 2016 base case, the 2016 zero-out case, and the 2016 rule case;
c. Underlying data sets, extractions thereof, and spreadsheets from which the EPA calculated and prepared the following summary tables and figures:

i. Within the Hg Risk TSD:

- Tables ES-1 to ES-5,
- Tables 2-1 to 2-15,
- Figures 2-1 to 2-18,
- Figures G-1 and G-2 and Table G-1

ii. Within the RIA:

- Figures 4.2 to 4.6,
- Tables 5-2 to 5-19,
- Figures 5-11 to 5-13

iii. Within the Air Quality Modeling TSD:

- Tables 111-1 to 111-3,
- Integrated 12-km model output Hg deposition file,
- HUC-12 Hg deposition file.

Commenters 6543 and 10943 add that there are numerous key endpoints that use the information in different ways; therefore, it would also be critical to include a step-by-step description of the process and spreadsheets leading to each endpoint, including the following:

- Maps and tables showing projected annual $PM_{2.5}$, daily $PM_{2.5}$, and ozone design values for the 2016 base and 2016 rule case

Items related to EPA's Integrated Planning Model (IPM)

- IPM parsed files for the ToxR Base Case illustrating the assigned emission controls and emission rates for each unit;
- IPM parsed files for the ToxR Policy Case illustrating the assigned emission controls and emission rates for each unit;

Item related to EPA's Beyond the Floor Determination for new source IGCC

- EPA's analysis that takes into account costs, energy, and non-air quality health and environmental impacts relating to going beyond the floor for new source IGCC.

Commenter 17627 recommends that the EPA reset the 60-day comment period when revised data or additional supporting information is made publicly available. The commenter adds that the posting of support documents during the comment period does not provide commenters with sufficient time to evaluate the impact of the support documents on the rule. The commenter gives the following examples:

a. *Air Quality Modeling Technical Support Document: Point Source Sector Rules*, posted June 16, 2011;
b. List of facility/unit Hg stack emission averages from the EU MACT ICR Parts II and III, posted June 30, 2011;
c. Clarification and updating of Hg deposition maps provided in the Hg Risk TSD, posted July 1, 2011.

Response to Comment 15: The EPA disagrees with the commenters that the data underlying the proposed rule were not made sufficiently available. Below we identify the docket identification number for each requested dataset, all of which were either posted at proposal or with more than 30 days remaining in the public comment period.

- Original contractor test reports associated with the Part II ICR data: All docketed separately by company name with multiple docket entries for each EGU's ICR data submittals, posted in February and March 2011.
- Additional ICR Part III documentation, such as the complete contractor test reports and the laboratory reports appended to the ERT: EPA-HQ-OAR-2009-0234-10827, posted on 05/23/11. Although this information posted to the docket after proposal, this documentation simply reformatted data already available in the docket in the individual data submittals provided by the companies through the ERT; these individual ICR/ERT submittals are in the docket under multiple entries (by unit) for each company and were made available prior to proposal.
- Input and surface layer output files and analyses of all CMAQ simulations: Docket EPA-HQ-OAR-2009-0234-2989, posted on 5/3/2011.
- Data summaries for the 2005 EGU zero-out case, the 2016 base case, the 2016 zero-out case, and the 2016 policy case Hg Risk TSD: EPA only generated these specific data summaries for the 2005 and 2016 base case because these specific data summaries were not relevant to the Hg Risk TSD. However, these data summaries can be generated from the data in EPA-HQ-OAR-2009-0234-3079, posted on 5/3/2011. The 2005 and 2016 base case summaries are provided in the Hg Risk TSD.
- Underlying data sets for the Hg Risk TSD: Docket EPA-HQ-OAR-2009-0234-3074 and EPA-HQ-OAR-2009-0234-3079, both posted on 5/3/2011.
- Underlying data sets for the Air Quality Modeling and Hg Benefits in the RIA: AQ modeling data in Docket EPA-HQ-OAR-2009-0234-2989 on 5/3/2011. Hg benefits data mostly consistent with Hg Risk TSD data in Dockets EPA-HQ-OAR-2009-0234-3074 and EPA-HQ-OAR-2009-0234-2989,

both posted on 5/3/2011. Additional RIA-specific information in Docket EPA-HQ-OAR-2009-0234-13662, posted on 6/7/11. Although the RIA-specific information was posted to the docket after proposal, it did not contain data relevant to the Hg Risk TSD. Underlying data sets for the Air Quality Modeling TSD: Can be generated from CMAQ output files in Docket EPA-HQ-OAR-2009-0234-2989, posted on 5/3/2011.

- Maps and tables of projected $PM_{2.5}$ and ozone design values: Can be generated from CMAQ output files in Docket EPA-HQ-OAR-2009-0234-2989, posted on 5/3/2011, in conjunction with publically available data and software. Because absolute design values were not relevant to the rulemaking, EPA did not generate these absolute estimates, only the change in design values between the baseline and policy scenario presented in the RIA. Note: IPM does not estimate ambient levels of pollution or design values.
- IPM parsed files for the ToxR Base Case: Docket EPA-HQ-OAR-2009-0234-3032, posted on 5/3/2011.
- IPM parsed files for the ToxR Policy Case: Docket EPA-HQ-OAR-2009-0234-3033, posted on 5/3/2011.
- *Air Quality Modeling Technical Support Document: Point Source Sector Rules:* Docket EPA-HQ-OAR-2009-0234-2988, posted on 5/3/2011, but also posted on EPA website (http://www.epa.gov/ttn/atw/utility/utilitypg.html) on 6/30/11.
- List of facility/unit Hg stack emission averages from the EGU MACT ICR Parts II and III: EPA-HQ-OAR-2009-0234-15896 on 7/7/2011, but also posted on EPA website (http://www.epa.gov/ttn/atw/utility/utilitypg.html) on 6/30/2011. Although this information posted to the docket after proposal, this documentation simply reformatted data already available in the docket in the individual data submittals provided by the companies through the ERT; these individual ICR/ERT submittals are in the docket under multiple entries (by unit) for each company and were made available prior to proposal.
- Clarification and updating of Hg deposition maps provided in the Hg Risk TSD: Docket EPA-HQ-OAR-2009-0234-15522, posted on 7/5/2011, also posted on SAB website (http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/4A60092A413F56608525783F0050F148?OpenDocument) on 7/1/2011, and discussed at SAB teleconference on 7/20/2011. Although these documents were posted to the docket after proposal in response to questions raised during the SAB meeting on 6/15/2011, the use of intermediate maps in the Hg Risk TSD did not affect the risk calculations.

As noted in the preamble to the proposed rule,[9] the EPA has no information on the costs and non-air quality health, environmental, and energy impacts of setting the new source limits for new IGCC units, and EPA solicited comment, including data on costs, emissions data, or engineering analyses. However, the EPA did not receive any data as requested, and, thus, the EPA does not have any datasets as implied by the commenter.

[9] 76 FR 25049

1D - Hg Emissions

1. Hg Emissions from U.S. EGUs.

Commenters: 17627, 17770, 17771, 17775, 18421, 19536, 19537, 19538, 18023

Comment 1: Commenter 17627 states that the 2005 base year did not include emission reductions that have already occurred as a result of many enforceable federal and state programs and that the 2016 emissions are predicated off the IPM related NODA dated October 2010 and do not include results from two subsequent NODAs. According to the commenter, if the emission estimates were corrected the benefits would not be overstated, and it is possible that the rule could not be justified on cost considerations.

Response to Comment 1: The EPA disagrees with the commenter's implication that either the baseline risks or the benefits are overstated based on a 2005 base year. While the EPA agrees that the 2005 Hg emissions may be overestimated, such an overestimate in 2005 would actually lead to an underestimate of risk in 2016 and not an overestimate of risk, as claimed by the commenter, because the ratio approach used by the EPA to scale fish tissue data would underestimate risk if 2005 Hg estimates were overestimated. Since the 2005 emissions are not used as a starting point for 2016 emissions from IPM, any 2005 overestimate does not affect the 2016 emissions levels. The 2016 emissions are computed by IPM based on forecasts of demand, fuel type, Hg content of the fuel, and the emissions reductions resulting from each unit's configurations. See IPM Documentation for further information. No commenter has provided any evidence that the IPM 2016 emissions projection methodology resulted in an overestimate. The benefits CAA section of the RTC addresses the portion of this comment regarding benefits.

Comment 2: Commenters 17771 and 17775 state that there are questions about the Hg emission estimates used in the Hg TSD for the 2005 and 2016 cases. According to the commenters, the 2005 HAP emission estimates come from the 2005 National Emissions Inventory (NEI) and U.S. coal-fired EGUs emitted 53 tons of Hg in 2005, and the EPA used this estimate as in input to the IPM run that predicted 2016 Hg emissions from U.S. EGUs to be 29 tons per year after implementation of all CAA rules (including the then-proposed Transport Rule) but not the requirements of the EGU MACT. The commenters state that if the 2005 NEI estimate of 53 tons is an over estimate of Hg emissions that would lead to an overestimation of the remaining risk attributable to U.S. EGUs in 2016. In addition, according to the commenters, the EPA's estimate for 2010 Hg emissions from U.S. EGUs based on the 2010 ICR data is 29 tons. The commenters suggest that the 2016 estimate of 29 tons must be incorrect because it is not lower than the 2010 estimate and the installation of scrubbers from the CSAPR would result in lower Hg emissions in the future. The commenters further claim that the EPA has not included the 2010 emissions estimation approach in the public record.

Response to Comment 2: The EPA acknowledges that the current Hg emissions estimate would not be the same as the 2016 Hg emissions estimate given that compliance with CSAPR is anticipated to have some Hg co-benefits. For this reason, the EPA included reflected emission reductions from CSAPR in the mercury deposition modeling for 2016 in the Hg Risk TSD.

The EPA disagrees with the commenters' overall conclusion that the Hg Risk TSD overestimates the risk from U.S. EGUs from Hg for several reasons as follows. The commenter incorrectly assumes that the EPA's 2016 Hg estimate is based on the 2005 Hg estimate that the commenter claimed is an

overestimate. The commenter incorrectly concludes that a 2005 overestimate in Hg emissions would overestimate the risk in the 2016 analysis. The commenter improperly questions the EPA's choice of a 2005 modeling year, when this is based on the mid-point of the available fish tissue data. The commenter incorrectly calls into question the EPA's 2016 Hg estimate based on the EPA's 2010 estimate, providing no specific comments on the 2016 IPM emissions approach but rather including speculation of problems. The commenter incorrectly stated that the 2010 Hg calculations were not provided, since these data were provided in the docket on 5/3/2011 through EPA-HQ-OAR-2009-0234-3035. While the EPA agrees that the 2005 Hg emissions may be an overestimate, such an overestimate in 2005 would lead to an underestimate of risk in 2016 and not an overestimate of risk as claimed by the commenter because the ratio approach used by the EPA to scale fish tissue data would underestimate risk if 2005 Hg estimates were overestimated. Furthermore, the commenters provide no alternative emissions data that could be used for 2005 in place of the EPA's approach, so the EPA continued its conservative approach of using a 2005 value that may be somewhat too high. The EPA also agrees that the 2010 and 2016 Hg estimates of 29 tons may seem inconsistent given known expected reductions in emissions, but disagrees that this inconsistency impacts its conclusions on risk from Hg since the 2010 data were not used in the Hg Risk TSD.

The commenters incorrectly assume that the 2016 Hg emissions are an overestimate because they are tied to the 2005 NEI Hg values, which the commenter claimed is an overestimate. This assumption is incorrect, and therefore any overestimates in 2005 emissions would not lead to an overestimate in 2016 emissions. The 2016 emissions are computed by the IPM based on forecasts of demand, fuel type, Hg content of the fuel, and the emissions reductions resulting from each unit's configurations. See IPM Documentation for further information. No commenter has provided any evidence that the IPM 2016 emissions projection methodology result in an overestimate.

Further, the EPA disagrees with the commenters' central assertions that any 2005 overestimate would lead to an overestimate in risk. The 2005 emissions and modeling predict 2005 Hg deposition, and the 2016 base emissions and modeling predict 2016 Hg deposition. The EPA used the ratio of the 2016 deposition to the 2005 deposition to scale the fish tissue Hg levels from the best available data from 2000-2009. Thus, any overestimate of the 2005 Hg emissions would lead to an underestimate of the 2016 Hg fish tissue levels because a smaller 2005 emissions and deposition estimate would give a smaller reduction of the Hg fish tissue data to 2016.

The EPA disagrees with the commenters' assumption that the EPA used a 2005 modeling episode as a representative case for present emissions. The 2005 model year is the midpoint of the fish tissue data (2000-2009) used for the scaling of fish tissue Hg levels.

The EPA agrees with the commenters' claim that the 2005 Hg estimate of 53 tons/year may be an overestimate, but maintains that the 2005 Hg estimate is the best available comprehensive estimate needed for performing the type of modeling needed for this rule. In response to this comment, the EPA reviewed its methodology for estimating the 2005 inventory and has concluded that there could be a modest overestimate. This is because the approach to compute 2005 emissions did not consider changes in control configurations between 1999 and 2005, but rather has scaled the 1999 emissions rates based on changes to unit-level throughput from 1999 to 2005. As another check on the EPA's estimate, the EPA reviewed the Toxics Release Inventory (TRI) data for 2005 and has found that industry-reported emissions of Hg in 2005 were 48 tons/year. As described above, an overestimate in 2005 is a more conservative approach for the overall Hg Risk TSD because of the deposition scaling approach used.

However, the EPA disagrees that a trend from 2010 to 2016 due to the Cross-State Rule should necessarily be evident. As previously mentioned, these were estimated using different methods for different purposes, these estimates have different uncertainties and therefore are difficult to compare when the numbers are relatively close. One important difference is that the 2010 emissions included state Hg rules that lower 2010 emissions, but the 2016 total does not include state Hg rules. The EPA excluded state Hg regulations because the CAA directs the EPA to consider only federal CAA requirements in estimating future risks associated with EGUs. In addition, the significant decrease in demand observed in the industry in 2009 and 2010 will tend to depress the emissions in 2010 relative to the 2016 projections, all else constant, simply as a result of the higher future electricity demand assumed in IPM, which is identical to AEO 2010 projections of net energy for load.

In response to this comment, the EPA further improved its "current base" estimate labeled at proposal as "2010," but representing a 2007-2009 average throughput using current-year facility configuration and emission rates. This estimate is 29 tons/year, which is consistent with the estimate at proposal. The average throughput approach helps to account for the decrease in EGU activity that started in 2008 to allow the EPA to create a representative value for a current-year best estimate. This revised current base Hg estimate represents final emission rates based on the ICR data (i.e., the latest facility configurations), and actual throughputs from the Acid Rain CEMS program rather than the maximum heat inputs and capacity factors used at proposal. In addition to the revised current base, the EPA also computed alternative estimates using the same emission rates (present-day controls) but different throughputs. Using only 2010 throughputs results in an estimate of 27 tons/year, and using 2002 through 2010 average throughputs results in 29 tons/year. The EPA found that from 2007 to 2010, the Hg decreases associated with decreased demand alone is 3.8 tons and from 2007 to 2009 is 5 tons, which supports the EPA's position that even the revised current base estimate using 2007-2009 includes impacts of depressed demand which is not expected to continue at the same low levels and is therefore not reflected in the 2016 estimate.

Further, the EPA disagrees with the commenters' assertion that the IPM Hg emissions estimates in 2016 are "thrown into doubt" by the 2010 emissions estimate. The reason these numbers are inconsistent with expected trends is that different emission estimation methods were used for each inventory. In addition to the different assumption about state rules, it is not possible for the future-year estimation to rely on stack test data because it is forecasting the future, whereas the 2010 method relies a great deal on stack test data. In any case, this inconsistency is not relevant to the core of the Hg Risk TSD since the 2010 emissions are not used in calculating the 2016 to 2005 deposition ratios. Concerns about the 2005 estimates have already been addressed above. Any meaningful comments on the validity of the 2016 Hg estimates need to specifically address concerns with the IPM Hg estimation methods. The EPA addressed all comments on the IPM predictions and has revised emissions estimates accordingly.

In the final rule, the EPA revised the estimate of Hg emissions remaining from U.S. EGUs in 2016, which includes additional emission reductions anticipated from the final CSAPR. The revised estimate shows that U.S. EGUs would emit 27 tons of Hg in 2016.This new IPM modeling for the final rule continues the methodology excludes state Hg regulations. The revised current base estimate is 29 tons/year and does not exclude state Hg regulations. Even given the difficulty comparing these estimates as described above, these revised estimates show a 1 ton decrease, even though the current base estimate reflectsstate Hg regulations in the current base but not 2016 estimate does not. Conclusions about the trend between current emissions and emissions in 2016 are limited by the fact that different methods were used to compute the two estimates, as fully explained in the revised Emissions Overview memo in the docket.

In addition, the EPA considered other data sources to help assess the validity of its 2005 and 2010 emissions estimates. The TRI data submitted by industry includes estimates for 2005 through 2010. The 2005 TRI Hg emissions are 48 tons/year, supporting the EPA's conclusion that its 2005 estimate may be somewhat too high. The EPA notes that the 2010 emissions cited for this rule proposal were actually an average of 2007-2009 throughputs with emission rates from the ICR data. To have a comparable value, the EPA averaged the 2007, 2008, and 2009 TRI Hg emissions from U.S. EGUs (46.9, 44.8, and 35.6 tons/year, respectively), resulting in an estimate of 42 tons/year. Furthermore, the TRI national Hg emissions estimate in 2010 is 31 tons/year, and this value is expected to be an underestimate since the final numbers have not yet been compiled to include emissions from all facilities.

Finally, the EPA disagrees with the comment that the calculations for the 2010 annual emissions were not provided. These calculations were provided in an Excel spreadsheet to the docket on 5/3/2011 [EPA-HQ-OAR-2009-0234-3035]. The spreadsheet lists each unit included in the calculations, the throughput assumed, the emission factor bin, the emission factor, and the resulting Hg emissions for each unit. A readme tab included in the spreadsheet provided additional information about the approach.

Comment 3: Commenter 18421 states that coal-fired power plants were responsible for 72% of Hg air emissions in 2008 and 50 percent of total Hg in the U.S. According to the commenter, by 2005 hospital and medical waste incinerators and municipal waste combustors had reduced their Hg emissions by over 95 percent. In contrast, coal-fired power plants had reduced Hg emissions by only 10% and, today, they persist as the single largest anthropogenic source of Hg air pollution in our nation. The commenter notes that the top 25 emitters of Hg from coal-fired power plants accounted for only eight percent of the country's electric generation in 2008

Response to Comment 3: The EPA agrees with the commenter's assertion that coal-fired power plants are a major source of Hg air emissions in 2008 and that other sectors such as hospital and medical waste incinerators and municipal waste incinerations have reduced their Hg significantly based on other EPA rules. The EPA appreciates the data provided showing that coal-fired power plants have reduced Hg emissions only 10% since 2005, however, other data sources such as industry-provided TRI data show greater reductions (2005: 48 tons; 2009: 36 tons is a 25% reduction). Nevertheless, even larger reductions were considered as part of the EPA's Hg Risk TSD and the EPA concluded that risk still exists from coal-fired power plants.

Comment 4: Commenter 17775 states that there is no indication how the EPA derived emission factors used by the EPA in its IPM runs to estimate future Hg emissions. According to the commenter, Appendix A to CAA section 3 of the RIA contains a detailed list of emissions factors for the three species of Hg (elemental, gaseous ionic and particulate) depending on the control equipment installed on a given unit, and these included factors for control configurations that are fairly rare in the utility industry (such as units equipped with DSI) and the factors included four significant figures. The commenter suggests that without further explanation these factors could result in an overstating Hg emissions and remaining Hg risks in 2016 following full implementation of the existing CAA rules.

Response to Comment 4: The 2016 projected Hg emissions are not based on emissions factors. The 2016 Hg emissions are computed by the IPM based on forecasts of demand, fuel type, Hg content of the fuel, and the emissions reductions resulting from each unit's configurations. See IPM Documentation for further information on demand assumptions, coal supply and Hg content, and Hg emissions reductions.

The speciation factors in the RIA, Chapter 3 provide a basis for the speciation of total projected Hg emissions into particulate, divalent gaseous, and elemental species, and do not impact the total amount of Hg emissions. The data used for the MATS proposal and final rule are the same as the data used for the Clean Air Hg Rule. More information is available in the docket under Hg speciation for EGUs in the "Hg_speciation_summary_CAMR.pdf" and associated spreadsheet.

Comment 5: Several commenters (19536, 19537, 19538) state that EGUs remain the largest source of Hg in the U.S., accounting for approximately half of U.S. anthropogenic emissions and Hg emissions from U.S. EGUs are projected to remain relatively unchanged through 2016. According to the commenters, even in 2016 Hg emissions from U.S. EGUs will be over six times larger than those from the second largest contributing source.[10] Additionally, state the commenters, the significant fractions of oxidized and particulate Hg in Hg emissions from U.S. EGUs make these emissions more relevant to local and regional deposition than natural emissions comprised of elemental Hg.

Response to Comment 5: The EPA agrees with the commenter's statement that EGUs remain the largest source of Hg in the U.S. and that significant fractions of oxidized and particulate Hg in Hg emissions from U.S. EGUs make these emissions more relevant to local and regional deposition than natural emissions comprised of elemental Hg.

Comment 6: Commenter 18023 states that the EPA's indication (on page 31 of the Hg TSD) that "current" or 2010 EGU Hg emissions were 29 tons and would be the same amount in 2016 after full implementation of other existing regulations, in particular CSAPR, cannot be true because neither program would be fully implemented in 2010. Similarly, the commenter notes that page 15 of the Hg TSD the EPA noted "[f]urther modeling of future emissions indicates that in the absence of binding federal regulations U.S. EGU emissions are not likely to be substantially reduced between 2010 and 2016..." According to the commenter, it is unreasonable to conclude that EGU Hg emissions will not decrease further as a co-benefit of other regulations. The confusion over the level of current emissions makes meaningful comment difficult.

Response to Comment 6: See response to Comment 2 above regarding the comparability of the 2010 and 2016 emissions estimates.

The EPA disagrees with the commenter's assertion that the "confusion over the level of current emissions makes meaningful comment difficult." The reason these numbers are inconsistent with expected trends is that different emission estimation methods were used for each inventory. However, this inconsistency is not relevant to the core of the Hg Risk TSD since the 2010 emissions are not used in calculating the 2016 to 2005 deposition ratios. Meaningful comment is therefore relevant only for comments on 2005 and 2016 emissions values and approaches. Comments on the 2005 estimates have already been addressed above. The EPA also addressed all comments on IPM estimation methods and the resulting updated Hg emissions are 27 tons/year, and this value is 2 tons less than the revised current-base ("2010") estimate of 29 tons/year. While uncertainties exist about all emissions estimates, the EPA considered all comments on its estimates and has revised its methods to reflect the best available estimates in both years. The EPA maintains that the commenters are well aware of uncertainties associated with emissions estimation and that such uncertainties are not cause for avoiding review or comment, as evidenced by the numerous relevant comments received by the EPA on emissions values used at proposal.

[10] 76 FR 25,002.

Comment 7: Commenter 17770 states that the EPA TSDs include an assumption that two of We Energies' plants, the Oak Creek Power Plant and the Valley Power Plant, will be retired in 2015. The commenter states that this assumption is incorrect and should be changed; We Energies has no current plans to retire either of these plants.

Commenter 17770 further states that the EPA's utility sector modeling analyses includes an estimate of unit retirements that will occur as a result of the proposed rule. According to the commenter, the EPA assumes that two of We Energies' plants, the Oak Creek Power Plant and the Valley Power Plant, will be retired in 2015. Again, the commenter states that this assumption is incorrect and should be changed, as We Energies has no current plans to retire either of these plants.

Response to Comment 7: Contrary to commenter's statement, the EPA does not assume that the units referenced by the commenter will retire in 2015. The EPA's IPM modeling represents a national perspective of least-cost electricity dispatch throughout the modeled regions to meet electricity demand, in both base case projections as well as projections with policy constraints (such as the proposed MATS emission rate limitations). The EPA is not making any determination of future unit-level compliance based on these modeling projections; individual unit owners will make their own economic determination of how they wish to comply with the regulation. Unit owners and operators should consider compliance options with the proposed emission rate standards and are advised to weigh the economic merit of each compliance option to minimize costs while achieving compliance in the future.

The EPA's IPM modeling relies on assumptions regarding future electricity demand and available generating capacity in each modeled region. The parsed file disaggregates model results to a unit level and does not necessarily capture all of the relevant unit-level details that a unit owner may account for in the future when determining compliance planning and economic operations. IPM projections represent a least-cost system-wide pattern of generation allowing the agency to determine the overall cost impacts of a potential regulation. In the future, the decision to continue operation with emissions controls, or to cease operation, will be made by each facility according to that owner's determination of economic operation potential.

2. Global Hg emissions.

Commenters: 17254, 17620, 17621, 17756, 17807, 17877, 18014, 18033, 18023

Comment 8: Commenter 17620 states that mandatory Hg emission reductions from the international community are essential if the Hg problem in this country is to be effectively addressed. The commenter states that the U.S. is currently engaged in international efforts to reduce global Hg emissions and that the third session of the United Nations Environment Programme (UNEP) Intergovernmental Negotiating Committee will be held in November 2011 to attempt to prepare a global legally binding instrument for the control of Hg. The UNEP negotiation schedule calls for an agreement to be reached by February 2013. According to the commenter, if the U.S. fails to require Best Available Technology (BAT) levels of controls of its EGU sector, the prospects for an international agreement will be substantially diminished. For this reason, states the commenter, effective Hg regulation of U.S. EGUs, while not sufficient in and of itself, is nonetheless a necessary component of the larger program that is needed to effectively address excess Hg exposure of sensitive U.S. populations, including U.S. children and pregnant women.

Response to Comment 8: The EPA agrees with the commenter that the regulation of Hg from EGU in the U.S**.** would enable the U.S**.** to serve as a model of effective policies and technologies to reduce Hg. Such leadership could provide confidence to other countries that they can succeed in meeting their commitments to reduce Hg, including Hg from EGU's. The regulation would also demonstrate the U.S**.** commitment to addressing the global Hg problem by decreasing the largest remaining man-made source of Hg emissions in the U.S**.** and serve to encourage other countries to reduce Hg emissions from their own sources.

Comment 9: Commenter 17621 states that predicted Hg deposition relies heavily on the amount of gaseous elemental Hg used to define the boundary and initial conditions of a model. For example, Pongprueksa, et al. (2008)[11] demonstrated this effect while simulating atmospheric Hg on a regional scale; they found that increasing the amount of gaseous elemental Hg in the boundary condition by 1 nanogram per cubic meter (ng/m^3) caused the predicted monthly deposition of total Hg to increase by 1270 nanograms per square meter (ng/m^2) in the continental U.S. Model initial conditions have a similar, but weaker effect. The commenter states that Pongprueksa, et al. (2008) found that increasing the amount of gaseous elemental Hg in the initial condition by 1 ng/m^3 increased predicted deposition in the continental U.S. by 250 ng/m^2. According to the commenter, similar sensitivity analyses have not been provided by the EPA, but need to be reported, most appropriately as part of a more comprehensive model performance evaluation. This is especially important, states the commenter, because Hg emissions from Asia—the region immediately upwind of North America that affects U.S. Hg deposition significantly and also affects it the most compared to other regions—are expected to continue to increase (Jaffe et al., 2005[12]; Jaffe et al., 2008[13]; Pacyna et al., 2010[14]; Pironne et al., 2010[15]; Streets et al., 2009[16]; Weiss-Penzias et al., 2006[17]). According to the commenter, this will have implications for the amount of Hg in the boundary and initial conditions; however, these emission changes have not been accounted for in the EPA's model exercise, thus leading to an overestimate of U.S. EGU-attributable deposition in 2016.

Response to Comment 9: The EPA disagrees with the commenter that additional sensitivity analysis is needed for this Hg assessment. The EPA also disagrees that boundary and initial conditions inflow needs

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[11] Pongprueksa, P., Lin, C.J., Lindberg, S.E., Jang, C., Braverman, T., Bullock, O.R., Ho, T.C., Chu, H.W., 2008. "Scientific uncertainties in atmospheric Hg models III: Boundary and initial conditions, model grid resolution, and Hg(II) reduction mechanism." *Atmospheric Environment* 42, 1828-1845.

[12] Jaffe D., Prestbo E., Swartzendruber P., Weiss-Penzias P., Kato S., Takami A., Hatakeyama S., Kajii Y., 2005. "Export of Atmospheric Mercury from Asia," *Atmospheric Environment*, 39, 3029–3038.

[13] Jaffe D., Strode S., 2008. "Fate and Transport of Atmospheric Mercury from Asia," *Environmental Chemistry*, 5, 121.

[14] Pacyna E.G., Pacyna J.M., Sundseth K., Munthe J., Kindbom K., Wilson S., Steenhuisen F., Maxson P., 2010. "Global Emission of Mercury to the Atmosphere from Anthropogenic Sources in 2005 and Projections to 2020," *Atmospheric Environment*, 44, 2487–2499.

[15] Pirrone N., Cinnirella S., Feng X., Finkelman R.B., Friedli H.R., Leaner J., Mason R., Mukherjee A.B., Stracher G.B., Streets D. G., Telmer K., 2010. "Global Mercury Emissions to the Atmosphere from Anthropogenic and Natural Sources," *Atmospheric Chemistry and Physics*, 10, 5951–5964.

[16] Streets, D.G., Zhang, Q., Wu, Y., 2009. "Projections of Global Mercury Emissions in 2050." *Environmental Science & Technology* 43, 2983-2988.

[17] Weiss-Penzias P., Jaffe D., Swartzendruber P., Dennison J.B., Chand D., Hafner W., Prestbo E., 2006. "Observations of Asian Air Pollution in the Free Troposphere at Mt. Bachelor Observatory in the Spring of 2004," *Journal of Geophysical Research*, 110, D10304.

adjustment for several reasons. First, the EPA does not use the first 10 days of the modeling simulation are not used in the analysis, which is more than sufficient to remove the influence of initial conditions on Hg deposition estimates (Pongprueksa et al., 2008). Second, it is difficult to accurately characterize the speciation of Hg the flows into the U.S. from other countries due to the lack of data near the boundaries of the modeling domain. Without appropriate observational constraints characterizing lateral boundary concentrations from the surface to upper troposphere, it is difficult to design meaningful sensitivity scenarios. The EPA does not consider the perturbations applied in Pongprueksa et al.2008 of 1 ng/m^3 are realistic boundaries of global speciated Hg concentrations and do not provide directly applicable information.

The boundary inflow for the CMAQ Hg modeling used to predict Hg deposition for the Hg Risk TSD are based on a global model GEOS-CHEM simulation using a 2000 based global inventory as described in (Selin et al., 2007) [18]. A recently published comparison of global Hg emissions by continent for 2000 and 2006 found that total Hg emissions from Asia (and Oceania) total 1,306 megagrams per year (Mg/yr) in 2000 and 1,317 Mg/yr in 2006 (Streets et al., 2009). The EPA determined that because the Asian Hg emissions estimated in this study are nearly constant between 2005 and 2006, any adjustments to the boundary conditions or adjustments to modeled Hg deposition would be invalid and inappropriate. Recent research has shown that ambient Hg concentrations have been decreasing in the northern hemisphere since 2000 (Slemr et al., 2011)[19]. Since emissions from Asia have not appreciably changed between 2000 and 2006 and ambient Hg concentrations have been decreasing, ENVIRON's analysis contains information with incorrect assumptions and will be disregarded. For these reasons and the large uncertainties surrounding projected Hg global inventories the EPA concludes that the most appropriate technical choice is to keep the Hg boundary conditions the same between the 2005 and 2016 simulations.

Comment 10: Commenter 17621 states that considering the relatively small contribution of U.S. EGUs, defining boundary and initial conditions accurately and correctly is even more important. According to the commenter, anthropogenic sources of Hg to the atmosphere have been extensively studied, with the most recent global estimates of about 2,500 megagrams (Mg) emitted annually. The commenter states that about 18% of these global anthropogenic emissions come from U.S. EGUs, with U.S. EGUs making up approximately 2.5 and 1.2% of this global anthropogenic total in 2005 and 2010, respectively (Pacyna et al., 2010; Pironne et al., 2010; Streets et al., 2009; U.S. EPA, 2011[20]).

Response to Comment 10: The EPA agrees with the comment that boundary conditions need to be appropriately characterized and has done so in the air quality modeling TSD. The EPA asserts that the boundary conditions used for this analysis fairly represent global inflow.

Comment 11: Commenter 17621 states that global modeling studies show that only 20–33% of all the Hg deposited within the continental U.S. comes from North American anthropogenic sources.

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[18] Selin, N.E., Jacob, D.J., Park, R.J., Yantosca, R.M., Strode, S., Jaegle, L., Jaffe, D., 2007. Chemical cycling and deposition of atmospheric Hg: Global constraints from observations. Journal of Geophysical Research-Atmospheres 112.

[19] Slemr, F., Brunke, E.G., Ebinghaus, R., Kuss, J., 2011. "Worldwide trend of atmospheric Mercury since 1995." *Atmospheric Chemistry and Physics* 11, 4779-4787.

[20] U.S. EPA, 2011. *Technical Support Document: National-Scale Mercury Risk Assessment Supporting the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units. The EPA*-452/D-11-002. March.

According to the commenter, Seigneur et al. (2004) [21] used a global chemical transport model and a continental chemical transport model (TEAM) to calculate the contribution of North American anthropogenic sources to total Hg deposition for low, average, and high Hg emission scenarios, and their calculations yielded a range of 25–32%, which they defined as the upper and lower bounds of U.S. anthropogenic contribution to Hg deposition within the country. In another global modeling study, states the commenter, Travnikov (2005)[22] found that 30–33% of Hg deposited in North America is of North American origin, while 21–24% comes from Asia. Using the GEOS-CHEM model, Selin and Jacob (2008)[23] found that North American anthropogenic emissions contributed, on average, 20% of the total Hg deposited within the continental U.S., corroborating previous findings by Selin, et al. (2007).

Response to Comment 11: The EPA agrees that Hg is a global problem, but disagrees about the nature of EGU impacts. The complex chemical nature of the pollutant means it is also important on a local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010, Keeler et al., 2006; White et al., 2009[24]).

Comment 12: Commenter 17621 states that most of the reactive gaseous Hg deposited by wet processes originates in the global atmospheric Hg pool. The commenter states that in their GEOS-CHEM study, Selin and Jacob (2008) found that 60% of reactive gaseous Hg deposited by wet processes within the U.S. comes from scavenging Hg (removing it from the gas stream) in the free troposphere; the rest of the reactive gaseous Hg deposited by wet processes comes from scavenging within the U.S. atmospheric boundary layer, where oxidation of gaseous elemental Hg is the principal source of reactive gaseous Hg.

Response to Comment 12: The EPA does not agree that the cited study is relevant to the analysis for this rule. The EPA examined contribution to total Hg deposition of all forms of speciated Hg through wet and dry deposition pathways, not just wet deposition of reactive gas phase Hg.

Comment 13: Commenter 18014 states that under the EGU MACT, the agency estimates that the deposition of Hg in the U.S. would be reduced by only about 1% since most of the Hg deposition is related to natural or international industrial sources (i.e., U.S. Hg deposition is not significantly impacted by EGU emissions).

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[21] Seigneur C., Vijayaraghavan K., Lohman K., Karamchandani P., Scott C., 2004. "Global Source Attribution for Mercury Deposition in the United States," *Environmental Science & Technology,* 38, 555–569.

[22] Travnikov O., 2005. "Contribution of the Intercontinental Atmospheric Transport to Mercury Pollution in the Northern Hemisphere," *Atmospheric Environment,* 39, 7541–7548.

[23] Selin N.E., Jacob D.J., 2008. "Seasonal and Spatial Patterns of Mercury Wet Deposition in the United States: Constraints on the Contribution from North American Anthropogenic Sources," *Atmospheric Environment,* 42, 5193–5204.

[24] White, E.M., Keeler, G.J., Landis, M.S., 2009. "Spatial Variability of Mercury Wet Deposition in Eastern Ohio: Summertime Meteorological Case Study Analysis of Local Source Influences." *Environmental Science & Technology* 43, 4946-4953

Response to Comment 13: The EPA corrected the statement in the RIA. While the percentage of total Hg deposition attributed to EGUs on a national-scale is a small amount, the absolute amount of total Hg deposition attributable to EGU emissions will go down significantly. In certain parts of the country, the percentage reduction is much larger than 1%. As shown in the revised Hg Risk TSD, 11% of Hg deposition in the 99th percentile watershed comes from U.S. EGUs in 2016.

Comment 14: Commenter 17877 states that the proposed rule emphasizes global emissions of Hg and overall atmospheric deposition of Hg as critical factors for Hg concentrations in fish, but the EPA's proposed rule would only reduce U.S. atmospheric levels by 1/1000. According to the commenter, this fact "leads away" from a finding that it is necessary and appropriate to regulate U.S. EGUs.

Response to Comment 14: The EPA disagrees that the EGU MACT would only reduce U.S. ambient concentrations of Hg by 1/1000. Further, it is important to keep in mind the impacts on total Hg deposition are evaluated for the purposes of this rule, not changes to ambient concentrations of Hg. As noted in the Hg Risk TSD, the EPA modeled Hg emissions from U.S. and non U.S. anthropogenic and natural sources to estimate Hg deposition across the country. The EPA also determined the contribution of Hg emissions from U.S. EGUs to total Hg deposition in the U.S. by running modeling simulations for 2005 and 2016 with Hg emissions from U.S. EGUs set to zero. Based on the analysis done for this rule the EPA finds that total Hg deposition from U.S. EGUs do significantly impact human health.

Comment 15: Commenter 17807 states that Hg emissions from U.S. coal-fired power plants have decreased considerably over the past 10 years, from a national total of approximately 60 tons per year to the current level of approximately 29 tons, and they will continue to fall even without the utility MACT as a result of other regulations, such as the current CAIR, the recently finalized CSAPR, and changes resulting from NAAQS reductions. According to the commenter, the 29 tons per year from U.S. EGUs is a relatively small amount compared to the more than 1,200 tons per year arriving from Asia and the approximately 2,500 tons per year that are emitted worldwide from natural sources of Hg (half of all Hg emissions are from natural sources such as the soil and volcanoes). The commenter states that compared to these numbers the EPA's estimate of 35 tons per year contributed from global sources is extremely low. According to the commenter, the EPA should re-evaluate and compare its data with other independent sources to test its conclusions and determine the necessity of proceeding with this costly proposed rule in light of the most current information.

Response to Comment 15: The EPA disagrees that Hg emissions reductions from other rules will result in the same level of decrease expected from the EGU MACT. The commenter provides no technical support for that statement. The EPA agrees that Hg is a global problem, but disagrees about the nature of EGU impacts. The complex chemical nature of the pollutant means it is also important on a local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010 , Keeler et al., 2006; White et al., 2009).

Comment 16: Commenter 18033 states that the EPA's conclusions in the 2005 rulemaking are bolstered by the continuing Hg emission trends in the U.S. According to the commenter, power plants emit an estimated 41-48 tons of Hg per year. However, states the commenter, U.S. forest fires emit at least 44 tons per year; cremation of human remains discharges 26 tons; Chinese power plants eject 400 tons; and

volcanoes, subsea vents, geysers and other sources spew out 9,000-10,000 additional tons per year. In short, states the commenter, the U.S. releases less than 5% of the 2,400 tons of Hg emitted per year due to human activities. U.S. coal-based power plants emit less than 2% of the global total of human-caused Hg emissions. The commenter states that taking into account natural emissions, U.S. power plants contribute less than 1% of total Hg emissions to the global pool.

Response to Comment 16: The EPA disagrees with the commenter's characterization of the nature of EGU impacts. The complex chemical nature of the pollutant means it is important on a global, local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents and other regional sources contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010; Keeler et al., 2006; White et al., 2009).

Comment 17: Commenter 18033 states that the EPA ignores the fact that over 75% of the Hg that deposits in the U.S. comes from sources outside the country. The commenter states that once Hg is released, it accumulates in the atmosphere resulting in deposition long distances from the actual source exacerbating the lack of causal relationship between the need for regulation and the risk posed by Hg emissions from U.S. EGUs. According to the commenter, EPRI has documented in recent studies the critical role that intercontinental Hg transport from Asia and other nations play in determining U.S. Hg deposition. According to the commenter, direct measurements have revealed significant levels of Hg exiting mainland Asia and crossing the Pacific to the U.S. In 2001 and 2002, EPRI, in cooperation with the National Center for Atmospheric Research, the National Aeronautics and Space Administration, the National Oceanographic and Atmospheric Administration, and other agencies used aircrafts to measure Hg in air plumes exiting China near the city of Shanghai, following them over the Pacific for 400 miles. The commenter states that a later set of flights over the Pacific between southern California and Oregon found evidence of the same plume crossing the California coast.

Commenter 18033 concludes that because Hg is emitted and transported globally, reductions of U.S. Hg emissions from U.S. EGUs would have a negligible impact on Hg deposition in the U.S. For all of these reasons, states the commenter, the factual record does not support a finding that Hg emissions from U.S. EGUs pose a meaningful health risk, and it is therefore not "appropriate" to regulate EGU Hg emissions under CAA section 112(n)(1)(A).

Response to Comment 17: The EPA agrees that Hg is a global problem, but disagrees about the nature of EGU impacts. The complex chemical nature of the pollutant means it is also important on a local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010; Keeler et al., 2006; White et al., 2009).

Comment 18: Commenter 17254 states that studies from Cambridge University have been ignored. According to the commenter, the studies estimate that 9,100 pounds of Hg are put into the air from volcanoes alone; most of those emissions are going into the water as a result of volcanic activity

underwater and so there is no way to control it. The commenter compares this amount to the amount from all industrial sources and compares that amount to the 4,400 tons from forest fires. According to the commenter, that is roughly 0.5% of what volcanoes put in the air. The commenter states that power plants in the south supposedly emit 24 tons per year and the U.S. total is 50 tons, and if you combine the power plants and the forest fires, you get perhaps 1% of the Hg in the air that could be controlled if we stopped all forest fires and stopped all Hg in all power plants. According to the commenter, that means that in 20 years, the detectable amount of Hg in the air will not change.

Response to Comment 18: The EPA agrees that Hg is a global problem but disagrees about the nature of EGU impacts. The complex chemical nature of the pollutant means it is also important on a local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010; Keeler et al., 2006; White et al., 2009). As noted in the Hg Risk TSD, the EPA modeled Hg emissions from U.S. and non U.S. anthropogenic and natural sources to estimate Hg deposition across the country. The EPA also determined the contribution of Hg emissions from U.S. EGUs to total Hg deposition in the U.S. by running modeling simulations for 2005 and 2016 with Hg emissions from U.S. EGUs set to zero. Based on the analysis done for this rule the EPA finds that total Hg deposition from U.S. EGUs do significantly impact human health.

Comment 19: Commenter 17756 states that the EPA's purported basis for regulating EGUs is rooted in nothing more than assertions of broad discretion delegated to it by Congress. The commenter states that such assertions do nothing to supplement the findings set forth in the EPA's 1998 "Utility Study," which shows that utility emissions of Hg are dwarfed by emissions from natural and other man-made sources around the globe, and that totally eliminating utility emissions of Hg will not advance the public health in any meaningful way.

Response to Comment 19: As noted in the Hg Risk TSD, the EPA modeled Hg emissions from U.S. and non U.S. anthropogenic and natural sources to estimate Hg deposition across the country. The EPA also determined the contribution of Hg emissions from U.S. EGUs to total Hg deposition in the U.S. by running modeling simulations for 2005 and 2016 with Hg emissions from U.S. EGUs set to zero. Based on the Hg Risk TSD, the EPA finds that Hg deposition from U.S. EGUs can cause a public health hazard.

Comment 20: Commenter 18023 states an alternative analysis performed by ENVIRON found that "The highest Hg deposition fluxes simulated in the U.S. in 2005 are at locations with EGU-attributable deposition less than 5% of total deposition. Before implementation of controls required by the proposed rule, areas with relatively high EGU-attributable Hg deposition (one-fifth or more of total deposition) in 2016 constitute less than 0.25% of the continental U.S. area and only 3 grid cells of the over 55000 twelve-km grid cells in the EPA's integrated CMAQ domain (or less than 0.006% of the total continental U.S. area) have EGU contributions exceeding half of total deposition."

Response to Comment 20: The EPA finds the fundamental approach taken by ENVIRON to match and adjust CMAQ-estimated Hg for the A&N Finding with older Hg modeling done with Hg chemistry that is not considered state-of-the-science and with in-plume Hg chemistry that has not been explicitly characterized and may not happen at all is inappropriate and the findings thus provide no useful

information. The EPA also disagrees with the commenter's assertion that the EPA failed to consider the relative magnitude of EGU Hg emissions compared to other sources. As noted in the Hg Risk TSD, the EPA modeled Hg emissions from U.S. and non U.S. anthropogenic and natural sources to estimate Hg deposition across the country. The EPA also determined the contribution of Hg emissions from U.S. EGUs to total Hg deposition in the U.S. by running modeling simulations for 2005 and 2016 with Hg emissions from U.S. EGUs set to zero. Based on the Hg Risk TSD, the EPA finds that total Hg deposition from U.S. EGUs can cause a public health hazard.

Comment 21: Commenter 17621 states that the origin of atmospheric Hg that is deposited to watersheds in the U.S. is still poorly understood. According to the commenter, the relative contributions of local, regional, and global anthropogenic sources—as well as natural sources—of Hg are likely to vary across the U.S. The commenter states that current research shows that models of Hg atmospheric fate and transport overestimate the local and regional impacts of some anthropogenic sources, such as U.S. EGUs, and thus, calculated contributions to Hg deposition and fish tissue MeHg levels from these sources represent upper bounds of actual contributions (Seigneur et al., 2003; Seigneur et al., 2004) According to the commenter, the EPA fails to provide a detailed discussion of its results based on currently available scientific data; these results should be presented as estimates of lower and upper bound limits.

Response to Comment 21: The EPA disagrees that recent research shows that U.S. EGU impacts are over-estimated. The commenter's references do not support this statement. The references provided by the commenter are based on Hg modeling that uses models that are no longer applied and that are based on out-dated Hg chemistry and deposition assumptions. Given the advances in Hg modeling since the early 2000's the EPA does not believe an upper and lower bound estimate is necessary.

Comment 22: Commenter 18034 states that U.S. EGUs do not contribute significantly to the current risk to public health resulting from all natural and anthropogenic sources of Hg worldwide. According to the commenter, any Hg reductions resulting from the proposed utility NESHAP rule would result in an insignificant change in the overall risk from Hg from all sources.

Response to Comment 22: The EPA agrees that Hg is a global problem, but disagrees about the nature of EGU impacts. The complex chemical nature of the pollutant means it is also important on a local and regional scale. Coal-fired power plants emit three forms of Hg: one form transports regionally and globally and the other forms deposit very quickly near the sources impacting local and regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. While emissions from other continents contribute to Hg deposition in the U.S., published research shows that U.S. coal-fired power plants significantly enhance local and regional Hg deposition (Caffrey et al., 2010 , Keeler et al., 2006; White et al., 2009). Based on the Hg Risk TSD, the EPA finds that Hg deposition from U.S. EGUs can cause a public health hazard.

1E - Hg Deposition Modeling

Commenters: 17681, 17775, 17807, 17777, 18023

1. General comments on deposition modeling.

Comment 1: Commenters 17775 and 18023 state that the boundary conditions used in the CMAQ modeling are based on a global emissions estimate for 2000. Global emissions have changed significantly in the last 10 years. For example, state the commenters, between 2000 and 2005, Hg emissions from China alone increased 38%. The commenters state that the Hg TSD does not contain any type of sensitivity analysis that evaluates the effects of variable boundary conditions. According to the commenters, the change in boundary conditions results in a 1% or more over prediction of EGU-attributable deposition on average across the U.S.

Response to Comment 1: The EPA disagrees with the commenters. The CMAQ Hg modeling used in the Hg Risk TSD are based on a global model GEOS-CHEM simulation using a 2000 based global inventory as described in (Selin et al., 2007). A recently published comparison of global Hg emissions by continent for 2000 and 2006 found that total Hg emissions from Asia (and Oceania) total 1,306 Mg/yr in 2000 and 1,317 Mg/yr in 2006 (Streets et al., 2009). The EPA determined that because the Asian Hg emissions estimated in this study are nearly constant between 2000 and 2006, any adjustments to the boundary conditions or adjustments to modeled Hg deposition would be invalid and inappropriate.

Comment 2: Commenter 17621 states that the AQ Modeling TSD fails to include detailed context and background information on the effect of grid size on CMAQ model results. The commenter states that the EPA used a 36-km grid resolution (i.e., 36 x 36 km) to establish incoming air quality concentrations (boundary conditions) along the boundaries of 12 x 12 km grids (144 km^2) but used only the 12 x 12 km grids in determining the impact of changes in Hg emissions on changes in Hg deposition. According to the commenter, this choice raises numerous concerns.

1. First, CMAQ predicts only an average Hg concentration for an entire grid cell. For example, if there is only one Hg source in a grid cell, then that source's emissions will be averaged over the entire grid cell. Such averaging causes an artificially fast dilution and may result in smoothing out areas of high and low deposition. APT (see EPRI Comments, CAA section 3.2.3) resolves this problem.
2. Second, although the ability to identify large areas of localized high deposition is important in the current proposed rulemaking, using a 12 x 12 km grid provides a resolution that is too coarse for pinpointing smaller areas of localized high deposition.
3. Third, anglers are likely to catch fish from several water bodies. Thus, a grid larger than the current 12 x 12 km would better account for such common fishing patterns. Conversely, a larger grid would also decrease model ability to simulate smaller areas of localized high deposition.
4. Finally, the EPA needs to provide detailed and rigorous background information regarding the effects of grid size on CMAQ model results, in the context of over- and underestimation of predicted changes in deposition.

Response to Comment 2: The EPA disagrees with the commenter's claim. Currently, models such as Advanced Plume Treatment (APT) use a surrogate reaction for the potential reactive gas phase Hg

reduction that may or may not occur in plumes (Vijayaraghavan et al., 2007)[25]. Reactions that may reduce gas phase oxidized Hg in plumes have not been explicitly identified in literature. The application of potentially erroneous in-plume chemistry that is a fundamental component of APT would be inappropriate. In addition, APT is not available in the latest state-of-the-science version of CMAQ.

The EPA agrees with the commenter that the CMAQ modeling with 12 km grid resolution is likely a lower bound estimate on EGU contribution as higher impacts using finer grid resolution are possible. The commenter's assertion that EGU impacts are likely higher further supports the final conclusions of the exposure modeling assessment.

The EPA notes that the application of a photochemical model at 12 km grid resolution for the entire continental U.S. is more robust in terms of grid resolution and scale that anything published in literature and represents the most advanced modeling platform used for a national Hg deposition assessment.

Comment 3: Commenter 18023 states that the EPA provides no underlying information about the CMAQ Hg deposition results associated with the 2005 and 2016 zero-out and the 2016 proposed rule simulations. According to the commenter, a full review of the EPA's analysis is difficult because the EPA failed to provide full and complete documentation of its analysis.

Response to Comment 3: The EPA disagrees that the EPA provided no information about the CMAQ Hg deposition results, these results are clearly shown in the air quality modeling TSD. However, the EPA provided additional information in the Air Quality Modeling TSD to answer questions raised by the commenter. For example, in response to comments, the EPA now included model performance evaluation for total Hg wet deposition for the 36 km modeling domain at the suggestion of ENVIRON.

Comment 4: Commenter 18023 states that according to the ENVIRON report the EPA overestimated U.S. EGU Hg deposition by 10% on average (and up to 41% in some areas).

Response to Comment 4: The EPA disagrees with the information presented by ENVIRON for Southern Company. The ENVIRON report is based on the misapplication of multiple incommensurate modeling studies and false premises which include the incorrect notion that the boundary conditions are over-estimated and the notion that the EPA should use in-plume chemistry that has not been explicitly characterized and peer reviewed. Reactions that may reduce gas phase oxidized Hg in plumes have not been explicitly identified in literature. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg (II) in plumes (Kolker et al., 2010[26]; Rothenberg et al., 2010[27]). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. The possibility that Hg (0) is oxidized to Hg (II) in plumes suggests

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[25] Vijayaraghavan, K., Seigneur, C., Karamchandani, P., Chen, S.Y. 2007. "Development and application of a multipollutant model for atmospheric mercury deposition." *Journal of Applied Meteorology and Climatology* 46, 1341-1353.

[26] Kolker, A., Olson, M.L., Krabbenhoft, D.P., Tate, M.T., Engle, M.A., 2010. "Patterns of mercury dispersion from local and regional emission sources, rural Central Wisconsin, USA." *Atmospheric Chemistry and Physics* 10, 4467-4476.

[27] Rothenberg, S.E., McKee, L., Gilbreath, A., Yee, D., Connor, M., Fu, X.W., 2010. "Wet deposition of mercury within the vicinity of a cement plant before and during cement plant maintenance." *Atmospheric Environment* 44, 1255-1262.

coal-fired power plant Hg contribution inside the U.S. may be underestimated in the EPA modeling. The EPA asserts that the numbers suggested by the commenter are inaccurate as it is not appropriate to adjust the EPA estimated deposition estimates based on previous Hg modeling done with older Hg chemistry and in-plume reactions that have not been explicitly identified. Recent research has shown that ambient Hg concentrations have been decreasing in the northern hemisphere since 2000 (Slemr et al., 2011). The EPA declines to revise this analysis as commenter suggests for several reasons, including available evidence indicates that emissions from China have not appreciably changed between 2000 and 2006 (Streets et al., 2009) and ambient Hg concentrations have decreased, of the commenter inappropriately comingled out–of- date Hg modeling simulations with the EPA results, and ENVIRON's analysis has not undergone any scientific peer review and presents information with incorrect assumptions as noted in this response.

Comment 5: Commenter 18023 states that the EPA's use of highly aggregated (spatially and temporally) metrics to compare against similarly aggregated observations obscures errors and biases and is a highly degraded and lenient approach to operational evaluation. According to the commenter, the EPA did not provide any diagnostic evaluation in any of its modeling for regulatory purposes and as a result not only can the model performance conducted not determine if the model is getting the right answer for the right reasons (*i.e*., no diagnostic evaluation), it cannot tell if it is getting the right answer (degraded operational evaluation).

Response to Comment 5: The EPA disagrees that the model performance presented in the air quality TSD is insufficient. The EPA also disagrees that the Agency used "highly aggregated performance metrics" that result in degraded and lenient model evaluation.The EPA asserts that the model performance evaluation is generally similar to the level of model performance presented in literature. The commenter presents the results of several Hg modeling studies as providing information they believe to be appropriate and relevant for this assessment. (Lohman et al., 2006)[28] model near-source Hg chemistry from U.S. EGUs, but provide absolutely no information about model performance evaluation. Results from (Seigneur et al., 2006[29]; Vijayaraghavan et al., 2008[30]) are identified by the commenter as supposedly having Hg modeling results that are applicable to the EPA's analysis. These studies present similar model performance metrics as the EPA, and aggregate the metrics across many monitor locations; however, these articles calculate long-term annual averages or model estimates and observations total Hg wet deposition before estimating performance metrics, which presents a more favorable evaluation. It is common practice to pair modeled estimates and observations in space and time (weekly in this case) and estimate performance metrics, then average all the metrics together. The latter is the approach taken by the EPA and should have been taken by the studies presented by the commenter. The EPA finds the performance evaluation presented in the modeling TSD consistent with and in the case of (Lohman et al., 2006) far beyond what is presented in published articles deemed relevant by the commenter. In addition to the evaluation presented by the EPA in the modeling TSD,

[28] Lohman, Kristen; Christian Seigneur; Eric Edgerton & John Jansen. 2006. *Modeling Mercury in Power Plant Plumes*, 40 Envtl. Sci. & Tech. 3848.
[29] Seigneur, C., Lohman, K., Vijayaraghavan, K., Jansen, J., Levin, L., 2006. "Modeling atmospheric Hg deposition in the vicinity of power plants." *Journal of the Air & Waste Management Association* 56, 743-751.
[30] Vijayaraghavan, K., P. Karamchandani, C. Seigneur, R. Balmori, and S.-Y. Chen. 2008, "Plume-in-grid modeling of atmospheric mercury, "*J. Geophys. Res.*, 113, D24305, doi:10.1029/2008JD010580.

CMAQ model performance for total Hg wet deposition has been compared with other Hg models (Bullock et al., 2009) [31].

Comment 6: Commenter 18023 states that instead of establishing specific performance goals, the EPA judges acceptance of model performance if "the mean bias (bias) and mean error (error) statistics...are within the range or close to that found by other groups in recent applications."

Response to Comment 6: The EPA disagrees that the model performance presented in the air quality TSD is insufficient or that it differs from the model performance presented in literature. The model performance reported for the CMAQ Hg modeling done by the EPA is consistent or better than applications the commenter finds relevant for this type of analysis. This includes journal articles cited by the commenter including (Lohman et al., 2006; Seigneur et al., 2006; Vijayaraghavan et al., 2008). None of these articles establishes specific model performance goals and, in particular, the Lohman et al. (2006) paper presents absolutely no model performance evaluation of any kind.

Comment 7: Commenter 18023 states that the results of the modeling are extracted and used in the Hg Risk TSD at a highly specific geographic scale (*i.e*., census tracts, [Hydrologic Unit Code] HUC-12s, and 50 km to 500 km circles to calculate ratios) to calculate the relative contribution of Hg emissions from U.S. EGUs and changes in deposition resulting from Hg emission reductions. According to the commenter, the EPA's approach to model performance provides no confidence in the models' estimates for such purposes, especially around point sources where the EPA assumes significant gradients exist.

Response to Comment 7: The EPA disagrees. The EPA's approach to model performance is consistent or better than the journal articles referenced by the commenter for such purposes: Lohman et al., 2006; Seigneur et al., 2006; and Vijayaraghavan et al., 2008. In fact, the Lohman et al. (2006) study is titled "Modeling Mercury in power plant plumes" and provides no model performance of any kind. The Seigneur et al., 2006 paper is titled 'Modeling atmospheric mercury deposition in the vicinity of power plants' and employs a less stringent approach for matching observations and model estimates of total Hg wet deposition in that this paper makes annual averages of both before comparison to make model performance seem optically better. The EPA's model performance evaluation is at a minimum consistent with and in some cases better than what is employed in journal articles supplied by the commenter.

Comment 8: Commenter 17807 states that the EPA has not conducted an adequate model performance evaluation and no diagnostic evaluation was conducted to ensure the results were attributable for the reasons the EPA assumed. According to the commenter, the EPA used inappropriate operational performance test to confirm it correlates with actual observations; a review of actual historical emissions data and contemporaneous deposition monitoring data does not support the EPA's modeling conclusions. For example, states the commenter, statistical analysis of available data conducted on behalf of the Florida Electric Power Coordinating Group does not show evidence of a statistically significant relationship between temporal trends in coal-fired EGU Hg emissions in Florida and Hg concentrations in rain during 1998-2010 (Vijayaraghavan et al., 2011). The commenter states that using a Theil-Sen (TS) slope analysis to determine statistically significant trends, Florida EGU reductions of 83% between 1997 and 2010 were compared to publicly available monitoring data (SEARCH, MDN,

[31] Bullock, O.R., Atkinson, D., Braverman, T., Civerolo, K., Dastoor, A., Davignon, D., Ku, J.Y., Lohman, K., Myers, T.C., Park, R.J., Seigneur, C., Selin, N.E., Sistla, G., Vijayaraghavan, K., 2009. "An analysis of simulated wet deposition of Hg from the North American Hg Model Intercomparison Study." *Journal of Geophysical Research-Atmospheres* 114.

FSU-WDF) from the same timeframe, and the analysis showed a poor correlation (R2 = 0.10) with total Hg deposition remaining essentially flat during a period of substantial Hg emission reductions.

Response to Comment 8: The EPA's approach to model performance is consistent or better than the journal articles for similar purposes: Lohman et al., 2006; Seigneur et al., 2006; and Vijayaraghavan et al., 2008. In fact, the Lohman et al. (2006) study is titled "Modeling Mercury in power plant plumes" and provides no model performance of any kind. The EPA's model performance evaluation is at a minimum consistent with and in some cases better than what is employed in journal articles supplied by the commenter. The EPA used actual historical emissions representing 2005 and compared model estimates of total Hg wet deposition to monitors that collected that data in 2005. No other routinely available measurements are available in 2005. The EPA does not consider information presented at conferences or industry reports to be peer-reviewed literature, and consideration of oral presentation material would be inappropriate. However, the EPA does not necessarily expect an analysis of a single EGU with monitor located near the ocean to be representative of the entire sector.

Comment 9: Commenters 17775 and 18023 state that the EPA overestimated EGU-attributable Hg deposition by 11% across the U.S., and by even higher percentages, deposition in the vicinity of coal-fired EGUs where ionic Hg reduction has a stronger effect as well as in regions with frequent wildfires or prescribed burns because fire emissions have not been accounted for in the CMAQ modeling. The commenters rely on a report by ENVIRON that provides that that Hg emissions from biomass fires are not included in EPA CMAQ modeling inventory. According to the commenters, Hg emissions from fires in the continental U.S. in 2005 were approximately 28 Mg/y (Wiedinmyer and Friedli, 2007) [32] and, hence, are significant compared to the U.S. anthropogenic emissions 2005 emissions total of 105 tons (EPA, 2011d)[33]. The commenters state that unlike many natural sources, fires have large Hg(p) emissions (EPA, 2011d; Finley et al., 2009)[34] which deposit locally and regionally.

Response to Comment 9: The EPA disagrees with the information presented by ENVIRON for Southern Company. The work by ENVIRON is based on the misapplication of multiple incommensurate modeling studies and false premises which include the incorrect notion that the boundary conditions are over-estimated and the notion that the EPA should use in-plume chemistry that has not been explicitly characterized and peer reviewed. Reactions that may reduce gas phase oxidized Hg in plumes have not been explicitly identified in literature. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg (II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. The possibility that Hg (0) is oxidized to Hg (II) in plumes suggests coal-fired power plant Hg contribution inside the U.S. may be underestimated in the EPA modeling. The EPA asserts that the numbers suggested by the commenter are inaccurate as it is not appropriate to adjust the EPA-estimated deposition estimates based on previous Hg modeling done with older Hg chemistry and in-plume reactions that have not been explicitly identified. Recent research has shown

[32] Wiedinmyer, C., H. Friedli, 2007. "Hg emission estimates from fires: an initial inventory for the U.S." *Environ. Sci. Technol*. 41, 8092-8098.
[33] EPA, 2011d. *Memorandum – Emissions Overview: HAP in Support of the Proposed Toxics Rule.* Toxics Rule docket, number EPA-HQ-OAR-2009-0234, March 15.
[34] Finley, B. D., Swartzendruber, P. C., and Jaffe, D. A., 2009. "Particulate Hg emissions in regional wildfire plumes observed at the Mount Bachelor Observatory." *Atmospheric Environment*, 43(38), 6074-6083.

that ambient Hg concentrations have been decreasing in the northern hemisphere since 2000 (Slemr et al., 2011). Since emissions from China have not appreciably changed between 2000 and 2006 (Streets et al., 2009) and ambient Hg concentrations have been decreasing, inappropriate mixing and matching of older out of date Hg modeling simulations with the EPA results has been included, and the fact that ENVIRON's analysis has not undergone any scientific peer review and presents information with incorrect assumptions as noted in this response, it will be disregarded.

The EPA also disagrees with the commenters' interpretation of the applicability of wildfire Hg emissions to this assessment. Finley et al., 2009, suggests caution when using their field data to make assumptions about Hg(p) emissions from wildfires; the estimated particulate Hg emissions from wildfires is based on one field site with a limited sample size and the assumptions made (such as the observed Hg(p) to carbon monoxide (CO) ratios at this location) may not be valid on a broader scale (Finley et al., 2009). Hg emissions from wildfires are a revolatilization of previously deposited Hg (Wiedinmyer and Friedli, 2007). Given that electrical generating power plants are currently and have historically been a large Hg emitting source the appropriate inclusion of wildfire emissions in a modeling assessment would increase the contribution from this emissions sector.

Comment 10: Commenter 17681 states that the EPA has not acknowledged the dramatic decline in Hg emissions from U.S. EGUs since the late 1990s (approximately 50%) to the current level of approximately 29 tons. The commenter notes that in Florida specifically, a recent study shows that EGU Hg emissions have declined 83% between 1997 and 2010. According to the commenter, the EPA also fails to consider the relative magnitude of EGU Hg emissions compared to other sources, natural and human-caused. The commenter states that the current U.S. EGU Hg emissions (approximately 29 tons) represents about 1% of worldwide human-caused emissions, and about 0.5% of total Hg emissions (approximately two-thirds of Hg emissions are from natural sources, such as volcanic events and forest fires).

Response to Comment 10: The EPA disagrees with the commenter's assertion that the EPA has not acknowledged the decline in Hg emissions for the U.S. EGUs since the late 1990s. The EPA analyzed historical, current, and future projected Hg emissions from the power generation sector, as stated in the preamble to the proposed rule. Because the commenter's assertion is based on a conference presentation which is not part of the peer reviewed scientific literature, the EPA is unable to further consider the merits of that work.

The EPA also disagrees with the commenter's assertion that the EPA failed to consider the relative magnitude of Hg emissions from U.S. EGUs compared to other sources. As noted in the Hg Risk TSD, the EPA modeled Hg emissions from U.S. and non U.S. anthropogenic and natural sources to estimate Hg deposition across the country. The EPA also determined the contribution of Hg emissions from U.S. EGUs to total Hg deposition in the U.S. by running modeling simulations for 2005 and 2016 with Hg emissions from U.S. EGUs set to zero. Based on the analysis done for this rule the EPA finds that total Hg deposition from U.S. EGUs do significantly impact human health.

The commenter suggests that Hg emissions from U.S. EGUs represent a limited portion of the total Hg emitted worldwide, including anthropogenic and natural sources. While the EPA acknowledges that Hg emissions from U.S. EGUs are a small fraction of the total Hg emitted globally, it views the environmental significance of Hg emissions from U.S. EGUs and other sources as a more germane consideration. Hg is emitted from U.S. EGUs in three forms. Each form of Hg has specific physical and chemical properties that determine how far it travels in the atmosphere before depositing to the

landscape. While gaseous oxidized Hg and particle bound Hg are generally local/regional Hg deposition concerns, all forms of Hg have the potential to deposit to local or regional watersheds. U.S. coal-fired power plants account for over half of the U.S. controllable emissions of the quickly depositing forms of Hg. Although emissions from Hg sources outside the U.S. contribute to Hg deposition in the U.S., the peer reviewed scientific literature shows that EGU Hg emissions in the U.S. significantly enhance Hg deposition and the response of ecosystems in the U.S. (Caffrey et al., 2010; Driscoll et al., 2007[35]; Keeler et al., 2006; White et al., 2009).

Comment 11: Commenter 17681 states that the "statistical analysis does not show evidence of a significant relationship between temporal trends in Hg emissions from coal-fired EGUs in Florida and Hg concentrations in precipitation during 1998-2010." (Vijayaraghavan et al., 2011)

Response to Comment 11: The EPA disagrees that the commenter is providing information that is peer reviewed and broadly applicable to the entire sector. The EPA does not consider information presented at conferences to be peer reviewed literature and consideration of oral presentation material would be inappropriate. However, the EPA does not necessarily expect an analysis of a single EGU with monitor located near the ocean to be representative of the entire sector.

Comment 12: Commenter 17777 recommends that the EPA consider the Hg emitted by EGUs as partially elemental and partially in divalent and particle-bound forms. According to the commenter, the EPA's estimation that Hg emissions from U.S. EGUs are expected to pose a more limited local health risk is based on an assumption of divalent and particle-bound Hg as readily deposits locally. The commenter states that the science establishes that Hg emissions emitted by U.S. EGUs pose a less significant local risk.

Response to Comment 12: The EPA agrees with the commenter that Hg speciation (e.g., elemental, divalent, and particle bound forms) substantially affects the distance away from the source that Hg emissions deposit, and the modeling that the EPA conducted for both the Hg Risk TSD and the RIA for the proposed and final rulemaking includes speciated Hg emissions in these three forms. As fully explained in the Hg Risk TSD and the Excess Deposition TSD as well as other responses to comments, Hg emissions from U.S. EGUs can contribute to local health risks.

2. Chemical reactions.

Commenters: 17621, 17775, 17807, 18023

Comment 13: Several commenters (17775, 18023, 177621) state that the CMAQ modeling fails to account for the chemical reduction of gaseous ionic Hg to elemental Hg that occurs in EGU plumes. According to the commenters, recent EPRI studies designed to measure the concentration of Hg species in an EGU plume have found more gaseous elemental Hg in the plume than would have been predicted by stack emissions alone. The commenters note that the EPA did not assess model performance using available CMAQ updates and that those updates help to reduce uncertainties in predicting Hg deposition. According to the commenters, the Advanced Plume-in-Grid Treatment has been shown to improve performance of predicting wet deposition and of partially correcting the wet deposition over

[35] Driscoll, C. T., Han, Y.-J., Chen, C. Y., Evers, D. C., Lambert, K. F., Holsen, T. M., et al. 2007. "Mercury Contamination in Forest and Freshwater Ecosystems in the Northeastern U.S." *BioScience, 57*(1).

predictions in the northeast U.S. Also according to the commenters, if the CMAQ accounted for chemical reactions in the plume and used improved techniques for predicting wet and dry deposition, EGU-attributable Hg deposition would have decreased by 10%.

Response to Comment 13: The EPA disagrees with the commenters' claim that oxidized Hg chemically reduces to elemental Hg within the plume. There is no evidence of these chemical reactions in the scientific literature. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg (II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. Currently, models such as Advanced Plume Treatment (APT) use a surrogate reaction for the potential reactive gas phase Hg reduction that may or may not occur in plumes (Vijayaraghavan et al., 2007). The APT is not available in the most recent version of CMAQ. It would be inappropriate for the EPA to apply an out of date photochemical model with in-plume chemistry that has not been shown to exist.

Comment 14: Commenter 17621 states that the EPA needs to provide a sensitivity analysis that shows how inclusion of in-plume reduction of reactive gaseous Hg to gaseous elemental Hg changes model results. According to the commenter, the CMAQ model fails to include in-plume reduction of reactive gaseous Hg (Hg2+) to gaseous elemental Hg (Hg0) and that this is a "significant shortcoming of its analyses." The commenter states that chemical reactions that reduce reactive gaseous Hg to gaseous elemental Hg are another source of uncertainty in Hg atmospheric modeling, and the choice of reduction mechanism can influence model predictions, as shown by Lin, et al. (2007), Pongprueksa, et al. (2008), and Lohman, et al. (2006). The commenter notes that in a sensitivity analysis of the CMAQ-Hg model, Lin, et al. (2007) and Pongprueksa, et al. (2008) replaced aqueous Hg(II)–HO2 reduction by either: (1) reactive gaseous Hg reduction by CO (5×10^{-18} cm^3 $molecule^{-1}$ s^{-1}), or (2) reactive gaseous Hg photo-reduction (1×10^{-5} s^{-1}). According to the commenter, using either alternative reaction allowed the CMAQ-Hg model to predict Hg wet deposition more closely in agreement with deposition measured by the Mercury Deposition Network (MDN).

Response to Comment 14: The EPA disagrees with the commenter's suggestions. Reactions that may reduce gas phase oxidized Hg in plumes have not been explicitly identified in literature. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg (II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Since the specific reaction mechanisms for the oxidation of elemental Hg to reactive gas phase Hg in plumes and the specific reaction mechanisms for the reduction of gaseous oxidized Hg to elemental Hg are not known and either could happen, the presentation of both as a sensitivity analysis would not provide physically meaningful information. In-plume reactions to oxidize elemental Hg to oxidized gas phase Hg would likely increase local and regional deposition of Hg and the opposite may happen if reactive gas phase Hg is reduced to elemental Hg. The EPA asserts the most appropriate approach is to only apply known in-plume chemical reactions until more specific reaction mechanisms are identified. Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling.

Comment 15: Commenter 17621 summarizes another study, Lohman et al. (2006), which simulated in-plume chemical transformations using the Reactive & Optics Model of Emissions (ROME), using two reduction pathways: a pseudo-first-order decay of reactive gaseous Hg of 0.3 h^{-1}, and an empirical reaction of reactive gaseous Hg with SO_2 of 8×10^{-18} cm^3 $molecule^{-1}$ s^{-1}. According to the commenter,

results showed better agreement between the simulations and the measurements of Hg concentrations in power plant plumes.

Response to Comment 15: The EPA disagrees with the commenter. Lohman et al. (2006) provides no model performance evaluation and uses a model (ROME) that is not used for regulatory dispersion modeling and does not seem to be peer reviewed. The application of ROME is not well characterized in this document. The lack of any performance evaluation and the fact a non-peer reviewed dispersion model was applied makes this research not relevant or useful for the purposes of the EPA's analysis.

Comment 16: According to Commenter 17621, reduction of reactive gaseous Hg to gaseous elemental Hg has been reported in power plant plumes. Supporting data the commenter notes include atmospheric concentrations of speciated Hg measured downwind of power plant stacks and model predictions (Edgerton et al., 2006[36]; Lohman et al., 2006). The commenter states that a detailed description of various plume measurement studies is provided in EPRI Comments, CAA section 3.4.

Response to Comment 16: The EPA disagrees with the commenter's suggestions. Reactions that may reduce gas phase oxidized Hg in plumes have not been explicitly identified in literature. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg (II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry.

Comment 17: Commenter 17621 states that the EPA didn't assess model performance using available CMAQ updates, although advances in modeling capabilities help to reduce uncertainties in predicting Hg deposition. For example, states the commenter, the Advanced Plume-in-grid Treatment (APT) is a CMAQ update that allows better resolution of sub-grid-scale processes associated with emissions from elevated point sources, such as EGUs. According to the commenter, CMAQ-APT has shown improved performance in predicting Hg deposition, as well as in predicting the behavior of NO_X, SO_2, ozone, and PM (Vijayaraghavan et al., 2006, 2009), and using CMAQ-APT to model Hg in the stack plumes of the top 30 Hg-emitting power plants in the U.S., Vijayaraghavan et al. (2008) demonstrated (1) improved performance in predicting Hg wet deposition compared with a purely Eulerian grid-based model, (2) partial correction of wet deposition over-predictions downwind of coal-fired power plants in the northeastern U.S., and (3) decreases of approximately 10% in simulated dry and wet deposition over large areas of the eastern U.S.—with larger decreases occurring near power plants selected for APT analysis.

Response to Comment 17: The EPA disagrees with the commenters' claim that oxidized Hg chemically reduces to elemental Hg within the plume. There is no evidence of these chemical reactions in the scientific literature. Inferences about chemical reactions are very different from explicitly identified chemical reactions. Inferences about chemical reactions cannot be implemented in a photochemical model. Currently, models such as Advanced Plume Treatment (APT) use a surrogate reaction for the potential reactive gas phase Hg reduction that may or may not occur in plumes (Vijayaraghavan et al., 2007). Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg(II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better

[36] Edgerton E.S., Hartsell B.E., Jansen, J.J., 2006. "Mercury Speciation in Coal-fired Power Plant Plumes Observed at Three Surface Sites in the Southeastern US," *Environmental Science & Technology*, 40, 4563–4570.

field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. It would be inappropriate for EPA to apply an out-of-date photochemical model with in-plume chemistry that has not been shown to exist.

Comment 18: Commenter 17621 states that the EPA needs to enhance the Hg chemistry routines in its CMAQ model to implement in-plume conversion of reactive gaseous Hg to gaseous elemental. According to the commenter, studies by EPRI finds that there is more gaseous elemental Hg in coal-fired power plant plumes traveling downwind of their sources than would be predicted from stack emissions alone. The commenter states that when simulating rain in the plume dilutions chamber (PDC) researchers typically observe a continuous, gradual increase in gaseous elemental Hg; this suggests SO_2-mediated conversion of reactive gaseous Hg in water droplets to gaseous elemental Hg, followed by diffusion to the droplet interface and transfer to the gas phase. In an alternative scenario with no chemical conversion, states the commenter, dissolved gaseous elemental Hg diffuses into the droplet interface, where mass transfer to the gas phase occurs over the course of the simulation. The commenter states that given the extremely low water solubility of gaseous elemental Hg, the second explanation is much less likely than the first. The commenter states that several PDC studies have been performed by EPRI including (Prestbo et al.,2004; Laudel and Prestbo, 2001), recent studies at Plant Pleasant Prairie, WI (August 2003) and Plant Bowen, GA (October 2002), as well as those at the Energy & Environmental Research Center (EERC) at the University of North Dakota (March 2000) and at WEPCO Presque Isle Power Plant, WI (February 1995).

Response to Comment 18: The EPA disagrees with the commenter's claims that oxidized Hg chemically reduces to elemental Hg within the plume. There is no evidence of these chemical reactions in the scientific literature. The references supplied by the commenter do not contain any explicit Hg reduction reactions. These references suggest that oxidized gas phase Hg may be reduced and postulate a possible pathway, but never describe the chemical mechanism. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg(II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. It would be inappropriate for the EPA to apply an out of date photochemical model with in-plume chemistry that has not been shown to exist.

Comment 19: Commenter 17621 states there are numerous field studies to support the occurrence of in-plume conversion. The commenter provides tables documenting the various studies. See Tables 3-1 and 3-2 (pages 3-17 through 3-19 of comment document). According to the commenter:

- Plant Bowen, Georgia – researchers found that reactive gaseous Hg levels decreased slightly in samples taken 12 miles downwind of the stack, as compared to levels in stack samples. The ratio of gaseous elemental Hg to reactive gaseous Hg was 84% of the in-stack ratio; in other words, elemental Hg concentrations in the plume were 16% higher than those measured in the stack. Researchers suggested a combination of deposition and/or chemical changes in the plume to explain these results (Prestbo et al., 2004).
- Plant Pleasant, Wisconsin - found a 44% reduction in the fraction of reactive gaseous Hg between the stack exit and the first sampling location (1500 feet downwind), and a 66% reduction from the stack to 5 miles downwind, with no additional reduction between 5 and 10 miles downwind[37,38].

[37] EPRI, 2005. *Evaluation of Mercury Speciation in a Power Plant Plume.* Palo Alto, CA: 1011113.

- Plant Crist, Florida - Analyses of in-plume, flue gas, and coal samples showed around 4% conversion of reactive gaseous Hg to gaseous elemental Hg in the plume at about 1 km downwind of the stack tip. These observations agree with those from the previous two EPRI in-plume studies[39],[40]

Response to Comment 19: The EPA disagrees with the commenter's claims that oxidized Hg chemically reduces to elemental Hg within the plume. There is no evidence of these chemical reactions in the scientific literature. The EPA does not consider information presented at conferences or industry reports to be peer reviewed literature, and consideration of oral presentation material would be inappropriate. Further, even these cited references do not provide sufficient information for incorporating the supposed reactions into the modeling (e.g., specific chemical reactions, reaction rates, etc.); rather, the cited references only suggest that oxidized gas phase Hg could be reduced and postulate a possible pathway. Recent studies in central Wisconsin and central California suggest the opposite may happen; elemental Hg may be oxidized to Hg(II) in plumes (Kolker et al., 2010; Rothenberg et al., 2010). Better field study measurements and specific reaction mechanisms need to be identified before making conclusions about potential Hg in-plume chemistry or applying surrogate reactions in regulatory modeling. It would be inappropriate for the EPA to apply a photochemical model with in-plume chemistry that has not been explicitly identified.

3. Modeled deposition compared to measured deposition.

Commenters: 17621, 18023

Comment 20: Commenter 17621 states that the agency failed to extensively evaluate the CMAQ model against real-world measurements and failed to evaluate the use of CMAQ to match point sources to specific watersheds in order to identify hotspots. The commenter further states that in addition, the EPA vaguely and poorly explains model inputs in its proposed rulemaking and supporting documents. Thus, according to the commenter, many uncertainties remain that influence CMAQ performance in predicting Hg deposition under the 2005 and 2016 scenarios.

Response to Comment 20: The EPA added additional comparison of model estimates to real world measurements of total wet deposition. The EPA disagrees that the description of model inputs and outputs are poorly characterized in the revised Air Quality Modeling TSD.[41] However, additional information about many of the model inputs has been added to the Air Quality Modeling TSD. The EPA disagrees that a need exists to match CMAQ modeled Hg deposition to specific plants.

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[38] EPRI, 2006. *Mercury Chemistry in Power Plant Plumes*. Palo Alto, CA: 1010142.

[39] Landis M., Ryan J., Oswald E., Jansen J., Monroe L., Walters J., Levin L., ter Schure, A.F.H, Laudal D., Edgerton E., 2009. "Plant Crist Hg Plume Study." Presented at Air Quality VII, Arlington, VA, October 27.

[40] Ter Schure, A., Caffrey J., Gustin M., Holmes C., Hynes A., Landing B., Landis M., Laudel D., Levin L., Nair U., Jansen, J., Ryan J., Walters, J., Schauer J., Volkamer R., Waters D., Weiss P., 2011. "An Integrated Approach to Assess Elevated Hg Wet Deposition and Concentrations in the South Eastern U.S." Presented at the 10th International Conference on Hg as a Global Pollutant, Halifax, Nova Scotia, Canada, July 27.

[41] U.S. Environmental Protection Agency, 2011. *Air Quality Modeling Technical Support Document: EGU Hg Analysis. The EPA*-454/R-11-008.

The EPA disagrees with the commenter's interpretation of the intent of the Hg deposition hotspot analysis. Specifically, the analysis is not of "Hg hotspots" but rather of Hg deposition hotspots, defined as excess local Hg deposition around power plants. To reduce the confusion about this term, the EPA re-titled this analysis to "Potential for Excess Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document. Second, the EPA disagrees that the analysis assumes that deposition of Hg is confined to a 50-km radius around power plants. The purpose of the EPA analysis was to evaluate whether there existed "excess deposition of Hg in nearby locations within 50 kilometers (km) of EGUs that might result in Hg deposition 'hotspots'." As better explained in the new TSD, the EPA calculated the average EGU-attributable deposition (based on CMAQ modeling of Hg deposition) in the area 500 km around each plant and the average EGU-attributable deposition in the area 50 km around each plant. The difference between those two values is the excess local deposition around the plant. As discussed in the new Excess Deposition TSD, the CMAQ modeling shows that around plants, especially those with high Hg emissions, there is local deposition in excess of regional deposition. The EPA clarified the purpose of the excess local deposition analysis in new Excess Deposition TSD.

Comment 21: Commenter 17621 states that the EPA fails to provide first-hand information on wet and dry deposition processes (such as wet/dry deposition ratio) used in their model, although this information is important to provide accurate predictions of Hg wet and dry deposition. According to the commenter, it is reasonable to assume that the CMAQ-Hg model was run with default settings for Hg chemistry, predicting total Hg deposition of about 35% through wet processes and 65% through dry processes (wet/dry deposition ratio of 0.5), with little seasonal variation between January and July (Pongprueksa et al., 2008). However, states the commenter, modifying Hg chemistry in the model to include seasonal factors (such as solar radiation, precipitation, and availability of oxidizing agents) can introduce seasonal variation in overall deposition, but the wet/dry deposition ratio remains the same (Pongprueksa et al., 2008).

Response to Comment 21: The EPA disagrees with the commenter's assessments. A description of the model and references for the model processes are clearly provided in the Air Quality Modeling TSD. The commenter's assumption about the version of CMAQ is incorrect. The EPA strongly urges the commenters to read the Air Quality Modeling TSD to avoid the fundamental misunderstandings presented in this comment. For instance, the Hg Risk TSD clearly states that the EPA applied CMAQ v4.7.1 not CMAQ-Hg. The EPA agrees that there are differences in dry and wet deposition that are related to seasons. The EPA provided additional model performance evaluation by season to the air quality modeling TSD.

Comment 22: Commenter 17621 states that the EPA needs to assess how predicted values of deposition compared to MDN data. According to the commenter, the wet/dry deposition ratio predicted by CMAQ-Hg does not match Hg deposition measurements. Namely, states the commenter, direct and indirect measurements show that the wet/dry deposition ratio for Hg in the continental U.S. averages around 3 (ranging between 0.1 and 16.7)—that is, 6 times higher than CMAQ-Hg predicts (Engle et al., 2010[42]; Lombard et al., 2011[43]; Lyman et al., 2007[44]; Lyman et al., 2009[45]; Zang et al., 2009[46]).

[42] Engle M.A., Tate M.T., Krabbenhoft D.P, Schauer J.J., Kolker A., Shanley J.B., Bothner M.H., 2010. "Comparison of Atmospheric Hg Speciation and Deposition at Nine Sites across Central and Eastern North America," *Journal of Geophysical Research,* 115, D18306, doi:10.1029/2010JD014064.

[43] Lombard M.A.S., Bryce J.G., Mao H., Talbot R., 2011. "Hg Deposition in Southern New Hampshire, 2006–2009,"*Atmospheric Chemistry and Physics Discussions,* 11, 4569–4598.

Response to Comment 22: The EPA disagrees that it did not conduct an assessment comparing CMAQ total Hg wet deposition estimates to MDN data. The air quality modeling TSD clearly shows a comparison of CMAQ estimated total Hg wet deposition with MDN data for the entire length of the modeling period. The EPA disagrees with the commenter's interpretation of the cited references. Lombard et al. (2011) reports ratios of total Hg wet deposition to reactive gas phase Hg dry deposition not total Hg dry deposition. Additionally, the dry deposition totals are modeled estimates and not direct measurements. Similarly, Engle et al. (2010) present ratios of total Hg wet deposition to the sum of reactive gas phase and particle bound Hg. Both studies ignore dry deposition of elemental gas phase Hg and both studies use a modeling approach to estimate dry deposition rather than direct measurements. Zhang et al. (2009) do not present any comparison of wet and dry deposition totals but present estimates of dry deposition velocities. The Lyman references discuss new research grade dry deposition measurement approaches and do not provide any broader information about wet and dry deposition relationships. The characterization of wet and dry deposition processes relating to speciated Hg in global and regional scale photochemical models should be continually evaluated by the academic community and improved when appropriate. CMAQ wet deposition of Hg has been and will continue to be extensively evaluated against Hg Deposition Network sites (Bullock et al., 2008). There is no dry deposition monitoring network, which precludes evaluating CMAQ dry deposition.

Comment 23: Commenter 17621 states the EPA overestimates predictions of Hg wet deposition by 34%. According to the commenter, the EPA reports that modeled Hg wet deposition shows a mean bias of 34% (annual average normalized) and a mean error of 52% (annual average normalized). See Air Quality Modeling TSD: Point Source Sector Rules (AQM TSD), table III-3, page 9.

Response to Comment 23: The EPA agrees that the commenter accurately restated information provided by the EPA in the Air Quality Modeling TSD. To provide context, other Hg modeling studies show a positive bias for annual total Hg wet deposition (Bullock et al., 2009; Vijayaraghavan et al., 2007). An annual Hg modeling application done by ENVIRON (Yarwood et al.) and the Atmospheric and Environmental Research for Lake Michigan Air Directors Consortium show seasonal average normalized bias between 70 and 158% and seasonal average normalized error between 72 and 503% (Yarwood et al., 2003)[47]. These results indicate a very large over-estimation tendency. The model performance shown by the EPA is consistent with other long-term Hg modeling applications.

Comment 24: Commenter 17621 states that unrealistic wet deposition values evidence problems with the performance of the EPA's CMAQ model. The commenter states that in table III-3, predicted total Hg wet deposition for the 4t^{h} quarter is reported at – 0.80 (minus 0.80) micrograms per square meter

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[44] Lyman S.N., Gustin M.S., Presto E.M., Marsik F.L., 2007. "Estimation of Dry Deposition of Atmospheric Hg in Nevada by Direct and Indirect Methods," *Environmental Science & Technology,* 41, 1970–1976.

[45] Lyman S.N., Gustin M.S., Prestbo E.M., Kilner P.I., Edgerton E., Hartsell B., 2009. "Testing and Application of Surrogate Surfaces for Understanding Potential Gaseous Oxidized Hg Dry Deposition." *Environmental Science & Technology,* 43, 6235–6241.

[46] Zhang L, Wright L.P., Blanchard P., 2009. "A Review of Current Knowledge Concerning Dry Deposition of Atmospheric Hg," *Atmospheric Environment,* 43, 5853–5864.

[47] Yarwood, G, Lau, S., Jia, Y., Karamchandani, P., Vijayaraghavan, K. 2003. *Final Report: Modeling Atmospheric Hg Chemistry and Deposition with CAMx for a 2002 Annual Simulation.* Prepared for Wisconsin Department of Natural Resources.
http://www.gypsymoth.wi.gov/air/toxics/Hg/hg_X97579601_appB.pdf

($\mu g/m^2$). According to the commenter, a negative value for wet deposition is physically impossible. The reported wet deposition bias for the 4th quarter is also negative (– 1.27) and could be generated only by negative concentrations of Hg that are non-physical. According to the commenter, it appears that the negative value is not a typographical error, but instead an error somewhere in the analysis and likely the result of inaccurate post-processing or manipulation of the data, or some other mistake that needs to be corrected.

Response to Comment 24: The negative estimate for wet deposition in the Air Quality Modeling TSD was an error. This error reflected an incorrect calculation in the post-processing of model and observation pairs that only influenced the calculation of model performance metrics. This error did not affect Hg deposition. The error has been fixed and the model performance metrics in the revised air quality modeling TSD have been updated.

Comment 25: Commenter 18023 states the CMAQ documentation and results of the atmospheric modeling is exceedingly sparse and does not allow for a meaningful review, especially of apparent errors, and cites, for example, AQ Modeling TSD at 9, Table III-3, where the 4th quarter wet deposition is negative, a physical impossibility.

Response to Comment 25: The negative estimate for wet deposition in the Air Quality Modeling TSD was an error. This error reflected an incorrect calculation in the post-processing of model and observation pairs that only influenced the calculation of model performance metrics. This error did not affect Hg deposition. The error has been fixed and the model performance metrics in the revised air quality modeling TSD have been updated.

Comment 26: Commenter 18023 states that the EPA uses Hg wet deposition data only in its model performance evaluation and fails to use available ambient concentration measurements of elemental, oxidized, and particulate Hg such as available through the AMNet and SEARCH networks.

Response to Comment 26: The EPA disagrees this evaluation would be useful for the purposes of this modeling application. The AMNet Hg network did not exist in 2005, which is the year the EPA modeled. The SEARCH network just started making preliminary measurements of Hg at one or two sites in 2005. In addition, measurement artifacts related to gaseous oxidized Hg are difficult to quantify and make direct comparison to model estimates problematic (Lyman et al., 2010)[48]. Given the problems associated with TEKRAN measurements of ambient Hg, this data was not compared against model estimates. In addition, the commenter presents the results of several Hg modeling studies as providing information they believe to be appropriate and relevant for this assessment (Lohman et al., 2006; Seigneur et al., 2006; Vijayaraghavan et al., 2008), none of which include any comparison of modeled ambient Hg to measurements.

4. Excess local deposition from Hg emissions from U.S. EGUs (i.e., "deposition hotspots").

Commenters: 17621, 17775, 17789, 19686, 19536, 19537, 19538, 18023

a. Comments generally questioning the EPA's analysis.

[48] Lyman, S.N., Jaffe, D.A., Gustin, M.S., 2010. "Release of Hg halides from KCl denuders in the presence of ozone." *Atmospheric Chemistry and Physics* 10, 8197-8204.

Comment 27: Commenter 17621 states that there is there is no evidence of Hg hotspots due to local deposition associated with coal-fired power plants. According to the commenter, the EPA's use of a 50-km radius to calculate hotspots is flawed. For example, states the commenter, modeling studies show that deposition of Hg emitted from power plants is not confined to a 50-km radius around the plants; for example, Seigneur, et al. (2006) calculated that emissions from five randomly selected power plants contributed less than 8% (plume model), less than 14% (Eulerian model at 84-km resolution), or less than 10% (Eulerian model at 16.7-km resolution) to total Hg deposition within a 50-km radius of the source plants. According to plume model calculations, states the commenter, more than 96% of Hg emitted from these plants traveled beyond 50 km from the sources. Likewise, states the commenter, grid-based Eulerian models predicted that more than 91% (coarse resolution) or more than 95% (fine resolution) of Hg emitted from the plants traveled beyond 50 km.

Response to Comment 27: First, the EPA disagrees with the commenter's interpretation of the intent of the Hg deposition hotspot analysis. Specifically, the analysis is not of "Hg hotspots" but rather of Hg deposition hotspots, defined as excess local Hg deposition around power plants. To reduce the confusion about this term, the EPA re-titled this analysis to "Potential for Excess Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document. Second, the EPA disagrees that the analysis assumes that deposition of Hg is confined to a 50-km radius around power plants. The purpose of the EPA analysis was to evaluate whether there existed "excess deposition of Hg in nearby locations within 50 km of EGUs that might result in Hg deposition 'hotspots'." As better explained in the new TSD, the EPA calculated the average EGU-attributable deposition (based on CMAQ modeling of Hg deposition) in the area 500 km around each plant and the average EGU-attributable deposition in the area 50 km around each plant. The difference between those two values is the excess local deposition around the plant. As discussed in the Hg Risk TSD, the CMAQ modeling shows that around EGUs, especially those with high Hg emissions, there is local deposition in excess of regional deposition. The EPA clarified the purpose of the excess local deposition analysis in the new Excess Local Deposition TSD.

The study cited (Seigneur et al., 2006) in this comment supporting the notion that 91-96% of Hg emitted from power plants travels beyond 50 km is based on a photochemical transport model (TEAM model) that does not employ current state-of-the-science and that is not actively developed or updated. Furthermore, the modeling is based on grid cells that are 20 km in size, which limits generalizability to the EPA modeling performed at 12 km grid resolution using a state-of-the-science photochemical grid model. The cited modeling study ignores dry deposition of elemental Hg from all sources, an assumption that clearly limits the regional impacts from sources (Seigneur et al., 2006). This study cited by the commenter is critically flawed in that it presents no results where individual Hg emission sources are removed and the difference between the zero out simulation and baseline model simulations are directly compared. Finally, the modeling study cited by the commenter presents an illustration of gridded total annual Hg deposition from the TEAM model for the eastern U.S., which clearly shows elevated annual total Hg deposition in the vicinity of coal-fired power plants in the Ohio River Valley and northeast Texas (Seigneur et al., 2006).

Comment 28: Several commenters (17621, 18023, 17775) state that the EPA does not adequately define hotspots in this proposed rule. According to the commenters, in 2005 the EPA defined hotspots as "a waterbody that is a source of consumable fish with MeHg tissue concentrations, attributable solely to utilities, greater than EPA's MeHg water quality criterion of 0.3 mg/kg" (milligrams per kilogram)[49]. Commenters state that it is unclear why the EPA changed from defining a hotspot by fish tissue MeHg

[49] EPA, 2005; 70 FR 16026

concentration to defining a hotspot by depositional excess. The commenters note that all EGUs add to local deposition, so this definition will inevitably result in a positive value. This test is too broad, as all EGUs would fail this test.

Response to Comment 28: The EPA agrees that there is no generally agreed-upon, absolute definition of "hotspot." As discussed in the preamble and Excess local Deposition TSD, for the purposes of the Appropriate and Necessary Finding, the EPA determined that information on the potential for excess deposition of Hg in areas surrounding power plants would be useful in informing the finding. To reduce the confusion about the term "hotspot," the EPA re-titled this analysis to "Potential for Excess Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document. In addition, the commenter interprets the analysis incorrectly, in that the focus was on excess local deposition, rather than all local deposition. The EPA agrees that all EGUs add to local deposition, however, not all EGU have local deposition that greatly exceeds regional deposition, which is the relevant question. In fact, Figure 1 in the new Excess Local Deposition TSD shows that some plants actually have local deposition that is less than the regional average deposition, suggesting that most of the Hg from those plants is transported regionally, or that other EGUs in the vicinity of those plants dominate the deposition of Hg near the plants. The EPA clarified the purpose of the excess local deposition analysis in the new TSD. Because the EPA did not identify "Hg hotspots" of high Hg concentrations in fish, EPA's MeHg water quality criterion of 0.3 mg/kg is irrelevant.

Comment 29: Commenters 17621 and 17775 suggest that a Hg hotspot is a specific location that is characterized by elevated concentrations of Hg exceeding a well-established criterion, such as an RfC when compared to its surroundings. The commenter states that identifying Hg hotspots should not be constrained to locations where concentrations can be attributed to a single source or sector, as the EPA does (Evers et al., 2007). Commenter 17621 notes that others have defined "hotspots as a spatially large region in which environmental concentrations far exceed expected values, with such values (i.e., concentrations) being 2 to 3 standard deviations above the relevant mean" (Sullivan, 2005).

Response to Comment 29: The EPA agrees that there is no generally agreed-upon definition of "hotspot." As discussed in the MATS preamble and Excess Local Deposition TSD, for the purposes of the Appropriate and Necessary Finding, the EPA determined that information on the potential for excess deposition of Hg in areas surrounding power plants would be useful in informing the Appropriate and Necessary Finding. To reduce the confusion about the term "hotspot," the EPA re-titled this analysis to "Potential for Excess Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document.

Comment 30: Commenter 17621 states that wet deposition measurements were taken between November 2004 through 2007 at three sites located downwind from the coal-fired power plant Crist in Pensacola, FL. The commenter states that during this period, Plant Crist emitted about 230 pounds of Hg annually, about 85% of which was reactive gaseous Hg (EPRI, 2010). Landing et al. (2010) estimated that 22–33% of wet-deposited Hg at these sites came from coal combustion, including regional and local sources while the remaining 67–78% came from the global background. The commenter states that using the same data from these same wet deposition sites, Caffrey et al. (2010) found that Hg deposition and concentrations did not differ in a statistically significant manner among these three sites and that the concentrations values were similar to those from Hg Deposition Network (MDN) sites that are more than 50 km away from Plant Crist located along the Northern Gulf of Mexico coast.

Response to Comment 30: The EPA disagrees that the information provided by the commenter regarding the Crist plant and other coal-fired power plants in Florida is relevant to the EPA's analysis of excess local deposition from U.S. EGUs because it is based on measurements of wet Hg deposition without consideration of dry Hg deposition, which can be a significant component of Hg deposition. A more appropriate observation based assessment would be to evaluate both wet and dry deposition. Soil analysis indicates that Hg controls on coal-fired power plants have a global and substantial local impact on human health outcomes (Hatcher and Filippelli, 2011).[50]

Comment 31: Commenter 17621 states that Plant Crist installed a wet scrubber and has operated that scrubber continuously since 2009. The commenter states that the scrubber reduces total Hg emissions by about 70%, but reduces emissions of reactive gaseous Hg (RGM, Hg2+, divalent Hg; the water-soluble and precipitable form, believed by the EPA to deposit locally) by about 85%. According to the commenter, using Hg to trace metal (arsenic and Se) ratios in precipitation collected in the same MDN in (post-scrubber) 2010, Krishnamurthy, et al. (2011)[51] reported that Hg deposition due to local and regional sources had changed between -10 to (IV)% at these sites, relative to historic measurements. These changes were thought to represent upper bound estimates, states the commenter, since the researchers assumed that all Hg, arsenic, and Se measured in wet deposition was from local and regional coal combustion sources even though measured deposition can also include global emission sources. According to the commenter, taken collectively, these findings show that increased local deposition possibly due to EGUs, and deposition changes due to changes in EGU emissions, are small and within the range of natural variability.

Response to Comment 31: Changes to wet deposition over a fairly short time frame such as a year (the part of the study where the coal-fired power plant (Crist) emitting Hg installed controls) are not expected to provide a meaningful information about the effectiveness of control technology. Wet deposition is highly variable from year to year and is subject to varying meteorological wind patterns from year to year. Another fundamental problem that precludes the use of the research identified in the comment is that it does not in any way consider dry deposition. Soil analysis indicates that Hg controls on coal-fired power plants have a global and substantial local impact on human health outcomes (Hatcher and Filippelli, 2011).

Comment 32: Commenter 17621 states that Hg concentrations are not always highest at sites closest to a major source. The commenter refers to a study by Kolker, et al. (2010) that demonstrated that concentrations of atmospheric reactive gaseous Hg, gaseous elemental Hg (GEM, Hg0), and fine particulate Hg (Hg- $PM_{2.5}$) were lower when measured 25 km from a 1114 MW coal-fired EGU than when measured 100 km away. The commenter states that these findings contradict the notion, implicit in the EPA's hotspot analysis, that RGM decreases with distance from a large point source.

Response to Comment 32: The commenter is interpreting the analysis incorrectly, in that the focus was on excess local deposition due solely to EGU emissions, rather than all local and regional deposition. To reduce the confusion about the term "hotspot," the EPA re-titled this analysis to "Potential for Excess

[50] Hatcher, C.L., Filippelli, G.M., 2011. "Hg Cycling in an Urbanized Watershed: The Influence of Wind Distribution and Regional Subwatershed Geometry in Central Indiana, USA." *Water Air and Soil Pollution* 219, 251-261.

[51] Krishnamurthy N., Landing W.M, Caffrey J.M., 2011. "Rainfall Deposition of Mercury and Other Trace Elements to the Northern Gulf of Mexico." Presented at the 10th International Conference on Mercury as a Global Pollutant, Halifax, Nova Scotia, Canada, July 27.

Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document. Because of regional deposition from both domestic and global sources of Hg, total Hg deposition at any location is unlikely to be highly correlated with local sources. However, the EPA's analysis focused on U.S. EGU-attributable Hg deposition, and demonstrates that for some plants (especially those with high Hg emissions), there is local deposition of Hg that exceeds the average regional deposition around the plant. The EPA's analysis shows there is heterogeneity in the amount of excess local deposition around plants, and Figure 1 in the new Excess Deposition TSD shows that some plants actually have local deposition that is less than the regional average deposition, suggesting that most of the Hg from those plants is transported regionally, or that other EGUs in the vicinity of those plants dominate the deposition of Hg near the plants. This does not detract from the overall finding that around some power plants with high levels of Hg emissions, there is excess local deposition that is on average three times the regional EGU-attributable deposition around those plants.

Comment 33: Commenters 17621 and 18023 state that the EPA refers readers to the Hg Risk TSD for more detailed information about Hg hotspots. According to the commenters, the Hg Risk TSD presents no information, summary statistics, and/or actual calculations showing how excess deposition within 50 km of an EGU source is obtained. The commenters state that by assessing only Hg deposition attributable to EGUs, the EPA fails to provide a context for all other sources of Hg deposition and does not explain why deposition from the top 10% of EGU Hg emitters does not decline, despite substantial reductions in modeled Hg emissions from those sources between 2005 and 2016. According to the commenters, this implies that the top 10% EGUs may have approximately as much of a regional effect as a local effect.

Response to Comment 33: First, the EPA disagrees that the Hg Risk TSD did not provide sufficient information regarding the excess local deposition calculation. Nonetheless, the EPA further clarified the methodology in the new TSD, including the method used to calculate the local and regional deposition around power plants is described, along with maps and tables of results. The purpose of the analysis was to focus on whether excess local deposition from U.S. EGUs occurred in the areas directly around power plants, relative to the regional deposition that occurred from all U.S. EGUs in areas farther away from the power plants. This was not an analysis of total Hg deposition, because as the EPA acknowledges throughout its analysis, global sources of Hg deposition account for a large fraction of total Hg deposition, and including those global sources of deposition would simply be adding noise to the comparison of local and regional U.S. EGU-attributable Hg deposition. The EPA clarified the method for calculating excess local deposition analysis in the new Excess Local Deposition TSD. Second, the EPA disagrees that the discussion of local deposition in the Hg Risk TSD did not demonstrate that Hg deposition from the top 10% of Hg emitters by U.S. EGUs declines. Table 1 of the Hg Risk TSD clearly shows that mean local deposition (within 50 km of a plant) for the top 10% of emitters declines from 4.89 $\mu g/m^3$ to 1.18 $\mu g/m^3$. What does not change is the percent local excess for EGU-attributable Hg deposition. This implies that while Hg deposition from U.S. EGUs is declining, there is still an excess contribution to local deposition relative to regional deposition, e.g., because of dispersion, the contribution to average deposition outside 50 km from the plant is lower than the contribution to average deposition within 50 km of the plant.

Comment 34: Commenters 17775 and 18023 state that the CMAQ model has limitations when used to predict local deposition and tends to "overestimate" local deposition. According to the commenters, modeling studies using either a plume model or an Eulerian model predict that 91 to 96% of the Hg emitted by an EGU travels beyond 50 km.

Response to Comment 34: The EPA disagrees that the peer-reviewed CMAQ model has limitations for this application or "overestimates" local deposition. The commenters do not provide any credible support for the notion that grid based models typically overestimate "local" deposition surrounding EGUs. The EPA maintains that the CMAQ photochemical model represents the best science currently available in simulating atmospheric chemistry, transport, and deposition processes. The EPA does not suggest Hg emissions from power plants stop at 50 km from the source. Some portion of EGU emissions deposit before 50 km and some portion travels beyond 50 km. In addition, Hg disperses as it transports, so the average EGU contribution can be lower in areas beyond 50 km relative to areas within 50 km even though Hg emissions from U.S. EGUs are depositing into U.S. watersheds.

In fact, even research funded by the Southern Company contradicts the notion that 91 to 96% of Hg emitted by EGUs travel beyond 50 km. Edgerton et al. (2006) identified Hg from nearby coal-fired power plants as primary contributors at monitor locations 7.4 km (Plant McDonough to Jefferson Street SEARCH monitor), 14.4 km (Plant Crist to OLF SEARCH monitor location), and 25 km (Plant Bowen to Yorkville SEARCH monitor) from the source. In addition, the same research shows coal-fired power plants impact monitors even further from emissions release points: Plant Hammond at 44 km, Plant Wansley at 57 km, and Plant Gaston at 149 km from the Yorkville SEARCH site monitor (Edgerton et al., 2006). The study cited (Seigneur et al., 2006) in this comment supporting the notion that 91-96% of Hg emitted from power plants travels beyond 50 km is based on a photochemical transport model that does not employ current state-of-the-science (TEAM model) and that is not actively developed or updated. The modeling is based on grid cells that are 20 km in size, which limits generalizability to the EPA modeling performed at 12 km grid resolution using a state-of-the-science photochemical grid model. The cited modeling study ignores dry deposition of elemental Hg from all sources, which is an assumption that will clearly limit the regional impacts from sources (Seigneur et al., 2006). This study cited by the commenter is critically flawed in methodology such that individual power plants did not have their emissions zeroed out then re-simulated with the photochemical model. No results are presented where individual Hg emission sources are removed and the difference between the zero out simulation and baseline model simulations are directly compared. Finally, the cited modeling study presents an illustration of gridded TEAM model total annual Hg deposition for the eastern U.S., which clearly shows elevated annual total Hg deposition in the vicinity of coal-fired power plants in the Ohio River Valley and northeast Texas (Seigneur et al., 2006).

Comment 35: Commenters 17775 and 18023 state that a study by the U.S. Department of Energy (DOE) that collected and analyzed soil and vegetation samples for Hg near three U.S. coal-fired power plants – one in North Dakota, one in Illinois, and one in Texas – found no strong evidence of "hotspots" around these three plants.

Response to Comment 35: The EPA disagrees that the DOE study referenced attempted to assess the same analytical question as the EPA's analysis. The DOE study focused on comparisons of total deposition near and far from power plants. The purpose of the EPA analysis documented in the Hg Risk TSD was to focus on whether excess local deposition from U.S. EGUs occurred in the areas directly around power plants, relative to the regional deposition that occurred from all U.S. EGUs in areas farther away from the power plants. This was not an analysis of total Hg deposition, because as the EPA acknowledges throughout its analysis, global sources of Hg deposition account for a large fraction of total Hg deposition. The EPA clarified the purpose of the excess local deposition analysis in the new Excess Local Deposition TSD.

Comment 36: Commenters 17775 and 18023 state that analysis of long-term trends in coal-fired EGU Hg emissions and wet deposition in Florida concluded that statistical analysis does not show evidence of a significant relationship between temporal trends in Hg emissions from coal-fired EGUs in Florida and Hg concentrations in precipitation during 1998-2010. According to the commenters, these observational studies are supported by and consistent with evidence that oxidized Hg emitted from coal-fired power plants rapidly converts to elemental Hg, significantly reducing the potential for "local" or nearby deposition.

Response to Comment 36: Analysis of total deposition near power plants does not address the issue of whether EGUs add more deposition locally or regionally. The purpose of the EPA analysis as better explained in the new TSD was to focus on whether excess local deposition from U.S. EGUs occurred in the areas directly around power plants, relative to the regional deposition that occurred from all U.S. EGUs in areas farther away from the power plants. This was not an analysis of total Hg deposition, because as the EPA acknowledges throughout its analysis, global sources of Hg deposition account for a large fraction of total Hg deposition, and would obscure the comparison of local and regional U.S. EGU-attributable Hg deposition. Total deposition is driven mainly by the global pool of Hg. The EPA's analysis showed that when other sources of Hg deposition are removed, there is on average over three times as much contribution of EGUs to deposition within 50 km of the plants compared with average deposition in the area 500km around a plant, indicating that there is excess local deposition from U.S. EGUs.

Comment 37: Commenter 17775 states that available Hg deposition modeling results and Hg ambient monitoring data show that EGUs do not cause Hg hotspots and that a hotspots analysis cannot serve as a basis for an "appropriate and necessary" finding.

Response to Comment 37: The EPA disagrees that EGUs do not cause hotspots. Specifically, the analysis is not of "Hg hotspots" but rather of Hg deposition hotspots, defined as excess local Hg deposition around power plants. To reduce the confusion about the term "hotspot," the EPA re-titled this analysis to "Potential for Excess Local Deposition of Hg in Areas near U.S. EGUs" and moved it to a separate document. The EPA clarified the purpose of the analysis in the new Excess Local Deposition TSD. As shown in the TSD, modeled local deposition near EGUs with high Hg emissions exceeds regional deposition. The EPA also disagrees that we cannot consider the analysis of excess local deposition to support the Appropriate and Necessary Finding. The commenter provides no justification why excess local deposition is irrelevant to the finding or why excess local deposition must be excluded from the finding.

Comment 38: Commenter 18023 states that the EPA did not justify the metric that compares EGU-attributable deposition near a source (i.e., within 50 km) against the EGU-attributable deposition regionally (i.e., within 500 km). The commenter also states that because any source will contribute to deposition around the source, the metric will always show an enhancement and that the EPA implies that any enhancement is unacceptable.

Response to Comment 38: The EPA disagrees that it did not justify the metric used in the excess local deposition analysis. As stated in the new Excess Local Deposition TSD, the average deposition within the 500 km buffer represents the likely area in which an EGU contributes to regional deposition. The average deposition within the 50 km buffer is used to characterize local deposition plus regional deposition near the EGU. While we acknowledge that other distances could have been selected, we believe our approach is reasonable. Furthermore, this assessment did not attempt to determine acceptable levels of deposition

or estimate risk, as claimed by the commenter. As clarified in the new TSD, the purpose of the assessment was simply to determine whether excess deposition of Hg in the local areas around U.S. EGUs existed.

b. Comments generally supporting the EPA's analysis.

Comment 39: Several commenters (19536, 19537, 19538) state that reducing Hg will benefit local environments. According to the commenters, recent research has confirmed that local sources of Hg emissions contribute the most to local contamination problems. According to the commenters, in fact, a 2007 study confirmed the presence of Hg "hotspots" downwind from coal-fired power plants. The commenters state that the 2007 hotspot study builds on previous studies confirming that coal-fired power plants within the U.S. are the primary source of Hg to the Great Lakes and the Chesapeake Bay and is also consistent with a major Hg deposition study conducted by the EPA and the University of Michigan that concluded that approximately 70% of Hg wet deposition resulted from local fossil fuel emissions in the region.

Commenters agree that the agency's assessment of potential for deposition "hotspots" shows that Hg deposition near EGUs can be three times as large as the regional average. The commenters state that this excess Hg deposition would substantially increase the health and environmental risks associated with emissions at these sites. Furthermore, state the commenters, the methodology applied by the EPA to quantify near-source Hg deposition is conservative; in the EPA's analysis, the average local deposition is estimated from the area within 50 km of the EGU source. This method averages local Hg deposition across a large area (over 7500 km^2). According to the commenters, maximum excess local Hg deposition may be significantly underestimated by averaging high deposition sites downwind of an EGU in the direction of prevailing winds with lower excess deposition at locations close to but frequently upwind of the facility.

One commenter suggests that had the EPA used a Community Multiscale Air Quality model and individual 12x12 km^2 grid cells to quantify local deposition the model could increase the excesses Hg deposition at these locations significantly and place them at even greater risk of adverse health and environmental effects of HAP from U.S. EGUs. Though this alternative methodology might indicate the likelihood of much higher concentrations, states the commenter, the EPA's methodology nonetheless quite clearly demonstrates that excess Hg deposition occurs in the vicinity of EGUs and is especially significant around the largest Hg emitters.

Comment 40: Commenter 17789 states that in 2007, the Hubbard Brook Research Foundation built upon the BRI study and issued its own report entitled "Mercury Matters." According to the commenter, this study confirmed five Hg hotspots, along with four suspected hotspots. The commenter states that one of the confirmed hotspots was in the Adirondack Park. According to the commenter, this study also provides a good description of the impacts of Hg on the Common Loon; loons are a symbol of a healthy Adirondack environment and an integral part of the Adirondack Council's logo.

Comment 41: According to Commenter 19686, Hg deposition hotspots occur within 60 miles of EGUs making fish from water bodies within this range more dangerous to consume. The commenter states that the EPA evaluated the potential for hotspot deposition near EGU emission sources covered by the rule and found that "[b]y 2016, although the absolute excess deposition falls, the local excess still remains around 3 times the regional average for the highest 10 percent of mercury [Hg] emitting U.S. EGUs."

The commenter states that the EPA also found that the EGUs "will impact local waterbodies around the EGU sources."

Response to Comments 39 - 41: The EPA agrees with the commenters that Hg emissions from U.S. EGUs deposit locally and regionally and contribute to excess local deposition near U.S. EGUs. The EPA acknowledges additional studies cited by the commenters that corroborate the EPA's conclusions. However, the EPA disagrees with the commenters' characterization of the methodology used to calculated the potential for excess local deposition; therefore, the EPA clarified the methodology in the new TSD entitled, "Potential for Excess Local Deposition of Mercury in Areas near U.S. EGUs."

1F - National-scale Hg Risk TSD

1. Assumption of linear proportionality in relationship between changes in Hg deposition and changes in fish tissue Hg concentrations (Mercury Maps).

Commenters: 17621, 17775, 18023, 17712, 17877, 17383 17885

Comment 1: Commenter 17621 states that the Mercury Maps model has limited capability to adequately determine bioaccumulation in fish. According to the commenter, the Mercury Maps approach establishes a proportional relationship between Hg deposition to a watershed and resulting fish tissue MeHg levels, assuming that certain criteria are met. The commenter states that the Hg Cycling Model (MCM) developed by EPRI is a more rigorous tool that has been used for this purpose. According to the commenter, this model was developed expressly to evaluate the relationship between changes in atmospheric Hg deposition to water bodies and changes in fish tissue MeHg levels, and EPRI's MCM has been found to be applicable and useful under several environmental conditions (Chen et al., 2008[52]; Chen and Herr, 2010[53]; Harris et al., 2011[54]).

Response to Comment 1: The EPA commissioned a formal peer review of the Hg Risk TSD through the EPA's independent SAB, which provides independent advice and peer review to the EPA's Administrator on the scientific and technical aspects of environmental issues. The SAB established a 22-member with representation from academic institutions, industry, federal agencies, and state governments. The panel met in June 2011 and produced a comprehensive peer review report, which was finalized in September 2011. The EPA specifically asked the peer review committee to evaluate the EPA's assumption of linear proportionality in the relationship between Hg deposition and fish tissue MeHg concentrations, supported by the Hg Maps analysis. The SAB provided the following overall response, which generally supports the EPA's approach:

"The SAB agrees with the Hg Maps approach used in the analysis and has cited additional work that supports a linear relationship between Hg loading and accumulation in aquatic biota. These studies suggest that Hg deposited directly to aquatic ecosystems can become quickly available to biota and accumulated in fish, and reductions in atmospheric Hg deposition should lead to decreases in MeHg concentrations in biota. The SAB notes other modeling tools are available to link deposition to fish concentrations, but does not consider them to be superior for this analysis or recommend their use. The integration of Community Multiscale Air Quality Modeling System (CMAQ) deposition modeling to produce estimates of changes in fish tissue concentrations is considered to be sound. Although the SAB is generally satisfied with the presentation of uncertainties and limitations associated with the application of the Hg Maps approach in qualitative terms, it recommends that the document include quantitative estimates of uncertainty available in the existing literature."

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[52] Chen C.W., Herr J.W., Goldstein R.A., 2008. "Model Calculations of Total Maximum Daily Loads of Hg for Drainage Lakes," *Journal of the American Water Resources Association*, 44 (5), 1295–1307.
[53] Chen C.W., Herr J.W., 2010. "Simulating the Effect of sulfate Addition on MeHg Output from a Wetland," *Journal of Environmental Engineering*, 136 (4), 354–362, doi:10.1061/_ASCE_EE.1943-7870.0000176.
[54] Harris, R.C., Pollman C., Landing W., Hutchinson D., Evans D., Axelrad D., Morey S.L., Sunderland E., Rumbold D., Dukhovskoy D., Adams D., Vijayaraghavan K., 2011. "Mercury Cycling, Bioaccumulation and Human Exposure in the Gulf of Mexico." Presented at the 10th International Conference on Hg as a Global Pollutant, Halifax, Nova Scotia, Canada, July 27.

The SAB specifically addressed the Hg Cycling Model suggested by the commenter, and had the following Response to Comment:

"The SAB agrees with the application of Hg Maps in this assessment. There are other modeling tools capable of making a national-scale assessment, such as the Regional Hg Cycling Model (R-MCM). However, the R-MCM is more data intensive and the results produced by the two model approaches should be equivalent.

"The R-MCM, a steady-state version of the time-dependent Dynamic Hg Cycling Model, has been publicly available to and used by EPA (Region 4, Athens, Environmental Research Laboratory) for a number of years. R-MCM requires more detail on water chemistry, methylation potential, etc., and yields more information as well. Substantial data support the Hg Maps and the R-MCM steady-state results, so that the results of the sensitivity analysis and the outcomes from using the alternative models would be equivalent between the two modeling approaches. Though running an alternative model framework may provide additional reassurance that the Hg Maps "base case" approach is a valid one, it is unlikely that substantial additional insight would be gained with the alternative model framework." (U.S. EPA-SAB, 2011)

Based on the responses of the SAB, the EPA's use of the linear proportionality assumption, supported by the Hg Maps analysis, is well-supported.

Comment 2: Commenter 17621 states that the EPA incorrectly assumes a steady-state linear relationship between changes in Hg deposition and fish MeHg tissue levels. According to the commenter, data that demonstrate a steady-state linear reduction in fish tissue MeHg in response to a reduction in atmospheric Hg deposition within watersheds do not exist. The commenter states that the Hg Experiment to Assess Atmospheric Loading in Canada and the U.S. (METAALICUS) study (Harris et al., 2007)[55] and other studies (Orihel et al., 2007)[56] describe deposition increases into low trophic-level lakes, not deposition decreases and that these studies are partial demonstrations in individual watersheds that may show non-linear responses to changes in Hg deposition. The commenter disagrees with the EPA's conclusions regarding Figure 2-17 (March TSD, page 45) that notes that "This plot allows consideration for whether there appears to be a correlation between these two factors at the watershed level" and "it is expected to hold within a given watershed." (March TSD, page 48). According to the commenter, the U.S. Geological Survey national waterway study showed that sheet flow and drainage, not deposition, dominated input to the water bodies it surveyed.[57] The commenter

[55] Harris., R. C., John W. M. Rudd, Marc Amyot, Christopher L. Babiarz, Ken G. Beaty, Paul J. Blanchfield, R. A. Bodaly, Brian A. Branfireun, Cynthia C. Gilmour, Jennifer A. Graydon, Andrew Heyes, Holger Hintelmann, James P. Hurley, Carol A. Kelly, David P. Krabbenhoft, Steve E. Lindberg, Robert P. Mason, Michael J. Paterson, Cheryl L. Podemski, Art Robinson, Ken A. Sandilands, George R. Southworth, Vincent L. St. Louis, and Michael T. TateRudd, J. W. M., Amyot M., et al., "Whole-Ecosystem study Shows Rapid Fish-Hg Response to Changes in Hg Deposition." *Proceedings of the National Academy of Sciences* Early Edition, PNAS 2007 104 (42) pp. 16586-16591; (published ahead of print September 27, 2007).

[56] Orihel D.M., Paterson M.J., Blanchfield P.J., Bodaly R.A., Gilmour C.C., Hintelmann H., 2007. "Temporal Changes in the Distribution, Methylation, and Bioaccumulation of Newly Deposited Hg in an Aquatic Ecosystem," *Environmental Pollution*, 154, 77–88.

[57] Scudder B.C., Chasar L.C., Wentz D.A., Bauch N.J., Brigham M.E., Moran P.W., Krabbenhoft D.P., 2009. *Hg in fish, bed sediment, and water from streams across the U.S., 1998–2005*: U.S. Geological

states that sheet flow and drainage could well contain Hg, complicating the relationship that the EPA claims is linear and direct, and that Mercury Maps provides no insight into whether U.S. EGU-attributable MeHg levels in fish tissue are directly based on U.S. EGU atmospheric Hg deposition.

Response to Comment 2: The EPA disagrees with the commenter. As noted in the previous response, the SAB directly evaluated the EPA's assumption of linear proportionality between deposition and fish tissue MeHg concentrations and determined that the assumption is well-supported. In addition, contrary to the commenter's statement, the SAB states, "Since the Hg Maps approach was developed, several recent publications have supported the finding of a linear relationship between Hg loading and accumulation in aquatic biota (Orihel, 2007; Orihel, 2008;[58] Harris, 2007). These studies suggested that Hg deposited directly to aquatic ecosystems can become quickly available to biota and accumulated in fish, and that reductions in atmospheric Hg deposition should lead to decreases in MeHg concentrations in biota. These results substantiate EPA's assumption that proportionality between air deposition changes and fish tissue MeHg level changes is sufficiently robust for its application in this risk assessment" (U.S. EPA-SAB, 2011).

The EPA also disagrees with the commenter's interpretation of Figure 2-17. As stated in the Hg Risk TSD, while this figure is useful to demonstrate the lack of correlation across watersheds between total deposition of Hg and MeHg concentrations in fish tissue, it is not indicative of the likely correlation between changes in Hg deposition at a given watershed and changes in MeHg concentrations in fish tissue from that watershed. The SAB agreed with this interpretation, noting the importance of Figure 2-17 demonstrating that "spatial variability of deposition rates is only one major driver of spatial variability of fish MeHg and that variability of ecosystem factors that control methylation potential (especially wetlands, aqueous organic carbon, pH, and sulfate) also play a key role." (U.S. EPA-SAB, 2011)

Comment 3: Commenter 17621 states that despite the EPA acknowledgement that response lag time influences the benefits of decreasing Hg deposition from U.S. EGUs, the Mercury Maps fails to incorporate this information. According to the commenter, given the demonstrated lag time in response to deposition change, it is logical to conclude that a lag time needs to be incorporated in Mercury Maps to adjust the current overestimation of how much fish tissue MeHg levels decrease in response to decreases in Hg deposition attributable to U.S. EGUs. According to the commenter, the METAALICUS study shows that there is a lag time (and a non-proportional response) after 3–4 years. Additionally, the commenter notes that there are numerous factors that influence lag time including (1) watershed characteristics (Grigal et al., 2002)[59], (2) watersheds may act as legacy sources releasing Hg when disturbed (Yang et al., 2002)[60], (3) the magnitude of emission reductions and subsequent changes in atmospheric deposition need to be weighed against the amount of Hg already in an ecosystem (Krabbenhoft et al., 2007)[61], (4) the distance of an ecosystem from Hg sources (Lindberg et al.,2007)[62],

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Survey Scientific Investigations Report 2009–5109, 74 p.

[58] Orihel D.M., Paterson M.J., Blanchfield P.J., Bodaly R.A., Hintelmann H., 2008. "Experimental Evidence of a Linear Relationship between Inorganic Hg Loading and MeHg Accumulation by Aquatic Biota," *Environmental Science & Technology,* 41, 4952–4958.

[59] Grigal D.F., 2002. "Inputs and Outputs of Mercury from Terrestrial Watersheds: A Review," *Environmental Review,* 10, 1–39.

[60] Yang H., Rose N.L., Battarbee R.W., Boyle J.F., 2002. "Mercury and Lead Budgets for Lochnagar, a Scottish Mountain Lake and Its Catchment," *Environmental Science & Technology,* 36, 1383–1388.

[61] Krabbenhoft D.P., Engstrom D., Gilmour C., Harris R., Hurley J., Mason R., 2007. "Monitoring and

and (5) Hg deposited to aquatic ecosystems becomes less available for uptake by biota over time (Orihel et al., 2008).

Response to Comment 3: In the revised Hg Risk TSD, the EPA discusses uncertainty introduced into the risk assessment as a result of assuming that steady-state conditions are met in linking changes in deposition to changes in fish tissue Hg levels (and risk). Research cited by the commenter (and discussed in the revised Hg Risk TSD), clearly points to variation in lag times across watersheds for Hg response depending on relevant attributes (e.g., pH, sulfate deposition, topography which influences importance of erosion/runoff as a source of loading). Because of the complexity associated with characterizing potential response times for the linkage between fish tissue Hg levels and Hg deposition, it is difficult to characterize the magnitude of uncertainty introduced into the analysis due to associating current patterns of Hg deposition with fish tissue Hg levels collected between 2000 and 2010. However, the SAB was broadly supportive of elements of the assessment associated with application of the proportionality assumption (Mercury Maps) in linking changes in Hg deposition to changes in fish tissue Hg levels. For example, the SAB (a) notes advantages and disadvantages of the agency decision to limit fish tissue concentration data to the period after 1999 but agrees with this approach, given that older data might not be representative of conditions during the 2005 reference deposition year, (b) agrees with the Hg Maps approach used in the analysis and has cited additional work that supports a linear relationship between Hg loading and accumulation in aquatic biota, (c) points out that studies suggest that Hg deposited directly to aquatic ecosystems can become quickly available to biota and accumulated in fish, and reductions in atmospheric Hg deposition should lead to decreases in MeHg concentrations in biota, and (d) supports efforts by the EPA to exclude watersheds (from the analysis and application of the proportionality assumption) where non-air sources might play an important role in Hg loading.

Comment 4: Commenter 17621 states that the Mercury Maps method assumes that steady-state has been achieved, when in reality Hg emissions and deposition are changing, and thatatmospheric deposition of Hg can enter a water body in one of two ways. According to the commenter, the first is through direct deposition onto the water body's surface, and the second is by way of deposition onto the terrestrial portion of the watershed (soils and vegetation), some of which eventually travels by way of evasion, runoff, and erosion into the wate rbody. Therefore, states the commenter, lag times would need to be included in the modeling and be able to vary from watershed to watershed and sometimes even from water body to water body within a watershed. According to the commenter, another problem with the instantaneous steady-state assumption used by the EPA is that the emission rates of Hg due to U.S. sources have been decreasing for more than a decade, while emissions due to sources outside the U.S. have been increasing (see also EPRI Comments, CAA section 3.2.1). Therefore, states the commenter, the system is not at steady-state, a basic premise of the model (see Appendix G, 2.11 for further information).

Response to Comment 4: See response to comment 3 above.

Evaluating Trends in Sediment and Water Indicators." In Harris R., Krabbenhoft D., Mason R., Murray M.W., Reash R., Saltman T. (Eds.), *Ecosystem Responses to Mercury Contamination: Indicators of Change.* New York: Society of Environmental Toxicology and Chemistry (SETAC) North America Workshop on Mercury Monitoring and Assessment, CRC, pp. 47–87.

[62] No citation provided, but presumably Lindberg et al., 2007. "A synthesis of progress and uncertainties in attributing the sources of mercury in deposition." *Ambio*, **36** (2007), pp. 19–32.

Comment 5: Commenter 17775 states that the EPA's use of the Mercury Maps model used to establish the relationship between Hg deposition and Hg levels in fish is not well suited to predict health benefits from reducing Hg on a national or regional level where there are many type of water bodies. In particular, the commenter stated that the central assumption of the Mercury Maps model is that there a proportional relationship between Hg deposition from U.S. EGUs and Hg levels in fish lacks scientific support. According to the commenter, Figure 2-17 in the Hg TSD shows that there is no well-defined relationship between Hg deposition and MeHg concentrations in fish tissue on a national basis. Additionally, states the commenter, the Mercury Maps does not provide any information about the time lag between deposition and changes in fish tissue concentrations and, further, "[i]f a lag in response of MeHg levels in fish were assumed, the monetized benefits could be significantly lower."

Response to Comment 5: See response to Comment 2 above. In addition, the EPA notes that the determination of a hazard to public health is made without regards to the timing of the risk reduction, reflecting that hazards to future generations are also important in determining the appropriateness of regulating U.S. EGUs. As such, the assumption of linear proportionality between Hg deposition and fish tissue concentrations in the steady-state is well-supported.

The EPA acknowledges that Mercury Maps does not account for a time lag in ecosystem response to reductions in Hg emissions. Ecosystems are highly variable in their response to reductions in Hg emissions. Due to limitations in data and methodology, the EPA was not able to quantify the effect of lag times on benefits.

Comment 6: Commenter 18023 states that the Hg risk is overstated as a result of the Mercury Maps assumptions. According to the commenter, response in fish Hg to changes in atmospheric deposition were assumed to be linear and proportional, with little supporting evidence from long-term studies in a cross CAA section of natural water bodies. The commenter states that the Hg Risk TSD cites the Mercury Maps approach for support, but this is not a primary study, and does not show any data that supports the proportional change approach. The commenter states that the Mercury Maps study concluded after reviewing published research that only about 20% of atmospherically deposited Hg reaches a water body on a long-term average rate. The commenter states that while the time lag for deposition to reach a water body is mentioned in the Hg Risk TSD, there is no discussion of that fact that a portion of the deposition is unlikely to reach the water at all.

Response to Comment 6: See responses to Comments 2 and 3 above.

Comment 7: Several commenters (17712, 17877, 17383, 17885) state that the Mercury Maps has many deficiencies. The commenters assert that it is a static model unable to account for the dynamics of ecosystems that affect Hg bioaccumulation is fish, cannot consider non-air Hg inputs to watersheds, and assumes reductions in airborne Hg lead to proportional reductions fish Hg concentrations.

Response to Comment 7: Although the EPA agrees that ecosystems are dynamic, the EPA disagrees that the Mercury Maps model is deficient for the current application. The Mercury Maps model, like any model of complex ecosystem dynamics, has simplifications and assumptions that are acknowledged. However, the model has been peer reviewed, and the SAB agreed that the assumption of linear proportionality between Hg deposition and MeHg concentrations in fish is well-supported, not only by the Mercury Maps analysis, but also by the scientific literature (see response to Comment 2 above).

Comment 8: Commenter 18023 notes additional Mercury Maps assumptions that do not allow for considerations of lag in response to changes in: (1) deposition; (2) legacy sources of Hg such as mining; (3) historical Hg deposition; (4) natural Hg levels in fish; (5) ecosystem dynamics over time; or (6) the relative source contributions over time. The commenter states that the historical relative contribution of sources is not reflected in the EPA's model of Hg concentrations in fish today. According to the commenter, the EPA simply assumes that all Hg presently contained in fish is from current deposition (and its current source allocation), as opposed to historical deposition, and assumes that if current (or future) deposition is eliminated, fish will eventually contain zero Hg. Also according to the commenter, the EPA implies that its EGU risk estimates using Mercury Maps are underestimated because they do not account for legacy EGU-attributable deposition, which the EPA assumes to be higher. The commenter believes the EPA's assumption is incorrect.

Response to Comment 8: The EPA disagrees with the commenter's characterization of the Hg Risk TSD methodology. First, the EPA is applying an assumption of linear proportionality between changes in Hg deposition and changes in MeHg concentrations in fish, and not using the Mercury Maps model directly. Second, in applying the assumption of linear proportionality, the EPA excluded watersheds from the Hg Risk TSD where other sources of Hg, such as mining, were likely to be significant contributors to Hg loadings. The EPA made all reasonable attempts to identify and exclude those watersheds with non-atmospheric sources of Hg, but there may be a small number of watersheds where the fish concentrations reflect historic Hg deposition. After reviewing the EPA's approach, the SAB concluded, "The technique used to exclude watersheds that may have substantial non-air inputs is sound. Although additional criteria could be applied, they are unlikely to substantially change the results" (U.S. EPA-SAB, 2011). Third, the EPA states in the revised Hg Risk TSD, that the projections of changes in fish tissue Hg levels (or apportionment between U.S. EGU-attributable and total Hg deposition) reflects attainment of steady-state conditions, and the EPA discusses uncertainty associated with that assumption. By assuming steady-state conditions in apportioning fish tissue Hg levels and risk, the EPA does not attempt to project lag times. Lag times will likely differ depending on a number of factors, with many watersheds displaying a two-phase response. The measured fish tissue Hg levels reflect the pattern of Hg deposition contributing to those levels. However, in projecting changes in fish tissue Hg levels and consequently risk (or attributing risk between U.S. EGU and total Hg), the EPA used "current" estimates of Hg deposition and did not attempt to reflect patterns of deposition from earlier periods when both the absolute magnitude as well as the U.S. EGU-attributable fraction may have been different.

As discussed in the revised Hg Risk TSD, the approach of scaling fish tissue Hg levels using recent projections of Hg deposition introduces potential uncertainty into the Hg Risk TSD. Depending on the impact of earlier patterns of Hg deposition on fish tissue Hg levels, there could be a high or low bias in the assessment of U.S. EGU-attributable risk. Recent research identifies relatively rapid response of fish tissue Hg to changes in Hg loading, which suggests that fish tissue Hg levels could react more quickly to reductions in Hg deposition than previously thought (Orihel et al. 2007; Orihel et al., 2007; Harris et al., 2007). This finding reduces concern that fish tissue Hg levels could be linked to older patterns of Hg deposition and strengthens the approach used in the revised Hg Risk TSD.

Comment 9: Commenter 18023 states that by not adequately excluding watersheds not meeting the Mercury Maps assumptions (*e.g.,* watersheds with historical mining) and by having a geographically biased data set the EPA has overestimated risk. According to the commenter, both of these situations would violate the assumptions for application of the Mercury Maps methodology. As discussed by Tetra Tech in their comments, states the commenter, the EPA's screening process is inadequate because it

does not account for historic Hg mining or other industrial operations or discharges. The commenter does note that the EPA properly attempts to eliminate from its analysis watersheds that are not dominated by atmospheric input or that may be dominated by non-EGU atmospheric input.

Commenter 18023 states that Tetra Tech found other concerns with the Mercury Maps methodology including: "Inclusion of high fish Hg concentrations due to non-atmospheric sources in a watershed is significant, because the Hg Risk TSD protocol is to multiply the 75th percentile fish Hg for a given watershed by the ratio of the Hg deposition from U.S. EGUs to the total Hg deposition, regardless of whether the high fish Hg was due to the EGU deposition," and "(T)he study was not geographically balanced, and was dominated by rivers in the coastal region of the southeast that has numerous wetlands, which are favorable locations for methylation. The conditions in the southeast are not typical of much of the rest of the U.S."

Response to Comment 9: The EPA specifically asked the SAB to evaluate the methods to exclude watersheds that were likely significantly influenced by non-atmospheric sources. The SAB concluded, "The technique used to exclude watersheds that may have substantial non-air inputs is sound. Although additional criteria could be applied, they are unlikely to substantially change the results" (U.S. EPA-SAB, 2011). As a result, the EPA disagrees with the commenter that the EPA's screening process is inadequate.

Comment 10: Commenter 17775 states that the concentrations of MeHg in fish used by the EPA are skewed because the EPA's screening process was inadequate. According to the commenter, the EPA failed to screen out all of the waterways affected by mining and other sources of Hg emissions. In addition, the EPA screened watersheds on a temporal basis. The commenter states that watersheds were eliminated only if the 2008 TRI-net query for Hg emissions exceeded 39.7 pounds; that requirement ignores the fact that past Hg deposition can affect a water body for many years. As a result, states the commenter, water bodies were included in the Hg Risk TSD that the EPA then assumed exceeded the risk criteria due solely to EGU deposition, when that was not the case.

Response to Comment 10: The EPA disagrees that the screening process was inadequate, and the SAB agreed with the EPA (U.S. EPA-SAB). In the revised Hg Risk TSD, the EPA acknowledges uncertainty associated with various aspects the fish tissue Hg database, including the potential that some watersheds with substantial current or past non-air Hg impacts may have not been screened out. However, the EPA also notes that coverage for watersheds by available fish tissue Hg sampling data is limited (with only about 4% of watersheds in the U.S. having measured fish tissue Hg data). This limited coverage applies in areas of elevated U.S. EGU-related impacts where risk attributable to U.S. EGUs (due to the elevated Hg deposition linked to U.S. EGUs) is likely to be elevated. Consequently, the limited fish tissue Hg data represents a low-bias in the overall characterization of risk and would likely counter to some extent (or totally) a high-bias in risk resulting from not having screened out all of the watersheds with significant non-air Hg impacts.

2. Characterization of subsistence fishing populations and exposure scenario.

Commenters: 17621, 17775, 18023

Comment 11: Commenter 17621 states that the EPA provides no clear definition of subsistence, near subsistence, or high end fish consumption. According to the commenter, the EPA assumes that poverty

is a direct indication of subsistence fishing and high end fish consumption, but there is no documentation supporting these assumptions.

Response to Comment 11: The EPA agrees with the comments that subsistence fish consumption was not clearly defined, and we have provided a clearer definition in the revised Hg Risk TSD. However, this clarification does not result in any changes to the quantitative analysis. In the revised Hg Risk TSD, the EPA clarifies that "subsistence fishers" are defined as individuals who rely on non-commercial fish as a major source of protein (U.S. EPA, 2000).[63] This definition is reflected in the range of high-end percentile consumption rates used in estimating risk (see Table 1-5, revised Hg Risk TSD). In addition, for the revised Hg Risk TSD, the EPA models risk for the most policy-relevant scenario (the female subsistence fisher) without accounting for income (i.e., assessing this scenario for all watersheds with fish tissue Hg data, regardless of the presence of a poor source population). Because the EPA applied the female subsistence scenario uniformly to all watersheds with fish tissue Hg data, this should address the concern raised over linking subsistence fishing risk to poverty. However, the EPA continues to model risk for poor white and black subsistence fishers in the southeastern U.S. In this case, the association of poverty with high-end self-caught fish consumption is supported by the Burger et al.(2002) study[64], which suggests that poor fishers can have substantially higher self-caught consumption rates, compared with wealthier populations. Finally, the SAB review panel concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

Comment 12: Commenter 17621 states that the Hg Risk TSD lacks a clear definition for the subsistence, near-subsistence, or high-end populations evaluated in Hg Risk TSD. According to the commenter, variations of all three terms intermingle throughout the document. The commenter states that the Hg Risk TSD cites an earlier EPA report to define subsistence fishers as 'individuals who rely on non-commercial fish as a major source of protein," however the Hg Risk TSD interprets this as "self-caught fish consumption ranging from a fish meal (8 ounce) every few days to a large fish meal (12 ounces or more) every day" (approximately 65-340 grams per day)—an interpretation that is not consistent with earlier EPA documents. Similarly, the commenter notes that another agency definition for high-end consumption rates is given in the Hg Risk TSD Executive Summary as "(i.e.,a meal every 1-2 days) as clearly subsistence." Elsewhere, states the commenter, the Hg Risk TSD Executive Summary (page 8 paragraph 3) stated that the "high-end percentile consumption rates (90^{th} to 99^{th} … (i.e., 120 grams per day (g/day) to greater than 500 g/day fish consumption)" define particular populations of interest.

Response to Comment 12: The EPA disagrees that the description of subsistence fishing activity is inconsistent and maintains that the data is supported by the peer reviewed literature. In the revised Hg Risk TSD, the EPA clarified that the risk assessment models subsistence fisher risk and that, reflecting the EPA's definition, this refers to individuals who rely on non-commercial fish as a major source of protein (U.S. EPA, 2000). For purposes of this analysis, the EPA focuses on the non-commercial fish consumers, who receive most, if not all, of their fish from self-caught fishing activity. The likely

[63] U.S. EPA, U.S. Environmental Protection Agency. (2000). *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 3: Overview of Risk Management.* Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency, Washington, DC. The EPA 823-B-00-007.

[64] Burger, J., 2002. "Daily Consumption of Wild Fish and Game: Exposures of High End Recreationists," *International Journal of Environmental Research and Public Health*, 12 (4), 343–54.

presence of this type of subsistence fish consumer (i.e., individuals who catch enough fish to contribute substantially to their protein intake), is supported by available peer reviewed literature (see Table 1-5 of the revised Hg Risk TSD). These studies clearly show that some subset of surveyed fishers consume self-caught fish at the rates that are cited in the Hg Risk TSD (i.e., at levels ranging from 120 to 500 g/day, which translates into 1 fish meal every few days to a large fish meal a day). See also the response to comment 11.

Comment 13: Commenter 17775 states that providing comment on the Hg Risk TSD to subsistence anglers is hindered by the EPA's failure to define three terms it uses the Hg Risk TSD: "subsistence," "near subsistence" and "high-end." The commenter states that the "EPA also appears to use census tract assigned poverty as an indicator of "subsistence" fishing. According to the commenter, while subsistence fishing can be associated with poverty, the inverse is not true - poverty does not indicate subsistence fishing.

Response to Comment 13: See responses to comments 1 and 2 above. Regarding the linkage between subsistence fishing activity and poverty, for the revised Hg Risk TSD, the EPA modified the female subsistence fisher scenario (which receives the greatest emphasis from a policy context) to be applied universally to all watersheds with fish tissue Hg data and no longer constrain this scenario to locations with poor source populations. The EPA continues to model risk for white and black subsistence fishers active in the southeast and in this case, the EPA continues to link poverty with subsistence fishing in that these populations are only modeled for locations with poor source populations. However, in modeling these two populations, the EPA is not asserting that the presence of a poor source population necessarily indicates subsistence fishing activity (as asserted by the commenter). Instead, in modeling these three populations, the EPA asserts that the presence of a poor source population is an indicator of the potential for subsistence fishing activity, rather the presence of such activity.

Comment 14: Commenter 18023 states that while subsistence can be associated with poverty, poverty is not a predictor of subsistence fishers. According to the commenter, the EPA assumes that if there is a small number (25) of individuals (of a specified demographic) living in poverty then they must be subsistence fishers (or populations that may be at-risk) and that watershed/population gets included with the same weight as any other. According to the commenter, this results in few watersheds being excluded using this screen and, thus, the risks are overstated.

Response to Comment 14: See responses to comments 1, 2, and 3 above. Regarding weighting of the watershed-level risk estimates, because it is not possible to enumerate any of the subsistence fisher populations covered in the analysis, there is no way to provide differing population weights for the watersheds. Consequently, the risk distributions that are generated should be viewed as characterizing the distribution of subsistence fisher risk assuming equal weights across watersheds with potential activity for the fisher scenario being considered.

3. Cooking loss adjustment factor.

Commenters: 17621, 17775, 18023

Comment 15: Commenter 17621 states that the EPA did not justify the selection of a cooking loss factor of 1.5 that, according to the commenter, increases estimated intake by 50%, thus increasing the daily MeHg intake rate by a constant factor of 33% (using the formula Appendix D) and also increasing

any resulting (HQ) risk estimate by a similar factor. The commenter states that Mor[g]an et al. (1997) [65], the source of the EPA's selected loss factor, reported a range of cooking losses. According to the commenter, several studies report "no or highly variable changes in MeHg levels as a result of cooking fish (Armbruster et al., 1988;[66] Gutenmann and Lisk, 1991;[67] Farias et al., 2010;[68] Perello et al., 2008;[69] Torres-Escribano et al., 2011[70]).

Response to Comment 15: The EPA selected the Morgan (1997) study as the basis for the food preparation/cooking adjustment factor because it focused on the types of freshwater fish species representative of what might be consumed in the simulation of risk (i.e., walleye and lake trout). The Morgan (1997) study provides a range of adjustment factors for each fish type including 1.1 to 1.5 for walleye and 1.5 to 2.0 for lake trout. Given these two ranges, the EPA determined it to be reasonable to take an intermediate value between the two ranges (i.e., 1.5). The Morgan (1997) study reports that preparation/cooking of fish results in an increase in MeHg levels per unit fish because Hg concentrations in the muscle, while preparation/cooking tends to reduce non-muscle elements (e.g., water, bone, fat).

Regarding the alternative studies identified by the commenter, the EPA disagrees that these studies considered collectively contradict the cook loss factor in the analysis. Regarding the Farias et al. (2010) study, the study suggests that the authors may have included measurement of non-fish components added to dishes (e.g., onions, heavy breading etc.) in measuring Hg concentrations post-cooking. These non fish-meat elements could dilute the post-cooking Hg measurements making it look like there was a cooking loss, even as actual fish tissue Hg levels could have increased.

With the Perello et al. (2008) study, the fish species are saltwater, not freshwater. In addition, the authors note that the absolute content of Hg in fish does not decrease during cooking but instead the reduction of water and fat increased the Hg concentration without changing absolute content, which is conceptually consistent with the EPA's cooking loss factor.

The Torres-Escribano (2010) article focuses on measurement of bioaccessible Hg in raw and cooked fish. Their analysis shows that the concentration of bioaccessible Hg appears to significantly decrease in cooked fish compared with raw fish and they suggest that this needs to be factored in when measuring risk. However, in order to factor in (quantitatively) measurements of bioaccessible Hg into the risk assessment, the risk model would have to be parameterized to work with this category of Hg. However,

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[65] Morgan, J.N., M.R. Berry, and R.L. Graves. 1997. "Effects of Commonly Used Cooking Practices on Total Hg Concentration in Fish and Their Impact on Exposure Assessments." *Journal of Exposure Analysis and Environmental Epidemiology* 7(1):119-133.

[66] Armbruster G., Gerow K.G., Lisk D.J., 1988. "The Effects of Six Methods of Cooking on Residues of Hg in Striped Bass," *Nutrition Reports International*, 37, 123–126.

[67] Gutenmann, W.H. and Lisk D.J., 1991. "Higher Average Mercury Concentration in Fish Fillets after Skinning and Fat Removal," *Journal of Food Safety,* 11, 99–103.

[68] Farias L.A., Favaro, D.I., Santos J.O., Vasconcellos M.B., et al., 2010. "Cooking Process Evaluation on Hg Content in Fish," *Acta Amazonia*, 40 (4), 741–748.

[69] Perelló G., Martí-Cid R., Llobet J.M., Domingo J.L., 2008. "Effects of Various Cooking Processes on the Concentrations of Arsenic, Cadmium, Hg, and Lead in Foods," *Journal of Agricultural and Food Chemistry*, 156 (22), 11262–11269.

[70] Torres-Escribano S., Ruiz A., Barrios L., Vélez D., Montoro R., 2011. "Influence of Hg Bioaccessibility on Exposure Assessment Associated with Consumption of Cooked Predatory Fish in Spain," *Journal of the Science of Food and Agriculture*, 91 (6), 981–6.

available information currently allows us to specify the risk model in terms of total Hg intake (and not bioaccessible Hg). Specifically, the factor linking Hg intake to hair Hg level (which is then used as the exposure metric to estimate risk) is based on intake of total Hg. Consequently, while this article provides information that is potentially informative for guiding future research and methods development, it does not directly impact the current risk assessment. In addition, in terms of total Hg (not differentiated as bioaccessible), the Torres-Escribano study shows a substantial increase in unit fish concentration following cooking (see Table 1 in the article).

The Armbruster et al. (1988) study focused on the issue of whether cooking of fish decreased Hg levels, as can be the case with lipophilic chemicals. Their study found instead, a modest, but non-statistically significant increase in Hg levels for most of the cooking methods assessed, which is directionally consistent with the values used in the Hg Risk TSD.

The Gutenmann et al. (1991) study focuses on the relationship between fish size and sex and Hg concentration (specifically for brown trout), and only addresses the issue of Hg concentration in relation to cooking and preparation tangentially in a qualitative manner. Specifically, while the article does provide results for skin on versus skin off (noting a non-statistical increase in Hg concentration with the latter), it qualitatively discusses the potential of fat removal (which could occur through preparation and cooking) to increase Hg concentration given that Hg is associated with protein elements of the fish. Because the article does not provide substantial empirical data regarding preparation/cooking adjustment, it is of little use in informing the food preparation/cooking adjustment factor used in the Hg Risk TSD.

When considered collectively, the EPA disagrees that the additional studies identified by the commenter contradict the cooking loss factor used in the Hg Risk TSD and maintains that the Morgan (1997) study remains the most applicable for characterizing cooking/preparation effects on Hg concentrations in fish, given the fisher scenarios assessed in this study.

Comment 16: Commenter 17621 states the EPA should make clear that the cooking loss factor is not applicable to studies surveying recollection on raw or uncooked fish tissue portions (Burger et al., 2003)[71]. According to the commenter, in previous documents the EPA suggests using uncooked fish values for exposure assessments and fish advisories if population-specific data are unavailable. (See *U.S. EPA, 1997*[72]) The commenter notes that it remains unclear why a default value of 1.5 was selected as an exposure modifier for use across all subpopulations in the present analysis, especially given the potential for large geographic and cultural differences in cooking practices.

Response to Comment 16: The EPA agrees that the application of the food preparation/cooking adjustment factor is only appropriate (and in fact required) if the fish consumption rates are for *as cooked* or *as consumed* and not *as purchased*. Careful review of the three studies used in the Hg Risk TSD to identify subsistence fisher consumption rates suggests that all three represent annual-average daily intakes (g/day) of *as consumed* or *as cooked* fish. The Burger et al. (2002) study states that they used models of portion or meal size servings (the size of the serving the respondent regularly eats). Therefore, the EPA interprets the fish consumption rates provided in the Burger et al. (2002) study as

[71] Burger J., Dixon C., Boring C.S., 2003. "Effect of Deep-frying Fish on Risk from Mercury," *Journal of Toxicology and Environmental Health, Part A*, 66 (9), 817–28.
[72] EPA, 1997. *Exposure Factors Handbook Update*. EPA 600-8-89-043 May 1989, EPA 600-P-95-002 August.

representing *as cooked/prepared* and not *as purchased* and for that reason, application of a preparation/cooking adjustment factor is required. A similar logic holds for the other two fish consumption studies used in the Hg Risk TSD. The Shilling et al. (2010) study[73] used different sized models of cooked fish filets and therefore these consumption rates are also interpreted as represented *as cooked/prepared* and not *as purchased* rates. The Dellinger et al. (2004) study[74,75], did query survey responders for meal portion or serving size and therefore, the consumption rates do represent as prepared or as consumed. As for the selection of a 1.5 value used in the Hg Risk TSD for the food preparation/cooking adjustment factor, this value was chosen because it falls midway between the ranges provided in the Morgan (1997) study for walleye (1.1 to 1.5) and lake trout (1.5 to 2.0). Because both fish types represent the types of fish likely caught by at least a portion of the fishers reflected in the Hg Risk TSD (and because it is not currently feasible to specify the mix of fish caught by fishers active in different regions of the country), the EPA determined that it is reasonable to use the 1.5 value which falls between the two ranges.

Comment 17: Commenter 17775 states that the EPA assumed a cooking loss factor of 1.5 despite the range of 1.1 to 6 for this adjustment. According to the commenter, the EPA did not mention other studies that found no or highly variable changes in MeHg levels before cooking. The commenter also states that the South Carolina study did not specify if the ingestion rates were cooked or uncooked.

Response to Comment 17: The food preparation/cooking adjustment factor used in the analysis was chosen because it falls midway between the ranges provided in the Morgan (1997) study for walleye (1.1 to 1.5) and lake trout (1.5 to 2.0), both of which represent fish types likely consumed by at least a portion of the subsistence fishers modeled. Many of the other studies identified addressing the cooking/preparation issue either (a) did not focus specifically on the change in Hg concentration pre and post cooking, or (b) focused on fish species that are not as relevant to this analysis (e.g., salt water fish species consumed primarily in Europe). With regard to the Burger et al. (2002) study that provided subsistence fisher consumption rates for several of the scenarios modeled, that study did use models of portion or meal size servings (the size of the serving the respondent regularly eats). Therefore, the EPA interprets the fish consumption rates provided in the Burger et al. (2002) study as representing *as cooked/prepared* and not *as purchased* and for that reason, application of a preparation/cooking adjustment factor is required.

Comment 18: Commenter 18023 states that the EPA picked a cooking loss factor of 1.5 near the high end of the reported range but did not rely on the literature, some of which show no, or highly variable, enhancements in concentration through cooking.

Response to Comment 18: See responses to comments 2 and 3 above.

Comment 19: Commenter 18023 states the EPA applied the cooking loss factor to all fish Hg levels but it is only applicable where the ingestion rate was estimated based on cooked fish intake. According to the commenter, many studies use a raw fish (as opposed to cooked fish) ingestion rate.

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[73] Shilling, Fraser, Aubrey White, Lucas Lippert, Mark Lubell. 2010. "Contaminated fish consumption in California's Central Valley Delta." *Environmental Research* 110, p. 334-344.
[74] Dellinger JA. 2004. "Exposure assessment and initial intervention regarding fish consumption of tribal members of the Upper Great Lakes Region in the United States." *Environ Res* 95:325–340.
[75] Personal communication, Dr. Dellinger, September 27, 2011

Response to Comment 19: See responses to comments 2 and 3 above.

4. Fish consumption rates and fish tissue Hg characterization.

Commenters: 17621, 17775, 18034, 19536, 19537, 19538, 18023

Comment 20: Commenter 17621 states that in the past the agency has recommended various default consumption rates (in the general range of 130 to < 150 g/day) to provide default intakes for subsistence fishers under the *Risk Assessment Guidance for Superfund (RAGS)* or the *Fish Advisory Guidance*. The commenter states that these default consumption rates are derived from various studies and generally are based on 90th to 99th percentile distribution estimates.

Response to Comment 20: The Hg Risk TSD is designed to inform the Appropriate and Necessary Finding. As such, the Hg Risk TSD is intended to address the question of whether Hg emitted by U.S. EGUs contribute topotential exposures associated with increased risk of neurologic health effects . Thus, the Hg Risk TSD is focused on characterizing risk for the group likely to experience the greatest U.S. EGU-attributable Hg risk (i.e., subsistence fishers active at inland freshwater watersheds – see revised Hg Risk TSD). Specifically, within that subsistence fisher population, the EPA is interested in those individual who are most at-risk, which includes those who consume the most fish. For that reason, the EPA included consideration for a range of high-end fish consumption rates including the 99th percentile representing the most highly-exposed individuals. Evidence of these high fish consuming populations can be found in surveys, e.g., Burger et al. (2002), and specialized studies (Burger et al., 1999a[76],b[77]; California EPA, 1997[78]; Tai, 1999[79]; Corburn, 2002[80]). A search of the literature reveals several studies that identified fishing populations with subsistence or near subsistence consumption rates, including urban fishing populations (including low-income populations), Laotian communities, and Hispanics. This focus for the Hg Risk TSD (including modeling of the 99th percentile fish consumption rate by subsistence fishers) reflects consideration for the provisions of the CAA addressing the appropriate and necessary determination for U.S. EGUs, and is consistent with treatment of other HAP under CAA section 112 of the CAA, which focuses on maximally exposed individuals. In that context, the design of the risk assessment is particular to this statutory context. In addition, the SAB concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD, and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

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[76] Burger, J., K. Pflugh, L. Lurig, L. Von Hagen, and S. Von Hagen. 1999. "Fishing in Urban New Jersey: Ethnicity Affects Information Sources, Perception, and Compliance." *Risk Analysis* 19(2): 217-229.

[77] Burger, J., Stephens, W. L., Boring, C. S., Kuklinski, M., Gibbons, J. W., Gochfeld M. 1999. "Factors in Exposure Assessment: Ethnic and Socioeconomic Differences in Fishing and Consumption of Fish Caught along the Savannah River." *Risk Analysis*, Vol. 19, No. 3, p. 427.

[78] California Environmental Protection Agency. 1997. *Chemicals in Fish Report No. 1: Consumption of Fish and Shellfish in California and the U.S. Final Draft Repor*t. Pesticide and Environmental Toxicology Section, Office of Environmental Health Hazard Assessment, July.

[79] Tai, S. 1999. "Environmental Hazards and the Richmond Laotian American Community: A Case Study in Environmental Justice." *Asian Law Journal* 6: 189.

[80] Corburn, J. 2002. "Combining community-based research and local knowledge to confront asthma and subsistence-fishing hazards in Greenpoint/Williamsburg, Brooklyn, New York." *Environmental Health Perspectives*, 110(2).

Comment 21: Commenter 17621 states that the Hg Risk TSD describes a body of peer reviewed or other literature supporting the identification, selection, and extrapolation of the source populations chosen to represent subsistence fishing exposure and risk, including a "variety of diverse populations in different regions of the country." However, according to the commenter, only three studies are used in the EPA's analyses (Burger, 2002; Schilling et al., 2010; Dellinger, 2004), and two other studies are only mentioned briefly in TSD Appendix C (Burger et al., 1999; Moya et al., 2008[81]). The commenter concludes that it is unclear what literature the agency says "generally supports the plausibility of high-end subsistence-like fishing … to some extent across the watersheds" and stated that if other studies exist, then the EPA should provide the values for comparison.

Response to Comment 21: The EPA agrees that the Hg Risk TSD would be improved by clarifying that the literature review focused on identifying studies that characterize subsistence fish consumption for groups active at freshwater locations within the U.S., and the EPA revised the Hg Risk TSD accordingly. Furthermore, in identifying these studies, the EPA focused on surveys for subsistence fishers that were applicable at the broader regional or national level (i.e., that were not site-specific to the extent that the consumption information could not be generalized to provide coverage for larger areas). The three studies identified provide defensible and representative subsistence fish consumption rates for a variety of SES-differentiated groups.

In addition, the SAB concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD, and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

Comment 22: Commenter 17621 states that the EPA should summarize available supporting studies by basic study content, characteristics, design, size, demographics, dietary recall period, and fish intake rates by demographic variables (e.g., sex, race, socioeconomic status/income, geographic area) important in the Hg Risk TSD. According to the commenter, this summary would support the scientific validity of the assessment, and better illustrate the potential variability and uncertainty involved in extrapolating data from small populations to the national-scale. The commenter notes that the three studies actually used to provide subsistence population estimates, which were extrapolated to the national-scale, included a limited number of individuals living in diverse and localized areas, as briefly summarized below in Table 3-4.

Response to Comment 22: The EPA agrees that the Hg Risk TSD would be improved by clarifying that the literature review focused on identifying studies characterizing subsistence fish consumption for groups active at freshwater locations within the U.S., and the EPA revised the Hg Risk TSD accordingly. The SAB concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD, and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011). In selecting the studies used, the EPA focused on surveys for subsistence fishers that were applicable at the broader regional or national level (i.e., excluded site-specific creel survey data given that these data can typically not be generalized to provide coverage for larger areas). Furthermore, the EPA acknowledged the smaller sample sizes for some of the subsistence fisher groups, and in several cases, the EPA did not use the 99th percentile consumption rates because the sample sizes were too low to support this level of resolution. This decision did not affect EPA's finding

[81] Moya J., Itkin C., Selevan S.G., Rogers J.W., Clickner R.P., 2008. "Estimates of Fish Consumption Rates for Consumers of Bought and Self-caught Fish in Connecticut, Florida, Minnesota, and North Dakota," *Science of the Total Environment*, 15 (403) 89–98.

of a hazard to public health, which is based on the results for the female subsistence fishing population, which has an estimate of the 99th percentile consumption rate that is supported by an adequate sample size. Given that goal, the Hg Risk TSD focuses on modeling reasonable high-end fish consumption that could be experienced by some unquantifiable fraction of the fishing population. The presentation of fish consumption rates, including the description of underlying studies, is matched to the way in which fish consumption rate data are used in the risk assessment.

Comment 23: Commenter 17621 states that the EPA used poorly documented population and exposure assumptions in deriving estimates of people at-risk from exposure to Hg. According to the commenter, the estimate of the amount of fish consumed by various sensitive population groups is not supported or documented sufficiently to conduct sensitivity analyses, and is drawn from small populations.

Response to Comment 23: See responses to comments 21 and 22 above.

Comment 24: Commenter 17621 states that the EPA does not clearly define criteria for assignment of census tracts to HUC watershed. According to the commenter, the EPA combined two parameters with differing scales to establish the geographic unit used in the Hg Risk TSD; HUC watersheds are based on average about 35 square miles in size, while U.S. census tracts (used to identify watersheds relevant for subpopulations of interest) cover a few tenths to hundreds of square miles. The commenter notes that it is unclear how these differences in geographic resolution were handled in the analyses.

Response to Comment 24: The EPA disagrees with the comment that the EPA did not clearly define criteria for assignment of census tracts to watersheds.

The EPA notes that there is some confusion in the comments related to the size of the watersheds modeled. Several commenters stated that HUC watersheds are 35 km on a side. The commenters appear to be referring to HUC-8 classifications. HUCs are defined for varying spatial resolutions. The geographic unit used as the basis for generating risk estimates is HUC-12, which are watersheds about 10 km on a side, which is comparable with the size of the 12 km^2 grid cells in CMAQ. The EPA also clarified that the specific unit of analysis for this assessment is at the watershed, not enumerated subpopulations.

The EPA only used U.S. Census tracts to determine whether there are populations in the vicinity of a given watershed, which could increase the potential for a category of subsistence fishers to be active at that watershed. In the revised Hg Risk TSD, the EPA modified the female subsistence scenario to apply equally to all watersheds with fish tissue Hg data based on the likelihood that these populations have the potential to fish at most watersheds. Thus, concerns regarding the use of census data to select watersheds with the potential for subsistence fishing no longer apply for this scenario. However, for the remaining subsistence scenarios, the EPA continues to use U.S. Census tract-level data to evaluate the presence of a "source population" in the vicinity of the watershed being modeled for risk. In this context, the EPA uses the U.S. Census data are being used to assess whether a SES-differentiated group similar to the particular type of subsistence fisher being modeled (e.g., poor Hispanics) are located in the vicinity of the watershed. If a source population is nearby, then this increases the potential that subsistence fishing activity could occur for that population scenario.

Comment 25: Commenter 17621 states that the unspecified decision criteria for assigning census tracts could bias exposure outcomes. For example, states the commenter, a single influential census tract in a watershed could drive risk, even if the watershed had only a minimal number of fish samples, and this

possibility is a concern in urban areas, which account for the majority of census tracts. The commenter states that due to population densities, these census tracts are more likely to be included in the Hg Risk TSD because, for example, they house more than 25 people living in poverty. According to the commenter, such influential census tracts may drive the extremes of the distribution without regard to the actual number of high, self-caught fish consumers within their boundaries. The commenter could not assess the potential bias and notes that the EPA did not test the bias by sensitivity analyses.

Response to Comment 25: See response to comment 24 above.

Comment 26: Commenter 17621 states that using census tract assigned poverty as an indicator of subsistence fishing or high-end fish consumption lacks justification. The commenter notes that although subsistence fishing can be associated with poverty, poverty is not an indicator of subsistence fishing or high-end fish consumption. The commenter states that although subsistence fishing can be associated with poverty, poverty is not an indicator of subsistence fishing or high-end fish consumption. However, states the commenter, the EPA assumes that poverty indicates the presence of at-risk fishing populations, regardless of the actual character or underlying distributions of the census tract and HUC watershed combinations. The commenter states that in the Hg Risk TSD, any combination that meets the poverty threshold is weighted equally for the existence of a source population.

Response to Comment 26: The EPA links poverty with subsistence fishing in that these populations are only modeled for locations with poor source populations. However, in modeling these three populations, the EPA asserts that the presence of a poor source population is an indicator of the potential for subsistence fishing activity, rather the presence of such activity. The linkage between poverty and higher rates of subsistence fish consumption is supported by the Burger et al. (2002) study, which identified substantially higher consumption rates for poor individuals (see Table 5 of the study). The EPA acknowledges that subsistence fishing activity by specific subpopulations might only be present across a subset of the watersheds the EPA modeled for risk.

Comment 27: Commenter 17621 states the concern over the actual character of underlying distributions of the census tract and HUC watersheds is applicable to race/ethnicity. For example, states the commenter, any watershed with at least one census tract housing more than 25 Hispanics, Vietnamese, or Laotian residents—regardless of age, sex, and income—appears to be included. The commenter states that this is true even though children born to women of childbearing age are the at-risk population. According to the commenter, such low, generalized thresholds may lead to the inclusion of watersheds actually lacking subsistence fishers in the target subpopulation and to an overestimate of the number of watersheds representing health risks related to MeHg.

Response to Comment 27: The EPA disagrees with the commenter that a threshold of 25 source population members is too low for use in identifying scenarios for potential exposures leading to increased risk for neurological effects. The SAB "agrees that the criterion of using at least 25 persons per census tract from a given target subsistence fisher population is a reasonable approach to identify watersheds with potentially highly exposed fish consuming populations" (U.S. EPA-SAB, 2011). As noted in the revised Hg Risk TSD, the EPA used the U.S. Census tract data to help identify watersheds with the potential for subsistence fisher activity by a specific type of subsistence fisher. The EPA readily acknowledges that that kind of fishing activity might only be present across a subset of the watersheds the EPA modeled for risk (for that subsistence fisher scenario). However, given the stated goal of the analysis of determining whether the potential exists for subsistence fishing activity that could result in a public health hazard due to U.S. EGU-attributable Hg deposition, identifying a set of watersheds with

the potential for that type of activity is appropriate. Furthermore, the EPA notes that a relatively few watersheds have fish tissue Hg data, thereby allowing them to be included in the Hg Risk TSD. Consequently, while there is the potential for some watersheds to be modeled for risk, which may not have currently active fishing activity of the type modeled (as noted by the commenter), there is also the very real possibility that due to a lack of fish tissue Hg data, the EPA excluded other watersheds from the analysis where this type of fishing activity occurs.

Comment 28: Commenter 17621 states that the record is unclear whether the poverty criterion was applied beyond the high-end female consumer scenario (see TSD, page 23 narrative). The commenter states that derived risk estimates (indicate that poverty, race/ethnicity, or sex (as appropriate) were taken into account for at least some subgroups of interest—such as high-end female consumers, poor white fishers in the southeast, poor black fishers in the southeast, and poor Hispanics, and some surveys have indicated the socioeconomic characteristics of subsistence level fishers, and related fish consumption. However, states the commenter, the lack of summary or tabulated data and descriptions of subpopulation distributions used in the analysis hinder the commenter's ability to understand the analytical criteria used in the Hg Risk TSD assessment. According to the commenter, using the EPA's assumption, any densely populated urban census tract with a single fish tissue sample could be assigned to a modeled watersheds with populations potentially at-risk, regardless of the actual degree of recreational or subsistence fishing taking place there.

Response to Comment 28: For the revised Hg Risk TSD, the EPA modified the female subsistence fisher scenario (which receives the greatest emphasis from a policy context) to be applied universally to all watersheds with fish tissue Hg data and no longer constrain this scenario to locations with poor source populations. The EPA continues to model risk for white and black subsistence fishers active in the southeast and Hispanics nationally. In this case, the EPA links poverty with subsistence fishing, as the EPA only modeled locations with poor source populations. As noted in the revised Hg Risk TSD, the EPA used the U.S. Census tract data to help identify watersheds with the potential for subsistence fisher activity by a specific type of subsistence fisher. The EPA readily acknowledges that that kind of fishing activity might only be present across a subset of the watersheds modeled for risk (for that subsistence fisher scenario).

Comment 29: Commenter 17775 states that the EPA's use of the 99th percentile fish consumption for the Hg Risk TSD is inconsistent with the agency's risk assessment guidelines. According to the commenter, the EPA's 1998 *Risk Assessment Guidelines*[sic] (U.S. EPA, 1998)[82] recommend evaluating a reasonable maximum exposure scenario, which equates to about a 95th percentile fish consumption value. The commenter notes that the EPA applies the 99th percentile to a "small survey of 149 South Carolina female anglers" to calculate an ingestion rate of 373 g/day. According to the commenter, if the 95th percentile is used, the ingestion rate would be 173 g/day and if the default ingestion rate for determining ambient water standards is used the ingestion rate would be 142 g/day.

Response to Comment 29: The Hg Risk TSD is designed to inform the Appropriate and Necessary Finding. As such, the Hg Risk TSD is intended to address the question of whether Hg emitted by U.S. EGUs contribute to potential exposures associated with increased risk of neurologic effects. Thus, the Hg Risk TSD is focused on characterizing risk for the group likely to experience the greatest U.S. EGU-attributable Hg risk (i.e., subsistence fishers active at inland freshwater watersheds – see revised Hg Risk TSD). Specifically, within that subsistence fisher population, the EPA is interested in those

[82] U.S. EPA. 1989. *Risk Assessment Guidance for Superfund (RAGS).* EPA/540/1-89/002. December.

individuals who are most at-risk, which includes those who consume the most fish. For that reason, the EPA included consideration for a range of high-end fish consumption rates including the 99th percentile to cover the most highly-exposed individuals. Evidence of these high fish consuming populations can be found in surveys, e.g., Burger et al. (2002), and specialized studies (Burger et al., 1999a,b; California EPA, 1997; Tai, 1999; Corburn, 2002). A search of the literature reveals several studies that identified fishing populations with subsistence or near subsistence consumption rates, including urban fishing populations (including low-income populations), Laotian communities, and Hispanics. This focus for the Hg Risk TSD (including modeling of the 99th percentile fish consumption rate by subsistence fishers) reflects consideration for the provisions of the CAA addressing the appropriate and necessary determination for U.S. EGUs, and is consistent with treatment of other HAP under CAA section 112 of the CAA, which focuses on maximally exposed individuals. In that context, the design of the risk assessment is particular to this statutory context. In addition, the SAB concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD, and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

Comment 30: Commenter 17775 states that the EPA also assumed that the subsistence fisher only caught large fish that contained the 75th percentile fish tissue MeHg concentrations. The commenter states that the EPA chose this value to reflect the possibility that high-end subsistence fishers would target larger fish, which would have higher MeHg concentrations. According the commenter, larger fish may be the target of recreational fishers, but a subsistence fisher eats what he catches. The commenter states that a more reasonable assumption would have been fish MeHg concentrations at the 50th percentile.

Response to Comment 30: Given the goal for the Hg Risk TSD to determine whether there is the potential exposurs associated with increased risk from fish consumption, the EPA focused on a subset of subsistence fishers with behavior that is reasonable and places them at greater risk. While the EPA agrees with the commenter that some subsistence fishers likely consume fish without consideration for size (given dietary necessity), it is also reasonable to assume that a subset of subsistence fishers could target larger fish in order to maximize the volume of fish. The EPA uses this subset of subsistence fishers targeting larger fish, which is represented by the 75th percentile fish tissue value. In addition, focusing on the female subsistence fishing population scenario also provides coverage for high-end recreational anglers who target larger freshwater fish. The EPA is not attempting to generate a comprehensive population-weighted picture of high-end fish consumption but rather focused on modeling risk for subsistence fisher scenarios reflecting realistic behavior that would place these fishers at higher risk. The SAB commented, "Using the 75th percentile of fish tissue values as a reflection of consumption of larger, but not the largest, fish among sport and subsistence fishers is a reasonable approach and is consistent with published and unpublished data on predominant types of fish consumed" (U.S. EPA-SAB, 2011).

Comment 31: Commenter 18023 states that the EPA provides broad summary statistics of its fish tissue data in Table 5-2 of the RIA, but the summary does not allow an assessment of the representativeness and robustness of the underlying data for the Hg Risk TSD, especially at the tails of the distribution. The commenter states that the table does not include a median statistic and does not provide any information on the number of lakes and river segments in each watershed. According the commenter, an analysis of the EPA's database by one of the SAB members indicated that 60% of the watersheds with fish Hg data from rivers have risks calculated based upon a sample size of one or two fish. The commenter asserts that it is not reasonable to base a significant policy and regulation decision on watersheds whose exposure is based on a single fish sample in a single water body within it.

Response to Comment 31: The EPA disagrees with the commenter that it is not reasonable to use watersheds where only a single fish sample is available. While it is generally preferred to have multiple samples, the SAB noted that using a single sample is likely to underestimate the 75th percentile fish MeHg concentration and is therefore likely to underestimate the risk estimates for those watersheds. The SAB suggested that the EPA conduct additional analyses of the fish tissue MeHg data, which the EPA has done and included in the revised TSD. Those analyses include an assessment of risk when the median MeHg concentration is used, as well as providing information on the number of watersheds modeled in the Hg Risk TSD with various fish tissue Hg samples sizes (e.g., 1, 2, 3-5, 6-10 and >10 measurements).

Comment 32: Several commenters (19536, 19537, 19538) state that the EPA's assessment takes into account human exposure to MeHg through ingestion of fish from U.S. freshwater lakes and streams and does not quantify adverse effects from the ingestion of MeHg in seafood. According to the commenter, recent studies demonstrate that were the EPA to take into account consumption of seafood, MeHg consumption in the U.S. is of even greater concern.

Response to Comment 32: While the EPA agrees with the comment that it is likely that exposure to total MeHg through commercial fish consumption represents a more significant risk for the general population than consumption of freshwater fish obtained through self-caught fishing activity, exposure to total MeHg through self-caught fish consumption is the most significant risk for subsistence fishing populations and high-end recreational fishers. For the subset of these populations that focus their fishing activity in freshwater streams and lakes, it is also the case that they will experience a higher fraction of MeHg exposure attributable to U.S. EGU Hg emissions. As a result, the EPA focused the risk assessment on subsistence fishers active at inland freshwater watersheds because they are likely to experience the highest levels of individual risk as a result of exposure to U.S. EGU-attributable Hg.

Comment 33: Commenter 18023 states that the EPA's uncertainty analysis in the Hg Risk TSD is limited for several reasons: first, it fails to assess critical assumptions such as the EPA's decision to use the 75th percentile fish Hg level (as opposed to the more reasonable mean or median fish Hg level) and its decision to use poverty as a surrogate for the existence of subsistence fishers in an area; second, the EPA assumes that by focusing on HUCs with the highest total Hg deposition that HUCs with such sources get excluded; and third, the EPA excludes four states based largely on the observation that the Hg fish tissue levels "are fairly high, while Hg deposition is not relatively elevated (compared to other eastern states) – this raising the concern that some other factor may be in play (*e.g.,* other non-air sources, or per HAP substantially increased methylation potential)." According to the commenter, the EPA's own evidence would tend to demonstrate that there is essentially no relationship between Hg deposition and fish Hg levels, and because the EPA appears (with these four states) to exclude watersheds with high methylation potential. TSD Figure 2-17 implies that many more water bodies should have been excluded but were not. According to the commenter, it is plausible that many of the highest Hg fish levels are in locations with such high methylation potential that even low levels of Hg deposition, regardless of source or changes in deposition, will result in high fish Hg levels.

Response to Comment 33: In the revised Hg Risk TSD, the EPA included a sensitivity analysis examining the impact on risk of using a median watershed-level fish tissue Hg level rather than the 75th percentile value. However, given the goal of the analysis (i.e., characterizing risk for the subset of subsistence fishers likely to experience the highest, but still realistic exposure to U.S. EGU-attributable Hg), using the 75th percentile fish tissue Hg level to reflect targeting of larger fish by a subset of subsistence fishers is reasonable. In addition, regarding the 75th percentile value, the SAB stated, "Using

the 75th percentile of fish tissue values as a reflection of consumption of larger, but not the largest, fish among sport and subsistence fishers is a reasonable approach and is consistent with published and unpublished data on predominant types of fish consumed" (U.S. EPA-SAB, 2011). Regarding the commenter's observation that the EPA did not include the poverty criterion in the uncertainty analysis, for the subsistence fisher scenario with the greatest policy relevance in the analysis (the female subsistence fisher) for the revised Hg Risk TSD, the EPA removed the poverty criterion and now assess this scenario at all watersheds with applicable fish tissue Hg data. Regarding the commenter's points on sensitivity analyses (simulating risk for the highest Hg impacted watersheds and assessing risk with exclusion of 4 states), these sensitivity analyses were intended to explore uncertainty related to application of the proportionality assumption. In neither case did the EPA assert that these sensitivity analyses represented optimal risk simulations that should be considered in place of the core risk assessment.

Comment 34: Commenter 18023 states that the EPA arbitrarily inflates the risk estimates by assuming consumption of only fish greater than 7 inches and then chooses the largest of the 75th percentile of fish Hg levels from these larger fish (*i.e.*, larger than 7 inches) for rivers and lakes. According to the commenter, it is equally plausible that a subsistence fisher (*i.e.*, a fisher relying on fish as his sole source of protein) would necessarily eat whatever he could catch. For this reason, states the commenter, the mean or median of all fish, not just those greater than 7 inches, might be more appropriate. The commenter notes that the EPA did not provide a basis for its conclusion that "use of a median or mean value could low-bias likely catch-related Hg levels," Hg TSD at 72.

Response to Comment 34: The EPA disagrees that it the risk estimates are inflated. The goal of the Hg Risk TSD is to determine whether Hg emitted by U.S. EGUs contribute to potential exposures associated with increased risk of neurologic health effects. Given this goal, the EPA focused on modeling risk for the subset of subsistence fishers whose behavior places them at greater risk, with these behavioral factors including: (a) focused fishing activity within a single watershed (means that if fish at a given watershed have elevated MeHg, the fishers will experience those elevated levels without dilution via consumption of fish from less impacted proximal watersheds) and (b) targeting larger fish which have greater MeHg bioaccumulation/biomagnifications (as reflected in the 75th percentile values used). Regarding the 7 inch criteria, for the revised Hg Risk TSD, the EPA clarified that this cutoff represents a minimum size limit for a number of key edible freshwater fish species established at the state-level. For example, Pennsylvania establishes 7 inches as the minimum size limit for both trout and salmon (other edible fish species such as bass, walleye and northern pike have higher minimum size limits (Pennsylvania Fish and Boating Commission, 2011).[83]

Comment 35: Commenter 18023 states that the EPA provides no rationale for its decision to choose the highest of the 75th percentile for fish Hg levels among rivers and lakes within the HUC. According to the commenter, the mean or median of all available data within the HUC would be more reasonable.

Response to Comment 35: The EPA disagrees with the comment that it did not provide a rationale for choosing the highest 75th percentile fish tissue concentration across lakes and rivers in a watershed. However, the EPA modified the methodology based on evaluation of the number of samples within each watershed (responding to a recommendation from the SAB). In the revised methodology, the EPA computes the 75th percentile value at each sampling site within a watershed. The EPA then computed the

[83] Pennsylvania Fish and Boat Commission. 2011. *Summary Book: 2001 Pennsylvania Fishing Laws and Regulations* available at: http://fishandboat.com/fishpub/summary/inland.html.

average of the site-specific 75th percentile fish tissue Hg values within a given watershed. This approach does not differentiate between rivers and lakes and reflects an improved treatment of behavior, allowing for fishers to choose among multiple fishing sites within a watershed.

Comment 36: Commenter 18023 states that "by far' the assumption with the greatest impact is the fish consumption rate. To illustrate its importance, states the commenter, Tetra Tech used the data from the spreadsheet called "Risk Assessment Model" found in the docket provided by the EPA and performed a series of sensitivity analyses based on this data. The commenter states that as to the effect of ingestion rate, Tetra Tech found:

"The impact of the fish ingestion rate for these populations is shown in Figure 3 for the 90th percentile watershed for 2016 deposition...There is a dramatic effect of increased HQs and loss of IQ depending on the ingestion rate considered going from the 50th percentile ingestion rate to the 99th percentile ingestion rate. Even when a relatively conservative estimate of the 95th percentile ingestion rate of the 15-44 year old female population is considered, the HQ is a tenth of the value computed with the 99th percentile high end female fisher. Likewise for IQ loss, there is a factor of 10 difference between the 95th percentile of the general population compared to the 99th percentile of the high end female fisher."

Response to Comment 36: The EPA agrees that the fish consumption rate is an important factor in calculating risk from exposure to MeHg in fish. The EPA acknowledges that the distribution of fish consumption rates is positively skewed, which means that at higher percentiles (e.g., 90th, 95th and 99th there is a substantial increase in ingestion rates relative to the mean or median. The revised Hg Risk TSD includes a reasonableness check on the amount of fish consumed (as a daily value) reflected in the different rates. While the 99th percentile consumption rates for the subsistence female fisher (373 g/day) is substantially higher than the 90th or 95th percentile values (123 and 173 g/day respectively) the 99th percentile value translates into a 13-ounce meal. While this represents a large serving, it is still reasonable if representing an individual who receives all of their meat protein from self-caught fishing, and the 13 ounces per day do not have to be eaten all at one meal. The higher consumption rates (i.e., greater than 250+ g/day) are supported by all three studies used in the Hg Risk TSD, and therefore, there is support across studies near the upper bound of likely consumption rates in this range. The EPA acknowledges uncertainty associated with estimating of high-end percentile values in these studies due to relatively low samples sizes for some of the population groups. However, even if a few individuals reported these high self-caught fish consumption rates, making it difficult to characterize the population percentiles they represent, the values still suggest that these levels of high fish consumption exist among surveyed individuals. To determine whether a public health hazard could exist, the EPA asserts that it is reasonable to include these consumption rates as representative of the most at-risk populations. In these cases, however, the EPA acknowledges that it is important to highlight uncertainty associated with characterizing the specific population percentile that these ingestion rates represent, and the EPA has done so in the revised Hg Risk TSD.

Comment 37: Commenter 18023 states that the EPA fails to explain how it matched HUCs to census tracts. The commenter states that the average area of a HUC-12 in the U.S. is about 35 square miles, and census tracts range in size from a few tenths of a square mile to hundreds of square miles. The commenter states that the EPA uses the words "containing" and "intersecting" and appears to have performed some sort of an analysis assigning distance between census tracts and HUCs with measured fish Hg.

Response to Comment 37: The EPA notes some confusion in the comments related to the size of the watersheds modeled. Several commenters stated that HUC watersheds are 35 km on a side. The commenters appear to be referring to HUC-8 classifications. HUCs are defined for varying spatial resolutions. The geographic unit used as the basis for generating risk estimates is the HUC-12 scale, which is about 10 km on a side, which is consistent with the size of the CMAQ grid cells, which are $12km^2$. The EPA also clarified that the specific unit of analysis for this assessment is at the watershed, not enumerated subpopulations.

The U.S. Census tracts are only used to determine whether there are populations in the vicinity of a given watershed, which could increase the potential for a category of subsistence fishers to be active at that watershed. In the revised Hg Risk TSD, the EPA modified the female subsistence scenario to be applied equally to all watersheds with fish tissue Hg data based on the likelihood that these populations have the potential to fish at most watersheds. Thus, concerns regarding the use of census data to select watersheds with the potential for subsistence fishing are no longer applicable for this scenario. However, for the remaining subsistence scenarios, the EPA continues to use U.S. Census tract-level data to evaluate the presence of a "source population" in the vicinity of the watershed being modeled for risk. In this context, the U.S. Census data are being used to assess whether a SES-differentiated group similar to the particular type of subsistence fisher being modeled (e.g., poor Hispanics) are located in the vicinity of the watershed. If a source population is nearby, then this increases the potential that subsistence fishing activity could occur for that population scenario. Technically, the EPA identified the set of U.S. Census tracts associated with a given watershed by seeing which tracts intersected the boundaries of the HUC-12 watershed. That set of U.S. Census tracts was then queried to see if a source population of at least 25 individuals existed for any of the subsistence fisher scenarios being considered.

Comment 38: Commenter 18023 states that the EPA is not clear as to which individuals are included in identifying the 25 "at risk" individuals – whether the individuals represent 25 females, adult females, only females of child-bearing age, or 25 individuals regardless of age and sex. According to the commenter, this question applies equally to the subsistence fisher population assessments; the footnotes cited make varying and inconsistent descriptions of which individuals are included.

Response to Comment 38: For the revised Hg Risk TSD, the EPA modified the female subsistence fisher scenario (which receives the greatest emphasis from a policy context) to be applied universally to all watersheds with fish tissue Hg data and no longer constrain this scenario based on consideration for a source population. However, modeling of the other subsistence fisher scenario continues to be based on only assessing each scenario at those watersheds (with fish tissue Hg data) that intersect a U.S. Census tract with at least 25 members of the relevant source population. It is important to clarify that these source populations do not represent "at risk" populations, since they are not estimates of the number of subsistence fishers. Rather the source populations are used to determine if an SES group similar to the subsistence fisher scenario being modeled is in close proximity to a given watershed, thereby increasing the potential of activity by that subsistence fisher scenario. In defining source populations, the EPA considered the total count of person falling into the particular SES group (e.g., for Laotians – are there at least 25 Laotians; for poor Hispanics, are there at least 25 Hispanics living below the poverty line). The definition of source populations was not constrained by age groups, because as mentioned above, the EPA is not attempting to enumerate subsistence fishers, but simply determine if a population similar to a given subsistence fisher (with regard to SES attributes) was located in the vicinity of a given watershed.

Comment 39: Commenter 18023 states that it appears that a HUC with measured fish Hg is included in the risk calculation if it has at least 25 individuals of the subject demographic, living below the poverty

level, and living in a census tract(s) within some distance of that HUC. According to the commenter, almost all of the 2,461 HUCs get assessed, whether or not any true subsistence fishers exist in that census tract. The commenter states that they believe the EPA overstates the risks (at least for the HUCs for which it has data) but then declares that the risk is underestimated because only 2,461 out of 88,000 HUC- 12s could be assessed.

Response to Comment 39: The EPA disagrees that it has overstated the Hg risks. As stated in the revised Hg Risk TSD, modeling of subsistence fisher risk focuses on assessing risk based on the potential for activity at the watersheds modeled. Given available data, it is not possible at this point to determine exactly where subsistence fishing activity occurs or to enumerate those fishers. However, it is reasonable to assume that subsistence fishing activity (of the type modeled in this analysis) does occur across some subset of the watersheds assessed, even if the EPA cannot explicitly identify that group.

Comment 40: Commenter 18034 states that the EPA's worst-case scenario (e.g., combining high ingestion rates from interviews with 149 women, a cooking factor of 1.5 established from cooking 13 walleye, highest modeled deposition watersheds, and highest fish tissue concentrations from the eastern half of the U.S.) overestimates risk for the vast majority of the U.S. population, particularly considering that 84% of the seafood (including fresh and marine fish) consumed in the U.S. is imported.

Response to Comment 40: The EPA disagrees that it has overestimated Hg risk. The EPA explicitly states in the revised Hg Risk TSD that it is not intended to be representative of broader U.S. population risk associated either with commercial seafood consumption or with recreational angler activity. Rather, emphasis is placed on modeling risk for the group of fish consumers likely to experience the greatest individual risk from U.S. EGU-attributable Hg (here individual risk referring to level of hazard potentially experienced by a representative individual from a specific fish consuming group and not total adverse effect incidence within a population). For reasons outlined in detail in the revised Hg Risk TSD, subsistence fishers active in freshwater water bodies in certain regions of the U.S. are likely experience the greatest individual-level risk from U.S. EGU-attributable Hg. For that reason, the Hg Risk TSD focuses specifically on modeling this group, including coverage for a number of SES-differentiated subset of subsistence fishers. In describing the subsistence fishers modeled in the analysis, the EPA clearly stated that the analysis focuses on the subset of these fishers whose behavior (a) places them at increased risk through Hg exposure and (b) is reasonable (for a subset of the subsistence fishers). Specifically, the EPA focused on the subset of subsistence fishers who target somewhat larger fish for consumption (reflected in the 75th percentile fish tissue value used) and focus their activity at water bodies within a specific watershed (thereby allowing less dilution of high Hg impacted water bodies through distributed fishing across multiple watersheds). In framing the risk estimates that are generated, the EPA is careful to emphasize that they represent risk for a relatively small (but not quantifiable) group of subsistence fishers and that they, in no way, represent levels of individual risk experienced by the average consumer or recreational angler. Furthermore, the EPA readily acknowledges that there is a different subset of subsistence fishers whose behavior may reduce their risk (e.g., consume wider range of sized fish and distribute their activity between watersheds).

5. Reference dose for MeHg and Hg health effects studies.

Commenters: 12267, 14115, 17621, 17689, 17702, 17712, 17769, 17775, 17807, 17877, 17886, 18018, 18033, 18034, 18443, 18500, 17838, 17681, 19536, 19537, 19538

a. General RfD comments.

Comment 41: Commenters 17702 and 18018 believe that the EPA's analysis is not based on best available science and that the analysis is flawed and overestimated the impact of Hg emissions on human health. Commenter 18018 states that the EPA's own data for the EGU MACT shows that the risks from eating seafood are very low. This commenter identifies two recent scientific studies as supporting their belief that the risks are low; the first, states the commenter, is a study published in the Lancet (Hibbeln, 2007)[84], which concludes maternal consumption of less than 340 grams of seafood per week did not protect children from adverse outcomes (less verbal intelligence and social development); rather, consumption of more than 340 grams of seafood a week produced beneficial outcomes, suggesting that "advice to limit seafood consumption could actually be detrimental." The study concludes that "the risks of the loss of nutrients were greater than the risk of harm from trace contaminants in 340 grams of seafood a week." The commenter states that the second study (Mozaffarian, 2011)[85] found no evidence of any clinically relevant adverse effects of Hg exposure on coronary heart disease, stroke or total cardiovascular disease in U.S. adults that was not outweighed by the beneficial effects of eating fish.

Response to Comment 41: The EPA disagrees that it did not use the best available science in the Hg Risk TSD. It is the policy of the EPA to use the most current peer reviewed, publicly available data and methodologies in its risk assessments. The Hg Risk TSD evaluated the potential Hg exposures for several high-risk subpopulations, specifically high-consuming subsistence fishers. This assessment was not designed to characterize the full range of risk associated with exposure to Hg emitted from U.S. EGUs. After reviewing this Hg Risk TSD, the SAB concluded, "SAB supports the overall design of and approach to the risk assessment and finds that it should provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs" (U.S. EPA-SAB, 2011). For this rulemaking, the EPA did not conduct an analysis of risks and benefits of fish consumption. Rather, the EPA conducted an analysis of the risks of exposure to Hg and the benefits accruing to consumers of freshwater fish from reduction in Hg emissions from U.S. EGUs. The study cited by the commenter does not address the question as to whether eating a given level of fish with less Hg has more benefits that eating a fish with more Hg. There are in fact many contemporary scientific publications that observe adverse effects of MeHg exposure when the exposure route is through fish consumption. Moreover, many studies show that beneficial effects of fish on both cardiovascular and neurodevelopmental health are decreased by concomitant exposure to MeHg. Studies describing one or more aspects of exposure to fish nutrient and MeHg include Grandjean et al. (2001b); Budtz –Jorgenson (2007)[86], Choi (2008a,b) [87,88]; Oken et al. (2008)[89]; Strain et al. (2008)[90]; Suzuki et al. (2010)[91]. Note that

[84] Hibbeln JR, Davis JM, Steer C, Emmett P, Rogers I, Williams C, et al., 2007. "Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study." *Lancet*;369: 578.

[85] Mozaffarian, Darish. 2011. "Hg Exposure and Risk of Cardiovascular Disease in Two U.S. Cohorts" *N Engl J Med*, 364: pages 1116-1125.

[86] Budtz-Jorgensen, E.; Grandjean, P.; Weihe, P. (2007). Separation of risks and benefits of 16 seafood intake. *Environmental Health Perspectives*. Vol. 115, 323-327.

[87] Choi AL, Cordier S, Weihe P, Grandjean P. 2008a. "Negative confounding in the evaluation of toxicity: the case of MeHg in fish and seafood." *Crit Rev Toxicol*. 2008;38(10):877-93.

[88] Choi AL, Budtz-Jørgensen E, Jørgensen PJ, Steuerwald U, Debes F, Weihe P, Grandjean P. 2008b. "Selenium as a potential protective factor against Hg developmental neurotoxicity." *Environ Res*. May;107(1):45-52. Epub 2007 Sep 12.

[89] Oken, E., Radesky, J.S., Wright, R.O., Bellinger, D.C., Amarasiriwardena, C.J., Kleinman, K.P., Hu, H., Gillman, M.W. 2008. Maternal fish Intake during Pregnancy, Blood Hg Levels, and Child Cognition

in the Hibbeln et al. (2007) study cited above, there were self-reported levels of fish consumption, but no measures of Hg exposure; no biomarker data such as blood, hair or urine Hg were reported. Daniels et al. (2004)[92] reporting on the same population noted that no significant increase was seen in umbilical cord Hg (the biomarker used) as seafood consumption increased from one meal per 2 weeks to four or more per week. Consequently, no MeHg-associated suboptimum performance outcomes would be expected in the [Avon Longitudinal Study of Parents and Children] ALSPAC population.

Comment 42: Commenter 17775 states that the EPA noted that research demonstrates that the 10% risk level of benchmark dose roughly correlates with the [no observed adverse effect level] NOAEL in the EPA's 1995 IRIS RfD for MeHg. According to the commenter, the EPA departed from this approach and used a 5% risk level for the benchmark dose and this results in a benchmark dose that is six times more stringent than the traditional 10% risk level [benchmark dose] BMD or NOAEL approach.

Response to Comment 42: It is the policy of the EPA to use the most current peer reviewed, publicly available data and methodologies in its risk assessments. The comment above refers to calculations based on the science available at the time, which have been superseded by advances in knowledge and best practices used by risk assessors. It is the best practice of the EPA when the data support it, to use benchmark dose modeling (BMD), rather than a point estimate derived from inspection or a pair-wise comparison. The EPA is not obliged to use any particular benchmark response level (BMR) in calculation of the BMD. The choice of the BMR for the MeHg RfD was guided by the advice of the National Research Council (NAS, 2000) and an independent scientific peer review panel. Scientists conversant in the tests and neurobehavioral endpoints to be modeled found that a 5% BMR was most appropriate and congruent with practice in the field.

Comment 43: Commenter 17775 states that the EPA's explanation of the application of a uncertainty factor of 10 to the benchmark dose as part of developing the RfD for MeHg is "poorly explained." The commenter asserts that the EPA's uncertainty factor of 10 is higher than the uncertainty factors used by the World Health Organization (WHO) and Agency for Toxic Substances and Disease Registry (ATSDR). According to the commenter, WHO used an uncertainty factor of 6.442 and ATSDR used an uncertainty factor of 4.5.

Response to Comment 43: The EPA disagrees that the information underlying the RfD is "poorly explained." Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003). The uncertainty factor used in calculation of EPA's peer-reviewed RfD is small (10-fold), including a three-fold factor to account for measured variability in human pharmacokinetics (see analyses in NAS, 2000) and three-fold for uncertainty in human pharmacodynamics. This uncertainty factor considered advice of NAS (2000) and an

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at Age 3 Years in a U.S. Cohort. *American Journal of Epidemiology, 167(10),* 1,171-1,181.

[90] Strain, J.J. et al. 2008. "Associations of maternal long chain polyunsaturated fatty acids, methyl Hg, and infant development in the Seychelles Child Development Nutrition Study." *Neurotoxicology*. 29(5): 776–782.

[91] Suzuki, K., Nakai, K., Sugawara, T., Nakamura, T., Ohba, T., Shimada, M., Hosokawa, T., Okamura, K., Sakai, T., Kurokawa, N., Murata, K., Satoh, C., and Satoh, H. "Neurobehavioral effects of prenatal exposure to MeHg and PCBs, and seafood intake: neonatal behavioral assessment scale results of Tohoku study of child development." *Environ Res* 110, 699-704.

[92] Daniels JL, Longnecker MP, Rowland AS, Golding J. 2004. "Fish intake during pregnancy and early cognitive development of offspring." *Epidemiology*;15:394–402.

independent panel of scientific peer reviewers convened as part of the IRIS process. NAS (2000) specifically advised against using either the study or the uncertainty factor employed by ATSDR in the calculation of its MeHg minimal risk level (MRL).

Comment 44: Commenter 17775 states that the EPA assigned an unusually high uncertainty factor of three to account for pharmacokinetic variability. According to the commenter, much of the uncertainty the EPA attributes to this source of variability results from the model selected by the EPA. The commenter states that the EPA used a one-compartment model instead of the more sophisticated Psychologically Based Pharmcokinetic Model (PBPK) model suggested by the NRC panel (NAS, 2000), and that the EPA would have eliminated much of the model-based uncertainty by using the PBPK model.

Response to Comment 44: The EPA disagrees that the uncertainty factor is "unusually high." The uncertainty factor of 10 for inter-human variability includes a three-fold factor to account for measured variability in human pharmacokinetics (see analyses in NAS, 2000) and three-fold for uncertainty in human pharmacodynamics. When the EPA was deriving the RfD for MeHg, the EPA used the one compartment model to calculate ingested dose from cord and maternal blood Hg levels. This was done on advice of NAS (2000) and an independent peer review panel convened as part of the IRIS process. Both groups of scientists felt at that time that the available PBPK model had not undergone sufficient scientific scrutiny to be used in the derivation of the MeHg RfD.

At this time, the EPA is neither reviewing nor revising its RfD for MeHg. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Comment 45: Commenter 17775 states that the EPA's RfD documentation fails to explain why an uncertainty factor of three was applied to address toxicodynamic variability and uncertainty when such a factor was considered unnecessary in the EPA's earlier MeHg RfDs in 1980 and 1995 based on poisoning incidents in Iraq and Japan.

Response to Comment 45: The EPA disagrees that the RfD documentation is inadequate. It is the policy of the EPA to use the most current peer reviewed, publicly available data and methodologies in its risk assessments. The uncertainty factor of 10 includes a three-fold factor to account for measured variability in human pharmacokinetics (see analyses in NAS, 2000) and three-fold for uncertainty in human pharmacodynamics. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Comment 46: Multiple commenters (17689, 17681, 17877, 17838, 17712, 17886, 18443, 18500, 18033) stated that the EPA used a Hg RfD that is two to four times more restrictive than the "safe" levels set by the U.S. Food and Drug Administration (FDA) (0.4), the WHO (0.21), and the U.S. ATSDR (0.3).

Response to Comment 46: The EPA agrees that the EPA's RfD is not the same as the levels used by FDA, WHO, or ATSDR. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003). In their advice to the EPA on the appropriate

bases for a MeHg RfD, NAS (2000) specifically recommended that the EPA use neither the study nor the uncertainty factor employed by ATSDR in the calculation of their minimal risk level (MRL).

Comment 47: Several commenters (17681, 17769, 17807, 18034) state that the EPA's use of the 1999 NHANES data is outdated. According to the commenters, the EPA data shows a decline in NHANES blood Hg levels since 1999 and, since 2001, the levels are below the EPA RfD.

Response to Comment 47: The EPA disagrees that there is a statistically discernible downward trend in the National Health and Nutrition Examination Survey (NHANES) data on blood Hg. The EPA is unaware that a formal statistical analysis for temporal trends has been completed for NHANES data on blood Hg levels for the period 1999 to 2008. Mahaffey et al. (2009)[93], evaluating NHANES data collected 1999 to 2004 for women at child-bearing age, could "not support the conclusion that there was a general downward trend in blood Hg concentrations over the 6-year study period." However, the same publication noted that "there was a decline in the upper percentiles reflecting the most highly exposure women" having blood Hg concentration greater than established levels of concern. Visual observations of the data show a slight decrease in Hg blood level concentrations from 1999-2008 at the geometric mean, but this decrease may not be statistically significant. A decrease in Hg blood level concentrations is also observed at the 95th percentile. Except for differences observed between 1999 and 2008, the temporal decrease may not be statistically significant. Conclusions cannot be drawn without further and more formal statistical analysis of the data.

The EPA remains concerned that substantial numbers of women of childbearing age in the U.S. may have blood Hg levels that are equivalent to exposures at or above the RfD. Mean and 95th percentiles from recent NHANES data are below 5.8 µg/l (a blood Hg concentration equivalent to the RfD). However, blood levels for some portions of the population (high consumers of fish, for example) show exposures above this level. The EPA did not find data for NHANES blood distributions above the 95th percentile. Modeled data from Tran et al. (2004)[94] provided estimates showing high blood Hg levels at the 99th percentile for females of child-bearing age (i.e., 24.41 µg/L at the 99th percentile). Mahaffey et al. (2009) showed that 2.4% of women of child-bearing age had blood Hg values above 5.8 µg/L. Other published studies have shown that various population groups can have high blood Hg levels (Mahaffey, 2005[95]; Miranda et al., 2011[96]; Hightower and Moore, 2003[97]; Hightower et al., 2006[98]; McKelvey et al., 2007[99]). For example, in Hightower et al. (2006) the authors found that Asian populations had Hg

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[93] Mahaffey, K.R., R.P. Clickner and R.A. Jeffries. 2009. "Adult Women's Blood Mercury Concentrations Vary Regionally in the United States: Association with Patterns of Fish Consumption (NHANES 1999–2004)." *Environ. Health Perspect*., 117: 47-53.

[94] Tran, N. L., L. Barraj, et al. 2004. "Combining food frequency and survey data to quantify long-term dietary exposure: a methyl mercury case study." Risk Anal 24(1): 19-30.

[95] Mahaffey, K. R. 2005. "Mercury exposure: medical and public health issues." *Trans Am Clin Climatol Assoc* 116: 127-153; discussion 153-124.

[96] Miranda, M. L., S. Edwards, et al. 2011. "Mercury levels in an urban pregnant population in Durham County, North Carolina." *Int J Environ Res Public Health* 8(3): 698-712.

[97] Hightower Jane M, Moore Dan. 2003. "Mercury levels in high-end consumers of fish." *Environ Health Perspect.* Apr;111(4):604–608.

[98] Hightower, J. M., A. O'Hare, et al. 2006. "Blood mercury reporting in NHANES: identifying Asian, Pacific Islander, Native American, and multiracial groups." *Environ Health Perspect* 114(2): 173-175.

[99] McKelvey, W., R. C. Gwynn, et al. (2007). "A biomonitoring study of lead, cadmium, and mercury in the blood of New York city adults." *Environ Health Perspect* 115(10): 1435-1441.

exposures greater than 5.8 µg/L in 83% of the Asian population compared to 12% for the total survey population.

Comment 48: Commenter 17621 states that because the exposure levels in the U.S. remain lower than those observed in the primary Faroe Islands study used to derive the MeHg RfD, the selection of the dose-response model is critical. According the commenter, a linear dose-response model was assumed for both the RfD-based HQ metric and the IQ metric without supporting explanation beyond the interpretation that this is NRC's preference, and that it was "easier to quantify IQ loss." The commenter states that the standard MeHg RfD established by the EPA assumes a threshold dose below which an appreciable risk of adverse effects is unlikely. In choosing a k-power model, states the commenter, the NRC committee did not evaluate whether MeHg exposure data from the Faroe Islands were better fit by a linear or non-linear model, or by a threshold or non-threshold model. The commenter states that in the Hg Risk TSD, the EPA states that "no threshold was observed in the Faroe data set; but such an observation cannot be made since neither EPA nor others have been able to acquire and model the Faroe data. In the case of the Seychelles and Iraqi data sets, evidence of a threshold has been observed."

Response to Comment 48: The EPA disagrees that exposure levels in the U.S. are lower than in the Faroe Islands study. Exposure to MeHg in the U.S. has been reported at the same levels as those published in the Faroe Islands (Schober, 2003)[100]. Mahaffey et al. (2009) note that in the NHANES data (1999-2004), the highest 5% of women's blood Hg exceeded 8.2 µg /L in the northeast U.S. and 7.2 µg/L in coastal areas. Higher levels have been reported among subjects known to consume fish. For example, Hightower and Moore (2003) reported mean blood Hg for women aged 27 to 87 in their study to be 15 µg /L; range for men and women was 2 to 89.5 µg /L.

At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001[101]; U.S. EPA-IRIS, 2001; Rice et al., 2003[102]).

Regarding choice of model, both the preference of NAS (2000) and an independent panel of scientific peer reviewers was based on analyses of model goodness of fit to the data. The models were fit to data in the observable range to generate a point of departure. No modeling was done for low dose extrapolation; rather, an uncertainty factor of 10 was applied to the chosen points of departure (lower limit on a BMD_{05} for multiple endpoints).

IRIS makes this statement regarding a threshold for MeHg: "It is also important to note that no evidence of a threshold arose for MeHg-related neurotoxicity within the range of exposures in the Faroe Islands study. This lack [of a threshold] is indicated by the fact that, of the K power models, K = 1 provided a

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[100] Schober Susan E, Sinks Thomas H, Jones Robert L, Bolger P Michael, McDowell Margaret, Osterloh John, Garrett E Spencer, Canady Richard A, Dillon Charles F, Sun Yu, Joseph Catherine B, Mahaffey Kathryn R. 2003. "Blood mercury levels in U.S. children and women of childbearing age, 1999-2000." *JAMA* 289(13):1667–1674.

[101] U.S. EPA, 2001. *Water Quality Criterion for the Protection of the Human Health: MeHg*EPA-823-T-01-001, available at http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/MeHg/index.cfm

[102] Rice D, Schoeny R, Mahaffey K. 2003. "Methods and Rationale for Derivation of a Reference Dose for MeHg by the U.S. EPA." *Risk Analysis*. 23(1)107-115.

better fit for the endpoint models than did higher values of K" (U.S. EPA-IRIS, 2001)[103]. This remains a factual statement.

Comment 49: Several commenters (19536, 19537, 19538) state that the EPA's RfD of 0.1 μg/kg per day is based on sound science. According to the commenters, when Congress passed the CAA Amendments of 1990, it shifted the burden of proving a substance's health hazard from those who support regulation to those that oppose regulation. *See* CAA section 112(b)(3). Given the overall emphasis on protecting human health, state the commenters, if faced with two alternatives methods of determining RfD, it is reasonable for the agency to choose the method that is more conservative with respect to human health; thus, the EPA applied an appropriate RfD in its analysis based Faroe Islands study, a decision supported by the findings of the National Academy of Sciences' Study on Hg.[104]

Response to Comment 49: The EPA agrees with the commenters that the MeHg RfD is the appropriate health value for determining elevated risks from MeHg exposure. At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Comment 50: Several commenters (19536, 19537, 19538) state that in the EPA's 2000 determination, some utility groups took issue with the EPA's reliance on a Faroe Islands study to determine a proper RfD. According to the commenters, this industry argument was largely based on the fact that (1) Faroe Islanders were exposed to high levels of polychlorinated biphenyl in addition to Hg and (2) the diet of Faroe Islanders differed from that of Americans. However, state the commenters, this argument fails to acknowledge that the findings of the Faroe Islands study were consistent with a smaller study conducted in New Zealand (0.1 μg/kg-day) for which neither of these issues was present.[105] According to one commenter, further, analyses done since 2000 integrating data from both the Faroe Islands and New Zealand studies with a third study conducted in the Seychelles demonstrate a significant relationship between prenatal MeHg exposure and neurobehavioral deficits.

The commenter states that since the 2000 Finding, additional studies from Poland and the U.S. support the conclusion of the New Zealand, Faroe Islands, and Seychelles studies, and find that there is a negative correlation between maternal Hg levels and neurological development.

Response to Comment 50: The EPA agrees with the commenters. The 2001 RfD was developed from multiple endpoints from the Faroe Islands, Seychelles and New Zealand studies as documented in U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003. At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. However, the EPA noted in the Appropriate and Necessary Finding in the preamble to the proposed rule that "data published since 2001 are generally consistent with those of the earlier studies that were the basis of the RfD, demonstrating persistent effects in the Faroe Islands cohort, and in some cases associations of effects with lower MeHg exposure concentrations than in the Faroe Islands. These new studies provide additional confidence that exposures above the RfD are contributing to risk of adverse effects, and that reductions in exposures above the RfD can lead to

[103] U.S. Environmental Protection Agency – Integrated Risk Information System (U.S. EPA-IRIS). 2001. MeHg (MeHg) (CASRN 22967-92-6). Available at http://www.epa.gov/iris/subst/0073.htm
[104] 76 FR 25000.
[105] 76 FR 25,000.

incremental reductions in risk." However, EPA has not completed a comprehensive review of the new literature, and as such, it would be premature to draw conclusions about the overall implications for the RfD.

b. Confounding with PCBs.

Comment 51: Commenter 17621 states concern regarding the potential for residual confounding due to the presence of neurotoxic PCBs found in high levels in marine species (particularly pilot whale) consumed in the Faroe Islands. According to the commenter, PCBs were measured in the biological fluids obtained from the study cohort (maternal serum and cord blood), and these cord blood PCB levels were highly associated with decreased performance on neurological function tests (including the sensitive Boston Naming Test) in the Faroe Islands cohort at 7 years of age.

Response to Comment 51: The EPA disagrees with the commenter regarding PCBs. The commenter is in error; PCB congeners were measured in cord tissue for the first Faroese cohort recruited in 1986 and 1987 and in maternal serum in the cohort recruited in 1994 – 1995 (Grandjean et al., 2001a,[106] Grandjean et al., 2001b[107]).

Upon advice of an independent peer review panel, the EPA did not base the RfD only on the results of the Boston Naming Test whole cohort (U.S. EPA, 2001[108]). Rather multiple benchmark doses and RfDs were calculated on various endpoints and studies (including New Zealand and integrative assessment of the three large studies), and partial cohorts from Faroe Islands (both excluding PCB-exposed members and statistically accounting for PCB exposure). Documentation of the independence of PCB and MeHg effects in the Faroe Islands population is found in U.S. EPA (2001). For example, note the discussion from pp 4-38 to 4-39:

The Confounders and Variables Panel at the OSTP meeting (NIEHS, 1998)[109] concluded that both PCB and Hg had adverse effects on the CVLT score and on the BNT scores with and without cues. They felt that it was not possible to determine the relative contribution of each. NRC concluded that there was no empirical evidence or theoretical mechanism to support the opinion that *in utero* Faroese exposure to PCBs exacerbated the reported MeHg effect. They note that statistical tests for interaction between PCB and Hg show no interaction. NRC reached a similar conclusion to the Confounders and Variables Panel; a likely explanation is that both PCB and Hg adversely affect some test outcomes, but their relative

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[106] Grandjean P, Bjereve K, Wihe P, and Sterewald u. 2001a. "Birthweight in a fishing community: significance of essential fatty acids and marine food contaminants." *In. J. Epidemiol.* 30:1272-1278.

[107] Grandjean, Philippe, Pal Weihea, c, Virlyn W. Bursed, Larry L. Needhamd, Eva Storr-Hansene, Birger Heinzowf, Frodi Debesc, Katsuyuki Muratag, Henrik Simonsenh, Peter Ellefsenc, Esben Budtz-Jørgenseni, Niels Keidingi, Roberta F. White. 2001b. "Neurobehavioral deficits associated with PCB in 7-year-old children prenatally exposed to seafood neurotoxicants." *Neurotoxicology and Teratology* 23:305– 317.

[108] U.S. Environmental Protection Agency (U.S. EPA). 2001. *Responses to Comments of the Peer Review Panel and Public Comments on MeHg*. Available on the internet at http://www.epa.gov/iris/supdocs/methpr.pdf.

[109] NIEHS (National Institute of Environmental Health Sciences). 1998. *Scientific issues relevant to assessment of health effects from exposure to MeHg.* Workshop organized by Committee on Environmental and Natural Resources (CENR) Office of Science and Technology Policy (OSTP), The White House, November 18-20, 1998, Raleigh, NC.

contributions cannot be determined given their co-occurrence in the Faroe Islands population. NRC stated it is unlikely that a difference in PCB exposure between the two populations explains the lack of developmental neurotoxic effects in the Seychelles (NAS, 2000, pp. 220 and 223).

In a second set of analyses, Budtz-Jørgensen et al. (1999)[110] found that the effect of prenatal PCB exposure was reduced when the data were sorted into tertiles by cord PCB concentrations. Regressions assessing Hg exposure and the five principal test outcomes were then run separately for each of the three groups. The regression coefficients for a Hg effect in the lowest PCB tertile were no weaker than those for the higher two PCB groups. This lends additional credence to a conclusion that the associations between Hg and test outcomes are not attributable to confounding by prenatal PCB exposure. Calculations of benchmark doses and lower limits (BMDLs) were done using the whole cohort, after a PCB correction and for the portion of the cohort with the lowest PCBs (NAS, 2000, Table 7-4). In this table results are reported separately for MeHg measured in hair and cord blood and are calculated using the K-power model described in CAA section 4.3.4.

NRC commented on the results for the low-PCB-exposed subset for the two endpoints that were related to PCB exposure, the BNT and the CVLT. They noted that the BMDs for these outcomes did not differ from the BMDs for the total sample by any more than the BMDs for the two endpoints that were not related to PCB exposure. NRC opined that the variability seen in Table 4-2 is no more than that expected by chance; the BMDs and BMDLs for both the PCB-adjusted and the low-PCB subset analyses are within the intervals defined by the BMDs and corresponding BMDLs derived for the full cohort. The difference between the BMDs based on the full cohort and the low PCB subset is less than one standard error of the low PCB subset (NAS, 2000, p. 288). These analyses support a conclusion that there are measurable effects of MeHg exposure in the Faroese children that are not attributable to PCB toxicity.

Comment 52: Commenter 17702 believes that the EPA should not have relied on Faroe Islands study because the Faroe Islanders receive Hg exposure by atypical consumption of pilot whale meat contaminated by PCBs, which has little relationship to fish consumption in the U.S. These commenters assert that the EPA should have used data from the Seychelles Islands study, because this study is the most relevant to the U.S., where there was no adverse response observed in women or their children despite maternal Hg levels 10 times those found in the U.S.

Commenter 17775 also notes that (1) Seychelles islanders consume far more fish than do Americans; (2) the amount of MeHg in the U.S. population is 10 to 20 times below that of the Seychelles islanders; and (3) all ocean fish throughout the world contain about the same amount of MeHg, so per fish meal there is no difference in MeHg intake when comparing the seafood diet of Americans to Seychelles islanders. Commenter 17751 believes that the Seychelles Islands study is the right study to use as a basis for making a regulatory decisions and assessing the health impacts of Hg

Response to Comment 52: The EPA disagrees with the commenter that the EPA based the MeHg RfD solely on results from the Faroe Islands population. Rather, multiple benchmark doses and RfDs were calculated on various endpoints, studies (including New Zealand and integrative assessment of the three large studies), and partial cohorts from Faroe Islands (both excluding PCB –exposed members and statistically accounting for PCB exposure). The EPA did not choose to base the MeHg RfD solely on results from the Seychelles Islands; both the NAS (2000) and an independent scientific review panel

[110] Budtz-Jørgensen, E., N. Keiding, and P. Grandjean. 1999. *Benchmark modeling of the Faroese MeHg data. Final Report to U.S. EPA.*

convened as part of the IRIS process advised strongly against using results from a study that at the time had not shown an association between MeHg exposure and adverse effects.

Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003). Documentation of the independence of PCB and MeHg effects in the Faroe Islands population is found in U.S. EPA (2001). For example, note the following discussion from pp 4-38 to 4-39:

The Confounders and Variables Panel at the OSTP meeting (NIEHS, 1999) concluded that both PCB and Hg had adverse effects on the California Verbal Learning Test (CVLT) score and on the Boston Naming Test (BNT) scores with and without cues. They felt that it was not possible to determine the relative contribution of each. NRC concluded that there was no empirical evidence or theoretical mechanism to support the opinion that *in utero* Faroese exposure to PCBs exacerbated the reported MeHg effect. They note that statistical tests for interaction between PCB and Hg show no interaction. NRC reached a similar conclusion to the Confounders and Variables Panel; a likely explanation is that both PCB and Hg adversely affect some test outcomes, but their relative contributions cannot be determined given their co-occurrence in the Faroe Islands population. NRC stated it is unlikely that a difference in PCB exposure between the two populations explains the lack of developmental neurotoxic effects in the Seychelles (NAS, 2000, pp. 220 and 223).

In a second set of analyses, Budtz-Jørgensen et al. (1999) found that the effect of prenatal PCB exposure was reduced when the data were sorted into tertiles by cord PCB concentrations. Regressions assessing Hg exposure and the five principal test outcomes were then run separately for each of the three groups. The regression coefficients for a Hg effect in the lowest PCB tertile were no weaker than those for the higher two PCB groups. This lends additional credence to a conclusion that the associations between Hg and test outcomes are not attributable to confounding by prenatal PCB exposure. Calculations of benchmark doses and lower limits (BMDLs) were done using the whole cohort, after a PCB correction and for the portion of the cohort with the lowest PCBs (NAS, 2000, Table 7-4, reproduced here as Table 4-2). In this table results are reported separately for MeHg measured in hair and cord blood and are calculated using the K-power model described in CAA section 4.3.4.

NRC commented on the results for the low-PCB-exposed subset for the two endpoints that were related to PCB exposure, the BNT and the CVLT. They noted that the BMDs for these outcomes did not differ from the BMDs for the total sample by any more than the BMDs for the two endpoints that were not related to PCB exposure. NRC opined that the variability seen in Table 4-2 is no more than that expected by chance; the BMDs and BMDLs for both the PCB-adjusted and the low-PCB subset analyses are within the intervals defined by the BMDs and corresponding BMDLs derived for the full cohort. The difference between the BMDs based on the full cohort and the low PCB subset is less than one standard error of the low PCB subset (NAS, 2000, p. 288). These analyses support a conclusion that there are measurable effects of MeHg exposure in the Faroese children that are not attributable to PCB toxicity.

Commenter 1775 is in error regarding its points (2) and (3) above. Regarding (2) above, exposure to MeHg in the U.S. has been reported at the same levels as those published in the Seychelles. McKelvey et al. (2007) conducted a study of Hg exposure in the New York City. They report that NYC residents have mean blood Hg levels of 2.7 µg/L, and women of childbearing age had a mean of 2.64 µg/L– nearly at the 90th percentile in NHANES; ethnic Asians had even higher blood Hg levels. Mahaffey et al. (2009) note that in the NHANES data (1999-2004), the highest five per cent of women's blood Hg exceeded 8.2 µg/L in the Northeast U.S. and 7.2 µg/L in coastal areas. Higher levels have been reported

among subjects known to consume fish. For example, Hightower and Moore (2003) reported mean blood Hg for women in their study to be 15 µg/L; range for men and women was 2 to 89.5 µg/L.

Regarding (3) above, marine fish in commerce differ widely in Hg concentration by species (see for example, results of testing by the U.S. FDA.[111] As implied by the ranges published in FDA's table and as noted in other publications, fish within the same species but caught at different locations have variable amounts of Hg in their tissues (see for example, Hisamichi et al., 2010[112]; Sunderland, 2007[113]).

Comment 53: Commenter 17775 states that the EPA's RfD is derived solely from the results of a study of young children in the Faroe Islands and the EPA ignored an equally detailed study of young children performed in the Seychelles Islands.[114] According to the commenter, the Faroe Islands study is suspect because 1) the raw data from the Faroe Islands work have never been made available for independent analysis and scrutiny and 2) the confounding effect of PCBs, which was found in cord tissue. According to the commenter, the EPA's reliance on the statistical analysis performed by the Faroe Islands researchers at the request of the NRC failed to address the question of why study failed to observe any significant effects from PCBs when PCB exposures were at levels twice as high as the lowest observed effect level (LOAEL) for those compounds.

Response to Comment 53: The EPA disagrees with the commenter's claims because there are many inaccurate statements in the comment. The EPA's RfD for MeHg is based on multiple endpoints from the three extant large studies of childhood effects of in *utero* exposure: Faroe Islands, New Zealand, and an integrative measure including data from Seychelles. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Numerous analyses have shown neurobehavioral effects of PCBs; however, the effects of MeHg and PCB in the Faroe Islands study are separable. NAS (2000) summarizes some of these analyses. There is no lowest observed adverse effect level (LOAEL) in any of the three large studies of effects of *in utero* exposure. All three studies are continuous in both dose and effect; thus, EPA applied benchmark dose modeling to calculate the points of departure for the RfD derivation.

Comment 54: Several commenters (14115, 18034, 18033) state that the EPA relied on the flawed Faroe Islands' children study and ignores the Seychelles Islands Children Development Study (SCDS). According to the commenters, the SCDS study did not confirm any harmful effect on children due to MeHg exposure from eating a variety of ocean-caught fish at levels that are more representative for American public health. In contrast, state the commenters, the Faroe Islands study population is well-known to be exposed to not only MeHg but also other contaminants like PCBs and lead. More importantly, state the commenters, the Faroe Islands population got its MeHg dosage through

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[111] Available at http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FoodbornePathogensContaminants/MeHg/ucm115644.htm.

[112] Hisamichi Y, Haraguchi K, Endo T. 2010. "Levels of Hg and organochlorine compounds and stable isotope ratios in three tuna species taken from different regions of Japan." *Environ Sci Technol*.;44(15):5971-8.

[113] Sunderland EM. 2007. "Mercury exposure from domestic and imported estuarine and marine fish in the U.S. seafood market." *Environ Health Perspect*. 115(2):235-42. Epub 2006 Nov 20.

[114] Budtz-Jorgensen E, Debes F, Weihe P, Grandjean P. 2005. *Adverse Hg Effects in 7-Year-Old Children Expressed as Loss in "IQ". The EPA*-HQ-OAR-2002-0056-6046.

consumption of highly contaminated pilot whale meats and blubbers, as admitted by Dr. Pal Weihe, the Chief Physician of the Department of Occupational and Public Health of the Faroese Hospital System.

Response to Comment 54: The EPA disagrees with the commenters' claims because the comment has several inaccurate statements. As published in Weihe et al. (1996)[115], exposure to MeHg in the Faroe Islands was largely from consumption of pilot whale meat; exposure to PCBs was found in the portion of the population who also consume whale blubber. The lipophilic PCBs are found in the fat compartment of the pilot whales; MeHg, by contrast is bound covalently to protein in the whale meat. Contemporary publications on data and analyses from the SCDS have reported MeHg-related effects from testing of older children in their study cohort (e.g., van Wijngaarden et al., 2006[116]; Strain et al., 2008). We also note that there was no report of lead exposure in the Faroe Islands population.

The EPA's RfD for MeHg is based on multiple endpoints from the three extant large studies of childhood effects of *in utero* exposure: Faroe Islands, New Zealand, and an integrative measure including data from Seychelles. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Comment 55: Commenter 18034 states that a Texas-specific study conducted in 2004 by Texas Department of State Health Services (DSHS) determined that even when subsistence fishers are eating fish from Caddo Lake with elevated MeHg, women of child-bearing years did not have blood Hg levels greater than the RfD (DSHS, 2005).[117] Thus, states the commenter, the connection between MeHg in fish and adverse health effects in the U.S. is not fully understood and could involve other factors, including the protective effects of fatty acids and Se in fish, in populations that eat large amounts of fish which were not taken into account in the EPA's assessment. According to the commenter, because of the uncertainties involved in using the RfD and the lack of evidence that reductions in Hg emissions would provide any widespread reduction in concentrations of MeHg in fish, the EPA should focus efforts on those regulations that would have a measurable and real public health benefit to the U.S. population.

Response to Comment 55: First, the EPA disagrees with the commenter's implication that the MATS rule would not have public health benefits. As shown in the RIA accompanying the rule, the public health benefits are substantial, and the monetized benefits exceed the costs by a substantial margin. Second, the EPA disagrees with the commenter's assertion that the connection between MeHg in fish and observed health effects is not understood due to evidence from the cited Texas study. The Texas Commission on Environmental Quality (TCEQ) provided the U.S. EPA with a report published by DSHS and ATSDR on an investigation of consumption of fish with elevated Hg levels from Caddo Lake TX (DSHS, 2005). This is an exposure study rather than a study on measures of neurobehavioral or any other health endpoint. TCEQ noted that none of the Caddo Lake study participants had blood Hg levels above the BMDL of 5.8 µg/L (one of the several in the calculation of the MeHg RfD). The BMDL is not

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[115] Weihe P, Grandjean P, Debes F, White R. 1996. "Health implications for Faroe Islanders of heavy metals and PCBs from pilot whales." *Sci Total Environ.*;186:141-148.

[116] van Wijngaarden, Edwin, Christopher Beck, Conrad F. Shamlaye, Elsa Cernichiari, Philip W. Davidson, Gary J. Myers, Thomas W. Clarkson. 2006. "Benchmark concentrations for methyl Hg obtained from the 9-year follow-up of the Seychelles Child Development Study." *NeuroToxicology* 27 :702–709.

[117] DSHS. 2005. *Health Consultation: Hg Exposure Investigation Caddo Lake Area-Harrison County Texas*. Agency for Toxic Substances and Disease Registry. http://www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/085.pdf

a "no effect" level. Rather it is an effect level for a percentage of the population. The EPA noted in correspondence with TCEQ that, as an exposure study, the Caddo Lake study may be representative of the surrounding population; however, the sample size is very small. It is not appropriate to extrapolate from Caddo Lake to larger regional or national populations.

c. Use of RfD in Hg Risk TSD.

Comment 56: Commenters 17775 and 18033 state that the EPA uses the RfD as if it were an absolute threshold for health risk. According to the commenters, the RfC/RfD methodology was developed as a screening tool for deciding when risks clearly do not exist; the methodology was never designed to identify the existence of actual health risks or to quantify their magnitude. The commenters note that the EPA recognized that "[e]xceeding the RfC does not necessarily indicate that a public health risk will occur."[118] The commenters state that in the EPA's 1991 early reduction rulemaking under section 112(i)(5), the EPA stated that "to estimate a level [of exposure] at which public health risks could be potentially significant...it [is] appropriate to consider exposure levels *one order of magnitude higher than the reference concentration or dose.*"[119]

Response to Comment 56: The EPA disagrees that it is using the MeHg RfD as an absolute bright line for health effects in the Hg Risk TSD. As stated in the preamble to this proposed rule, the RfD is an estimate of a daily exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime. The EPA also stated that no RfD defines an exposure level corresponding to zero risk. Because mercury is a cumulative neurotoxin, it is important to distinguish health effects from public health hazard. Within the context of the appropriate and necessary finding, we interpret a public health hazard as risk, rather than certain occurrence of health effects. We use the Rfd as an indication of non-negligible increased risk of neurological effects in children, because it is based on a benchmark dose that reflects health effects occurring in a fraction of children.

The RfD for MeHg is based on multiple studies of effects related to the ability of a child to learn and process information. These studies were conducted in a sensitive subpopulation; namely, children who were exposed *in utero*. The uncertainty factor used in calculation of the RfD is small (10 fold); half of this factor is to account for measured variability in human pharmacokinetics. The uncertainty factor was applied to multiple calculated effect levels; that is, statistical lower limits on benchmark doses for a 5% response level. Note that some publications have reported Hg effects in U.S. populations near the current U.S. RfD (Oken et al., 2008; Lederman et al., 2008[120]). Note that references to FR notices cited by the commenter were published long before the use of methodologies applied in the MeHg RfD became the standard of practice. These methods, including use of benchmark dose and data-derived uncertainty factors, result in more precise and accurate estimates with decreased uncertainty. In addition, the SAB Hg Panel specifically "agrees that EPA's calculation of a hazard quotient for each watershed is appropriate as the primary means of expressing risk because it is based on an established RfD for MeHg that reflects a range of potential neurobehavioral effects" (U.S. EPA-SAB, 2011).

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[118] 59 FR 42250 (Aug. 17, 1994)

[119] 56 FR 27363 (June 13, 1991)

[120] Lederman, Sally Ann Robert L. Jones, Kathleen L. Caldwell, Virginia Rauh, Stephen E. Sheets, Deliang Tang, Sheila Viswanathan, Mark Becker, Janet L. Stein, Richard Y. Wang, and Frederica P. Perera. 2008. Relation between Cord Blood Hg Levels and Early Child Development in a World Trade Center Cohort. *Environmental Health Perspectives* 118(8) 1085 -1091.

Comment 57: Commenter 17621 states that in the Hg Risk TSD, the EPA makes general statements that the actual MeHg RfD is lower than the current EPA IRIS value. However, the EPA claims that no threshold was observed in the Faroe Islands data, which were the primary driver for the RfD value with the Seychelles and New Zealand data sets providing support for uncertainty factors. Thus, the EPA states that the Hg Risk TSD actually represents an underestimate of the number of modeled watersheds with populations potentially at-risk. However, this appears to contradict the actual derivation and basis of EPA IRIS RfD. Given this perspective, the Hg Risk TSD states that substantial populations remain at-risk for neurobehavioral losses at exposure levels "well below the RfD." Unfortunately, the agency offers no citations or narratives discussing the scientific evidence to support these statements—beyond referring to EPA documentation on IRIS.

Response to Comment 57: The EPA disagrees with several assertions made by the commenter; specifically EPA does not make the statements that the commenter claimed that EPA makes. IRIS makes this statement regarding a threshold for MeHg: "It is also important to note that no evidence of a threshold arose for MeHg-related neurotoxicity within the range of exposures in the Faroe Islands study. This lack [of a threshold] is indicated by the fact that, of the K power models, K = 1 provided a better fit for the endpoint models than did higher values of K" (U.S. EPA-IRIS, 2001). This remains a factual statement.

Comment 58: Commenter 17621 states that the assumptions the EPA made in deriving the MeHg RfD and in extrapolating a dose-response relationship between MeHg exposure and change in IQ influence the degree of uncertainty and variability in the Hg Risk TSD risk analyses. These assumptions are then applied and influence the number of watersheds (and individuals) at-risk, as well as the magnitude of the risk. According to the commenter, additional qualitative discussion about the uncertainty, beyond that offered in TSD Appendix F, would improve "clear thinking" about this important topic.

Response to Comment 58: The SAB also recommended that EPA revise the Hg Risk TSD to include additional qualitative discussion about uncertainty in the Revised Hg Risk TSD. Specifically, the SAB recommended that the EPA revise the Hg Risk TSD "to better explain the methods and choices made in the analysis, and analytical results, and where the uncertainties lie" (U.S. EPA-SAB, 2011). The SAB noted several uncertainties related to the RfD. EPA agrees with this recommendation and included a more completed discussion of these uncertainties in the revised Hg Risk TSD.

The SAB also recommended that the IQ analyses be retained but de-emphasized in the documentation underlying the final regulation, stating, "The Panel does not consider it appropriate to use IQ loss in the Hg Risk TSD and recommended that this aspect of the analysis be de-emphasized, moving it to an appendix where IQ loss is discussed along with other possible endpoints not included in the primary assessment. While the Panel agreed that the concentration-response function for IQ loss used in the Hg Risk TSD is appropriate, and no better alternatives are available, IQ loss is not a sensitive response to MeHg and its use likely underestimates the impact of reducing MeHg in water bodies" (U.S. EPA-SAB, 2011). The EPA is following up on the SAB recommendation by deemphasizing the IQ analysis and placing that analysis in an appendix to the revised TSD.

Comment 59: Commenter 17621 states that in its watershed-level risk estimates using the RfD-based HQ metric and the IQ metric, the EPA relies substantially on minimal citation from a limited selection of previously published reviews to support its outcome and risk modeling assumptions. According to the commenter, the EPA should integrate more recent and primary studies to support the selection criteria.

Response to Comment 59: The EPA commissioned a formal peer review of the Hg Risk TSD through the SAB. The overall finding of the SAB is that "The SAB finds that the design of and approach to the risk assessment are able to provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs. The SAB supports the overall design and general approach and considered the spatial resolution of the modeling of Hg deposition to watersheds to be appropriate for the analysis." (U.S. EPA-SAB, 2011). In addition, the SAB "agreed that the EPA's calculation of a hazard quotient for each watershed included in the assessment is appropriate as the primary means of expressing risk," and that "because the RfD from which the HQ is calculated is an integrative metric of neurodevelopmental effects of MeHg, it constitutes a reasonable basis for assessing risk." The panel did not express significant concerns that would corroborate the views of the commenter.

At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

The EPA notes in the Appropriate and Necessary Finding in the preamble to the proposed rule that "data published since 2001 are generally consistent with those of the earlier studies that were the basis of the RfD, demonstrating persistent effects in the Faroe Islands cohort, and in some cases associations of effects with lower MeHg exposure concentrations than in the Faroe Islands. These new studies provide additional confidence that exposures above the RfD are contributing to risk of adverse effects, and that reductions in exposures above the RfD can lead to incremental reductions in risk." However, the EPA has not completed a comprehensive review of the new literature, and as such, it would be premature to draw conclusions about the overall implications for the RfD.

Comment 60: Commenter 17621 states that the uncertainty introduced by using data from marine versus freshwater sources to establish the dose-response relationship is unknown, but should be qualitatively described in the Hg Risk TSD.

Response to Comment 60: The SAB also recommended that EPA revise the Hg Risk TSD to include additional qualitative discussion about uncertainty in the Revised Hg Risk TSD. Specifically, the SAB recommended that the EPA revise the Hg Risk TSD "to better explain the methods and choices made in the analysis, and analytical results, and where the uncertainties lie." The SAB noted several uncertainties related to the RfD. The EPA agrees with this recommendation and included a more completed discussion of these uncertainties in the revised Hg Risk TSD.

d. IQ effects.

Comment 61: Commenter 18018 believes this rulemaking will have little impact on IQ, arguing that the EPA RIA shows only a fraction of an IQ point gain for the most exposed individuals, with the average effected individuals as prenatal children, 244,000 annually, experiencing only a 2/1000 IQ point gain. Commenters 18018 and 18498 question whether the EPA's IQ impacts are real. Commenter 18018 notes that in nations such as Japan and Korea, where the maternal blood Hg levels are higher than in the U.S., there is no evidence of harm to child development or IQs. To support their statement, this commenter provided data from the UN Food and Agriculture Organization (showing that Japan and South Korea consume 152.1 and 112.9 pounds of fish annually compared to U.S. consumption of 46.1 pound) and average IQ data from a 113 country IQ study by Richard Lynn and Jelte Wicherts (showing Japan and Korea are 105 and 106, respectively while the U.S. is 98). Commenter 18018 quotes a study by Hibbeln

that found verbal IQ scores for children from mothers with no seafood intake were 50% more likely to be in the lowest quartile.

Response to Comment 61: The EPA disagrees that estimated IQ impacts for the regulation are questionable. Adverse effects of *in utero* Hg exposure have been reported in populations in the U.S. (for example Oken et al.2008; Lederman et al., 2008). Suzuki et al. (2010) published on neurobehavioral effects of prenatal exposure to MeHg through maternal consumption of seafood. In that study, adverse effects are observed for MeHg even without controlling for fish consumption. That study suggests that at normal Japanese dietary intake of MeHg and fish nutrients, the overall effect is adverse. While Japanese fish consumption and Hg exposure are both somewhat higher than the mean U.S. exposure, these levels are still within the distribution of U.S. consumers.

Note that in the Hibbeln et al. (2007) study cited above, there were self-reported levels of fish consumption, but were no measures of Hg exposure; no biomarker data such as blood, hair or urine Hg were reported. Daniels et al. (2004) reporting on the same population note that no significant increase was seen in umbilical cord Hg (the biomarker used) as seafood consumption increased from one meal per 2 weeks to four or more per week. Consequently, no MeHg-associated suboptimum performance outcomes would be expected in the ALSPAC population.

Comment 62: Commenters 1775 and 17621 state that the Hg TSD involves the IQ point loss predicted from maternal MeHg exposure. According to the commenters, changes in IQ are not a well-defined health consequence of MeHg exposure. The EPA relies on its MeHg RfD value to estimate risks associated with MeHg exposures and draw conclusions about IQ-based risks. However, performance on neurobehavioral tests, and not IQ tests, was the primary health endpoint in the Faroe Islands study used by the EPA to derive its MeHg RfD. Moreover, according to the commenters, the researchers who derived the relationship between IQ loss and MeHg exposure used by the EPA in the Hg TSD were unable to directly access the actual Faroe Islands data and had to rely on non-peer reviewed analyses provided by the Faroe study investigators (Budtz-Jorgensen, 2005)[121].

Response to Comment 62: The EPA agrees that IQ is not the most sensitive neurodevelopmental endpoint affected by MeHg exposure. The revised Hg Risk TSD was peer reviewed by the EPA's independent SAB. The SAB noted that IQ loss is not the most sensitive indicator of MeHg effect. They recommended that "the appropriate approach would be to mention the IQ analysis in the body of the TSD and to discuss the uncertainties involved with the use of the analysis, offering the conclusion that it would be a less sensitive endpoint than the Hazard Quotient (HQ), which is based on the current RfD for MeHg" (U.S. EPA-SAB, 2011). The EPA is following the SAB recommendation by deemphasizing the IQ analysis and placing that analysis in an appendix to the revised TSD. The data underlying the Faroe Islands study have been previously published in the peer reviewed literature.

Comment 63: Commenter 17621 states that appropriateness of using an IQ risk metric threshold of > 1 or > 2 points lost is questionable, in part, because of variation in IQ measures and the intra-individual variation in IQ is higher than the threshold. For example, a series of studies on personal variability in intelligence tests (Wechsler Adult Intelligence Scale) found statistically significant differences between the lowest and highest scores of 5 or more scaled IQ points (20% ≥ 9 points, or 3 standard deviations)

[121] The report referred to in the comment is Budtz-Jorgensen E, Debes F, Weihe P, Grandjean P. 2005. *Adverse Hg Effects in 7-Year-Old Children Expressed as Loss in "IQ"*. The EPA-HQ-OAR-2002-0056-6046.

(Matarazzo et al., 1988[122]; Matarazzo and Prifitera, 1989[123]). Similar, large intra-individual variations (≥ 3 standard deviations) in test scores were observed in a more comprehensive battery of 15 neuropsychological tests that yielded 32 scores (Schretlen et al., 2003). Changes in individual IQ scores over time (generally declining) have been demonstrated in children (Moffit et al., 1992[124]), with some evidence that socioeconomic, home environment, urban/suburban, or other factors may influence decline to a significant extent (Breslau et al., 2001[125]). According to the commenter, the reasoning behind EPA's choice to use this threshold, and its relative applicability to health effects of MeHg exposure, are not described in the Hg Risk TSD.

Response to Comment 63: The EPA disagrees that the IQ metric threshold is "questionable." The SAB recommended that the IQ analyses be retained but de-emphasized in the documentation underlying the final regulation. In their report they stated the following: "The Panel does not consider it appropriate for EPA to use IQ loss in the Hg Risk TSD and recommended that this aspect of the analysis be de-emphasized, moving it to an appendix where IQ loss is discussed along with other possible endpoints not included in the primary assessment. While the Panel agreed that the concentration-response function for IQ loss used in the Hg Risk TSD is appropriate, and no better alternatives are available, IQ loss is not a sensitive response to MeHg and its use likely underestimates the impact of reducing MeHg in water bodies" (U.S. EPA-SAB, 2011). The EPA is following the SAB recommendation by deemphasizing the IQ analysis and placing that analysis in an appendix to the revised Hg Risk TSD.

The SAB, however, also felt that it was reasonable to consider a loss of > 1 or > 2 IQ points a public health concern. The SAB stated, "The Panel agreed that if IQ loss is retained in the risk assessment despite these reservations, a loss of 1 or 2 points would be an appropriate benchmark" (U.S. EPA-SAB, 2011). The SAB further comments in their report: "The consensus is that if IQ were to be used, then a loss of 1 or 2 points as a population average is a credible decrement to use for this risk assessment. This metric seems to be derived from the lead literature and was peer reviewed by the Clean Air Scientific Advisory Committee (U.S. EPA-CASAC, 2007) [[126]]. While its applicability to MeHg is questionable, the size of the decrement is justified based on the extensive analyses available from the literature reviewed by CASAC" (U.S. EPA-SAB, 2011)" (U.S. EPA-SAB, 2011).

Comment 64: Commenter 17621 states that none of the studies, like the Faroe Islands cohort that the EPA relied upon to develop the "hypothetical full scale IQ" measure (– 0.18 IQ points per ppm hair Hg;

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[122] Matarazzo J.D., Prifitera A., 1989. "Subtest Scatter and Premorbid Intelligence: Lessons from the WAIS-R Standardization Sample," *Psychological Assessment*, 1, 816–191.

[123] Matarazzo, J.D., Daniel M.H., Prifitera A., Herman D.O., 1988. "Inter-subset Scatter in the WAIS-R Standardization Sample," *Journal of Clinical Psychology,* 44, 940–950.

[124] Moffitt T.E., Caspi A., Harkness A.R., et al., 1992. "The Natural History of Change in Intellectual Performance: Who Changes? How Much? Is it Meaningful?" *The Journal of Child Psychology and Psychiatry,* 34, 455–456.

[125] Breslau N., Chilcoat H.D., Susser E.S., Matte T., Liang K.Y., Peterson E.L., 2001. "Stability and Change in Children's Intelligence Quotient Scores: A Comparison of Two Socioeconomically Disparate Communities," *American Journal of Epidemiology*, 154 (8), 711–717.

[126] U.S. Environmental Protection Agency – Science Advisory Board (U.S. EPA-SAB). 2007. *Clean Air Scientific Advisory Committee's (CASAC) Review of the 1st Draft Lead Staff Paper and Draft Lead Exposure and Risk Assessments. The EPA*-CASAC-07-003. March. Available on the internet at http://yosemite.epa.gov/sab/sabproduct.nsf/989B57DCD436111B852572AC0079DA8A/$File/casac-07-003.pdf

95% confidence limits - 0.378 to - 0.009) measured full IQ. Although the integrated "hypothetical full scale IQ" measure is made more robust by using data from three studies (positive and negative), the EPA still relied on summary data results that include some uncertainty in the demonstration of a low-dose linear response.

Response to Comment 64: Although the EPA disagrees that the IQ results are too uncertain to rely upon, the EPA acknowledges that IQ is not the most sensitive neurodevelopmental endpoint affected by MeHg exposure. The EPA used a published methodology (Axelrad and Bellinger, 2007); this publication also presents rationale for choice of the endpoints used. The SAB did not consider it appropriate to use IQ loss in the risk assessment and recommended that this aspect of the analysis be de-emphasized, moving it to an appendix where IQ loss is discussed along with other possible endpoints not included in the primary assessment. While the Panel agreed that the concentration-response function for IQ loss used in the risk assessment is appropriate, and no better alternatives are available, IQ loss is not a sensitive response to MeHg and its use likely underestimates the impact of reducing MeHg in water bodies" " (U.S. EPA-SAB, 2011). The EPA is following the SAB's recommendation by deemphasizing the IQ analysis and placing that analysis in an appendix to the revised TSD. The SAB, however, supported the use of the IQ dose-response function calculated by the EPA in the Hg Risk TSD. The SAB noted, "The function used came from a paper by Axelrad and Bellinger (2007)[127] that seeks to define a relationship between MeHg exposure and IQ. A whitepaper by Bellinger (Bellinger, 2005)[128] describes the sequence of steps in relating MeHg exposure to maternal hair Hg and then that to IQ. The Hg Risk TSD furthers notes that IQ has demonstrated describing the health effects of other neurotoxicants. These are appropriate bases for examining a potential impact of reducing MeHg on IQ, but the Panel believes that these are not compelling reasons for using IQ as a primary driver of the risk assessment."

Comment 65: Commenters 17775 and 17621 state that the dose-response relationship between MeHg exposure and IQ change was developed for marine fish and mammalian species, not freshwater fish. MeHg studies in the Seychelles Islands and New Zealand involved populations that consumed marine fish, while the MeHg study in the Faroe Islands involved a population that consumed pilot whale. Thus, the studies used to derive the MeHg RfD and IQ dose-response did not involve the consumption of freshwater fish, which is the basis for the EPA's Hg TSD risk estimates. According to the commenters, the EPA does not discuss the potential uncertainty created by this reliance in the Hg Risk TSD.

Response to Comment 65: The EPA disagrees that the dose-response relationship between Hg and IQ was developed for consumption of marine fish because the dose-response function was not calculated for fish consumption at all. The dose-response function was calculated for exposure to MeHg, which can occur through consumption of either freshwater or marine species. Recent studies (e.g., Oken et al., 2008; Choi et al., 2008a[129],Choi et al., 2008b[130]) and analyses point to the potential for nutrients in fish

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[127] Axelrad, D. A.; Bellinger, D. C.; Ryan, L. M.; Woodruff, T. J. (2007). Dose-response relationship of prenatal mercury exposure and IQ: an integrative analysis of epidemiologic data. *Environmental Health Perspectives*. 2007, 115, 609–615.

[128] Bellinger, DC 2005. *Neurobehavioral Assessments Conducted in the New Zealand, Faroe Islands, and Seychelles Islands Studies of MeHg Neurotoxicity in Children.* Report to the U.S. Environmental Protection Agency. The EPA-HQ-OAR-2002-0056-6045.

[129] Choi AL, Cordier S, Weihe P, Grandjean P. 2008a. "Negative confounding in the evaluation of toxicity: the case of MeHg in fish and seafood." *Crit Rev Toxicol*. 2008;38(10):877-93.

[130] Choi AL, Budtz-Jørgensen E, Jørgensen PJ, Steuerwald U, Debes F, Weihe P, Grandjean P. 2008b.

(particularly marine fish) to ameliorate some of the observed adverse effects of MeHg when co-exposure occurs. There was no correction for potential confounding by nutrients in marine fish and mammals in calculation of the benchmark doses used in the RfD derivation; these benchmark doses may, thus, be underestimates. The calculation of the dose response function for IQ loss did not treat amelioration of MeHg effects by fish nutrients as a covariate or confounder. It may also be an underestimate of Hg-related risks.

Comment 66: Commenter 17775 states that the SAB review panel had reservations about the EPA's use of IQ loss as a second risk measure, stating in its draft report that "[t]he Panel had little enthusiasm for the use of IQ loss in the risk assessment and recommended that this aspect of the analysis be deemphasized." (Draft SAB Peer Review of EPA's Draft revised Hg Risk TSD at 2). The panel expressed concern about the sensitivity of IQ loss and suggested the discussion of IQ be moved to an appendix along with a discussion of other potential endpoints for neurodevelopmental effects. According to the commenter, the IQ analysis in the Hg Risk TSD does not justify a finding that is "appropriate and necessary" to regulate Hg emissions from U.S. EGUs.

Response to Comment 66: The EPA agrees that the EPA independent SAB recommended that the IQ analyses be retained but de-emphasized in the documentation underlying the final regulation. In their report they stated the following: "The Panel does not consider it appropriate for EPA to use IQ loss in the risk assessment and recommended that this aspect of the analysis be de-emphasized, moving it to an appendix where IQ loss is discussed along with other possible endpoints not included in the primary assessment. While the Panel agreed that the concentration-response function for IQ loss used in the risk assessment is appropriate, and no better alternatives are available, IQ loss is not a sensitive response to MeHg and its use likely underestimates the impact of reducing MeHg in water bodies." (U.S. EPA-SAB, 2011) The SAB, however, also felt that it was reasonable to consider a loss of > 1 or > 2 IQ points a public health concern. The EPA is following the SAB's recommendation by deemphasizing the IQ analysis and placing that analysis in an appendix to the revised TSD.

The EPA disagrees that the "Appropriate and Necessary Finding" was based on the IQ analysis in the Hg Risk TSD. As fully described in the preamble, the EPA made its finding in part on the hazard quotient (HQ) based risk metrics derived from comparisons of MeHg exposure to the RfD. The SAB "agreed that EPA's calculation of a hazard quotient for each watershed included in the assessment is appropriate as the primary means of expressing risk," and the SAB "regards the design of the risk assessment as suitable for its intended purpose, to inform decision-making regarding an 'appropriate and necessary finding' for regulation of hazardous air pollutions from coal and oil-fired EGUs" (U.S. EPA-SAB, 2011).

e. Other health effects.

Comment 67: Several commenters (19536, 19537, 19538) state that more recent studies find clear associations between maternal blood Hg levels and delayed child development using new cohorts based on urban populations. The commenters note that in addition to the neurobehavioral results, other potential health impacts of prenatal Hg exposure have been identified. For example, an association between cardiovascular effects and MeHg exposure has been reported. A recent study finds significant associations between Hg exposure and indicators of cardiovascular disease. Additionally, the potential

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"Selenium as a potential protective factor against Hg developmental neurotoxicity." *Environ Res*. May;107(1):45-52. Epub 2007 Sep 12.

effects of co-pollutants, those derived from exposures to pollutant mixtures, related to MeHg are ignored in the agency's assessment. One recent study finds that such an omission may lead to additional health effect associated with MeHg exposure being overlooked. This study identifies health effects associated with prenatal lead exposure when simultaneously exposed to MeHg.

Response to Comment 67: The EPA is aware of the possibility of both interactions among environmental contaminants and cumulative effects of pollutants that produce the same adverse endpoint. Agency guidance exists for dealing with such scenarios including U.S. EPA (1986)[131], U.S. EPA (1999)[132], U.S. EPA (2000)[133], U.S. EPA (2003).[134]

The agency's concern with the likelihood of human exposure to multiple contaminants is reflected in the multi-chemical scope of the proposed EGU regulation. However, due to time limitations, the EPA focused the technical analyses supporting the proposed regulation on effects of individual pollutants rather than cumulative effects. The EPA had previously identified emerging data on cardiovascular effects associated with Hg exposures. The data was significantly weaker than the data supporting neurodevelopmental effects of Hg exposure as noted in IRIS file and by NRC (2001). At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg. The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

Comment 68: Several commenters (17621, 18500, 17702) state potential cardiovascular effects due to MeHg exposure appear overstated given equivocal nature of studies. In the Hg Risk TSD and the proposed rule, the EPA relies on a workshop report as support for a causal relationship between MeHg exposure and cardiovascular disease (CVD). According to the commenters, the EPA's conclusion appears to be an overstatement, considering results from large, well-conducted, environmentally relevant U.S. prospective cohort studies reporting no increased risk for cardiovascular events associated with biological markers of MeHg exposure (Yoshizawa et al., 2002; Mozaffarian et al., 2011).

Response to Comment 68: The EPA disagrees that the EPA overstated the scientific literature on cardiovascular effects from MeHg exposure. As summarized in the preamble to the proposed rule, the EPA stated that the NAS study concluded that "Although the data base is not as extensive for cardiovascular effects as it is for other end points (i.e., neurologic effects) the cardiovascular system appears to be a target for MeHg toxicity in humans and animals." The EPA also stated that additional cardiovascular studies have been published since 2000. The EPA did not to develop a quantitative dose

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[131] U.S. EPA. 1986. *Guidelines for the Health Risk Assessment of Chemical Mixtures*. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. September. The EPA/630/R-98/002. Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=2256

[132] U.S. EPA. 1999. *Guidance for Performing Aggregate Exposure and Risk Assessments.* U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington, DC. October. Available at http://www.pestlaw.com/x/guide/1999/EPA-19991029A.html

[133] U.S. EPA. 2000a. *Supplementary Guidance for Conducting Health Risk Assessment of Chemical Mixtures.* U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, DC. The EPA/630/R-00/002. Available at http://www.epa.gov/ncea/raf/pdfs/chem_mix/chem_mix_08_2001.pdf

[134] U.S. EPA. 2003a. *Framework for Cumulative Risk Assessment.* Risk Assessment Forum, United States Environmental Protection Agency. Washington, DC. The EPA/630/P-02/001F. The EPA/600/P-02/001F. Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=54944

response assessment for cardiovascular effects associated with MeHg exposures, as there is no consensus among scientists on the dose-response functions for these effects, and there is inconsistency among available studies as to the association between MeHg exposure and various cardiovascular system effects. The EPA is not reviewing or revising its RfD for MeHg at this time. In the future, the EPA may update the MeHg RfD and will review all of the relevant scientific literature available at that time, including data on all relevant endpoints, and weight of evidence for likelihood that MeHg produces specific effects in humans.

Comment 69: Commenter 14115 states that the EPA proposal failed in reviewing scientific literature, and understanding how to link MeHg exposure to cardiovascular health for adults. The commenter states that the two major studies used by the EPA (to imply causal link from MeHg to negative cardiovascular health) are flawed in design and the results are simply not applicable to fish-eating adults in America, or to U.S. public health in general.

Response to Comment 69: The EPA disagrees that it failed to review the scientific literature on cardiovascular effects from MeHg exposure. As summarized in the preamble to the proposed rule, the EPA stated that the NAS study concluded that "Although the data base is not as extensive for cardiovascular effects as it is for other end points (i.e., neurologic effects) the cardiovascular system appears to be a target for MeHg toxicity in humans and animals." The EPA also stated that additional cardiovascular studies have been published since 2000. The EPA did not develop a quantitative dose response assessment for cardiovascular effects associated with MeHg exposures, as there is no consensus among scientists on the dose-response functions for these effects and there is inconsistency among available studies as to the association between MeHg exposure and various cardiovascular system effects. The EPA is not reviewing or revising its RfD for MeHg at this time. In the future, the EPA may update the MeHg RfD and will review all of the relevant scientific literature available at that time, including data on all relevant endpoints, and weight of evidence for likelihood that MeHg produces specific effects in humans.

Comment 70: Commenter 17621 states that Roman, et al. (2011) concluded that sufficient data exist to develop a dose-response value to quantify the relationship between MeHg exposure and at least one CVD outcome—myocardial infarction (MI). They based their conclusion on results of four epidemiologic studies: two European studies reporting a positive, statistically significant association Guallar et al., 2002; Virtanen et al., 2005); one null U.S. study (Yoshizawa et al., 2002); and one Swedish study finding an inverse relationship (MeHg exposure associated with decreased MI risk) (Hallgren et al., 2001). Roman, et al. did not evaluate the most recent U.S. report by Mozaffarian, et al. (2011) that found no relationship between MeHg biomarkers and CVD risk. They reported "Moderate" epidemiological strength of evidence for the biological plausibility of MeHg-related MI, increasing the classification to "Moderate to Strong" if intermediary effects—such as oxidation ("Moderate to Strong"), atherosclerosis ("Moderate"), heart rate variability ("Strong"), and hypertension ("Weak")—are taken into account. Roman, et al., recommended the two positive European studies (Guallar et al., 2002; Virtanen et al., 2005) for use in establishing a dose-response value. However, this seems premature.

Cardiovascular disease, including MI, remains a complex, multi-etiological disease process with a large number of known and unknown risk factors. To assess the relative contribution of any single environmental causal agent requires a systematic review using a standardized set of causal or weight-of-evidence criteria for supporting study inclusions, exclusions, or other decision making in quantitative or qualitative analyses. Unfortunately, the report by Roman, et al. (2011) does not present evidence of such

a formalized analysis. This makes it difficult to assess the scope of scientific support for the workshop's final recommendations. The small number of available studies precludes any conclusive decision, especially a robust quantitative result. The large U.S.-based cohort studies, particularly the most recent by Mozaffarian, et al. (2011), have several strengths, including evaluation of fatal and nonfatal MI risk, inclusion of women and men, and substantial evaluation of a range of potential risk or confounding factors (e.g., demographics, fish consumption, clinical and familial CVD markers, lifestyle habits, etc).

More research is needed in this area, especially since the few mechanistic high-dose experimental studies are of limited value for extrapolating biological effects to exposure ranges relevant to U.S. populations, demographics, and underlying risk structure. In the context of science to support regulatory action in the U.S., it would be pertinent not to exclude all epidemiological studies on MeHg exposure and MI risk, but rather to apply a set of standardized benchmark dose models to all of the available U.S. and European studies, both negative and positive.

Response to Comment 70: As summarized in the preamble to the proposed rule, the EPA stated that the NAS study concluded that "Although the data base is not as extensive for cardiovascular effects as it is for other end points (*i.e.,* neurologic effects) the cardiovascular system appears to be a target for MeHg toxicity in humans and animals." The EPA also stated that additional cardiovascular studies have been published since 2000. The EPA did not develop a quantitative dose response assessment for cardiovascular effects associated with MeHg exposures, as there is no consensus among scientists on the dose-response functions for these effects and there is inconsistency among available studies as to the association between MeHg exposure and various cardiovascular system effects. The EPA is not reviewing or revising its RfD for MeHg at this time. In the future, the EPA may update the MeHg RfD and will review all of the relevant scientific literature available at that time, including data on all relevant endpoints, and weight of evidence for likelihood that MeHg produces specific effects in humans.

f. Benefits of fish consumption and fish advisories.

Comment 71: Commenter 14115 states that the EPA proposal failed to report and fully account for the important role of dietary Se's protective effects against MeHg toxicity. According to the literature, dietary Se plays a beneficial role against MeHg toxicity because the binding affinity of Hg to Se is up to a million times higher than for sulfur – Hg's second-best binding partner.

Response to Comment 71: The EPA recognizes the potential for confounding of the effects of Hg on the developing nervous system by a range of nutrients (including long-chain poly-unsaturated fatty acids) and discuss this in the uncertainty characterization CAA section of the revised Hg Risk TSD. Regarding Se, the SAB commented that "one SAB member suggests the use of blood markers of Se-dependent enzyme function, noting that MeHg irreversibly inhibits Se-dependent enzymes that are required to support vital-but-vulnerable metabolic pathways in the brain and endocrine system. Impaired selenoenzyme activities would be observed in the blood before they would be observed in brain, but the effect is also expected to be transitory. The use of these measures is a minority view among the SAB members" (U.S. EPA-SAB, 2011). Given that the SAB did not express a consensus recommendation on adjustments to the risk estimates for exposure to Se, and the statement that in fact the statements on the role of Se are called out as representing a "minority view" among the panel, and given the fact that research into this issue is ongoing (and has not reached a general consensus), the EPA does not address this issue at length in the revised Hg Risk TSD.

Comment 72: Commenter 12267 states that ample evidence supports both the dietary omega-3 polyunsaturated fatty acids, eicosapentaenoic acid, and docosahexaenoic acid benefits and the potential neurodevelopmental contaminant harms of fish consumption to sensitive populations (fetuses, infants, and children), even at low dose exposure. According to the commenter, despite attempts to inform the public about the risks, there are studies showing the risk message has failed to reach vulnerable and sensitive populations. A 12-state survey conducted from 1998-1999 of women age 18-45 (n = 3,015) found two-thirds of women who consumed sport-caught fish were unaware of state fish advisories.[135] More recently, researchers uncovered similar findings among minority women living in specific geographic regions. Asians, Latinos[136], and Native Americans[137] had low advisory awareness but moderate to high rates of fish consumption from commercial, locally caught, or food bank sources.

Response to Comment 72: The EPA agrees that even low doses of Hg can contribute to potential health effects. Hg risk is increasing for exposures above the RfD, and as a result, any reductions in Hg exposures in locations where total exposures exceed the RfD can result in reduced risks. The Hg Risk TSD is based on scenarios reflecting subsistence fishing populations with high levels of fish consumption, and does not take into account compliance with fish consumption advisories. The highest levels of fish consumption may represent populations that do not respond to fish consumption advisories.

Comment 73: Commenters 18500 and 17702 state that some health experts are arguing that the EPA's warnings to pregnant women to not eat fish that have higher than normal Hg accumulation (such as shark or swordfish) over the last 15 years have actually harmed the health of children in the U.S. by reducing beneficial fish consumption by this important group (women of child-bearing age). According to the commenters, two recent scientific studies point in this direction. A study published in the Lancet[138] concludes maternal consumption of less than 340 grams of seafood per week did not protect children from adverse outcomes (less verbal intelligence and social development); rather, consumption of more than 340 grams of seafood a week produced beneficial outcomes, suggesting that "advice to

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[135] Anderson, L. Hanrahan, A. Smith, L. Draheim, M. Kanarek and J. Olsen, 2004. "The role of sport-fish consumption advisories in Hg risk communication: a 1998–1999 12 state survey of women age 18–45." *Environ. Res.*, 95, pp. 315–324

Knobeloch et al., 2005 L. Knobeloch, H.A. Anderson, P. Imm, D. Peters and A. Smith, 2005. "Fish consumption, advisory awareness, and hair Hg levels among women of childbearing age." *Environ. Res.*, 97 2, pp. 220–227.

Knobeloch L, Gliori G, Anderson H. 2007. "Assessment of MeHg exposure in Wisconsin." *Environ Res* 103(2):205–210.

[136] Silver et al., 2007 E. Silver, J. Kaslow, D. Lee, S. Lee, M. Lynn Tan and E. Weis, *et al.* 2007. "Fish consumption and advisory awareness among low-income women in California's Sacramento-San Joaquin Delta." *Environ. Res.*, 104 3, pp. 410–419.

Ricco, J. A., Anderko, L., & Anderson, H. A. 2008. "An assessment of Hg risk and advisory awareness and fish consumption in a Latino population in Wisconsin." Unpublished manuscript, University of Wisconsin School of Medicine and Public Health.

[137] Kuntz SW, Hill WG, Linkenbach JW, Lande G, Larsson L. 2009. "MeHg risk and awareness among American Indian women of childbearing age living on an inland northwest reservation." *Environmental Research*, 109:753–759.

[138] Hibbeln JR, Davis JM, Steer C, Emmett P, Rogers I, Williams C, et al. 2007. "Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. " *Lancet* 369.

limit seafood consumption could actually be detrimental." The study concludes that "the risks of the loss of nutrients were greater than the risk of harm from trace contaminants in 340 grams of seafood a week."

Response to Comment 73: The EPA acknowledges the research regarding the effectiveness of fish advisories. However, the proposed regulation does not address the subject of fish advisories, consumer advice on fish or efficacy of such advice. The EPA did not assess the impact of U.S. EGU-attributable Hg deposition on fish consumption advisories. The regulation of Hg emissions is an issue that is separate from local, state, and federal decisions related to fish consumption advisories.

Comment 74: Commenter 17807 states that the EPA should incorporate the latest Hg toxicological data, reevaluate its conclusions and determine whether the proposed rule is appropriate and necessary.

Response to Comment 74: The EPA disagrees that the EPA did not incorporate the latest Hg data to support the "appropriate and necessary" finding. It is the policy of the EPA to use the most current peer reviewed, publicly available data and methodologies in its risk assessments. The revised Hg Risk TSD was peer reviewed by the EPA's independent SAB, which concluded "the SAB regards the design of the risk assessment as suitable for its intended purpose, to inform a decision-making regarding an "appropriate and necessary finding" for regulation of HAP from coal and oil-fired EGUs" (U.S. EPA-SAB, 2011). Furthermore, the panel noted, "the SAB supports the overall design of and approach to the risk assessment and finds that it should provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs."

At this time, the EPA is neither reviewing nor revising the 2001 RfD for MeHg (MeHg). The 2001 RfD for MeHg is the EPA's current peer reviewed RfD, which is the value the EPA uses in all its risk assessments. Although recent publications support the 2001 RfD, it is not useful to cite these in the pending regulation in the absences of thorough EPA and public review. Citation of the reviews noted by the commenter is entirely appropriate as these publications were extensively discussed and peer reviewed in public venues. Documentation for the choices underlying calculation of the RfD can be found in (U.S. EPA, 2001; U.S. EPA-IRIS, 2001; Rice et al., 2003).

6. General comments on Hg Risk TSD.

Commenters: 11889, 14115, 15182, 16182, 17689, 17712, 17771, 17775, 17807, 17877, 17885, 18034, 18383, 19536/19537/19538, 18023

a. Comments agreeing with findings.

Comment 75: Several **c**ommenters (19536, 19537, 19538) state that the EPA reasonably determined that Hg emissions pose a public health hazard, and regulation of EGUs is appropriate. The EPA correctly requested peer review of the Hg Risk TSD. The agency will consider the results of the peer review prior to the final rule publication and make these available along with the agency's response. Among the findings the commenter cites to supports its general agreement with the EPA include, (1) EGU-attributable MeHg poses a hazard to public health at 28% of watersheds analyzed when considering all sources of Hg deposition. (2) Hg deposition attributable to U.S. EGUs alone poses a health risk at 12% of the watersheds analyzed without considering any other Hg source, and (3) The contribution of U.S. EGUs to total Hg deposition may be greater than 10% at hundreds of watersheds.

Response to Comment 75: The EPA agrees with the commenters, and in accordance with SAB advice, has revised the Hg Risk TSD as part of the final rulemaking and has made that revised TSD available in the rule docket. The revised TSD addresses the comments of the SAB and includes a detailed listing of the specific revisions made to the Hg Risk TSD.

Comment 76: Several **c**ommenters (19536, 19537, 19538) state that the Hg Risk TSD demonstrates that U.S. EGUs can significantly contribute to watershed Hg deposition. The EPA's modeling results indicate that the fraction of total Hg deposition attributable to EGUs is greater than 10% at hundreds of watersheds and that these U.S. EGU deposition alone may endanger sensitive populations near many of these watersheds. Thus, there are many areas of the nation for which EGUs are a significant contributor to potential Hg hazards to public health and the environment.

Response to Comment 76: The EPA agrees with the commenters and notes that the revised TSD includes data from several hundred additional watersheds which continues to demonstrate that there are hundreds of watersheds where U.S. EGU deposition contributes significantly to total Hg deposition, and where U.S. EGUs, either in combination with other sources of deposition or when deposition from U.S. EGUs is evaluated alone, lead to exposure in excess of the RfD, and thus are a hazard to public health.

b. Comments disagreeing with findings.

Comment 77: Commenter 17775 states that in presenting the results in the Hg Risk TSD there appears to be either math errors or an unexplained incorporation of additional data. For example, Table ES-1 shows a comparison of total and U.S. EGU-attributable Hg deposition for the 2005 and 2016 scenarios. Table ES-2 shows the same comparison, but expressed as the percentage of total Hg deposition attributable to U.S. EGUs for 2005 and 2016. For the 2005 scenario, the 99^{th} percentile total Hg deposition and U.S. EGU-attributable Hg deposition are reported as 58.32 and 7.77 ($\mu g/m^2$), respectively. Calculating this as a percentage would result in 13.32% (i.e., 7.77 ÷ 58.32 x 100%). However, without explanation, Table ES-2 shows that, under the 2005 scenario, U.S. EGU-attributable Hg deposition is 30% at the 99^{th} percentile level. The same holds for the 2016 scenario – i.e., the figure reported in Table ES-2 for the 99^{th} percentile is 11%, instead of the expected 4.28% (i.e., 2.41 ÷ 56.23 x 100%). According to the commenter, these errors limited the commenter's ability to provide any meaningful comment on this aspect of EPA's proposed rule.

Response to Comment 77: The EPA disagrees with the commenter that there were errors in the Hg Risk TSD. Instead, the commenter has misinterpreted how the EPA calculated the percentiles. The percentile (and mean) values presented in Table ES-1 for total and U.S. EGU-attributable Hg deposition are not matched by watershed. In other words, the EPA queried for the percentiles (and mean) provided for total Hg deposition and presented those percentiles and then separately estimated the percentiles for U.S. EGU-attributable Hg. Therefore, the total and U.S. EGU-attributable values for the 99^{th} percentile do not necessarily occur at the same watershed. By contrast, the percentiles in Table ES-2 are matched by watershed. In Table ES-2, the EPA queried for the 99^{th} percentile watershed in terms of U.S. EGU-attributable Hg deposition as a percent of total deposition. Given these definitions of the percentiles (and means) presented in Table ES-1 and ES-2, for example, that 95^{th} percentile values presented in each table (for the same air quality scenario) would reflect Hg deposition values from different watersheds. The EPA provided additional clarification in the revised Hg Risk TSD.

Comment 78: Commenter 15182 estimates that the risk associated with Hg exposure via fish consumption will be essentially unchanged by the proposed rule. The commenter cites the Hg Risk TSD as showing only 2.9% of the total Hg present from U.S. EGUs.

Response to Comment 78: First, the EPA disagrees with the commenter's assertion that this rule will not affect risks associated with Hg exposure. Hg from U.S. EGUs is a contributor to the levels of MeHg in fish across the country and consumption of contaminated fish can lead to increased risk of adverse health effects. Because any exposures above the RfD contribute to increased risk, reductions in those exposures will reduce risk. Second, the purpose of the Hg Risk TSD is not to assess the magnitude of risk reduction under the proposed rule, but rather to estimate the magnitude of absolute risk attributable to U.S. EGUs following implementation of other applicable CAA rules' requirements. That said, any potential risk reductions following implementation of the MACT rule itself would likely reflect a number of factors besides the national average U.S. EGU deposition value cited by the commenter. These additional factors include: (a) spatial gradients in the magnitude of absolute U.S. EGU-attributable Hg deposition, (b) spatial gradients in the magnitude of reductions in Hg deposition linked to the rule, (c) availability of measured fish tissue Hg levels in the vicinity of U.S. EGUs experiencing larger Hg emission reductions to support risk modeling and (d) the potential for subsistence fishing activity at watersheds in the vicinity of U.S. EGUs experiencing larger reductions in Hg emissions (also required to support risk modeling). It is also important to point out that while the national average U.S. EGU-attributable Hg deposition (for the 2016 scenario – see revised Hg Risk TSD) is 2%, values range up to 11% for the 99th percentile watershed. This illustrates the substantial spatial variation in U.S. EGU-attributable Hg deposition, which translates into spatial variation in the magnitude of U.S. EGU-attributable subsistence fisher risk.

Comment 79: Commenter 16182 states that even if the proposed rule is enacted there is need for more reduction. According to the commenter, if the proposed regulation is enacted and the estimated 91% capture of Hg emissions from U.S. EGUs is achieved, the resulting decrease in Hg levels in fish tissues, and subsequently the decrease in associated risk to fish consumers, is extremely low. According to the EPA's Hg Risk TSD supporting the proposed rule, the U.S. EGU-attributable Hg in fish tissue (2016 model) is only 2.9% (0.008 of 0.29 ppm) of the total Hg present. Therefore, with the possible exception of a very small subset of U.S. watersheds, reductions in Hg emissions from U.S. EGU's will not result in sufficient decreases in fish tissue concentrations as to eliminate the need for fish consumption advisories. The risk associated with Hg exposure via fish consumption will remain essentially unchanged.

Response to Comment 79: The EPA acknowledges that U.S. EGUs contribute only a small fraction of total Hg deposition in the U.S. However, U.S. EGUs remain the largest emitter of Hg in the U.S., and the revised Hg Risk TSD reports that up to 29% of total modeled watersheds have the potential for subsistence level freshwater fish consumers with total Hg exposures exceeding the RfD, 24% of modeled watersheds have the potential to exceed the RfD and have at least 5% of total Hg risk contributed by U.S. EGUs, and up to 10% of modeled watersheds have the potential for subsistence level freshwater fish consumers to have Hg exposures exceeding the RfD due to Hg emissions from U.S. EGUs even excluding Hg exposures due to other sources. As explained in the preamble, EPA EPA believes each of these results independently supports our conclusion that U.S. EGUs pose hazards to public health.Hg risk is increasing for exposures above the RfD, and as a result, any reductions in Hg exposures in locations where total exposures exceed the RfD can result in reduced risks. While these reductions in risk may be small for most populations and locations, in some watersheds and for some populations, reductions in risk may be greater. The EPA did not assess the impact of U.S. EGU-

attributable Hg deposition on fish consumption advisories. The regulation of Hg emissions is an issue that is separate from local, state, and federal decisions related to fish consumption advisories.

Comment 80: Commenter 17807 questions why the EPA departed from the CAA 112(n) risk comparison to the 1 in 1 million. According to the commenter, the EPA, in its discussion of the effects of Hg on fish consuming populations, describes an analysis of Hg deposition and the relationship to the RfD.

Response to Comment 80: The commenter is referring to cancer risk (i.e., a 1 in 1 million probability of developing cancer over a lifetime due to a specific chemical exposure). For Hg, the EPA focused on the potential for neurodevelopmental effects in the children born to mothers exposed to MeHg during pregnancy through fish consumption. This health endpoint is a non-cancer endpoint and risk in this context, is assessed by comparing an estimate of daily exposure (to MeHg for the mother) to the MeHg RfD. Values greater than one (i.e., exposures that exceed the RfD) are considered to represent an exposure that could represent a public health hazard, reflecting the methodology and underlying epidemiological data used in deriving the MeHg RfD.

Comment 81: Commenters 17771 and 18488 state that there are numerous significant flaws in the EPA's use of CMAQ, Mercury Maps, and the fish consumption rate and fish MeHg concentrations the EPA used for its analysis. These flaws, and many similar overly conservative assumptions, render the results reported in the Hg Risk TSD unreliable.

Response to Comment 81: The EPA disagrees with the commenters' statements that the assumptions in the Hg Risk TSD are overly conservative and lead to unreliable results. The EPA commissioned a formal peer review of the Hg Risk TSD through the SAB. The peer review report addresses the data inputs and assumptions used by the EPA including those mentioned by the commenter. The overall finding of the panel is that "the SAB supports the overall design of and approach to the risk assessment and finds that it should provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs." (U.S. EPA-SAB, 2011) The primary advice of the SAB was that the EPA should "revise the Technical Support Document to better explain the methods and choices made in the analysis, and analytical results, and where the uncertainties lie." The EPA revised the Hg Risk TSD as part of the final rulemaking and has made that revised TSD available in the rule docket. The revised TSD addresses the comments of the SAB and includes a detailed listing of the specific revisions made to the Hg Risk TSD.

Comment 82: Commenters 17771 and 17775 state that Tetra Tech evaluated six case studies to assess the impact of the EPA's excess conservatisms. The results of their analysis showed that a 99th percentile subsistence fisher consuming fish out of a 99th percentile waterway -- still highly conservative assumptions -- would result in a HQ of 0.67, a level that is protective of human health without any further Hg reductions from U.S. EGUs. According to the commenters, the EPA cannot rely on the Hg Risk TSD because it is not a reliable assessment of U.S. EGU Hg emission-related risks.

Response to Comment 82: The EPA disagrees with the commenters' description of the purpose of the Hg Risk TSD and asserts that Tetra Tech's analysis does not provide coverage for subsistence fishers likely to experience elevated U.S. EGU-related Hg exposure. Specifically, the risk estimated cited in the comment for the combination of the 99th percentile waterway and consumption rate (the HQ of 0.67) reflects application of a number of assumptions that do not reflect the characteristics of higher risk subsistence fishers – these factors are discussed below.

Tetra Tech's analysis uses a 99th percentile fish consumption rate of 110 g/day, which translates into 3.9 ounces (oz), or approximately one 8 oz fish meal every 2 days. However, fish consumption surveys cited in the revised Hg Risk TSD, suggest that higher percentile subsistence fishers eat more than twice this level of fish which equates to a single 8 oz fish meal (or a larger meal) a day; a rate which the EPA asserts is reasonable for subsistence fishers, and which the SAB supported. Use of the Tetra Tech value to represent the 99th percentile level of consumption does not reflect the potential exposure to Hg in fish as values used in the EPA analysis.

Tetra Tech's analysis also used the median fish tissue level at each watershed as the basis for risk modeling. In the revised Hg Risk TSD, the EPA readily acknowledges that a fraction of subsistence fishers likely target a wide range of sizes of fish, which would be reflected by use of the median value. However, the focus in this analysis is on modeling risk for fishers who are likely to experience reasonable but elevated risk due to U.S. EGU-related Hg. It is reasonable to assume that a fraction of subsistence fishers could target somewhat larger fish (reflected by the 75th percentile value) in order to maximize the volume of fish taken per unit time spent fishing. Use of the 75th percentile value was supported by the SAB and they expressed concern that low sample size counts across watersheds could low-bias the statistic for many water bodies, resulting in underestimates of risk.

Tetra Tech's analysis uses a cooking/preparation adjustment factor of 1.0 (i.e., assuming preparation of fish does not change the unit concentration of Hg in fish). However, a number of studies discussed in the revised Hg Risk TSD either explicitly provide adjustment factors involving a higher unit concentration following preparation, or at least speak qualitatively to the fact that cooking/preparation (by removing water and fat from the fish) will likely lead to an increase in the unit concentration of Hg. Given the information provided in cited literature, an assumption of no impact on Hg concentration following cooking/preparation does not appear to be supported and would low-bias risk estimates.

Taken together, the assumptions reflected in Tetra Tech's analysis result in simulation of a high-consuming fisher population that is likely to not provide coverage for the segment of subsistence fishers likely to experience the highest (reasonable) risk due to U.S. EGU-related Hg exposure. As such, their analysis does not comport with the stated goal of the Hg Risk TSD (i.e., to assess the nature and magnitude of risk for those individuals likely to experience the greatest risk associated with exposure to U.S. EGU-attributable Hg). In addition, the SAB was generally supportive both of the consumption rates used in modeling risk as well as the use of the 75th percentile fish tissue Hg value at the watershed-level. In relation to the cooking/preparation adjustment factor, the SAB asked that the EPA review some additional peer reviewed studies, which the Agency has done with the conclusion that the value of 1.5 continues to be supported by the literature (as discussed in the revised Hg Risk TSD).

Comment 83: Commenters 17775 and 18034 state that the Hg Risk TSD is insufficiently clear and lacks in detail. The commenters note that the SAB found the Hg Risk TSD to be "cursory" and "lacking critical details regarding both the methods used and the results represented." (7/12/11 draft of SAB Peer Review at 2). According to the commenters, these shortcomings preclude meaningful review.

Commenter 17775 stated that the SAB, through a specially convened SAB, was asked by EPA to comment upon the overall design and approach, as well as technical aspects of EPA's Hg TSD risk assessment. While the SAB had not made available to the public its final report as of the close of the comment period on the proposed rule, the draft peer review of the draft Hg Risk TSD (July 2011) prepared by the SAB is critical of EPA's efforts in several important respects. According to the commenter, the Chair of the SAB Hg Review Panel said that the SAB's reviewers had "found it difficult

to evaluate the risk assessment based solely upon information provided" in the Hg TSD, insofar as "[i]mportant elements of the methods and findings are missing or poorly explained." To that end, the two Chairs admonished that the Hg Risk TSD need to do a "much better job of explaining what was done and why, what the results represent, and where the uncertainties lie," with the "overall credibility of the risk assessment" being "dependent in part on a transparent description of the methods and findings."

Response to Comment 83: The SAB provided a thorough review of the Hg Risk TSD. The SAB stated, "The Technical Support Document needs to better explain what was done and why, translate the results into findings that relate to the key goals of the analysis and describe where the uncertainties lie" (U.S. EPA-SAB, 2011). The EPA revised the Hg Risk TSD as part of the final rulemaking and has made that revised TSD available in the rule docket. The revised TSD addresses the comments of the SAB and includes a detailed listing of the specific revisions made to the Hg Risk TSD.

While the SAB did indicate difficulty in evaluating the Hg Risk TSD based solely on the Hg Risk TSD, the panel obtained enough additional information from EPA through the peer review process and determined that the SAB "the overall design of and approach to the risk assessment and finds that it should provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs" (U.S. EPA-SAB, 2011). Furthermore, the SAB concluded, "The SAB regards the design of the risk assessment as suitable for its intended purpose, to inform decision-making regarding an "appropriate and necessary finding" for regulation of HAP from coal and oil-fired EGUs, provided that our recommendations are fully considered in the revision of the assessment" (U.S. EPA-SAB, 2011).

The minutes of the June SAB meeting were made available to the public on the SAB website prior to the close of the public comment period. The fact that the commenter was able to find the draft SAB letter and provide comments based on that letter suggests that the commenter had full access to the materials that the SAB found sufficient to allow it to evaluate the Hg Risk TSD, and makes its supporting determinations as stated above. The detailed public comments received on the Hg Risk TSD suggest that the public was in fact able to evaluate the analysis and provide meaningful comments. In addition, the EPA notes that the provision by the EPA of clarifying information to the SAB did not result in additional negative comments from the panel, rather, the clarifying information only increased the SAB support for the design of and approach to the risk assessment. It follows that public receipt of the clarifying information through the SAB website likely resulted in more rather than less support for the Hg Risk TSD. Given the detailed technical comments provided by the SAB, to which the EPA gives deference over technical comments provided by any single public commenter, it is unlikely that, even if the public were unable to access the minutes of the SAB meeting, the additional clarifications provided by the EPA would have resulted in any substantive changes to the EPA's analysis or conclusions based on the results of the analysis.

Comment 84: Several commenters (17712, 17877, 18383, 17885, 17689) state that even with a heavily weighted bias of overly stringent RFD and a national model, the EPA shows only a fraction of an IQ point gain for the most exposed individuals. According to the commenters, considering the extremely conservative Hg RFD the EPA chose and the numerous assumptions and shortfalls in its modeling technique, it is possible that no identifiable health benefits would accrue with the imposition of this proposal's Hg MACT.

Response to Comment 84: The EPA disagrees with the commenters' statement that the RfD is biased, and with the implication that a national model is inappropriate for determining that it is appropriate to regulate EGUs. As noted in the responses to comments in the RfD CAA section, the RfD for Hg has been peer reviewed and represents the agency's health benchmark for determining the potential for risk. In addition, the EPA notes that the IQ endpoint received no weight in the appropriate and necessary determination, specifically because it was determined to not be the health metric most appropriate for determining whether a hazard to public health exists. The decision to rely on the RfD-based hazard quotient as a health benchmark was supported by the SAB, which stated, "The SAB agrees that EPA's calculation of a hazard quotient for each watershed is appropriate as the primary means of expressing risk because it is based on an established RfD for MeHg that reflects a range of potential neurobehavioral effects" (U.S. EPA-SAB, 2011).

Comment 85: Commenter 18023 states that the TSD used to support the finding that it is appropriate and necessary to regulate EGUs is based on technical analyses that severely overstate the extent of the risk to the public posed by U.S. EGU Hg emissions. Generally, the commenter provides that the EPA (1) used and compounded a series of conservative assumptions; (2) focused on the extremes of the distributions; (3) cast many assumptions as an underestimate of the effect despite evidence to the contrary; (4) created inappropriate metrics for risk that show no improvement despite significant Hg emissions reductions in the U.S.; and (5) sets policy thresholds that can never be achieved but can only result in the answer "to regulate" or "to regulate further."

Commenter 18023 states that it is not "appropriate" to regulate U.S. EGU Hg emissions because the risks calculated by the EPA in the Hg Risk TSD are overstated (*i.e.*, 284 watersheds with U.S. EGU-attributable hazard quotient greater than 1.5 only occur for cases using unrealistically high fish ingestion rates and other assumptions inconsistent with the EPA's own guidance; there would be zero using assumptions consistent with such guidance). The commenter states that U.S. EGU Hg emissions do not pose a risk to public health and the EPA's methodology to claim the existence of "hotspots," as supporting evidence, is fallacious.

Commenter 18023 states using more reasonable assumptions consistent with the EPA guidance shows that there is only one watershed (out of 2,366 assessed) in 2005 estimated to have a U.S. EGU-attributable HQ greater than 1.5. In 2016, there are zero watersheds. Accordingly, the hazard to public health due to EGU Hg emissions is effectively nonexistent. Based on this the commenter concludes that it is neither "appropriate" nor "necessary" to regulate U.S. EGU Hg emissions.

Response to Comment 85: The EPA commissioned a formal peer review of the Hg Risk TSD through the SAB. The overall finding of the panel is that "The SAB finds that the design of and approach to the risk assessment are able to provide an objective, reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs. The SAB supports the overall design and general approach and considered the spatial resolution of the modeling of Hg deposition to watersheds to be appropriate for the analysis." Specifically, the SAB supported the EPA's risk assumptions and metrics. Based on the review by the SAB, the EPA disagrees with the commenter's statement that the results reported in the Hg TSD severely overstate the extent of the risk to the public posed by U.S. EGU Hg emissions.

The EPA disagrees that the evaluation of excess local deposition within 50 km of U.S. EGUs is fallacious. The analysis accomplishes its goal of determining whether there is U.S. EGU Hg deposition occurring within 50 km of U.S. power plants that is in excess of the average deposition occurring within

500 km of the plants. To alleviate concerns about the use of the term "hotspot," the EPA revised the title of the analysis to "Potential for Excess Local Deposition of Hg in Areas Near U.S. EGUs" and moving it to a separate document. The new TSD provides a full description of the approach used and shows that local deposition within 50 km of the 10% highest Hg emitting power plants is on average three times the average deposition within 500 km of the power plants.

The EPA disagrees that the commenter's assumptions are more reasonable that those in the Hg Risk TSD. The SAB agreed that all of the assumptions in the Hg Risk TSD are reasonable and appropriate.

Comment 86: Commenter 18023 states that it is also not "necessary" to regulate U.S. EGU Hg emissions because the imposition of the requirements of the CAA will be sufficient to address the currently miniscule hazards to public health and the environment posed by Hg emissions from U.S. EGUs. According to the commenter, the EPA's policy metrics used to judge risk can never be achieved and are inappropriate.

Response to Comment 86: The EPA disagrees with the commenter that current risks from exposure to Hg attributable to U.S. EGU Hg emissions are miniscule. As described in the revised Hg Risk TSD, 29% of watersheds currently have deposition of Hg from U.S. EGUs that will result in exposures that exceed the RfD or have total exposures to Hg from all sources that result in exposures that exceed the RfD and U.S. EGUs account for at least 5% of total deposition. The EPA disagrees with the commenter that the policy metrics are inappropriate. The SAB that reviewed Hg Risk TSD concluded, "The SAB agrees that EPA's calculation of a hazard quotient for each watershed is appropriate as the primary means of expressing risk because it is based on an established RfD for MeHg that reflects a range of potential neurobehavioral effects" (U.S. EPA-SAB, 2011).

Comment 87: Commenter 18023 states that they lacked sufficient time and the lack of available key information to assess other key questions, such as the nation-wide representativeness of the available data sets especially the fish Hg levels. According to the commenter, more data from Florida should have been included because Florida is known to have a rich data set on fish Hg concentrations.

Response to Comment 87: The SAB directly addressed the question of the nation-wide representativeness of the fish tissue MeHg data in the national Hg risk assessment. The SAB concluded, "Although the SAB considers the number of watersheds included in the assessment adequate, some watersheds in areas with relatively high Hg deposition from U.S. EGUs were under-sampled due to lack of fish tissue methy[l]mercury data. The SAB encourages the Agency to contact states with these watersheds to determine if additional fish tissue MeHg data are available to improve coverage of the assessment" (U.S. EPA-SAB, 2011).

As a result of the SAB advice, the EPA obtained additional fish tissue MeHg sample data from several states, particularly Pennsylvania, Wisconsin, Minnesota, New Jersey, and Michigan. This additional data increased the total number of watersheds assessed by 33% nationally. In Florida, the EPA assessed the Hg-related health risk for 40 watersheds. Because the EPA did not find any fish tissue data for new watersheds in Florida that could be incorporated into the analysis, the total number of watersheds in Florida assessed in the revised Hg Risk TSD remains the same as proposal.

Inclusion of the additional fish tissue MeHg data did not fundamentally change the total percentage of modeled watersheds with populations potentially at-risk (increased from up to 28% to up to 29%),

however, the total number of modeled watersheds with populations potentially at-risk increased substantially (see the revised Hg Risk TSD).

Comment 88: Commenter 18023 states that Figure 2-17 and 2-18, Hg TSD at 47, demonstrates that both 1) "changes in deposition are unlikely to result in fish Hg changes in an easily predictable manner, an assumption that is the foundation of the risk assessment for future time periods," Tetra Tech at 30; and, 2) that the subset of watersheds considered in the analysis (*i.e.*, with fish tissue data) have clearly higher U.S. EGU-attributable deposition than the distribution of all watersheds.

Response to Comment 88: As shown in Figure 2-17 of the revised Hg Risk TSD and noted by the SAB, the spatial relationship between Hg deposition and fish tissue MeHg concentrations is confounded by many other factors, including "variability of ecosystem factors that control methylation potential (especially wetlands, aqueous organic carbon, pH, and sulfate)" (U.S. EPA-SAB, 2011). However, several recent studies (Orihel et al., 2007, Orihel et al., 2008 and Harris et al., 2007) show, and the SAB agrees, that it is appropriate for the EPA to assume that changes in Hg deposition are linearly associated with *changes* in fish tissue concentration at a specific watershed. While the EPA agrees that the subset of watersheds in the Hg Risk TSD have somewhat higher U.S. EGU deposition than the distribution of all watersheds, the EPA disagrees that oversampling of high deposition watersheds is inappropriate. Fish tissue samples are often collected in watersheds where Hg risk is likely to be an issue, and where significant exposure through fish consumption is likely to occur.

Comment 89: Commenter 18023 states that the EPA uses extreme assumptions that are inconsistent with its own guidelines to overstate the risk of U.S. EGU Hg emissions. According to the commenter, a study by Tetra Tech found that "the overall methodology used to evaluate potential risks associated with the consumption of affected fish is consistent with U.S. The EPA guidelines, the assumptions/parameters used in the Hg Risk TSD are more conservative than those recommended by U.S. EPA."

Response to Comment 89: The EPA disagrees that it used extreme assumptions or was inconsistent with EPA risk guidelines. The SAB "found that the consumption rates and locations for fishing activity for high-end, self-caught fish consuming populations modeled in the analysis were supported by the data presented in the document and were generally reasonable and appropriate given the available data." The approach used in the revised Hg Risk TSD for assessing subsistence fisher risk reflects the statutory context for the analysis (i.e., informing the determination of whether it is appropriate and necessary to regulate U.S. EGUs under the CAA). In assessing the potential exposures associated with increased risk of neurologic health effects, the EPA focused on those fish consumers likely to experience the highest levels of individual risk associated with U.S. EGU-attributable Hg (i.e., inland freshwater subsistence fishers whose behavior places them at increased risk). Therefore, the EPA focused on subsistence fishers who (a) focus their activity on water bodies within a single watershed (thereby not diluting out localized areas with elevated fish tissue Hg) and (b) target somewhat larger fish that may have bioaccumulated more Hg. In addition, to provide increased perspective on high-end risk experienced by subsistence fishers, the EPA modeled a range of higher-end consumption rates including the 99th percentile value. In selecting self-caught fish consumption rates for use in modeling the subsistence fishers (including 99th percentile rates when available), the EPA relied on a set of peer reviewed studies whose findings are published in the literature.

Comment 90: Commenter 18023 provides a list of what they state are "conservative assumptions." That list includes (1) a subsistence fisher resides in the vast majority of watersheds for which they have fish

Hg data (2,461) by using poverty as a surrogate; (2) these fishers do not eat any small fish (less than 7 inches); (3) these fishers only eat the larger of the greater than 7 inch fish (*i.e.*, the 75th percentile Hg concentration fish); (4) these fishers only eat fish from the river or lake that has the largest 75th percentile fish (*i.e.*, they always eat the fish with very high Hg concentrations); (5) all fish Hg concentrations must then be increased by 50% to adjust for cooking; and (6) these fishers eat the equivalent of a large fish meal every day (373 g/day). According to the commenter, many of these assumptions are more conservative than the EPA's own recommendations and lead to a "factor of ten or more conservative results" (Tetra Tech at 11).

Response to Comment 90: The EPA disagrees that these assumptions are conservative in the context of the stated goals of the risk assessment. The EPA asked the SAB about each of these assumptions, and they concluded that "the design of the risk assessment as suitable for its intended purpose, to inform decision-making regarding an "appropriate and necessary finding" for regulation of HAP from coal and oil-fired EGUs."

In regards to the specific assumptions highlighted by the commenter:

1. The EPA clarified in the revised Hg Risk TSD, that the risk assessment is intended to characterize risk for the subset of subsistence fishers whose behavior places them at greater risk from U.S. EGU-source Hg (e.g., focused activity at water bodies within a given watershed, targeting of somewhat larger fish). The goal of the analysis is not to generate a representative characterization of risk to subsistence fishers as a total group. With regard to the comment that the EPA assumed subsistence fishers "resided" at most watersheds with fish tissue Hg levels - this is not correct. The EPA identified watersheds where there was the potential for subsistence-level fishing activity, rather the presence of such activity.

2. The SAB asked that the EPA justify the assumption that fish < 7 inches are not likely to be consumed. In the revised Hg Risk TSD, the EPA provides additional information supporting this assumption: "Seven inches represents a minimum size limit for a number of key edible freshwater fish species established at the State-level. For example, Pennsylvania establishes 7 inches as the minimum size limit for both trout and salmon (other edible fish species such as bass, walleye and northern pike have higher minimum size limits (Summary Book: 2001 Pennsylvania Fishing Laws and Regulations available at: http://fishandboat.com/fishpub/summary/inland.html)."

3. The SAB stated that the use of the 75th percentile Hg concentration is reasonable (in fact, they expressed some concern about the potential for underestimation of the 75th percentile for a watershed when the number of fish samples is small, as occurs in 60% of the watersheds). For the revised Hg Risk TSD, the EPA refined the approach used in generating the 75th percentile fish tissue Hg level used in generating risk estimates. Specifically, the EPA assumed that subsistence fishers fish at locations within a given watershed and take the 75th percentile at each location. This clarification addresses the misperception on the part of the commenter that after calculating 75th percentile values across rivers/lakes, the EPA took the 75th percentile value of those 75th percentiles.

4. See responses to comments in the cooking loss adjustment CAA section of this document.

5. The SAB concluded that that the consumption rates and locations for fishing activity for likely highly exposed consumers, i.e., self-caught fish consuming populations modeled in the analysis, are supported by the data presented in the document and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

Comment 91: Commenters 18023 and 17807 state that Tetra Tech also performed additional sensitivity analyses using more reasonable assumptions for consumption rates, cooking factor, fish Hg concentration (using mean vs. 75th percentile), and EGU-attributable Hg deposition (based on an estimate that CMAQ overestimated EGU-attributable deposition on average by 11 percent provided by the independent consultant, ENVIRON, retained by Southern). ENVIRON at 6. Using these more reasonable assumptions, they found:

"Based on our understanding of past EPA guidance, a conservative risk assessment could consider the 95th percentile ingestion rate of a general population such as the 15 to 44-year old female consumer. For 2005 levels of EGU-attributable deposition, and consideration of an HQ threshold of 1.5, only 1 of the 2,366 HUC-12 level watersheds is affected, and no watersheds at 2016 levels of deposition are affected. In comparison, when the 95thpercentile ingestion rate from the high end female consumer in the Hg Risk TSD is considered, 495 HUC-12 watersheds have an EGU-attributable HQ exceeding 1.5 in 2005, and 48 in 2016."

Response to Comment 91: The EPA does not agree that the analysis by Tetra Tech uses assumptions that are "more reasonable." The SAB agreed that all of the assumptions in the Hg Risk TSD are reasonable and appropriate. The specific assumptions used in Tetra Tech's analysis are not appropriate to identify risks to populations likely to be at greater risk of exposure to Hg levels that exceed the RfD.

Comment 92: Commenter 18023 states that the EPA's data shows U.S. EGU Hg emissions have little influence on fish Hg levels. According to the commenter, there is little improvement in fish Hg concentrations from a 41 ton reduction in U.S. Hg emissions between 2005 and 2016.[139] The commenter notes that the EPA acknowledges that "(t)his means that even substantial reductions in U.S. EGU deposition between the simulation years (2005 and 2016) is unlikely to substantially affect total risk." The commenter provided a plot, prepared by Terra Tech, showing the distribution of fish Hg concentrations in 2005 and projected changed for 2016. The commenter notes that the EPA failed to show similar data depicting the projected results of the proposed rule.

Response to Comment 92: While the commenter is correct in pointing out that eliminating U.S. EGU Hg emissions will not eliminate fish tissue Hg and the associated health risks, the EPA does not agree that there is no improvement in fish Hg concentrations between 2005 and 2016, nor that there will be no further improvement from decreasing U.S. EGU Hg emissions from the baseline in 2016. While total risk from all Hg exposures will remain elevated in much of the U.S., much of that risk is associated with global, non-U.S. Hg emissions. U.S. EGUs remain the largest source of Hg emissions in the U.S., and reductions in those emissions will result in reduced Hg deposition in many highly impacted watersheds. As shown in the revised Hg Risk TSD, average U.S. EGU-attributable fish tissue Hg concentrations is estimated to decrease by 44 percent between 2005 and 2016. Although we did not model risk for the 2005 scenario in the revised Hg Risk TSD, we estimated at proposal that the number of modeled watersheds with populations potentially at-risk from Hg emissions from U.S. EGUs would decline from 62 percent in 2005 to 28 percent in 2016.

Comment 93: Commenter 18023 states that the EPA's reporting of IQ point loss is erroneous and not relevant to informing policy. The EPA's analysis in the RIA estimates both an average and population-wide accumulation of IQ point loss. According to the commenter, accumulating IQ point loss across

[139] See EPA, Air Quality Modeling TSD: Point Source Sector Rules at 4 (Feb. 2011) (AQ Modeling TSD)

population provides no meaningful estimate of an affect. The commenter notes that the analysis included a per-exposed child IQ loss due to all Hg deposition contained in fish but the analysis did not include a projected change after implementation of the rule. According the commenter, the U.S. EGU contribution to these numbers is marginal as evidenced by the null values in Tables 2- 6 and 2-7, Hg TSD, for the 50th percentile watershed and therefore the total effect immeasurable.

Response to Comment 93: The EPA disagrees with the commenter's interpretation as to which risk estimates are most relevant for the determination of a hazard to public health. The EPA appropriately focused on populations that frequently consume fish, and watersheds with higher deposition of Hg attributable to U.S. EGUs. Thus the effects at the 50th percentile watershed are not useful in determining that there is not a hazard to public health (although certainly if there were a large effect at the 50th percentile watershed there would be no doubt that a hazard to public health exists). More important is evaluation of risk in watersheds with high levels of EGU-attributable deposition, and as shown in Tables 2-7, even at the 90th percentile of fish consumption, for the 99th percentile watershed in terms of EGU deposition, that EGU deposition alone would be enough to result in potential exposures greater than the RfD. Even at the 90th percentile watershed in terms of EGU deposition, for the highest fish consumption rates (99th percentile), EGU deposition alone is enough to result in potential exposures greater than the RfD.

Furthermore, the EPA disagrees with the commenter regarding the accuracy and relevance of the reported IQ loss in the RIA. The EPA is tasked with providing a national assessment of the benefits of proposed rules. To this end, the estimates provided are national in scope. In fact, the EPA asserts that the estimates presented in the RIA are an underestimate because the EPA was not able to analyze the impacts using the most sensitive endpoints for human health. According to the SAB, "the loss of IQ points is likely to underestimate the impact of reducing methyl Hg in water bodies. The reason is that IQ score has not been the most sensitive indicator of MeHg's neurotoxicity in the populations studied. As noted in the TSD, in the Faroe Islands study the most sensitive indicators were in the domains of language (Boston Naming Test), attention (continuous performance) and memory (California Verbal Learning Test). These two tests are neuropsychological tests that are not subtests of IQ tests and whose relationship with global IQ is not well-characterized. In the Seychelles study, the Psychomotor Development Index was the most sensitive measure and, while this index is a component of the Bailey Scales of Infant Development, it is not highly correlated with cognitive measures (Davidson et al., 2008)[[140]]" (U.S. EPA-SAB, 2011). In addition, the commenter is factually in error regarding the provision of estimates of benefits after rule implementation. See RIA at 5-10.

Comment 94: Commenter 18023 states that the EPA must re-evaluate the risk associated with Hg emissions from utilities by relying on credible assumptions, transparent methodologies, realistic exposure levels, and the EPA's own modeling standards. According to the commenter, the EPA must accurately describe the low health risks posed by utility HAP emissions.

Response to Comment 94: The EPA commissioned a formal peer review of the Hg Risk TSD through the SAB. The overall finding of the panel is that "In summary, based on its review of the draft TSD and additional information provided by EPA representatives during the public meetings, the SAB supports the overall design of and approach to the risk assessment and finds that it should provide an objective,

[140] Davidson P.W., J.J Strain., G.J.Myers, S.W. Thurston, M.P. Bonham et al. 2008. "Neurodevelopmental effects of maternal nutritional status and exposure to MeHg from eating fish during pregnancy." *NeuroToxicol* 29: 767-775.

reasonable, and credible determination of the potential for a public health hazard from Hg emitted from U.S. EGUs" (U.S. EPA-SAB, 2011). Furthermore, "The SAB regards the design of the risk assessment as suitable for its intended purpose, to inform decision-making regarding an "appropriate and necessary finding" for regulation of HAP from coal and oil-fired EGUs, provided that our recommendations are fully considered in the revision of the assessment" (U.S. EPA-SAB, 2011).

The primary advice of the SAB was that 1) EPA should "Improve clarity of the Technical Support Document in terms of the methods used in the risk assessment and presentation of results," 2) EPA should "Expand the discussion of sources of variability and uncertainty in the risk assessment," and 3) EPA should "De-emphasize IQ loss as an endpoint in the risk assessment" (U.S. EPA-SAB, 2011). The EPA revised the Hg Risk TSD as part of the final rulemaking and has made that revised TSD available in the rule docket. The revised TSD addresses the comments of the SAB and includes a detailed listing of the specific revisions made to the Hg Risk TSD. Based on the review by the SAB, the EPA accurately described the health risks posed by utility HAP emissions but disagrees with the commenter's statement that those risks are low, as the Hg Risk TSD results show that up to 28% of modeled watersheds have the potential for subsistence level freshwater fish consumers with total Hg exposures exceeding the RfD to have at least 5% of total Hg risk contributed by U.S. EGUs, and up to 12% of modeled watersheds have the potential for subsistence level freshwater fish consumers to have Hg exposures exceeding the RfD due to Hg emissions from U.S. EGUs even before considering Hg exposures due to other sources.

Comment 95: Commenter 18034 states that due mainly to PM controls the EPA's estimates of HQs due to U.S. EGU-attributable emissions of Hg have already decreased significantly between the 2005 and 2016 scenarios. According to the commenter, U.S. EGU-attributable HQs exceeded 1.5 only as a result of combining the highest percentiles of watersheds with the highest fish consumption rates (e.g., 95th and 99th percentile consumption rates paired with the 95th and 99th percentile watersheds). According to the commenter, the EPA should characterize HQs for more realistic general recreational angler population.

Response to Comment 95: The EPA disagrees with the commenter's implication that 95th and 99th percentile consumption rates are not realistic. The Hg Risk TSD is designed to inform the Appropriate and Necessary Finding. As such, the Hg Risk TSD is intended to address the question of whether Hg released from U.S. EGUs contribute to potential exposures associated with increased risk of neurologic health effects. Thus, the Hg Risk TSD is focused on characterizing risk for the group likely to experience the greatest U.S. EGU-attributable Hg risk (i.e., subsistence fishers active at inland freshwater watersheds – see revised Hg Risk TSD). Specifically, within that subsistence fisher population, the EPA is interested in those individuals who are most at-risk, which includes those who consume the most fish. For that reason, the EPA included consideration for a range of high-end fish consumption rates including the 99th percentile to represent the most highly-exposed individuals. Evidence of these high fish consuming populations can be found in surveys, e.g., Burger et al. (2002), and specialized studies (Burger et al., 1999a,b; California EPA, 1997; Tai, 1999; Corburn, 2002). A search of the literature reveals several studies that identified fishing populations with subsistence or near subsistence consumption rates, including urban fishing populations (including low-income populations), Laotian communities, and Hispanics. The focus on the most highly-exposed individuals is consistent with the appropriate and necessary finding and the treatment of other HAP under CAA section 112. In addition, the SAB concluded that the consumption rates and locations for fishing activity are supported by the data presented in the Hg Risk TSD, and are generally reasonable and appropriate given the available data (U.S. EPA-SAB, 2011).

As stated in the revised Hg Risk TSD, the EPA focused the analysis on those fisher consumers likely to experience the highest levels of individual risk linked to U.S. EGU-attributable Hg. This reflects the goal of determining whether Hg released from U.S. EGUs contribute to potential exposures associated with increased risk of neurologic health effects. Given that focus, it is not necessary to model risk for more generalized fish consuming populations (e.g., recreational anglers) since these populations are "covered" by risk estimates generated for the subsistence fisher populations modeled.

Comment 96: Commenter 11889 submitted, as an addendum to testimony at the Philadelphia hearing, an article for consideration, Stevens et al., 2009.[141]

Response to Comment 96: The EPA appreciates the commenter's identification of this article. The article (Stevens et al., 2009) is focused on assessing whether consumption of fish caught in Montana is "safe" based on comparisons with state consumption guidelines. The regulation of Hg emissions is an issue that is separate from local, state, and federal decisions related to fish consumption advisories. The revised Hg Risk TSD showed that of the watersheds modeled, almost all had potential Hg exposures for subsistence level fish consumers that exceed EPA RfD. As a result, reductions in Hg levels in fish that will result from decreasing Hg emissions from U.S. EGUs will result in reduced risk in most locations for those high fish consuming populations.

Comment 97: Commenter 14115 states that the EPA did not consider key scientific knowledge and many peer reviewed papers that suggest there is no straightforward connection between Hg emissions from power plants, or other man-made sources, to the Hg level in fish. According to the commenter, levels of the biologically active form of Hg, MeHg, are ultimately accumulating in fish tissue depend primarily upon environmental factors, such as sunlight and organic matter, pH, water temperature, and amounts of sulfate, bacteria, and zooplankton present in the ecosystem. MeHg levels in fish do not depend simply on the amount of elemental Hg available for conversion. As a result, according to the commenter, "meaningful management of Hg is likely impossible, because even a total elimination of all industrial emissions, especially those from U.S. coal-fired power plants, will almost certainly not be able to affect trace, or even high, levels of MeHg that have been found in fish tissue over century-long time periods." According to the commenter, a more rational and informed framework for dealing with the relatively low risk of MeHg exposure through fish consumption is required and "EPA's proposed NESHAP may actually be counter-productive to the protection of American public health."

Response to Comment 97: The EPA agrees with the commenter that MeHg levels in fish depend on a complicated set of environmental factors, and the EPA acknowledged this in the revised Hg Risk TSD. Furthermore, the EPA acknowledges that total Hg fish tissue levels are not correlated with levels of total Hg deposition when looking across watersheds because this relationship is highly dependent on the methylation potential at the specific water body, which is affected by pH, sulfate deposition, turbidity, etc. The linearity assumption used in attributing fish tissue MeHg levels to U.S. EGUs is based on the linearity of responses of fish tissue MeHg concentrations within a given water body to changes in Hg deposition, and is not based on correlations between Hg deposition and fish tissue MeHg concentrations between watersheds.

[141] Stevens, DK, McDonald, K. and Bishop, N. 2009. "Are Lake Trout (Salvelinus namaycush) From Flathead Lake, Montana, USA "Safe" to Eat? An Integrated Hg Risk Evaluation Study." *Environmental Bioindicators*, 4, 303-317.

The EPA specifically asked the SAB to evaluate the EPA's assumption of linear proportionality in the relationship between Hg deposition and fish tissue MeHg concentrations, supported by the Hg Maps analysis. The SAB provided the following overall response, which generally supports the EPA's approach:

"The SAB agrees with the Hg Maps approach used in the analysis and has cited additional work that supports a linear relationship between Hg loading and accumulation in aquatic biota. These studies suggest that Hg deposited directly to aquatic ecosystems can become quickly available to biota and accumulated in fish, and reductions in atmospheric Hg deposition should lead to decreases in MeHg concentrations in biota. The SAB notes other modeling tools are available to link deposition to fish concentrations, but does not consider them to be superior for this analysis or recommend their use. The integration of Community Multiscale Air Quality Modeling System (CMAQ) deposition modeling to produce estimates of changes in fish tissue concentrations is considered to be sound. Although the SAB is generally satisfied with the presentation of uncertainties and limitations associated with the application of the Hg Maps approach in qualitative terms, it recommends that the document include quantitative estimates of uncertainty available in the existing literature" (U.S. EPA-SAB, 2011).

The EPA revised the Hg Risk TSD to include additional discussions of uncertainty associated with application of the assumption of linear proportionality in the relationship between Hg deposition and fish tissue Hg levels, and based on the SAB comments, disagree with the commenter's statement that "meaningful management of Hg is likely impossible, because even a total elimination of all industrial emissions, especially those from U.S. coal-fired power plants, will almost certainly not be able to affect trace, or even high, levels of MeHg that have been found in fish tissue over century-long time periods." The EPA provided credible estimates that U.S. EGU-attributable Hg deposition results in up to 29% of total modeled watersheds with populations potententially at-risk.

Comment 98: Commenter 18033 states that the Hg TSD is still based on several unsupported general concerns about Hg levels in the environment ostensibly designed to unearth some demonstrable evidence of "risk to public health." According to the commenter, like the 2000 determination, the EPA has not adequately justified its "appropriate and necessary" determination. The findings that so little health benefit would result from aggressive Hg regulation are unsurprising. The commenter asserts that the modeling supporting CAMR found that EGUs contribute a "relatively small percentage" to fish tissue MeHg levels in the U.S. More importantly, the agency concluded implementation of CAIR would result in a level of Hg emissions that would not cause hazards to public health.

The commenter states that the EPA's findings are similar to the 2000 findings where the EPA found a plausible link between anthropogenic emissions of Hg from sources in the U.S. and MeHg in fish. According to the commenter, "plausible" is very much a euphemism for unproven as the agency further admits that, "…it was not possible to quantify how much of the MeHg in fish consumed by the U.S. population results from U.S. anthropogenic emissions, as compared to other sources of Hg."

Commenter 18033 concludes that to date the EPA has not provided any demonstrable evidence in the rulemaking record to show that anyone in the country has suffered adverse health problems as a result of Hg emissions from coal-fired EGUs. Rather, the EPA is asking the public to accept a higher cost of electricity and job losses based on an attenuated line of reasoning—EGUs emit Hg; some of that Hg is bound to deposit on the land or in water bodies; some of that deposited Hg in the water bodies can possibly be transformed into MeHg; and some of the MeHg produced in the sediments of those water bodies is consumed by fish where it ultimately enters the food chain.

Response to Comment 98: Based on the review by the SAB, the EPA accurately described the health risks posed by utility HAP emissions and disagrees with the commenter's statement that the EPA has not provided any demonstrable evidence to show that adverse health risks exist. The EPA applied peer reviewed modeling to estimate the deposition of Hg attributable to U.S. EGUs. The EPA also applied an assumption of linear proportionality between changes in deposition and changes in fish tissue Hg levels, which has been supported by the SAB. The EPA established a peer reviewed RfD for Hg which provides a benchmark for evaluating the presence of risks from Hg using the hazard quotient, and which the SAB agrees "is appropriate as the primary means of expressing risk because it is based on an established RfD for MeHg that reflects a range of potential neurobehavioral effects" (U.S. EPA-SAB, 2011). Based on comparisons of total and U.S. EGU attributable Hg exposure to the RfD, the revised Hg Risk TSD reports that up to 29% of total modeled watersheds have the potential for subsistence level freshwater fish consumers with total Hg exposures exceeding the RfD, 24% of modeled watersheds have the potential to exceed the RfD and have at least 5% of total Hg risk contributed by U.S. EGUs, and up to 10% of modeled watersheds have the potential for subsistence level freshwater fish consumers to have Hg exposures exceeding the RfD due to Hg emissions from U.S. EGUs even excluding Hg exposures due to other sources. As explained in the preamble, the EPA believes each of these results independently supports our conclusion that U.S. EGUs pose hazards to public health.

1G - Non-Hg Case Studies

1. Non-Hg case studies emissions.

Commenters: 17621, 17723, 17772, 17775, 17800, 17820

Comment 1: Commenters 17621 and 17775 state that the EPA's use of the arithmetic mean to determine emission factors for a log-normally distributed data set is inappropriate. According to the commenters, geometric mean should be used.

Response to Comment 1: The EPA disagrees with the commenters' assessment of the EPA's use of the arithmetic mean for computing emission factors. The EPA has always relied on the use of arithmetic, not geometric, means for determination of emissions factor estimates. By way of example, the Emission Factor Documentation for AP-42 CAA section 1.1 Bituminous and Subbituminous Coal Combustion document, which was developed in April 1993, describes how emissions factors were developed for the electric utility generating industry.[142]. This document plainly states that "…EPA guidance also prescribes that when averaging emission (sic) factors together in order to obtain an AP-42 factor, the average should be an arithmetic mean…"

Apart from remaining consistent with existing policy, the use of the arithmetic mean for emissions factors provides the single best value for predicting national emissions estimates, as shown in the table below:

	Emissions (tons/year)				Percent of Emissions		
		Estimator					
	Actual	Arithmetic Mean	Geometric Mean	Median	Arithmetic Mean	Geometric Mean	Median
PM	22,945	28,204	12,303	14,288	123	54	62
As	13	8.8	1.7	1.3	68	13	10
Cr	63	56	5.3	3.5	88	8	6
Ni	21	20	6.1	4.7	94	29	22
Average					93.3	26	25

This table was populated with emissions and fuel use data from the ICR. The arithmetic and geometric means, as well as the median, was determined from emissions data, in terms of pounds pollutant per million BTUs. These estimators were then multiplied by each site's average fuel use rate, in terms of millions BTUs per hour, and 8,760 hours per year, then summed to yield an annual emissions estimate. This value was then compared to the sum of each site's actual emissions, obtained from measured emissions and fuel use data. With respect to these data, in each and every instance, use of the arithmetic mean provides emissions estimates closest to actual emissions; in fact, within an average of seven percent of actual emissions. More specifically, use of the geometric mean, as recommended by the commenter, always underpredicts actual emissions by an average of more than seventy percent.

[142] Available on the internet at http://www.epa.gov/ttn/chief/ap42/ch01/bgdocs/b01s01.pdf

Comment 2: Commenters 17621 and 17775 state that emission factors for Cr were inappropriately calculated. According to the commenters, EPRI's review of the ICR data (Bin 1– ESP only) indicates that the data are clearly not normally distributed based on the EPA's own guidelines. Thus, the use of an arithmetic mean is not appropriate, and the use of a geometric mean is more appropriate for a lognormal distribution. According to the commenter, a March 16, 2011 memo by RTI indicated that data sets in the MACT analyses were to be examined for normality by two ratios—skewness and kurtosis. The 50 sites in Bin 1 (ESP only) were examined for arsenic, Cr, and Ni. The average, standard deviation, skewness, kurtosis (and their error estimates) for both normal and lognormal transformed values have been calculated and are presented in Table E-2. As stated by RTI, when the ratios of skewness and kurtosis to their error values exceed 2.0, the normal distribution is rejected. By these criteria, arsenic, Cr, and nickel data are clearly not normally distributed. Consequently, the arithmetic average is not appropriate for estimating the bin mean value, and a geometric mean is appropriate for developing emission factors.

Response to Comment 2: See also response to Comment 1. The EPA disagrees with the commenters' assertion that use of an arithmetic mean is fundamentally flawed based on statistical arguments and based on approaches developed for the MACT floor analysis. The purposes of the emissions factors developed for the case study emissions is quite different from the MACT program, which establishes emissions limits using emissions data from the best performing sources in a specific category. Consequently, an emissions factor value should not be expected to replicate a MACT emissions floor as the emissions factor is representative of a national average of all sources within a given category while the MACT floor is representative of the best performing sources within that category. Based on the comments, the EPA revised its methods for developing emissions factors for the case studies to include well-established, robust outlier checks – Dixon or Rosner tests, depending on the number of values - when more than three values are evaluated. These tests are the appropriate tests to use for the purpose of developing emission factors from stack test data, rather than the statistical approaches cited by the commenters.

As shown in Figure 1 on page 4 of the Introduction to AP-42[143] a hierarchy exists for describing emissions. Continuous, site-specific, direct measurement of the pollutants of concern, such as provided by continuous emissions monitoring systems (CEMS) provides the most accurate representation of site emissions. Next, discreet, site-specific measurement of the pollutants of concern, as determined through emissions testing, when combined with process operation knowledge, can provide accurate representation of site emissions, when CEMS data are not available. Emissions factors are the least accurate means for describing site-specific emissions, and there are various emission factor approaches available.

In 1993, the EPA approved the emissions factor approach mentioned by the commenter – computing emissions factors by using equations containing filterable PM emissions, fuel metal content, and fuel ash content - for those sources that had the requisite discrete, site-specific data. As noted by EPRI and DOE, the equations they developed were based on between 8 and 38 paired observations for nine metals with correlation coefficients (r^2) ranging from 0.51 to 0.83. Moreover, the equation developers noted that "…the absolute average emission level varied considerably for a given fuel concentration…" Given the low correlation coefficients, few data pairs, and absence of condensable PM data, the EPA decided as part of the ICR to collect metals and ash content of fuel, filterable and condensable PM emissions, and concurrent metals emissions for nine metals in order to assess the prediction capability of the equations.

[143] See http://www.epa.gov/ttn/chief/ap42/c00s00.pdf

The table shown below identifies the emissions factors developed from the ICR data for use in the final rule. All emissions factors are in terms of pounds pollutant per million BTUs.

Non-Hg metals Emissions Factors from EGU ICR data, lb /mMBTU			
Non – Hg Metal	Emissions Factor for Oil Units	Emissions Factor for Coal Units by Control Device(s)	
	(SCCs include 10100401, 10100404, 10100501, and 10102101)	Controls	
		ESP – electrostatic precipitator; FF – fabric filter; DS – dry scrubber; WS – wet scrubber	
Antimony	3.30 e-05	ESP	1.45 e-06
		FF, DS, WS	4.22 e-07
Arsenic	2.55 e-06	ESP	1.25 e-05
		FF	9.72 e-07
		DS	1.61 e-06
		WS	2.52 e-06
Beryllium	1.62 e-07	ESP	4.16 e-07
		FF, DS, WS	1.18 e-07
Cadmium	3.62 e-07	ESP	3.81 e-07
		FF, DS, WS	2.20 e-07
Cr	5.70 e-06	ESP, FF	4.89 e-05
		DS	1.53 e-06
		WS	4.75 e-06
Cobalt	1.71 e-05	ESP, FF	1.58 e-06
		DS, WS	5.10 e-07
Lead	1.3 e-05	ESP	6.61 e-06
		FF, DS, WS	2.25 e-06
Manganese	9.42 e-06	ESP, FF, DS, WS	1.01 e-05
Ni	3.46 e-04	ESP, FF, WS	2.74 e-05
		DS	3.41 e-06

Using the ICR data, the EPA conducted regression analyses between metals emissions measured at the site and predicted from the EPRI equations. If the EPRI/DOE equations accepted in AP-42 were good predictors of actual metals emissions, the correlation coefficient (r^2) would be high, i.e., between 0.85 and 1.00. As indicated in the table below, which shows the individual metals, number of paired observations, and correlation coefficient, the EPRI equations are not good predictors of metals emissions. The EPA concludes that the emission test data is a more accurate predictor of actual emissions than the formulas cited by the contractor, and the EPA has therefore used emission test data and emission factors based on the arithmetic mean rather than the equation-based emission factors.

Metal	Pairs of Observations	r^2
Antimony	66	0.02

Arsenic	112	0.05
Beryllium	104	0.11
Cadmium	78	0
Cr	126	0
Cobalt	134	0
Lead	138	0.15
Manganese	145	0
Ni	149	0.01

Comment 3: Commenters 17621 and 17820 state that EPRI's review of the individual run data in the EPA's data set found seven EGUs with elevated concentrations of Cr, arsenic, nickel, and sometimes manganese. The average Cr concentration from these suspect runs was 5.62E-5 lb/MMBtu, which is more than an order of magnitude higher than the average Cr concentration of 6.2E-6 lb/MMBtu obtained in all the other runs. Two EGUs (Conesville Unit 3, James River Unit 5) had Cr emission factors (EFs) that were statistically significant outliers or extreme values (in this case, defined as the average of the EF data set plus three standard deviations, $p < 0.0001$). Moreover, in some cases the amount of Cr measured at the stack was greater than the amount entering with the coal (e.g., James River Unit 5, Gallatin Unit 2). Commenters suggest this analysis suggests potential metallic contamination in one or more runs, and data from these seven EGUs should be excluded from any risk analysis.

Response to Comment 3: The EPA disagrees that the data cited are outliers because the EPA employed appropriate statistical outliers tests and has concluded that the data noted by the commenters are in fact not outliers. The identification of sources whose measured emissions do not match the commenter's preconceived notion of emissions behavior is not surprising. There are many possible explanations for these differences. For example, the inconsistency between the test data and the coal analysis could be due to any number of reasons including unrepresentative coal sampling, control device problems, degradation of the refractory, or sampling contamination. The notion that test data should be discarded because it does not match initial expectations is unfounded. In addition, source representatives collected, obtained, and most likely reviewed, all data before certifying their accuracy and submitting them to the EPA. If source representatives or the commenter were concerned about data accuracy, then they should have taken additional steps to explain their concern or improve their results, including qualifying their submissions or conducting additional testing. As the EPA is unaware of such additional test activity, the EPA maintains that the measured, submitted, and certified data are an accurate representation of site emissions. Consistent with that belief, the EPA finds that all relevant data, i.e., those data that are not removed via outlier tests, are suitable for emissions factor development.

Comment 4: Commenter 17621 states that based on its review of the data, metallic contamination was suspected at some of the ICR test sites that showed elevated levels of nickel and in some cases manganese, as well as Cr. Although the Method 29 blank sample train data from these suspect ICR test sites did not typically indicate a problem with sample system or reagent contamination for Cr, nickel, and manganese, the presence of elevated levels for all three of these elements suggests some other source of metallic contamination. Cr data from the ICR data set were evaluated on the basis of ppmw in the stack particulate matter(PM), in an attempt to determine a reasonable range of enrichment factors and to thus develop another tool to identify sites with possible contamination issues. The commenter provided a figure showing all the individual run ICR data for coal-fired units with stack filterable PM plotted versus Cr in the stack particulate (e.g., lb/MMBtu Cr divided by lb/MMBtu FPM, expressed on a ppmw basis) for individual runs. Higher Cr on a ppmw basis is expected at lower filterable PM emissions, due to enrichment effects in the fine particulate. However, there are a significant number of

individual test runs that show high Cr levels in the stack particulate at high stack filterable PM emissions, suggesting a problem with these data. The commenter compared this data to an analogous plot of Cr data, from the historical data set used to derive the emission correlations employed in EPRI's 2009 risk modeling. The commenter notes that the plots are generally similar, but the historical data does not show the same issue with outlier data points at higher filterable PM emissions.

Commenter states that the suspect runs for Cr shown in Figure E-1 are associated with the units shown in Table E-3 Those units used by the EPA in the calculation of the Phase II average emission factor for various control class bins are noted. The greatest impact likely occurs for the "-ESP" and "2-FF" bin average EFs, since these groups contain the largest number of sites with potential contamination issues. In some cases, (e.g., James River U5, Gallatin U2, Valley B1, Valley B3, and Craig C1) the amount of Cr measured at the stack was greater than the amount entering with the coal, when coal and stack emission values were compared on a lb/MMBtu basis. This is another indication of possible metallic contamination issues for stack gas measurements at these sites. The commenter provided a summary of Part III individual run ICR coal and stack measurement data from James River Unit 4 and Unit 5. Run 2 at Unit 4 shows both Cr and nickel emissions that are 5 to 10 times higher than Runs 1 and 3, yet the particulate emission rates for all three runs are comparable. Stack emission levels for Run 2 were at or above the inlet coal Cr concentration on a lb/TBtu basis. When expressed on a ppmw basis in the stack particulate, the Run 2 data indicate 18,000 ppmw (nearly 2 wt%) Cr in the PMr. This is inconsistent with other ICR data and historical test data, as shown previously in Figures E-1 and E-2. Likewise, all runs at Unit 5 show elevated Cr levels in the stack PM, as well as stack emission levels that are greater than the inlet coal levels for Runs 1 and 2.

Response to Comment 4: See response to Comment 3.

Comment 5: Commenter 17621 states that annual mass emission rates for each of the EPA case study facilities were developed using revised emission values or revised emission factors for various control class bins. For sites tested in the ICR, revised annual emission values were calculated by omitting the suspect individual run values. If all individual runs for a unit were suspect, a revised average emission factor for the appropriate control class bin was used to estimate emissions. Revised average emission factors for various control class bins were developed using the Phase II data sets presented in the EPA case study spreadsheet supporting data file as the starting point. Runs from units with suspect Cr data sets were then excluded from the Cr and nickel average emission factor calculations for the control configurations that apply to the list of case study plants. In addition, the commenter also developed revised emission factors by coal rank within each applicable control class bin. The resulting final set of revised emission factors used for units listed in the EPA case study spreadsheet are summarized and compared to the original Phase II emission factors calculated by the EPA in that spreadsheet. Note that no adjustments were made to the EPA's Phase II average arsenic emission factors for various control class bins. The commenter provides both the arithmetic average and the geometric mean value for each category. Note that the geometric mean, which may be the better statistic for most cases, is close to the arithmetic mean for the categories from which suspect data have been excluded. The arithmetic mean and geometric mean revised factors are based on the same data sets from which test sites with suspect data have been excluded.

The arithmetic mean values were used by the commenter to estimate actual annual emission for one or more units from the following plants listed in the EPA's case study spreadsheet: Canadys (ORIS 3280), Chesapeake (ORIS 3803), Conesville (ORIS 2840), Cromby (ORIS 3159), Labadie (ORIS 2103), Merrimack (ORIS 2364), Monticello (ORIS 6147), and Muskogee (ORIS 2952). All actual annual

emission rates were calculated based on the actual annual heat input values, as presented in the EPA's case study spreadsheet as MMBtu per year.

Response to Comment 5: In regard to commenter's assertion that outlier values should be excluded from emission factor averages, the EPA agrees and has therefore employed appropriate outlier tests, though these tests are different from those used by the commenter. See response to Comment 100 above. In regard to commenter's assertion that the geometric mean may be a better statistic for these purposes, see responses to Comments 1 and 2 above.

Comment 6: Commenter 17621 states that in EPRI's 2009 risk modeling project, emission correlations were developed by EPRI based on historical measurement data for HAP trace elements and then used to estimate emissions from each coal-fired unit in industry. These correlations predict lb/TBtu emission factors for each trace element, based on the following inputs: trace element content of the coal (ppmw), ash content of the coal (ash fraction), and the stack particulate emission rate (lb/MMBtu). These correlations represent modified versions of the correlations adopted by the EPA for estimating emissions from coal-fired units in the "AP-42 Compilation of Air Pollutant Emission Factors." The commenter provides an example of these emission factor correlations for arsenic.

The commenter believes that these correlations provide a more accurate representation of emissions compared to the average emission factor approach used by the EPA for case study sites not measured as part of the ICR. For example, the EPA's case study risk assessment included the four bituminous/ESP units at the Chesapeake Station, but none of these units was tested in the ICR. Therefore, the EPA appears to have used average emission factors derived from ICR measurements for units equipped with ESPs to estimate emissions from Chesapeake. The commenter reviewed the ICR Part II database and found that there were sufficient site-specific measurement data regarding coal composition and stack PM emission rates at Chesapeake to derive emission factors based on the EPRI correlations.

Response to Comment 6: See responses to Comments 1 and 2 above. In addition, while the EPA acknowledges some site-specific measurement data regarding coal composition and stack PM emissions rates at the Dominion Chesapeake Bay Energy Center facility, the EPA concluded based on the analysis described in the response to comment 100 above that the emission factor equations that would be used with the data noted by the commenter would be poor predictors for the emissions rates.

Comment 7: Commenters 17621 and 17775 state that emission factors for Cr were inappropriately calculated. According to the commenters, the emission factors are not differentiated by coal rank. For case study facilities not tested in the ICR, the EPA case study spreadsheet provides an assignment to a specific coal rank and control class. However, for case study facilities with ESPs not tested in the ICR, the EPA apparently used a single average emission factor that is not differentiated by coal rank.

Response to Comment 7: The EPA disagrees that coal rank must be a factor in computing Cr emission factors for use in the case studies. The EPA's analysis has demonstrated that coal rank appears to play no role in metals emissions, despite the EPRI equation developers inability to find meaningful differences in emissions from coal rank, integrating "…the data from the various control technologies and coal types" into generic equations.[144] The EPA's newly revised emissions factor development procedures have the ability to isolate and compare subgroups based on control device type or coal rank;

[144] See page 3-1 of EPRI's Electric Utility Trace Substances Synthesis Report, TR-104614, 1994.

the ICR data were subjected to these tests and no statistical significance was found between coal rank groups.

As shown in the table below, the metals emissions from coals whose rank is less than 8300 BTU/lb lies within the metals emissions from coals whose rank is at least 8300 BTU/lb.

	Control	Metals Emissions Range	
Metal	Configuration	by heat input, lb /mmBTU	
		< 8300 BTU/lb	≥ 8300 BTU /lb
Cr	Fabric filter and ESP	1.57E-07	1.77e-07 to 8.35e-04
	Dry scrubber	-------	1.40e-07 to 7.52e-06
	Wet scrubber	-------	1.36e-06 to 5.69e-05
Arsenic	ESP	-------	1.73e-07 to 2.75e-04
	Fabric filter	1.65E-06	1.64e-07 to 4.11e-06
	Dry scrubber	1.00E-07	6.08e-08 to 2.33e-05
	Wet scrubber	-------	2.34e-08 to 2.31e-05

Comment 8: Commenters 17621 and 17775 state that the ICR test EGUs were omitted from the 1-ESP bin used by the EPA to calculate the Phase II average emission factors. According to the commenters, the Sunbury, boiler 4, a coal-fired unit with ESP controls, should be included in the 1-ESP bin calculations. The commenters request that the EPA check the ICR data set to be sure all test units have been properly assigned to a control class bin for the emission factor calculations.

Response to Comment 8: The EPA agrees with the commenter that the unit mentioned - WPS Energy Services Sunbury Generating Unit 4 - was not included in the calculation of emission factors for the proposed rule. This unit was included in the ICR as one of the fifty additional coal-fired electric utility steam generating units not otherwise chosen for emissions testing as a best performing unit.

Minimum and maximum values from similar units (coal-fired with ESPs) found during the emissions factor development for the final rule bracket Sunbury Unit 4's reported emissions:

	Emissions Factor, lb/mmbtu			
Pollutant	Minimum value from ICR test data subset	Average from Sunbury Unit 4 ICR test data	Average from ICR test data subset	Maximum value from ICR test data subset
Arsenic	1.73e-7	6.46e-6	1.25e-5	2.75e-4
Cr	1.77e-7	5.85e-6	4.89e-5	8.35e-5
Ni	1.54e-7	6.10e-6	2.74e-5	3.73e-4

For the final rule, the EPA did not include the test data for Sunbury Unit 4 in its analysis. However, since the reported values from Sunbury Unit 4 are a fraction of the average from the ICR data (arsenic: 52%, Cr: 12%, Ni: 22%), and since there is already a large sample size for the data the EPA did use for the average emission factors, the impact of these data would be negligible to the results of the case studies. Furthermore, the coal emission factors for the bin associated with this unit (metals bin 103 "bituminous coal, conventional boiler, with ESP") was not used at most of the case studies showing risk > 1/million. The emission factors that would have been impacted by these data were used for 3% of the Cr (risk driver) emissions at the Conesville facility and just 0.01% of the emissions at Yorktown. Though the factor was used for 100% of the emissions at the Dominion Chesapeake Bay Energy Center

facility, any minimal impact of additional test data given the large sample sizes already used would not have changed the results of the final case studies.

Comment 9: Commenters 17621 and 17775 state that EPRI found several errors in the stack parameters (e.g., number of stacks, stack flow, velocity) used by the EPA for several case study EGUs. These errors would likely have implications for calculated emissions, as well as for the overall risk assessment**.**

Response to Comment 9: The EPA agrees that stack parameters impact estimated risks. The EPA modeled each coal unit as a separate emission source in AERMOD (with the exception of Spruance and Yorktown). For units that share a common stack, the units were given the same stack parameters and location but different source identifiers. This was done to facilitate the processing of emissions that would be input into AERMOD. The number of modeled stacks is not incorrect as the commenter stated. Regarding the comment about incorrect stack parameters, The EPA used the stack parameter data collected from facilities and submitted by the commenter in the modeling of the case study facilities for the final rule.

Comment 10: Commenter 17723 states that only Cr VI was found to pose non-cancer risks to the maximally exposed individual of greater than one in a million. According to the commenter, considering the analytical difficulties in measuring Cr in general and Cr (VI) in particular this finding has to be taken with a "grain of sodium chloride." The commenter notes that their testing performed in response to the ICR indicated that in some test runs, the unit was emitting vastly more Cr than was originally present in the coal. The commenter states that the EPA did not follow conventional data rejection standards, concluded that transmutation of elements within a coal-fired boiler environment must be chemically plausible, and included questionable results into their exposure risk models. The commenter notes that any regulation of non-Hg metals should be restricted to Cr (VI), and then only following a rigorous quality review of the emissions data collected during the ICR.

Response to Comment 10: See response to Comment 3. The EPA disagrees with the commenter's assertion that test data used in calculating emission factors for the case studies is flawed. However, to further strengthen the EPA's analysis in response to this and other comments, the EPA applied statistical outlier tools to the Cr and other metal source test data in developing emissions rates to use for the final case study analysis. The EPA asserts that the sample sizes and approaches used for the case study Cr emission factors have followed a rigorous quality review.

Further, the EPA disagrees with the commenter's assertion that Cr is the only non-Hg HAP that should be regulated. Source categories listed for regulation under CAA section 112(c) must be regulated under CAA section 112(d), and the D.C. Circuit Court has stated that EPA has a "clear statutory obligation to set emission standards for each listed HAP." *See Sierra Club v. EPA*, 479 F.3d 875, 883 (D.C. Cir. 2007), *quoting National Lime Association v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000). Therefore, even if EPA concluded that CAA section 112(n)(1) authorized a different approach for regulating HAP emissions from U.S. EGUs, the chosen course (i.e.,listing under CAA section 112(c)) requires the Agency to regulate under CAA section 112(d) consistent with the statute and case law interpreting that provision. In any case, the EPA disputes that Cr (VI) is the only non-Hg metal HAP that poses a hazard to public health and the environment. The EPA acknowledges that Cr was the primary cancer risk driver, but arsenic and nickel also pose significant risk in the case studies. Further, the EPA has not evaluated the additional risk posed from the non-Hg metal HAP from other sources nearby EGUs, and the EPA maintains that the uncertainty associated with that potential additional risk is further support for the agency's finding.

Comment 11: Commenter 17772 states that none of the 4 out of 16 coal-fired units that posed a risk greater than one in a million was actually tested for Cr(VI). Instead, these four facilities were tested for Cr compounds and a previous study that included four coal-fired boilers was used to make the unsupported assumption that 12% of the Cr will be Cr(VI) and the remaining 88% will be trivalent Cr or Cr(III) for every coal-fired unit. According to the commenter, the EPA failed to recognize that Cr(VI) is highly water-soluble and is easily reduced to Cr +3 in the presence of SO_2 in a low pH environment. The resulting Cr(III) would be expected to precipitate out in a FGD. The actual amount of Cr(VI) that would be present in the emissions from an EGU with a wet scrubber is likely to be far lower than the 12% estimate made by the EPA.

Response to Comment 11: The EPA disagrees with the commenter's assertion that any impact of scrubbers will impact the case study analyses. In the EPA's final case study analysis, six facilities have risk greater than one in one million, and of these, four facilities have Cr as the risk driver (James River, Conesville, TVA Gallatin, and Dominion – Chesapeake Bay). For these facilities, none of the units contributing the bulk of the Cr emissions have scrubbers according to the data provided to the EPA by those facilities, so scrubber impacts on Cr speciation is not relevant to the EPA's conclusions based on the non-Hg case studies.

In any case, the EPA disagrees with the commenter's conclusions about the impacts of scrubbers on Cr speciation. There have been several studies that have attempted to quantify the amount of Cr(VI) in the PM resulting from the combustion of coal. These studies have typically shown that Cr(VI) can range from <1% of the total Cr to up to 20%.[145,146,147] The specific amount is likely a function of the complex flue gas chemistry, the specific coal type, the combustion conditions, and site-specific configuration of the post-combustion control equipment. The EPA has seen, in some cases, an increase in leachable (i.e., water soluble) Cr in coal combustion residuals (fly ash, scrubber sludge) for units that have selective catalytic reduction (SCR) units for NOx control.[148] Since Cr(VI) was not measured during the 2010 Utility ICR, an assumption of 12% Cr(VI) seems conservative, but very reasonable.

Regarding the comment that "EPA apparently failed to recognize that Cr(VI) is highly water-soluble." The EPA agrees that some Cr(VI) compounds are highly water soluble. The Cr(VI) oxide (CrO_3) is water soluble and some chromates – $NaCrO_4$, K_2CrO_4, etc. are water soluble. However, there are other Cr(VI) compounds, for example calcium chromate ($CaCrO_4$), that are not very water soluble. The water solubility will only enhance the control of Cr(VI) compounds over Cr(III) compounds in an FGD scrubber if the Cr(VI) compounds are in a gaseous state, which is unlikely. Control of sub-micron Cr particulate matter in an FGD scrubber will be limited by mass transfer, not by solubility. As a result, there is no reason to assume that Cr(VI) particulate matter would have enhanced control over that of

[145] Shah, P.; Strezov, V.; Prince, K.; Nelson, P. 2008. "Speciation of As, Cr, Se and Hg under coal-fired power station conditions," *Fuel*, 87 1859.
[146] Kingston, H.; Cain, R.; Huo, D.; Mizanur Rahman, G. 2005. "Determination and evaluation of hexavalent Cr in power plant coal combustion by-products and cost-effective environmental remediation solutions using acid mine drainage," *J. Environ. Monit*., 7, 899.
[147] Huggins, F.; Najih, M.; Huffman, G. 1999. "Direct speciation of Cr in coal combustion by-products by X-ray absorption fine-structure spectroscopy," *Fuel*, 78 233.
[148] Kosson, D; Sanchez, F.; Kariher, P.; Turner, L.H.; Delapp, R.; Seignette, P. 2009. "Characterization of Coal Combustion Residues from Electric Utilities - Leaching and Characterization Data"; EPA-600/R-09/151; U.S. EPA.

Cr(III) compounds in a typical FGD scrubber. Given these considerations, EPA maintains that an assumption that 12% of the Cr emitted is Cr(VI) seems reasonable even for units with wet scrubbers.

The technology referenced - that Cr(VI) " is easily reduced to Cr(III) in the presence of SO_2 in a low pH environment" - refers to a water treatment technology for reducing Cr(VI) to Cr(III) in solution - often for treating waste streams from plating operations. In the FGD environment, a Cr(VI) compound that is in solution has already been captured. The presence of SO_2 and local low pH environments (and the fact that Cr(VI) is easily reduced) should result in some Cr(VI) reduction. However, again, that does not reduce air emissions of Cr(VI)...since that Cr(VI) was already captured. In any case, this is not entirely effective since the bulk pH of the scrubber solution is usually held at about a pH of 6 and the efficiency of the reduction reaction is highly dependent on pH with most waste water treatment processes operated between pH 2.0 and 3.0.[149] Soluble forms of Cr have been found in FGD scrubber effluents and leached from coal combustion solid residuals (fly ash, scrubber sludge, etc.)

Comment 12: Commenter 17800 states that two of the OG&E plants, Muskogee and AmerenUE-Labadie, were never sampled as part of the ICR Part III. However, the EPA stated that emission estimates are from the 2010 ICR utility data and that "Where test data were not available for a specific unit, emission factors were derived from similarly configured units…" According to the commenter, the EPA gives no detailed description of how emissions for these plants were developed and thus modeling results from these units should be considered suspect. Since the AmerenUE-Labadie plant burns a variety of subbituminous coals, the actual non-Hg emissions determined in the EPA's analysis may not be representative.

Response to Comment 12: The EPA disagrees with the commenter that the EPA gave no detailed description of how emissions for these plants were developed. These data were provided in an Excel spreadsheet and PDF file to the docket for this rule on 05/05/2011[150]. The EPA agrees with the commenter that Muskogee and Ameren UE-Labadie facilities were not sampled, but this fact does not change the outcome of the case studies because neither of these facilities showed risk > 1/million in the EPA's final analysis. The EPA agrees that site-specific test data are a better source of emissions information when it is available, but use of emission factors is an appropriate option when no better data are available. The EPA used test data for all of the case studies where it was available.

2. General comments on non-Hg Risk Case Studies

Commenters: 17383, 17621, 17689, 17716, 17723, 17760, 17772, 17774, 17808, 17820, 17877, 17885, 18025, 18831, 18500, 17871, 10943, 6543, 19536/19537/19538, 18023

Comment 13: Several commenters (19536, 19537, 19538) state that the EPA's 16 case study analysis reaffirms the need to regulate HAP emitted by both coal and oil-fired EGUs. The commenters note that over 40% of the case studies conducted by the EPA to quantify health hazards associated with the inhalation of non-Hg HAP indicated a cancer risk greater than or equal to the one in one million threshold level threshold required to delist a source as a category regulated under section 112 of the CAA.[151] The case study examining cancer risk from an oil-fired EGU indicated that the greatest cancer

[149] Pollution Prevention and Control Technologies for Plating Operations available at http://www.nmfrc.org/bluebook/tocmain.htm
[150] See Docket ID number EPA-HQ-OAR-2009-0234-4654
[151] 76 FR 25,011

risk estimate quantified in the assessment, ten in one million, is associated with this source.[152] The commenters note that studies of acid gases were not included due to uncertainties in their emission rates, and that potential overlapping impacts from different EGUs and other pollutant sources likely compound the cancer risks estimated in the case studies. The commenters agree with the EPA's decision to only peer review the speciation of Cr and Ni in the analysis of the health risks posed by non-Hg EGU emissions. The AERMOD modeling system methodology applied in the EPA's non-Hg HAP chronic inhalation test cases is well-established and has undergone numerous evaluations. For example, one recent comparative study finds that AERMOD produces the most reliable exposure risk simulation results among four different common exposure assessment methods.

Response to Comment 13: None needed.

Comment 14: Commenter 18023 states that the EPA's 16 plant assessment may be flawed by the use of "beta" tests versions of the processor software and cannot be relied upon to draw conclusions. According to the commenter, the EPA processed the meteorological data used in these assessments with beta (*i.e.*, test) versions of meteorological processors AERMET and AERMINUTE. The commenter obtained from the EPA the meteorological data used for the EPA's assessment of the Conesville facility and processed these data with the EPA's current regulatory versions of these processors, which differ from the beta version. A comparison of the hourly wind speed and hourly wind direction data produced by the beta processor and by current EPA processors revealed numerous and often substantial disparities.

Response to Comment 14: The EPA remodeled the case study facilities using the current versions of AERMINUTE (version 11059), AERMET (version 11059), and AERMOD (version 11103). While there were differences in the number of calm and missing winds in the current AERMINUTE/AERMET output compared to the beta version, the resulting risks differed by less than 2%, on average. For Conesville, which had the largest difference in calms between the beta and current versions of AERMINUTE/AERMET, the risks differed by 3%. For the final rule, the case study facilities have been modeled with the current available versions of AERMINUTE, AERMET, and AERMOD.

Comment 15: Commenter 18023 states that the EPA's finding that only three coal-fired facilities and one oil-fired facility out of roughly 440 coal-fired facilities and 97 oil-fired facilities in the U.S. indicated risk greater than one in a million supports a finding that it "appropriate" to regulate those four and not the other 537.

Response to Comment 15: The EPA disagrees. The 16 facilities the EPA selected as case studies for assessment may not represent the highest-emitting or highest-risk sources. Although case study facility selection criteria included high estimated cancer and non-cancer risks using the 2005 NEI data, high throughput, and minimal emission control, another necessary criterion was the availability of ICR data for the EGUs at those facilities (or for similar EGUs at other facilities). Because the ICR data were collected for the purpose of developing the MACT standards, the ICR was targeted towards better performing sources, with a smaller set of random recipients. Therefore, facilities for which ICR data were available may not represent the highest-emitting sources. The EPA's assessment of the case study facilities for the proposed rule concluded that three coal-fired facilities and one oil-fired facility had estimated lifetime cancer risks greater than one in a million. For the final rule, revisions were made to the 16 case studies based on comments received, and the results indicate that five coal-fired facilities

[152] 76 FR 25,012.

and one oil-fired facility had estimated lifetime cancer risks greater than one in a million. The EPA maintains that its finding that more than 30% of the case study facilities had a cancer risk greater than one in one million is sufficient to support the appropriate finding. Furthermore, the EPA did not base the appropriate finding on just the case study analysis as explained in the preamble to the proposed rule.

Comment 16: Commenter 18023 states that the EPA's discussion in the preamble to the proposed rule misleads the reader into believing that non-Hg HAP emissions from U.S. EGUs are associated with serious human health effects. According to the commenter, the EPA's discussion of the medical impacts associated with excessive exposure to an individual HAP would lead the reader to believe that those harms flow directly and inevitably from EGU emissions because EGU emissions have trace amounts of non-Hg HAP. For example, this CAA section begins with a description of the HAP measured in the ICR of EGUs and suddenly notes, "Exposure to *high levels* of the various non-Hg HAP emitted by EGUs is associated with a variety of adverse health effects. These adverse health effects include chronic (long-term) health disorders (*e.g.,* effects on the central nervous system, damage to the kidneys, and irritation of the lung, skin, and mucus (sic) membranes); and acute health disorders (*e.g.,* effects on the kidney and central nervous system, alimentary effects such as nausea and vomiting, and lung irritation and congestion)."[153] The commenter notes that the reader will infer that the health effects described are associated with EGUs despite the fact that the impacts described are exposure effects at high levels. EGUs do not expose individuals to high levels of non-Hg HAP.

The EPA states HCl is a corrosive gas that can cause irritation of the mucous membranes of the nose, throat, and respiratory tract. Brief exposure to 35 ppm causes throat irritation, and levels of 50 to 100 ppm are barely tolerable for 1 hour. The 35 ppm, 50 ppm, and 100 ppm exposures referenced in the EPA's discussion represent concentrations of 50,000, 75,000, and 150,000 $\mu g/m^3$, respectively. The EPRI has shown that there is no concentration from a utility unit greater than 630 $\mu g/m^3$, which is approximately 100 to 250 times lower than the exposure levels described by the EPA. The inhalation risk assessment from EPRI assessed the short-term (1-hour) concentrations of HCl and other HAP emitted by EGUs and found the hazard index to be below 0.3. Therefore, at a minimum (*i.e.*, assuming all risk is from HCl), there was no concentration above 630 $\mu g/m^3$. The EPA's implication that the public can experience such exposures and the implication that this rule will serve to preclude such exposures are the antithesis of transparency. The EPA did not report any analyses of acute exposure, but this result is consistent with the EPA's chronic hazard index range (based on annual averages) of 0.05 to 0.005 for the 16 "high risk" plants assessed for health risk.

The commenter state that the discussion of effects without the context of actual exposure was not isolated to HCl but included a list of HAP. *See* 76 FR 25,003–05.

Response to Comment 16: The EPA disagrees with the commenter's assertion that the health effects associated with exposures to non-Hg HAP emissions from U.S. EGUs are mischaracterized in the preamble to the proposed rule. The discussion of the health effects of non-Hg HAP provided in the preamble includes general information on the potential health effects associated with a broad range of exposure concentrations (from low to high levels) of the various non-Hg HAP (some of which have been determined to be carcinogenic to humans) based on peer reviewed scientific information extracted from priority sources such as IRIS, Cal EPA and ATSDR health effects assessments. The preamble CAA section referred to by the commenter does not include a quantitative analysis of HCl (or other non-Hg HAP) exposures to the public.

[153] 76 FR 25003.

Comment 17: Commenters 17760 and 18831 state that in the Utility Study, the EPA found that only 11 of the 137 oil-fired EGUs potentially posed inhalation cancer maximum individual risk greater than one in a million in 1990. The new scientific evidence, the fuel mix of several of the 11 plants identified as high risk by the EPA changed significantly since 1990, such that, based on new data, there likely would be fewer units posing one in a million cancer risk even using the rest of the EPA's assumptions. According to the commenters, the EPA failed to address this in the Non-Hg Risk Assessment, instead deciding to rely on emissions from only one oil-fired EGU. Non-HG Risk Assessment at 12-13.

Response to Comment 17: The EPA disagrees that addressing the fuel changes over the suite of all EGUs modeled in the past is relevant to the case study modeling performed for the MATS rule. The fuel mix used for the case studies considered for the MATS rule is based on current data provided by the facilities in response to the ICR for the rule, which identifies the HECO Waiau facility as completely oil-fired, as well as one unit at the Dominion, Yorktown facility. The EPA agrees that changes in fuel mix away from oil will change the risks at such a unit. The EPA cannot base decisions for the appropriate and necessary analysis on "likely" changes to units, but rather has selected case studies that demonstrate risks greater than one in one million for several facilities, which have fuel mixes of coal only, coal and oil, and oil only.

Comment 18: Commenter 17760 states that with the assumptions in the Utility Study, both in terms of conservative scientific estimates and overestimated amounts of oil burned by these units, the EPA concluded that the risks from oil-fired units would result in only *one new cancer case every five years. See* Utility Study at p. 6-50, Table 6-23. The commenter does not believe that this level of risk, standing alone, warrants regulation under CAA section 112(n)(1)(A) of the CAA. The agency should rescind the 2000 Regulatory Determination with respect to oil-fired EGUs until such time as the agency develops an appropriate factual record for regulation.

Several commenters (17383, 17689, 17877, 17885) state that even if the additional studies the EPA performed were taken as accurate representation they hardly demonstrate that it's necessary and appropriate to regulate HAP emissions from coal-fired U.S. EGUs under CAA section 112 because three sites nationwide show risks greater that one in one million with the highest at eight in one million.

Response to Comment 18: The EPA disagrees with the commenter's characterization of the Utility Study. The Utility Study represented the highest-quality factual record of information available at the time regarding EGU emissions and risks. Further, the EPA's recent risk assessments of 16 EGU case studies, performed with more recent data and refined scientific methods, indicate that there are still six EGU facilities that pose estimated inhalation cancer risks greater than one in a million. The EPA maintains that the findings of the case studies are one element that independently supports the EPA's determination that it remains appropriate and necessary to regulate EGUs under CAA section 112.

Comment 19: Commenter 17774 states that the highest cancer risk estimated for coal-fired EGUs is still within the acceptable range used by the EPA in other programs and is also far less than the background exposure risks the average person experiences. The background risk of developing cancer in a lifetime is approximately 1 in 3 (0.33). According to the EPA's own data, the predicted added cancer risk of exposure to HAP from U.S. EGUs would change the background risk from 0.33 to 0.330001. This level of change is so minimal that it could not be observed in any health effects study that might be conducted.

Response to Comment 19: As explained in the preamble to the proposed rule, the EPA reasonably looked to the cancer risk threshold established under CAA section 112(c)(9)(B)(1) for delisting a source category as an indicator of the level of cancer risk that was appropriate to regulate under CAA section 112. Commenter's comparison of the cancer risk from U.S. EGUs as compared with the risk of contracting cancer from unknown sources is not the standard Congress established for evaluating HAP emission risk and the commenter has provided no support for its contention that the agency should evaluate risk in that manner. The EPA maintains that the analysis was reasonable.

Comment 20: Commenter 17885 states that the EPA conducted a health risk assessment on a limited number of facilities and found a "few" facilities that have estimated maximum cancer risks in excess of one in a million for Ni or hexavalent Cr. According to the commenter, the Northern Star's Cambria Cogen was one of the plants included in the assessment and had a calculated maximum cancer risk of 0.5 per million for hexavalent Cr. None of the facilities selected had a non-cancer impact exceeding a hazard index of 1 for any HAP. Cambria Cogen had a maximum hazard index of 0.003 for Ni. Based on this limited health risk assessment, the EPA apparently decided that they were justified to regulate all non-Hg HAP for all sources in this category. For Cambria Cogen, and other similar waste coal power plants, this means the imposition of potentially costly emission controls or facilities that do not have a significant public health risk according to the EPA criteria.

Response to Comment 20: The facilities the EPA selected as case studies for assessment may not represent the highest-emitting (and highest-risk) sources. Although case study facility selection criteria included high estimated cancer and non-cancer risks using the 2005 NEI data, high throughput, and minimal emission control, another necessary criterion was the availability of ICR data for the EGUs at those facilities (or for similar EGUs at other facilities). Because the ICR data were collected for the purpose of developing the MACT standards, the ICR was targeted towards better performing sources for non-Hg metal HAP, acid gas HAP, and organic HAP, with a smaller set of random recipients. Therefore, facilities for which ICR data were available may not represent the highest-emitting sources. The EPA agrees with the commenter that the estimates of chronic inhalation risks for Northern Star's Cambria Cogen are below levels of concern. In addition, the EPA does not agree with the commenter's implication that the EPA must make a facility-specific finding for each HAP for each source and then only regulate individual EGU facilities for the individual HAP that identified as causing an identified hazard to public health or the environment. That approach is not required under CAA section 112(n)(1) or anywhere under CAA section 112, and it would be virtually impossible to undertake such an effort. For these reasons, the EPA does not agree with the commenter and maintains that the Appropriate and Necessary Finding is reasonably supported by the record and consistent with the statute for all the reasons set forth in the preambles to the proposed rule and this final action.

Comment 21: Several commenters (17621, 17820, and 18023) state that the EPA's assumption that implies that a person stays exactly at the center of a census tract for 70 years and that a unit will operate in exactly the same manner for 70 years is unrealistic. The commenters suggest that Tier 3 risk assessment is warranted or a lifetime exposure adjustment is needed.

Response to Comment 21: The EPA disagrees that an exposure adjustment is needed because it runs counter to the long-standing approach that the EPA took to estimate the maximum individual risk, or MIR. The MIR is defined by the EPA's Benzene NESHAP regulation of 1989[154] and codified by CAA 112(f) as the lifetime risk for a person located at the site of maximum exposure 24 hours a day, 365 days

[154] 54 FR 38044

a year for 70 years (e.g., census block centroids). The MIR is the metric associated with the determination of whether or not a source category may be delisted from regulatory consideration under CAA section 112 (112(c)(9)). The MIR is the risk metric used to characterize the inhalation cancer risks associated with the case study facilities. The EPA used the annual average ambient air concentration of each HAP at each census block centroid as a surrogate for the lifetime inhalation exposure concentration of all the people who reside in the census block. The EPA used this approach to estimate MIR values in all of its risk assessments to support risk-based rulemakings under CAA section 112 of the CAA to date.

Comment 22: Commenter 18023 asserts that the EPA explains in its preamble that the agency "focus[ed] in this rulemaking on exposure to MeHg through ingestion of fish [because] potential health risks do not likely result from Hg inhalation exposures associated with Hg emissions from utilities." Moreover, the EPA identifies the driving health metric as the RfD establish by NAS of 0.1 micrograms/kg-day. Likewise, the non-Hg HAP health impacts are not associated with acute concentrations. Instead, they are addressed in terms of total chronic exposure. The EPA analyzed "the MIR for each facility [in the 16-plant study] as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, and 52 weeks per year for a 70-year period)." Because the alleged health benefits are derived from total exposure (for example through bioaccumulation of Hg, or through continuous lifetime exposure to Cr(VI)), the EPA should explain how its numerical emission limit units, which would not directly restrict total exposure if heat inputs increase, redress this health concern. In its preamble, the EPA simply notes that its emission limit units are consistent with, and allow for simple comparison to, other regulations.

Response to Comment 22: The EPA disagrees with the commenter's assertion that the numerical emission limits being promulgated in today's final rule must be justified on their ability to redress the health concerns that were identified as the basis for regulating EGUs. The emission limits in today's rule are technology-based, as prescribed under CAA section 112, and do not need to be justified on the basis of their ability to protect public health. Regarding potential health concerns, the EPA has up to 8 years after the promulgation of the technology-based emission limits for EGUs to determine whether the regulations protect public health with an ample margin of safety. If the regulations do not, the CAA directs the EPA to promulgate additional more stringent standards (within the prescribed 8 years) to achieve the appropriate level of public health protection.

Comment 23: Commenter 17772 claims that prior studies provide no support for establishing standards for non-Hg HAP metals. The "Utility Study" concluded that "Hg from coal-fired utilities is the HAP of greatest potential concern and merits additional research and monitoring." It also identified other HAP of "potential concern," but explicitly stated that "the remaining HAP evaluated in the Utility Study did not appear to be a public health concern." Congress clearly intended that the EPA was to determine the "emissions which may warrant regulation under this [112(n)(1)(A)] CAA section." In 1990, after analysis and review of the Utility Study - even with the assumed increase in emissions and exaggerated modeling data, the EPA determined that Hg was the only HAP emission that warranted regulation.

Response to Comment 23: The EPA does not agree with the commenter's characterization of the 2000 listing or the proposed rule for the reasons set forth in the preamble to the proposed rule. The commenter also characterizes the Utility Study, and the EPA maintains that document speaks for itself. The EPA notes that the commenter makes much of the direction in CAA section 112(n)(1)(A) that the EPA develop and describe alternative control strategies for HAP "emissions which may warrant regulation under [CAA section 112]." Commenter then stated that the EPA determined that only Hg emissions warranted regulation. However, in the Utility Study, the EPA developed alternative control strategies for

all HAP, so it is clear that at the time the study was issued the EPA considered all HAP emitted from U.S. EGUs as potentially warranting regulation.

Comment 24: Commenter 18500 requests that the agency remove non-Hg HAP from the rule. Commenter 18422 stated that the EGU MACT should not include acid gases or metal HAP other than Hg and Ni because the agency has not provided adequate evidence of risk nor made a showing that regulation of other HAP and acid gases is necessary and appropriate. Commenter 17911 stated that while EPA studies have demonstrated health concerns associated with methyl-Hg and bio-accumulations, health impacts were not identified for acid gases and $PM_{2.5}$, which will be covered by updated rules for ozone, regional haze, and National Ambient Air Quality Standards. The commenter asserted legal disconnect with CAA section 112 of the CAA, and the rule should be re-proposed and only cover methyl-Hg emissions. The commenter adds that while addressing HAP may have the collateral benefit of controlling criteria pollutants, the focus should be on HAP health impacts.

Response to Comment 24: We do not agree with the commenter's characterization of the law or the facts as set forth in the preamble to the proposed rule. While the EPA may not have identified health concerns associated with each and every HAP emitted by EGUs, which is not what the CAA requires, the EPA has, in fact, identified health concerns associated with HAP emissions from U.S. EGUs emissions, and has used those health concerns to justify that it is appropriate and necessary to regulate EGUs under CAA section 112. Once this determination has been made, it is the EPA's obligation to address all HAP emitted by EGUs in any subsequent technology-based or risk-based regulations.

Comment 25: Several commenters (17777, 17871, 10943, 6543) state that they are concerned that significant errors were made in the risk calculations reported by the EPA, but no specific errors have been identified.

Response to Comment 25: The EPA disagrees with the commenters that the risk calculations contain unspecified errors. Both risk assessments have successfully undergone peer review.

Comment 26: Commenter 18436 submitted a report emphasizing that technology-based emission limitations for specific industrial categories have been established for HAP. Although this regulatory system has undoubtedly reduced the emission of toxic air pollutants in Alabama, the commenter claimed that the present regulatory system is not sufficient to reduce ambient concentrations of all toxic air pollutants below levels that pose an unacceptable risk to human health. The commenter states that HAP are known to cause damage to the eyes, skin, breathing passages, kidneys, lungs, and nervous system.

Response to Comment 26: No response needed.

3. Nickel risk.

Commenters: 19622, 17760, 17870, 17621, 18025, 18031, 12380

Comment 27: Commenter 19622 states that the May [sic] 16th memorandum on nickel cancer risk [Non-Hg Case Study Chronic Inhalation Risk Assessment] was based on 1) assumptions about the composition of the Ni emissions, 2) lack of consideration of differences in carcinogenic potency among Ni compounds and 3) assumptions about the linearity of the dose-response for Ni and respiratory cancer effects. According to the commenter, for all three aspects the Memorandum chose a very conservative

position leading to a conclusion that is likely to overstate the risks. The commenter urges the EPA to reconsider these three elements and weigh them in a more realistic way.

Comment 28: Commenter 19622 states that different forms of Ni have shown clear differences in their potency to induce respiratory tumors. Ni subsulfide and complex oxides containing Ni and copper are considered to be the more potent Ni compounds at inducing respiratory tumors. This information comes from results of epidemiological (e.g., ICNCM, 1990[155]) and animal studies (NTP 1996a[156],b[157],c[158], Sunderman et al., 1987[159]). In contrast, other Ni oxides such as Ni monoxide and silicate oxides are expected to have lower potency based on human and animal studies (e.g., Goldberg et al., 1987[160]; 1992[161]; 1994[162]; NTP 1996c). For example, high calcining temperature NiO had a 7-fold lower potency to induce respiratory tumors in animal inhalation studies than Ni subsulfide (NTP 1996c, Danish EPA, 2008[163]). Water-soluble Ni compounds do not induce tumors in rats via inhalation or oral routes (NTP 1996a; Heim et al., 2007[164]). Epidemiological evidence does indicate that soluble Ni exposures can increase cancer risks in sulfidic ore refinery workers. Soluble Ni compounds are suspected of not inducing tumors on their own but enhancing respiratory tumor induction when inhaled at levels above

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[155] ICNCM. 1990. "Report of the International Committee on Nickel Carcinogenesis in Man." *Scand J Work Environ Health* 16 (1 Spec No): 1-82.

[156] NTP, 1996a. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Nickel Sulfate Hexahydrate (CAS No. 10101-97-0) in F344/N Rats and B6C3F1 Mice (Inhalation Studies). NTP TR 454, NIH Publication No. 96-3370, U.S. Dept. of Health and Human Services, National Institutes of Health, Washington, D.C., 376 pp.

[157] NTP, 1996b. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Nickel Subsulfide (CAS No. 12035-72-2) in F344/N Rats and B6C3F1 Mice (Inhalation Studies). NTP TR 453, NIH Publication No. 96-3369, U.S. Dept. of Health and Human Services, National Institutes of Health, Washington, D.C., 360 pp.

[158] NTP, 1996c. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Nickel Oxide (CAS No. 1313-99-1) in F344/N Rats and B6C3F1 Mice (Inhalation Studies). NTP TR 451, NIH Publication No. 96-3367, U.S. Dept. of Health and Human Services, National Institutes of Health, Washington, D.C., 375 pp.

[159] Sunderman, P.W. Jr, SM Hopfer, J.A. Knight, KS. McCully, A.G. Cecutti, P.G. Thornhill, K Conwar, C. Miller, S.R. Patierno, and M. Costa. 1987. "Physicochemical characteristics and biological effects of nickel oxides." *Carcinogenesis* 8:305-313

[160] Goldberg M, Goldberg P, Leclerc A, Chastang JF, Fuhrer R. 1987. "Epidemiology of respiratory cancers related to nickel mining and refining in New Caledonia (1978-1984)" *Int. J. Cancer* 40: 300-304.

[161] Goldberg M, Goldberg P, Leclerc A, Chastang JF, Marne MJ, Gueziec J, Lavign F, Dubourdieu D, Huerre M. 1992. "A seven-year survey of respiratory cancers among nickel workers in New Caledonia (1978-1984)." *Nickel and human health: Current perspectives.* Nieboer, E; Nriagu, JO, eds. New York, NY John Wiley & Sons, Inc.

[162] Goldberg M, Goldberg P, Leclerc A, Chastang J-F, Marne M-J, Dubourdieu D. 1994. "A 10-year incidence survey of respiratory cancer and a case-control study within a cohort of nickel mining and refining workers in New Caledonia." *Cancer Causes and Control*, 5:15-25.

[163] Danish Environmental Protection Agency. 2008. *Nickel Sulphate, CAS No. 7786-81-4, EINECS No. 232-104-9 Risk Assessment Final version.* Copenhagen, Denmark. 226 pp.

[164] Heim K, Bates H, Rush R, Oller A. 2007. "Oral Carcinogenicity Study with Nickel Sulfate Hexahydrate in Fischer 344 rats." *Journal of Toxicology and Applied Pharmacology*, 224: 126–137.

the threshold for respiratory toxicity (Goodman et al., 2011[165]; Oller et al., 2002[166]). For these reasons, a unit risk for soluble Ni has never been derived. Recently, the SCOEL (2011) concluded that if soluble Ni exposures to workers were kept below 10 μg Ni/m^3, respiratory cancer risks would be prevented. Even after adjusting for exposure conditions of the general public (24 h/day, 7 days/week, 52 weeks/year, 70 years), the resulting adjusted value would be several fold higher than the value corresponding to an excess risk of one in one million calculated in the May [sic] 16th memorandum. Metallic Ni has not been shown to increase respiratory risks in epidemiological studies and was not a respiratory carcinogen in rat inhalation studies (ICNCM, 1990; Oller et al., 2008).

According to the commenter, assigning the same carcinogenic potency of Ni subsulfide to other forms of Ni is overly conservative and inconsistent with the best available evidence. This is particularly true, since the unit risk estimate (URE) of 4.8 x 10^{-4} per μg/m^3 that the EPA assigned to Ni subsulfide is an artificial value derived by doubling the URE that the EPA calculated for Ni refinery dust – on the assumption that Ni subsulfide constituted roughly 50% of the total Ni present in Ni refinery dust but was responsible for 100% of the cancer risk.

Comment 29: Commenter 17760 states that one conservative assumption by the EPA was that the Ni emitted from oil-fired plants is 50% as carcinogenic as Ni subsulfide. The EPA admitted in the Utility Study that the limited data available indicated that less than 10% of the Ni emitted from oil-fired EGUs is Ni subsulfide. This demonstrates that the low-level risk estimated by the EPA has been greatly overstated. According to the commenter, the EPA should obtain more Ni speciation data using updated techniques, and should, in light of such information, reevaluate whether it is appropriate and necessary to regulate oil-fired EGUs.

Comment 30: Commenter 17760 states that nothing in the preamble to the proposed rule refutes that 2005 Finding where the EPA acknowledged the flaws in the Utility Study. The agency concluded that "[b]ecause EPA could not have reasonably found that it was appropriate to regulate Ni emissions from oil-fired Utility Units based on the record before it at the time of the 2000 Regulatory Determination, it should not have made a finding that it was necessary to regulate such emissions." According to the commenter, the EPA rejected the 2005 Finding for reasons unrelated to public health risks associated with Ni emissions.

Comment 31: Commenter 17760 states that the Utility Study and Non-Hg Risk Assessment provide insufficient bases for regulating oil-fired EGUs under CAA section 112. Both studies raised substantial uncertainties regarding the species of Ni being emitted and the risk of such emissions from oil-fired EGUs. This lack of data made it impossible for the EPA to give an accurate assessment of the risk to human health from Ni emissions from oil-fired EGUs. In the face of such uncertainty, the EPA made ultraconservative assumptions aimed at overestimating the risk. According to the commenter, while this strategy may have been appropriate for the Utility Study, it should not have formed the basis for determining whether to regulate oil-fired units under CAA section 112(n).

Comment 32: Commenter 17760 states that they support the analysis of the Non-Hg Risk Assessment completed by Edward J. Zillioux on behalf of Florida Power & Light Company: "Comment on EPA's

[165] Goodman JE, Prueitt RL, Thakali S, and Oller AR. 2011. "The Ni iron bioavailability model of the carcinogenic potential of Ni-containing substances in the lung." *Crit Rev Toxicol* . 41:142-174.
[166] Oller A. "Respiratory carcinogenicity assessment of soluble Ni compounds." *Environ Health Perspect*. 2002, 110:841-844.

Ni Risk Assessment used to support the National Emission Standards for HAP (NESHAP)" (June 26, 2011)

Comment 33: Commenter 17760 states that the EPA acknowledged that the characterization of the chemical speciation for Ni emissions in the Non-Hg Risk Assessment should be subject to peer review and has stated that it will publish the result of the peer review and any EPA response to it before the final EGU MACT rule. The commenter supports this process and urges the EPA to withhold any ultimate determination until the results of that peer review and the EPA's response can be made publicly available and be subjected to public review.

Comment 34: Commenter 17870 states that the Non-Hg Case Study Chronic Inhalation Risk Assessment for the Utility MACT Appropriate and Necessary Analysis fails to take into consideration studies demonstrating that Ni sulfate alone has no evidence of carcinogenicity (NTP, 1996a; Dunnick et al., 1995).'[167]

Other papers have compared various studies including epidemiologic evidence of worker inhalation exposures to Ni refinery dust containing soluble Ni compounds. Oller (2002), for example, concluded, "Overall, the weight of evidence indicates that inhalation exposure to soluble Ni alone will not cause cancer; moreover, if exposures are kept below levels that cause chronic respiratory toxicity, any possible tumor-enhancing effects (particularly in smokers) would be avoided."

Comment 35: Commenter 17870 states that in the Non-Hg Case Study Chronic Inhalation Risk Assessment, the EPA relies on two agencies that "have determined that Ni sulfate, specifically, and Ni compounds, in general, are carcinogenic." According to the commenter, this reliance is problematic because these agencies relied on worker exposure studies that often suffer from poor quality of existing exposure data, no consistent dose response with increasing concentrations of soluble Ni, inconsistent results across cohorts, and presence of mixed exposures to water-insoluble Ni compounds and other confounders with known or suspected carcinogenic potential (e.g., soluble cobalt compounds, arsenic, acid mists, PAHs, cigarette smoke, etc.). The Danish EPA reported that the Technical Committee for Classification and Labeling (TCC&L), European Chemicals Bureau, "has agreed to classify Ni sulphates as Care. Cat. l; R49 (May cause cancer by inhalation), as there is no concern for carcinogenic potential with other routes of administration."

Comment 36: Commenter 17870 states that a focused assessment of the potential for carcinogenicity from inhaled Ni soluble salts was conducted by TERA (Toxicology Excellence for Risk Assessment) and others (Haber et al., 2000)[168] under contract to the Metal Finishing Association of Southern California, Inc., the U.S. EPA, and Health Canada. Conclusions of the assessment are (1) "the role of soluble Ni alone in carcinogenicity to humans cannot be determined from the epidemiologic studies" (2) "the carcinogenic activity of insoluble Ni compounds should not be used to predict the carcinogenic potential of water-soluble Ni salts," and (3) "under the U.S. The EPA's 1996 proposed Guidelines for Carcinogen Risk Assessment, inhaled soluble Ni compounds would be classified as 'cannot be

[167] Dunnick, J.K., M.R. Elwe U, A. E. Radovsky, JM. Benson, P.P. Hahn, KJ. Nikula, E. B. Barr and C. H. Hobbs. 1995. "Comparative carcinogenic effects of nickel subsulfide, nickel oxide, or nickel sulfate hexahydrate on chronic exposures in the lung." *Cancer Res*. 55:5251-5256.

[168] Haber, L.T., L Erdreich, G.L. Diamond, A.M. Maier, R. Ratney, Q. Zhao, and LL. Dourson. 2000. "Hazard identification and dose-response of inhaled Ni soluble salts." ***Reg. Toxicol. & Pharmacol***. 31:210-230)

determined,' because the existing evidence is composed of conflicting data" (e.g., co-exposure of populations to soluble and insoluble forms of Ni and limitations in exposure measurements). The final EPA *Guidelines for Carcinogen Risk Assessment* (2005)[169] employ different descriptors than the 1996 proposed guidelines; the comparable descriptor used for conflicting evidence in the final guidelines is inadequate information to assess carcinogenic potential.

Comment 37: Commenter 17870 states the NTP 1996 series of inhalation studies of Ni species also included the results of 2-year studies of Ni subsulfide and Ni oxide. The conclusions of the studies with Ni subsulfide were: (1) clear evidence of carcinogenic activity of Ni subsulfide in male and female F344/N rats and (2) no evidence of carcinogenic activity of Ni oxide in male or female B6C3F1 mice. Conclusions of studies with Ni oxide were: (1) some evidence of carcinogenic activity of Ni oxide in male and female F344/ N rats, (2) no evidence of carcinogenic activity of Ni oxide male B6C3F1, mice, and (3) equivocal evidence of carcinogenic activity of Ni oxide in female B6C31F, mice (NTP, 1996c). Together with the NTP 2-year inhalation studies of Ni sulfate that showed no evidence of carcinogenic activity in either male or female F344/N rats, or in male or female B6C3F1 mice, it is clear that differences exist in carcinogenic potential between various Ni species.

Comment 38: Commenter 17870 states that extensive literature exists indicating that only selected compounds of Ni may be regarded as carcinogenic or potentially carcinogenic in humans, with many papers reporting on postulated mechanisms that drive the carcinogenic process among Ni species. This is the subject of an extensive review by Teaf et al. (2004),[170] which also developed RfCs for Ni sulfate and Ni oxide using the benchmark dose approach in conjunction with NTP data for Ni species. The Memorandum cites NTP (2005), which noted that "The combined results of epidemiological studies, mechanistic studies and carcinogenesis studies in rodents support the concept that Ni compounds generate Ni ions in target cells at sites critical for carcinogenesis, thus allowing consideration and evaluation of these compounds as a single group." The fact that individual Ni compounds have been shown to display a wide range of efficiency with respect to the delivery of the Ni(II) ion to the target site has been ignored by this treatment and, thus, has not recognized the large variation in carcinogenic potential shown by the experimental evidence. For example, the Teaf et al. review cites evidence that soluble Ni does not readily enter mammalian cells, is rapidly cleared from the lung, and does not appear to be sufficiently bioavailable at nuclear target sites to induce tumors. In addition, the delivery of Ni(II) from high temperature Ni oxide to the target site appears to be much less efficient than for Ni subsulfide (Sunderman et al., 1987). The degree of phagocytosis between different forms of crystalline species may be a factor in carcinogenic potential (e.g., 2-3% for Ni oxide vs. >22% for Ni subsulfide), and this process may be mediated by differences in surface charges between the crystalline species and between crystalline and non-crystalline Ni species (Cost and Heck, 1982[171]; Heck and Costa, 1983[172]). Such

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[169] U.S. EPA. 2005. *Guidelines for Carcinogen Risk Assessment.* EPA/630/P-03/001F. March. Available on the Internet at http://www.google.com/url?sa=t&rct=j&q=guidelines%20for%20carcinogen%20risk%20assessment&source=web&cd=1&ved=0CDIQFjAA&url=http%3A%2F%2Foaspub.epa.gov%2Feims%2Feimscomm.getfile%3Fp_download_id%3D439797&ei=6IDFTpqbO4q50QGBp72kDw&usg=AFQjCNEpA0S8QdwKoI5eR7mIqUJL2TIspQ&cad=rja

[170] Teaf, C.M., BJ. Tuovila, E.J. Zillioux, A Shipp, G. Lawrence, and C. Van Landingham. 2004. Ni carcinogenicity in relation to the health risks from residual oil fly ash. HERA, 10:665-682.

[171] Costa, M and J.D. Heck. 1982. Specific Ni compounds as carcinogens. Trends Pharm. Sci. 3:408-410.

[172] Heck, J.D. and M Costa. 1983. Influence of surface charge and dissolution on the selective

mechanistic differences help explain the range in experimental findings of carcinogenic activity from no evidence for $NiSO_4 \cdot 6H_2O$, to equivocal evidence for Ni oxide, to clear evidence for Ni subsulfide. A recent review of mechanisms in metal carcinogenesis, including Ni, included the following caveat:

"The toxicity and carcinogenicity of Ni(II) depends on its intracellular dose that, in turn, is a function of physicochemical properties of particular Ni compounds, their ability to enter the cell and/ or to dissolve within the cell. Because of a fast clearance from the exposed tissues, which limits cellular uptake, water-soluble Ni(II) compounds possess lower toxic and carcinogenic potential as compared to semi-soluble compounds such as Ni subsulfide."

Comment 39: Commenter 17870 states that the EPA study on Ni did not take into account the evidence that no crystalline sulfidic Ni compounds, the only Ni compounds that clearly have been established as carcinogenic or potentially carcinogenic in humans, have been found in studies of residual oil fly ash samples (Galbreath, 2000;.[173] Galbreath, 2005;[174] Galbreath, 2004;[175] Huggins, 2011[176]).

Comment 40: Commenter 17870 notes that the EPA had available a report from the Energy & Environment Research Center of the University of North Dakota to the Electric Power Research Institute, which was entered into the rulemaking docket and noted in footnote #9 on p.l3 of the Memorandum. This was referred to in the Memorandum only as "Recent data from industry." The footnote noted that the insoluble Ni is primarily in a spinel form and that this spinel form "is not in the insoluble crystalline form." This was a mistake by the authors of the Memorandum; the spinel is the insoluble crystalline form. The footnote also stated that the report "does not provide us with a better means for characterizing the risks" since there was no attempt to characterize the toxicity of the spinel form. It is generally recognized that metals in spinel forms are tightly bound in lattice structures and thus essentially lose their chemical, physical, and physiological properties. Citing studies with the spinel compounds chromite ($FeCr_2O_4$) and magnetite (Fe_30_4), Heaney and Banfield (1993)[177] concluded "Spinels appear to be relatively inert in biological systems." In addition, there is a large and readily available literature, associated with the pigment chemical industry, on the insolubility and lack of bioavailability of heavy metal compounds absorbed by spinel lattices.

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phagocytosis of potentially carcinogenic particulate metal compounds. Cancer Res. 43:5652-5656.

[173] Galbreath, K.C., D.L. Toman, CJ. Zygarlicke, F. E. Huggins, G.P. Huffman, :and J.L. Wong. 2000. "Nickel speciation of residual oil fly ash and ambient particulate matter using X-ray absorption spectroscopy." *J. Air & Waste Management. Assoc.* 50:1876-1886.

[174] Galbreath, K.C., R.L. Schulz, D.L. Toman, C.i. Nyberg, F. E. Huggins, and G.P. Huffman. 2004. *Nickel species emission inventory for oil-fired boilers, Final Report*, Cooperative Agreement No. DE-FC26-98PT40321. U.S. Dept of Energy, National Energy Technology Laboratory, Pittsburgh, PA. 32 pp. Plus Appendices A-K.

[175] Galbreath, K.C., R.L. Schulz, D.L. Toman, C.M. Nyberg, P.E. Huggins, G.P. Huffman, and E.J. Zillioux. 2005. "Nickel and sulfur speciation of residual oil fly ashes from two electric utility steam-generating units*." J. Air & Waste Management Assoc*. 55:309-318.

[176] Huggins, FE, KC Galbreath, KE Eylands, LL Van Loon, JA Olson, EJ Zillioux, SG Ward, PA Lynch and P Chu. 2011. "Determination of Ni species in stack emissions from eight residual oil-fired utility steam-generating units." *Environ. Sci. Technol*.45:6188-6195.

[177] Heaney, PJ., and J.A. Banfield. 1993. *Structure and Chemistry of Silica, Metal Oxides, and Phosphates. ln: Health Effects of Mineral Dusts*, Guthrie, G.D. Jr., and B.T. Mossman, Eds., Mineralogical Society of America, Reviews in Mineralogy Series, Chapt. 5, Vol. 28, pp 185-233.

Comment 41: Commenter 17870 states that direct speciation measurements by Galbreath et al. indicated that >95% of the total Ni in residual oil PM was present as a mixture of NiSO4•xH2O and a Ni oxide spinel compound, similar in composition to $NiFe_2O_4$ (Huggins et al., 2011; Heaney, 1993).

According to the commenter, each of these studies, however, looked at Ni speciation in fly ash sampled from no more than two EGUs. This has prompted the question of whether the results were applicable to oil-fired EGUs in general in the U.S. Huggins et al. included emission studies of eight EGUs at three utility companies from Florida, New York, and Hawaii and is more broadly applicable. The data analyses of the oil used by these three companies are representative of residual oil use in the oil-fired electric generating industry. The commenter notes that approximately two-thirds of the residual oil power generation in the U.S. is supplied by the three companies involved in this testing - Florida Power and Light Company (FPL), Hawaiian Electric Company, Inc. (HECO), and National Grid. Huggins et al. (2011) was recently published and has been entered into the docket of the NESHAP proposed rule. The paper summarizes Ni speciation determined by Ni XAfS spectroscopy, which is the best available method for directly and nondestructively determining the speciation in such emissions. The Ni speciation of all samples investigated was found to be dominated by Ni sulfate in the form of $NiSO_4$•$6H_20$, with lesser amounts of Ni oxides, either (Ni, Mg)O and/or $NiFe_2O_4$. Importantly, the potentially carcinogenic Ni sulfide compounds are absent within the detection limits of the method (±2% of the total Ni).

Comment 42: Commenter 17870 states that in consideration of the lack of carcinogenicity of Ni sulfate alone, the equivocal evidence for carcinogenicity of Ni oxides along with mechanistic limitations in the delivery of the Ni+2 ion to the target site from Ni oxide exposures, the reported lack of bioavailability of spinel compounds, and the absence of sulfidic Ni species found in Ni speciation studies of oil-fired EGUs, they urge the EPA to re-evaluate the conclusions in the preamble to the proposed rule on the carcinogenicity of emissions from oil-fired EGUs.

Comment 43: Commenter 19622 states that the application of a linear dose-response approach to estimate the cancer risk of Ni in EGU emissions using a URE based on refinery dust exposure that does not match the composition of total Ni in EGU emissions represents an overly conservative approach to estimating increased cancer risk in the general population. According to the commenter, there have been some recent movements to consider some of the metal compounds as genotoxic carcinogens with a "practical threshold" for the purpose of risk assessment and setting of Occupational Exposure Levels (Bolt and Huici-Montagud, 2008[178]; De Flora, 2000[179]). The majority of the genotoxic effects that have thresholds can be explained by indirect effects through the generation of oxygen radicals or the inhibition of DNA repair.

In the case of epigenetic effects, the Ni (II) ion has been shown to compete with Mg (II) ion for binding to histones and triggering histone modification, DNA methylation, and changes in chromatin conformation and gene expression. Again, these effects have thresholds. The inferred theoretical presence of thresholds for tumors induced by Ni manifests in the practical threshold actually observed in some animal and human studies.

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[178] Bolt H and Huci-Montagud A. 2008. "Strategy of the scientific committee on occupational exposure limits (SCOEL) in the derivation of occupational exposure limits for carcinogens and mutagens." *Arch Toxicol*, 82:61-64.

[179] De Flora S. 2000. "Threshold mechanisms and site specificity in Cr(VI) carcinogenesis."*Carcinogenesis* 21(4): 533-541.

- The oral carcinogenicity study in rats with blood Ni levels approximately 300-fold above background did not show any systemic tumors (Heim et al., 2007).
- The inhalation studies in rats exposed to Ni sulfate and in rats exposed to Ni metal indicated that these compounds did not induce any respiratory tumors. For Ni metal this occurred at blood Ni levels 4 to 6-fold above background and lung Ni levels 3 to 4-fold above background (NTP, 1996a; Oller et al., 2008).
- In the case of Ni oxide, a threshold for tumor induction was clearly observed in the rat study (NTP, 1996c).
- None of the Ni compounds induced significant tumors in mice even at higher exposure levels than in rats (NTP, 1996a,b,c).
- Many epidemiological cohorts did not show excess respiratory cancer risks even though workers were exposed to high levels of Ni. For example ICNCM 1990; Shannon et al., 1984[180], 1991[181]; Egedahl et al., 2001[182]; Cornell, 1983[183]; Cornell and Landis, 1983[184]; Cox et al.,1981[185]; Enterline

[180] Shannon HS, Julian JA, Muir DCF, Roberts RS, Cecutti AC. 1984. "A mortality study of Falconbridge workers." In: Nickel in the human environment: Proceedings of a joint symposium; March 1983; IARC Scientific publication No. 53; edited by FW Sunderman and A Aitio. Lyon, France: International Agency for Research on Cancer. pp. 117-124.

[181] Shannon HS, Walsh C, Jadon N, Julian JA, Weglo JK, Thornhill PG, Cecutti AG. 1991. "Mortality of 11,500 nickel workers—extended follow up and relationship to environmental conditions." *Toxicology and Industrial Health* 7(4): 277-294.

[182] Egedahl R, Carpenter M, Lundell D. 2001. "Mortality experience among employees at a hydrometallurgical nickel refinery and fertilizer complex in Fort Saskatchewan, Alberta (1954-95)." *Occup Environ Med* 58: 711-715.

[183] Cornell RG. 1983. "Mortality patterns among stainless steel workers." In: Nickel in the human environment: Proceedings of a joint symposium; March 1983; IARC Scientific publication No. 53; edited by FW Sunderman and A Aitio. Lyon, France: International Agency for Research on Cancer. pp 65-71

[184] Cornell RG and Landis JR. 1983. "Mortality patterns among nickel/Cr alloy foundry workers." In: Nickel in the human environment: Proceedings of a joint symposium; March 1983; IARC Scientific publication No. 53; edited by FW Sunderman and A Aitio. Lyon, France: International Agency for Research on Cancer. Pp 87-93.

[185] Cox JE, Doll R, Scott WA, Smith S. 1981. "Mortality of nickel workers: Experience of men working with metallic nickel." *Br J Ind Med* 38: 235-239.

and March 1982[186]; Jakobsson et al.,1997[187]; Moulin et al.,1993[188]; Sorahan, 2004[189]; Arena et al., 1998[190], Cragle et al.,1984[191]; Godbold and Tompkins, 1979;[192] etc.

More specifically, the presence of thresholds for the carcinogenicity of Ni was discussed at a 2010 TERA workshop on Ni ion bioavailability (http://www.tera.org/Peer/NiBioavailability/). This concept was recently accepted by the SCOEL in the derivation of an indicative inhalable OEL of 0.01 mg Ni/m^3 for Ni compounds based on carcinogenicity data in epidemiological studies (SCOEL, 2011)[193].The approach followed in the May [sic] 16th Memorandum is not supported by the most recent data and understandings of Ni-related carcinogenicity. The commenter, therefore, urges the EPA to reconsider its risk analysis for Ni emissions from U.S. EGUs and develop a more realistic estimate of the increased risk.

Comment 44: Commenter 17621 states that the EPA assumed that 65% of Ni emissions from liquid-oil-fired EGUs are in the form of insoluble, crystalline species that are as carcinogenic as Ni subsulfide (Ni_3S_2). According to the commenter, this assumption is overly conservative because recent measurements by EPRI and others found that Ni emissions from residual-oil combustion are primarily soluble Ni sulfate, with lesser amounts of Ni/magnesium oxide and Ni ferrite. No regulatory agency, including the EPA, currently provides a cancer unit risk or other dose-response value for Ni sulfate or other soluble Ni compounds for use in risk assessment. The commenter notes the following studies:

- Huggins et al., 2011 – As study based on 21 PM samples from eight residual oil-fired EGUs determined, using X-ray diffraction (XRD) and X-ray absorption fine structure spectroscopy (XAFS), that Ni in the PM samples was primarily Ni sulfate (NiSO4 • 6H2O), with lesser amounts of Ni/magnesium oxide [(Ni, Mg)O] and/or Ni ferrite (NiFe2O4). Potentially carcinogenic Ni sulfide compounds were absent, within the detection limits of the methods (± 3% of total Ni).

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[186] Enterline PE and GM Marsh. 1982. "Mortality among workers in a nickel refinery and alloy manufacturing plant in West Virginia." *J Natl Cancer Inst* 68(6): 925-33.

[187] Jakobsson K, Mikoczy Z, Skerfving S. 1997. "Deaths and tumours among workers grinding stainless steel: a follow up." *Occup Environ Med* 54: 825-829.

[188] Moulin JJ, Wild P, Haguenoer JM, Faucon D, De Gaudemaris R, Mur JM, Mereau M, Gary Y, Toamain JP, Birembaut Y, Blanc M, Debiolles MP, Jegaden D, Laterrière B, Léonard M, Marini F, Massardier C, Moulin M, Reure M, Rigal L, Robert G, Viossat M. 1993. "A mortality study among mild steel and stainless steel welders." *British Journal of Industrial Medicine* 50: 234-243.

[189] Sorahan T. 2004. "Mortality of workers at a plant manufacturing nickel alloys, 1958-2000." *Occupational Medicine* 54: 28-34.

[190] Arena VC, Sussman NB, Redmond, CK, Costantino JP, Trauth JM. 1998. "Using alternative comparison populations to assess occupation-related mortality risk." *J Occup Environ Med* 40: 907-916.

[191] Cragle DL, Hollis DR, Newport TH, Shy CM. 1984. "A retrospective cohort mortality study among workers occupationally exposed to metallic nickel powder at the Oak Ridge Gaseous Diffusion Plant." In Nickel in the human environment: Proceedings of a joint symposium; March 1983; IARC Scientific publication No. 53; edited by FW Sunderman and A Aitio. Lyon, France: International Agency for Research on Cancer. pp. 57-63.

[192] Godbold JH, Jr. and Tompkins EA. 1979. "A long-term mortality study of workers occupationally exposed to metallic nickel at the Oak Ridge gaseous diffusion plant." *J Occup Med 2*1: 799-806.

[193] SCOEL. 2011. EU Scientific Committee on Occupational Exposure Limits Recommendation for nickel and inorganic nickel compounds. SCOEL/SUM/85. June 2011. Website accessed Aug 29, 2011. ec.europa.eu/social/BlobServlet?docId=6935&langId=en

- EPRI1999[194] – Work by the University of Louisville indicated that 3–26% of the total Ni emissions were composed of sulfidic forms of Ni. However, it could not be determined whether Ni subsulfide was present due to the limitations of the indirect (i.e., operationally defined) speciation method employed, sequential extraction.

Comment 45: Commenter 17621 states that, to date, soluble Ni compounds, including Ni sulfate, have not demonstrated the ability to induce cancer in either animal bioassays or epidemiological studies (Goodman, 2009;[195] NTP 1996a, TERA, 1999, [196]). Limited evidence suggests that soluble Ni compounds may promote the carcinogenicity of insoluble Ni compounds as found in Ni refining exposure scenarios (presence of substantial Ni subsulfide). However, the California EPA Office of Environmental Health Hazard Assessment (OEHHA) derived cancer risk estimates for all Ni compounds (soluble and insoluble), but based on evidence from insoluble Ni (subsulfide, Ni refinery exposures) (CalEPA, 2009)[197].

Comment 46: Commenter 17760 states that to determine the real risk from Ni emitted by oil-fired units, it is critical to know what species of Ni are emitted. Ni subsulfide (Ni_3S_2) is considered the most carcinogenic Ni species. In contrast, inhalation exposure to water soluble Ni salts has not been shown to cause cancer. According to the commenter, the data the EPA had available that showed that 3 to 26% of the Ni species emitted from oil-fired units was sulfidic. Utility Study at 6-7. However, the EPA conservatively assumed in the Utility Study that the Ni emissions from oil-fired units were 50% as carcinogenic as Ni subsulfide.

Comment 47: Commenter 17760 states that the EPA relied on an invalid method of Ni speciation known as "sequential Ni extraction" and therefore the data is not reliable (Galbreath et al., 2003).[198]

Comment 48: Commenter 17760 states that to provide additional data on speciation of Ni, the commenter hired the Energy and Environmental Research Center (EERC) at the University of North Dakota to conduct a fly ash speciation study to better understand the species of Ni emitted by oil-fired EGUs. The EERC study, "Ni Species Emissions Inventory for Oil-Fired Boilers," was submitted to the EPA in the docket for the 2004 proposed NESHAP for EGUs (OAR-2002-0056-0018). The EERC study detected no Ni sulfide or Ni subsulfide in the emissions from the two tested oil-fired units. The detected Ni species were Ni sulfate, Ni oxide and Ni in the form of spinel. Ni sulfate is not a carcinogen (see footnotes 2 and 3). Ni in a spinel form is tightly bound in an iron complex and likely is not bioavailable. According to the commenter, this study strongly suggests that the EPA's assumption regarding the

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[194] EPRI, 1999. *Nickel Speciation Measurements at Oil-Fired Power Plants*. Palo Alto, CA: TR-105647.
[195] Goodman J.E., Prueitt R.L., Dodge D.G., Thakali S., 2009. "Carcinogenicity Assessment of Water-Soluble Ni Compounds," *Critical Reviews in Toxicology* 39 (5), 365–417.
[196] TERA, 1999. Toxicology Excellence for Risk Assessment. *Toxicological Review of Soluble Ni Salts.* March. http://www.tera.org/art/Ni/Ni%20main%20text.PDF
[197] CalEPA, 2009. California Environmental Protection Agency. *Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Stage Exposures*. California EPA Office of Environmental Health Assessment. May.
[198] Galbreath KC, Crocker CR, Nyberg CM, Huggins, F.E., Huffman, G.P. and Larson, K.P., Ni . 2003. "Speciation Measurements of Urban Particulate Matter: Method Evaluation and Relevance to Risk Assessment." *J Environ Monit* 5:56N-61N (2003).

carcinogenicity of the Ni emitted by oil-fired EGUs is incorrect and that the inhalation cancer risks posed by oil-fired units are far closer to zero.

Comment 49: Commenter 17760 states that the Hawaiian Electric Company, Florida Power and Light Company, and National Grid conducted Ni carcinogenicity testing at their respective units. The companies took a total of 21 samples from eight units that combust residual oil. The test results indicated that Ni subsulfide may be present in concentrations ranging from 0 to less than 3%. The results of the studies were peer reviewed and published in Environmental Science & Technology on June 28, 2011.

Comment 50: Commenter 17760 states that the EPA did not conduct its own characterization of the actual speciation data and ignored the available data, instead assuming all insoluble Ni is crystalline and that the upper risk estimate for Ni subsulfide should be applied. According to the commenter, this is unreasonable. The EPA layered assumption upon assumption to develop a risk estimate that has no basis in the actual data.

Comment 51: Commenter 18025 states that the EPA's assumption that 50% of Ni emitted from oil-fired EGUs is carcinogenic greatly overestimates the Ni inhalation cancer risk from oil-fired utilities. Updated studies, including the DOE's final report entitled Ni Species Emission Inventory For Oil-Fired Boilers (2004), have been published evaluating the Ni species that are emitted by residual oil-fired EGUs.

Comment 52: Commenter 18831 states that the EPA's overestimation of the risks posed by oil-fired EGUs, particularly from Ni emissions, was the result of using outdated information. According to the commenter, the EPA received more recent and realistic data regarding the risks posed by Ni emissions from oil-fired units on two occasions: (1) in 2004, industry groups submitted data on Ni speciation in response to the EPA's initial proposal to establish MACT standards for EGUs; and (2) in 2011, industry members submitted data on Ni speciation after completing testing required by the EPA's 2010 ICR. The EPA should rely on this data and if they do not it will result in the imposition of burdensome and unnecessary regulation on EGUs.

Comment 53: Commenter 19622 states that the May [sic] 16 Memorandum's assumption that 65% of total Ni in power plant emissions is present as crystalline Ni subsulfide is overly conservative and not supported by current data. According to the commenter, there is information available on the chemical forms of Ni that are present in power plant emissions and in ambient air (e.g., Huggins et al., 2011; Galbreath et al., 2005; 2003; 2000). In general, two forms of Ni predominate: a water soluble Ni compound (Ni sulfate hexahydrate) and a water insoluble, oxidic, Ni compound (complex Ni oxide containing various amounts of other elements such as Fe and Mg). Importantly, neither Ni subsulfide nor complex oxides containing Ni and Cu are significantly present in power plant emissions. In fact, the most recent and carefully done analysis found that less than 3% of total Ni in particulate samples from oil-fired utility steam-generating units was present as sulfide or subsulfide (Huggins et al., 2011).

Comment 54: Commenter 19622 states that based on data from Germany, Ni subsulfide would at most constitute 8.5% of urban air and 4.5% of air near a steel mill (Füchtjohann et al., 2000). The EU 4th

Ambient Air Ni Directive (CSTEE, 2001)[199] found that Ni subsulfide would not constitute more than 10% of urban or "hotspot" air. The Directive states: "Also, there are considerable differences in carcinogenic potency among the different Ni species in ambient air, with the most potent sulfidic Ni only constituting up to 10 percent of the sum of Ni species in air as judged from the limited amount of data available." Commenter also notes that in the final version of the Texas Commission on Environmental Quality Development Support Document for Ni and Inorganic Ni Compounds (TCEQ, 2011)[200], the report notes that Ni subsulfide emissions are mainly associated with Ni refining and mining operations. According to ATSDR (2005)[201], there are no Ni refining or mining operations in the U.S. The TCEQ (2011) report further states:"Available information from the 2005 TRI indicates that Texas Ni emissions would predominantly be metallic (e.g., railroad equipment, steel foundries, aircraft engines, metal forging, oil/gas field machinery, plate work), along with soluble Ni (e.g., electric utilities) and Ni oxides (e.g., electric utilities, steel foundries and works, aircraft engines) (personal communications with Dr. Adrianna Oller (Ni Institute), Richard Wilds (Union Tank Car), and Randy Hamilton (TCEQ) 2008)." The report concludes: "Therefore, based on TRI data, Texas Ni emissions are expected to be low in (or per HAP devoid of) sulfidic Ni."

Comment 55: Commenter 12380 states that the absence of Ni sulfides in PM samples from the various commercial oil-burning power plants investigated in this study is significant because sulfidic Ni compounds are generally considered to be the most highly carcinogenic Ni compounds (U.S. EPA, 1998; Sunderam, 1987[202]). According to the commenter, the assumption made by the EPA that the Ni compound mixture emitted from U.S. oil-fired power plants is 50% as carcinogenic as Ni_3S_2 would appear overly conservative with respect to the findings of this study and should be re-assessed.

Comment 56: Commenter 18020 disagrees with the EPA's assumption that 50% of the Ni emissions from EGUs are in the form of Ni subsulfide, the most carcinogenic species. Current scientific studies show that the actual percentage of emissions in the Ni subsulfide species is essentially zero. Almost all Ni emissions have been shown to be in forms of Ni that basically pose zero inhalation cancer risk; therefore, commenter recommends that the EPA exclude oil-fired units from the rule.

Response to Comments 27 - 56: The EPA disagrees with the commenters' assertion that it is impossible to give an accurate assessment of the risks to human health from Ni emissions from U.S. EGUs, and maintains that its assessment of the potential inhalation risks from EGU emissions of Ni compounds is scientifically valid, reasonable, and based on the best-available current scientific understanding. To that end, in July 2011, the EPA completed an external peer review (using three independent expert reviewers) of the methods used to evaluate the risks from Ni and Cr compounds emitted by EGUs in a report titled, "Methods to Develop Inhalation Cancer Risk Estimates for Cr and Ni Compounds." There were two charge questions relating to Ni in that review. First, do the EPA's

[199] CSTEE, 2001. *Opinion of the Scientific Committee on Toxicity, Ecotoxicity and the Environment on the draft 4th daughter Directive 2004/107/EC of the European Parliament and of the Council on Cd, Ni and As.*

[200] TCEQ, 2011. Texas Commission on Environmental Quality. Development Support Document for Nickel and Inorganic Nickel Compounds. Final, June 01, 2011

[201] ATSDR. 2005. Toxicological profile for nickel. Place Published: Agency for Toxic Substances and Disease Registry. http://www.atsdr.cdc.gov/toxprofiles.

[202] Sunderam, F. W., Jr. 1987. "Physicochemical and biological attributes of Ni compounds in relationship to carcinogenic activities." In *Toxicology of Metals*; Brown, S. S., Kodama, Y., Eds.; Ellis Horwood, Ltd.: Chichester, U.K., pp 355-365)

judgments related to speciated Ni emissions adequately take into account available speciation data, including recent industry spectrometry studies? Second, based on the speciation information available and what is known about the health effects of Ni and compounds, and taking into account the existing URE values (i.e., values derived by the Integrated Risk Information System (IRIS, 1991)[203] California Department of Health Services (CDHS, 1991)[204]; and the Texas Commission on Environmental Quality (TCEQ, Development Support Document, 2011)[205]), which of the following approaches to derive unit risk estimates would result in a more accurate and defensible characterization of risks from exposure to Ni and compounds?

1. To continue using the same approach as that developed for use in the 2000 NATA, which consists of using the IRIS URE for Ni subsulfide and assuming that Ni subsulfide constitutes 65% of the mass emissions of all Ni compounds.
2. To consider a more health-protective approach, based on the consistent views of the most authoritative scientific bodies (i.e., NTP in their 12th ROC, IARC, and other international agencies) that consider Ni compounds to be carcinogenic as a group.
3. To make the same assumptions as in option 2, but considering alternative UREs derived by the CDHS or TCEQ

In responding to these peer review questions, two of the reviewers agreed with the views of the most authoritative scientific bodies, which consider Ni compounds carcinogenic as a group. These reviewers, therefore, did not focus on the availability of Ni speciation profile data. The third reviewer recommended that the EPA review several manuscripts on Ni speciation profiles showing that sulfidic Ni compounds (which the reviewer considered as the most potent carcinogens) are present at low levels in emissions from U.S. EGUs.

Ni and Ni compounds have been classified as human carcinogens by national and international scientific bodies including the IARC (1990),[206] the World Health Organization (WHO, 1991),[207] and the European Union's Scientific Committee on Health and Environmental Risks (SCHER, 2006).[208] In their *12th Report of the Carcinogens*, the NTP has classified Ni compounds as known to be human carcinogens based on sufficient evidence of carcinogenicity from studies in humans showing associations between exposure to Ni compounds and cancer, and supporting animal and mechanistic data. More specifically,

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[203] U.S. EPA, 1991. *Integrated Risk Information Service (IRIS) assessment for nickel subsulfide*. Available at: http://www.epa.gov/iris/subst/0273.htm

[204] California Department of Health Services (CDHS) 1991. Health Risk Assessment for Nickel. Air Toxicology and Epidemiology Section, Berkeley, CA. Available online at http://oehha.ca.gov/air/toxic_contaminants/html/Nickel.htm.

[205] Texas Commission on Environmental Quality (TCEQ), 2011. Development Support Document for nickel and inorganic nickel compounds. Available online at http://www.tceq.state.tx.us/assets/public/implementation/tox/dsd/final/june11/nickel_&_compounds.pdf

[206] International Agency for Research on Cancer (IARC), 1990. IARC monographs on the evaluation of carcinogenic risks to humans. *Cr, Ni and welding*. Vol. 49. Lyons, France: International Agency for Research on Cancer, World Health Organization Vol. 49:256.

[207] International Labour Organization/United Nations Environment Programme, World Health Organization (WHO), 1991. Nickel. In Environmental Health Criteria No 108 Geneva.

[208] European Commission, Scientific Committee on Health and Environmental Risks (SCHER), 2006. Opinion on: Reports on Nickel, Human Health part. SCHER, 11th plenary meeting of 04 May 2006 [http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_034.pdf].CHER 2006

this classification is based on consistent findings of increased risk of cancer in exposed workers, and supporting evidence from experimental animals that shows that exposure to an assortment of Ni compounds by multiple routes causes malignant tumors at various organ sites and in multiple species. The *12th Report of the Carcinogens* states that the "combined results of epidemiological studies, mechanistic studies, and carcinogenesis studies in rodents support the concept that Ni compounds generate Ni ions in target cells at sites critical for carcinogenesis, thus allowing consideration and evaluation of these compounds as a single group." Although the precise Ni compound (or compounds) responsible for the carcinogenic effects in humans is not always clear, studies indicate that Ni sulfate and the combinations of Ni sulfides and oxides encountered in the Ni refining industries cause cancer in humans. There have been different views on whether or not Ni compounds, as a group, should be considered as carcinogenic to humans. Some authors believe that water soluble Ni, such as Ni sulfate, should not be considered a human carcinogen, based primarily on a negative Ni sulfate 2-year NTP rodent bioassay (which is different than the positive 2-year NTP bioassay for Ni subsulfide).(Oller, 2002; Heller et al., 2011;[209] Goodman et al., 2011) Although these authors agree that the epidemiological data clearly supports an association between Ni and increased cancer risk, they sustain that the data are weakest regarding water soluble Ni. A recent review by Grimsrud and Andersen (2010)[210] highlights the robustness and consistency of the epidemiological evidence across several decades showing associations between exposure to Ni and Ni compounds (including Ni sulfate) and cancer.

Based on the views of the major scientific bodies mentioned above, and those of expert peer reviewers that commented on the EPA's approaches to risk characterization of Ni compounds, the EPA considers all Ni compounds to be carcinogenic as a group and does not consider Ni speciation or Ni solubility to be strong determinants of Ni carcinogenicity. With regard to non-cancer effects, comparative quantitative analysis across Ni compounds indicates that Ni sulfate is as toxic or more toxic than Ni subsulfide or Ni oxide (Haber, 1998; NTP, 1996a).

Regarding the second charge question, two of the reviewers suggested using the URE derived by TCEQ for all Ni compounds as a group, rather than the one derived by IRIS specifically for Ni subsulfide. The third reviewer did not comment on alternative approaches. The EPA decided to continue using 100% of the current IRIS URE for Ni subsulfide because IRIS values are at the top of the hierarchy with respect to the dose response information used in the EPA's risk characterizations, and because of the concerns about the potential carcinogenicity of all forms of Ni raised by the major national and international scientific bodies. Nevertheless, taking into account that there are potential differences in toxicity and/or carcinogenic potential across the different Ni compounds, and given that there have been two URE values derived for exposure to mixtures of Ni compounds that are 2-3 fold lower than the IRIS URE for Ni subsulfide, the EPA also considers it reasonable to use a value that is 50% of the IRIS URE for Ni subsulfide for providing an estimate of the lower end of a plausible range of cancer potency values for different mixtures of Ni compounds.

4. Cr risk.

[209] Heller JG, Thornhill PG, Conard BR. 2011."New views on the hypothesis of respiratory cancer risk from soluble Ni exposure; and reconsideration of this risk's historical sources in Ni refineries." *J Occup Med Toxicol* . 2009, 4:23.

[210] Grimsrud TK and Andersen A. 2010 "Evidence of carcinogenicity in humans of water-soluble Ni salts." *J Occup Med Toxicol*. 5:1-7.

Commenters: 17774, 17383, 17689, 17877, 17885, 17772 17885

Comment 57: Commenter 17774 states that Cr was the HAP that the EPA identified as exceeding a one in a million cancer risk from 3 out of the 16 facilities in the EPA study. According to the commenter, there are several problems with the EPA's analysis related to the fact that Cr emissions were evaluated as being entirely hexavalent Cr(VI), the carcinogenic form of the heavy metal. While hexavalent Cr is the oxidized form of Cr that is likely to be emitted from coal-fired EGUs, not all of the emitted Cr will remain in the hexavalent form by the time it reaches the target population. Some may be converted to the much less toxic (and noncarcinogenic) trivalent species. The EPA apparently acknowledges the problems of treating all Cr as if it were of the hexavalent species by stating that this approach is being evaluated through a peer review process. Moreover, the level of Cr exposure being contemplated in the EPA's risk assessment is far below that which occurred in the occupational setting. The cancer estimate the EPA derives should, therefore, be looked on with some skepticism due to the uncertainty in extrapolating doses downward to such an extent.

Comment 58: Several commenters (17383, 17689, 17877 and 17885) state that validity concerns with the chronic inhalation study by the EPA included (1) the use of surrogate speciated Cr emissions data instead of actual emissions data, (2) the assumption that units were run 100% of the time which is impossible, (3) dispersion modeling was used that is biased towards over-predicting downwind impacts, and (4) estimated ambient concentrations were utilized as substitutes for real exposure concentrations for all people within a census block.

Comment 59: Commenter 17772 states that none of the 4 out of 16 coal-fired units that posed a risk greater than one in a million were actually tested for Cr(VI). Instead, these four facilities were tested for Cr compounds and a previous study that included four coal-fired boilers was used to make the unsupported assumption that 12% of the Cr will be Cr(VI) and the remaining 88% will be trivalent Cr or Cr(III) for every coal-fired unit. According to the commenter, the EPA failed to recognize that CR(VI) is highly water soluble and is easily reduced to Cr(III) in the presence of SO_2 in a low pH environment. The resulting Cr(III)would be expected to precipitate out in a FGD. The actual amount of Cr(VI) that would be present in the emissions from an EGU with a wet scrubber is likely to be far lower than the 12% estimate made by the EPA.

Comment 60: Commenter 17855 states that the EPA conducted a health risk assessment on a limited number of facilities and found a "few" facilities that have estimated maximum cancer risks in excess of one in a million for Ni or hexavalent Cr. According to the commenter, the Northern Star's Cambria Cogen was one of the plants included in the assessment and had a calculated maximum cancer risk of 0.5 per million for hexavalent Cr. None of the facilities selected had a non-cancer impact exceeding a hazard index of 1 for any HAP. Cambria Cogen had a maximum hazard index of 0.003 for Ni. Based on this limited health risk assessment, EPA apparently decided that they were justified to regulate all non-Hg HAP for all sources in this category. For Cambria Cogen and other similar waste coal power plants, this means the imposition of potentially costly emission controls or facilities that do not have a significant public health risk according to the EPA criteria.

Response to Comments 57 - 60: The EPA disagrees with the commenters' assertion that all Cr was considered to be hexavalent. As discussed in "Methods to Develop Inhalation Cancer Risk Estimates for Cr and Ni Compounds," existing test data for utility and industrial boilers indicate that hexavalent Cr is, on average, 12% of total Cr from coal-fired boilers. This document underwent peer review by three external reviewers, and all three reviewers considered the EPA's use of the values to be reasonable

given the limited data available for Cr speciation profiling. The EPRI inhalation study for coal-fired boilers also used 12% value.

The EPA also disagrees that units were assumed to operate 100% of the time. The dispersion modeling performed for the case study facilities used hourly heat input as a temporalization factor for estimating hourly emissions, and in some cases hourly heat inputs (and emissions) were zero or very low. The commenter provided no data or information to support their claim that the dispersion modeling the EPA used is biased towards overestimating downwind impacts.

The EPA disagrees with the commenters' assertion that "real exposure concentrations for all people within a census block" must be considered because it runs counter to the long-standing approach that the EPA took to estimate the maximum individual risk, or MIR. The MIR is defined by the EPA's Benzene NESHAP regulation of 1989 [211] and codified by CAA 112(f) as the lifetime risk for a person located at the site of maximum exposure 24 hours a day, 365 days a year for 70 years (e.g., census block centroids). The MIR is the metric associated with the determination of whether or not a source category may be delisted from regulatory consideration under CAA section 112 (112(c)(9)). The MIR is the risk metric used to characterize the inhalation cancer risks associated with the case study facilities. The EPA used the annual average ambient air concentration of each HAP at each census block centroid as a surrogate for the lifetime inhalation exposure concentration of all the people who reside in the census block. The EPA used this approach to estimate MIR values in all of its risk assessments to support risk-based rulemakings under CAA section 112 of the CAA to date.

5. Acid gas risk.

Commenters: 17870, 17621, 17775, 17627, 17702, 18014, 17723, 17383, 17772, 18023

Comment 61: Commenter 17870 states that the comparison of coal- and oil-fired EGU emissions from the EPA's Emissions Overview memorandum to the Toxics Rule docket ' compared 2005 EGU acid gas emissions to 2005 total non-EGU acid gas emissions, showing the percent of total national emissions attributed to EGUs for HCN, HCI, and HF to be 8%, 82%, and 62%, respectively. The commenter notes that Table 3 of reference 34 also shows that the percentages of total 2010 EGU emissions attributed to oil-fired EGUs for the same acid gases are only 1.4%, 0.3%, and 0.2%, respectively. Acid gas emissions from oil-fired EGUs are not of the magnitude that triggered the EPA's decision to regulate EGUs in general, raising the question of whether reduction (or even total elimination) of acid gas emissions from oil-fired EGUs could have any significant effect on the EPA's goals of reducing non-cancer health risk or acidification of sensitive ecosystems in the U.S.

Comment 62: Commenter 17870 states that requiring oil-fired units to install controls for acid gases would cost a substantial amount without a demonstrable environmental benefit. A comparison of HCl "actual" emissions between individual coal and oil EGUs was made based on data from Group 1 provided in the EPA's case study risk analysis. However, generation capacity of the various facilities in Group 1 ranged from a low of 28 MW to a high of 760 MW. To reduce this generation capacity bias, only facilities with generation capacity >300 MW were used for this comparison. Table 2 from the commenter lists all Group 1 facilities with >300 MW total generation capacity together with the HCl "actual" annual emissions copied from the EPA's case study risk analysis. From Table 2, the mean HCI emissions from 11 coal-fired units is 145 ±82 TPY while the mean from 7 oil-fired units is 0.25 ±0.5

[211] 54 FR 3804

TPY, or only 0.17% of the average coal-fired EGU. (It should be noted that, although one of the criteria for Group 1 facility selection was to be without installed emissions controls, SCE&G unit 3 (HCl emissions of 4.8 TPY) had a baghouse installed in 1999 and a test scrubber in 2002. Without that one data point, the percent of oil over coal HCI emissions would be even less.)

Comment 63: Commenter 17870 states that the EPA recognized that the acid gases emitted by EGUs have not been characterized as carcinogens and therefore the EPA correctly focuses on the non-cancer risk assessment guidelines.

Comment 64: Commenter 17870 states that the EPA concluded that HAP emission at any case study facility selected by the EPA exceeded its threshold of concern. In addition, the HQs for all HAP that affect a common target organ system were summed to obtain the target-organ-specific hazard index hazard index (TOSHI) for that Target Organ System, or TOSHI. All facilities examined had TOSHI values less than one. Additionally the commenter notes that the maximum chronic impacts of HCl emissions were all less than 10% of its chronic RfC. Despite using the EPA's risk assessment guidance and finding that the emissions of acid gases in general from U.S. do not exceed established threshold levels of concern, the EPA still concluded it was appropriate to regulate acid gas HAP.

Comment 65: Commenter 17627 states that the EPA lacks information on peak short-term emissions of HCl from U.S. EGUs. According to the commenter, the EPA states "chronic exposure to concentrations at or below the RfC is not expected to cause chronic respiratory effects and little research has been conducted on its carcinogenicity but the one occupational study of which EPA is aware found no evidence of carcinogenicity."

Comment 66: Commenter 18014 states that the EPA did not identify exceedances of any HCl, HF or HCN health-based standards as part of the health risk studies documented in the Utility HAP Report that the EPA prepared for Congress in 1998. At atmospheric concentrations, the acid gas HAP concentrations from U.S. EGUs do not pose meaningful health risks. While the mass of HCl may seem relatively large, the actual health impacts of these emissions are not significant.

Comment 67: Commenter 18014 states that long-term compliance averaging is consistent with the fact there is no short-term exposure concern. According to the commenter, if the emissions from a source are a little higher one month due to control upset but are then offset by lower emissions during the next month(s), the health impact would be essentially identical to a source with no "ups and downs" in the monthly emissions but with the same annual emissions.

Comment 68: Commenter 17723 states that the regulation of acid gases is not supported and must be withdrawn. The commenter explains that the EPA's RfDs are established at levels known to exhibit no toxic effect, with an adequate margin of safety. Yet the maximal exposures of HCl are 90% below the RfD, with HF and sulfuric acid being even lower. The commenter points out that this level of exposure satisfies neither the "necessary" nor "appropriate" stricture imposed by Congress to address Public Health concerns. The commenter questions the EPA suggestion that there may be an unknown synergistic effect between these three acid gases, since 10 years of study into such an effect has not documented these synergies or proposed a mechanism by which they might exist.

Commenter 69: Commenters 17383 and 17772 state that the EPA did not identify any study or rational basis to demonstrate health concerns associated with acid gases from U.S. EGUs. The scant data that

does exist on non-Hg HAP metals has been extrapolated from a handful of tested facilities using clearly erroneous assumptions.

Comment 70: Commenter 18023 states that the preamble and the health studies referenced in it do not provide any compelling evidence of a health concern arising from acid gas emissions from oil-fired units. Rather, the EPA's entire discussion of the possible health concerns associated with the emissions from oil-fired units focuses solely on Ni emissions, and the EPA admits that significant uncertainty remains as to whether those emissions present a health concern as well. Ni emission from oil-fired EGUs contributed most to the potential cancer-related inhalation risks, but those risks were not high. According to the commenter, the non-cancer risk assessment due to inhalation exposure indicated exposures were well below the reference levels.

Comment 71: Commenter 17702 states that the EPA should not expand the proposed utility air toxics rule beyond Hg and Ni since in the preamble for the proposed rule, the EPA provided no data as to any health risks associated with non-Hg metal HAP and acid gases related to fossil fuel-fired EGUs. Regulating these emissions would serve no purpose and would add cost without commensurate health benefits. In addition, the EPA has not shown that the regulation of HCl and other air toxics is necessary and appropriate.

Response to Comments 61 - 71: We do not agree with commenters' implication that Congress intended EPA to regulate only those HAP emissions from U.S. EGUs for which an appropriate and necessary finding is made, and commenters have cited no provision of the statute that states a contrary position. The EPA concluded that we must find it "appropriate" to regulate EGUs under CAA section 112 if we determine that a single HAP emitted from EGUs poses a hazard to public health or the environment. If we also find that regulation is necessary, the agency is authorized to list EGUs pursuant to CAA section 112(c) because listing is the logical first step in regulating source categories that satisfy the statutory criteria for listing under the statutory framework of CAA section 112. See New Jersey, 517 F.3d at 582 (stating that "[s]ection 112(n)(1) governs how the Administrator decides whether to list EGUs..."). As we noted in the preamble to the proposed rule, D.C. Circuit precedent requires the Agency to regulate all HAP from major sources of HAP emissions once a source category is added to the list of categories under CAA section 112(c). National Lime Ass'n v. EPA, 233 F.3d 625, 633 (D.C. Cir. 2000). 76 FR 24989. The EPA discusses its concerns with HCl and other acid gas HAP emissions from EGUs in the preamble to the proposed rule, and discusses its conclusions on establishing section 112(d) standards for acid gas HAP in section 1A of this RTC.

6. EPRI's Inhalation Risk Analysis.

Commenters: 17621, 17820, 17383, 17689, 17877, 17885, 17656, 17775, 17681, 17774, 17716, 17723

Comment 72: Commenters 17621 and 17820 state that a tiered inhalation risk assessment performed by EPRI did not identify significant health risks (cancer or non-cancer) among U.S. coal-fired power plants (as they existed in 2007). Because the EPA's results differ from the EPRI results, the commenters recommend that the EPA re-evaluate its assessment and undertake a Tier 3 risk assessment for any facility of concern.

Comment 73: Several commenters (17383, 17689, 17877, 17885) state that, for non-Hg HAP, the EPA produced one study on chronic inhalation risk assessment that identified three sites with cancer risks

greater that one in one million for hexavalent Cr. According to the commenters, the study was authored by EPA staff and has not been peer reviewed.

Comment 74: Commenter 17621 provided a summary of a comprehensive evaluation of HAP emissions and potential inhalation risks attributable to those emissions from coal-fired electric utilities, based on updated sector-wide data for all units with capacity greater than 25 MW. The 2009 EPRI report used updated correlations, HAP-specific emission factors, plant configuration parameters, and fuel consumption data (including blended coal composition data) were used to estimate annual emissions (mass/year basis) for each power plant unit. These annual emissions estimates (e.g., lb/TBtu in 2007) served as specific input for the tiered inhalation health risk assessment conducted by EPRI and AECOM in 2008–2009. EPRI and AECOM followed guidance from the EPA's Office of Air Quality Planning and Standards (OAQPS) in designing the study's tiered approach, based primarily on guidelines published in the EPA's Air Toxics Risk Assessment Reference Library (EPA, 2004)[212] with additional input from OAQPS staff. In summary, the tiered approach evaluated chronic non-cancer, acute non-cancer, and cancer risk for a comprehensive group of HAP in the following three scenarios:

Tier 1: Screening level inhalation risk assessment on all 470 coal-fired U.S. generating facilities with a total of 825 stacks (base year 2007) using EPA's SCREEN3 model which is based on ISCST3 dispersion algorithms and applies a generic set of meteorological conditions.

Tier 2: Inhalation risk assessment using EPA Human Exposure Model (HEM3-AERMOD) for a subset of 198 power plants identified as highest risk in Tier 1.

According to the commenter, the summary results for the 470 individual coal-fired power plants included the following:

- Comparison of the overall Tier 1 modeling to the more-refined Tier 2 modeling indicated that Tier 2 risk was substantially lower—10% of corresponding Tier 1 risk. Even at the 95% percentile level, Tier 2 risk was only 24.1% of the corresponding Tier 1 risk.
- No individual power plant assessment resulted in a modeled health risk exceeding EPA recommended thresholds: non-cancer hazard quotient (HQ) > 1, or cancer risk greater than 1×10^{-6} (1 in a million).
- The 10 facilities with the highest cancer risk had values ranging from 7.14×10^{-7} to 9.78×10^{-7}, with all values below the 1×10^{-6} threshold.
- The 10 facilities with the highest chronic non-cancer risk had values ranging from HQ 0.284 to 0.668, with all values below the HQ > 1 threshold.
- The 10 facilities with the highest acute non-cancer risk had values ranging from HQ 0.119 to 0.295, with all below the HQ > 1 threshold.
- The primary chemical drivers of cancer risk were arsenic (average of 76%) and hexavalent Cr (17%), with minor contributions from other trace metals (7%).
- The primary chemical drivers of the chronic non-cancer risk were chlorine (average of 97%) and hydrogen chloride (1%).
- The primary chemical drivers of the acute non-cancer risk were arsenic (average of 52%) and acrolein (9%), with additional contributions from hydrogen chloride, chlorine, and hydrogen fluoride.

[212] EPA, 2004. *Air Toxics Risk Assessment Reference Library, Volume 2, Facility-Specific Assessment*, U.S. EPA Office of Air Quality Planning and Standards. EPA-453-04-001B. April.

Comment 75: Commenter 17777 states that EPRI's analysis shows cancer risks below the one in a million cancer risk threshold. Numerous conservative assumptions in EPRI's modeling compel the conclusion that actual risks are far lower than those calculated, including:

- The model plant was selected from the highest group of emitters in the U.S. fleet.
- Estimated emission rates are likely modeled high and actual measured HAP emissions would likely result in lower risks.
- Deposition modeling introduces numerous uncertainties that could result in over-prediction of risks.
- The site selected for EPRI's case study is likely as close to a worst case scenario as is possible given the numerous variables associated with ingestion pathway risks.
- Estimation of chemical intake from consumption is highly conservative, especially for fish consumption, which is the primary driver of risk for the Adult Angler receptor. A more representative ingestion rate would reduce angler risk by more than a factor of two.
- Lifetime exposure assumptions are conservative and generally represent the upper end of a wide range of potential exposure values that are not necessarily representative of exposures for people living in a real world location.
- The models relied upon contain conservative assumptions to account for uncertainties associated with extrapolating from high doses used in laboratory studies to anticipated human health effects from low doses experienced in the environment.

Comment 76: Commenter 17621, in addition to the Tier 1 and 2 study, also provided a risk evaluation for facilities having stacks located within 50 km of one another: Two-level analysis of 100 facility groups (consisting of two to 10 power plants) with the potential for overlapping plumes. Summary results for the two-level assessment of the 100 facility groups with potentially overlapping plumes included the following:

- The screening assessment, using simple addition of component facility maximum risk, identified 22 facility groups for refined analysis.
- Further analysis of these 22 facility groups—based on refined HEM3-AERMOD modeling with risks summed across the group on a receptor-by-receptor basis—identified two groups of facilities with potentially overlapping plume domains that could result in risks above the cancer threshold.
- The refined, combined cancer risk for the 22 facility groups ranged from 3.95×10^{-7} to 1.21×10^{-6}.
- The two highest facility groups marginally approached the 1×10^{-6} cancer risk threshold—four facilities on the Illinois/Indiana border at 1.03×10^{-6} and five facilities on the Ohio/Pennsylvania border at 1.21×10^{-6}.

In summary, a comprehensive tiered inhalation risk assessment using EPA-prescribed methods with improved emission factors, fuel data, and confirmed stack parameters did not identify significant health risks (cancer or non-cancer) among U.S. coal-fired power plants (as they existed in 2007). These results contrast with those presented by the EPA for its non-Hg case studies on 16 (15 coal-fired) power plants. As further described in EPRI Comments, CAA section 3.6, several issues appear to underlie these differences, indicating the need for the EPA to re-evaluate its assessment and to undertake a Tier 3 risk assessment for any facility of concern. The commenter states that in a Tier 3 multi-pathway risk assessment using EPA-prescribed methods along with improved data and analytical functionality, EPRI found no significant health or ecological risks for aquatic or terrestrial receptors from Hg and arsenic emissions at a modeled coal-fired generating facility. EPRI, 2011. ―Multi-Pathway Human Health and Ecological Risk Assessment for a Model Coal-Fired Power Plant. AECOM Report to Electric Power

Research Institute (EPRI), Palo Alto, CA. August. Appendix J presents a summary of this multi-pathway risk study.

Comment 77: Commenter 17621 states that EPRI's screening risk assessment finds lower risk numbers and recommends the EPA re-analyze its Tier 2 assessment. According to the commenter, EPRI conducted a Tier 2 screening risk assessment that included, among others, the case study facilities reported by the EPA as at or above one in a million risk (EPRI, 2009; Strum et al., 2011). EPRI found that found that all coal-fired facilities had maximum individual lifetime inhalation cancer risks below one in one million. The commenter notes that there are differences in the way modeling was applied that contribute to differences between the modeled risks in the EPA study and the EPRI study. For example, these differences relate to: 1) Meteorological data: EPRI 2009 and 2011 modeling use 1 year (mostly 1991) of data from EPA HEM3-AERMOD website, while the EPA 2011 modeling selected 5 years of data and, in some cases, used different sites. 2) For the Muskogee facility specifically, the EPA used Muskogee Davis Field for surface data while the HEM3 data are from Oklahoma City. However, both surface data and HEM3 data for the James River facility are from Springfield Regional Airport, and 3) Emissions variability: The EPRI 2009 study used a constant annualized emission rate, while the EPA 2011 study applied an hourly utilization factor for each EGU.

Comment 78: Commenter 17621 states that in EPRI's screening risk assessment there were differences in the way cancer risk was calculated. The EPA took the average risk over 5 years, rather than over 1 year. According to the commenter, experience with modeling indicates that year-to-year variations in maximum annual average concentrations at specific receptor can differ by a factor of about 1.5, and inter-site differences in meteorology can easily results in difference of more than a factor of 2.0. Thus, the differences between EPRI and EPA modeled risk results are within the expected range of variability given the differences in modeling methods and meteorological data. These differences underscore the cancer risk models' high sensitivity to input data selection.

Comment 79: Commenter 17656 states that for non-Hg metal emissions, and for gas and dioxin emissions, the EPA has not yet completed an in-depth study, complete with detailed risk analysis, to identify the mechanisms of human exposure. The EPA cannot assume the same results and risks that occur with non-Hg metals as the agency determined for Hg. According to the commenter, the EPA must complete a comparable and separate national-scale risk assessment for non-Hg metals in order to determine appropriateness of proposing emissions standards for non-Hg metals.

Comment 80: Commenter 17775 states that since the 1998 Utility Study, approximately 149 scrubbers and 222 SCRs were installed at EGUs. The commenter would have expected that the risk posed by EGUs would have decreased since 1998. However, the 16-Unit Study found three facilities with maximum cancer risks, driven primarily by Cr(VI), of greater than one in one million with the highest risk being 2.7 times higher than the highest risk in the 1998 Utility Study. The EPA also modeled the inhalation risks associated with non-carcinogen HAP emissions of the 15 coal-fired facilities and found that the highest target-organ-specific hazard index (TOSHI) for any coal-fired facility was 0.05, or 20 times below the RfC. According to the commenter, a comparison of these results to the Utility Study results should have made the EPA suspicious of the cancer risk calculated in the 16-Unit Study.

Comment 81: Commenter 17681 states that the EPA study is based on misinformation and overestimates assumptions. The commenter relies on the report by Dr. Willie Soon (June 2011) to conclude that the EPA has no data demonstrating health impacts from EGU emissions of non-Hg HAP, or the benefit from reducing such emissions.

Comment 82: Commenter 17774 states that new information on health risks does not add any new credible evidence that would support regulating non-Hg HAP. According to the commenter, the health information focuses on high does effects that are not consistent with exposure from coal-fired EGUs.

Response to Comments 72 - 82: The commenters are incorrect in their assertion that the EPA's case studies were performed with less rigor than the EPRI analysis. The EPRI analysis used a tiered approach to risk assessment, beginning with Tier 1 using EPA's SCREEN3 dispersion model on all 470 coal-fired power plants in the U.S., and following with Tier 2 with EPA's Human Exposure Model (which uses the AERMOD dispersion model) for plants with higher risks from the Tier 1 modeling. Although tiered risk assessment is an appropriate approach, the Tier 2 modeling could have been more refined. For example, more meteorological data could have been used and building downwash could have been considered. The EPRI analysis ostensibly concluded that the Tier 2 modeling with HEM was conservative, and that because the modeled risks did not exceed certain thresholds, no further refinement was necessary. However, such refinements could result in higher modeled risks than those from the commenter's Tier 2 modeling.

The EPA's dispersion modeling of the case study facilities was actually performed with a greater degree of refinement than the EPRI analysis, and was consistent with EPA's Guideline on Air Quality Models.[213] In contrast to the approach used in the EPRI analysis, the EPA used:

1) 5 years of recent meteorological data from the weather station nearest to each facility, rather than 1 year of meteorological data. This is more representative of long-term (i.e., lifetime) exposures and risks.
2) Temporally-varying emissions based on continuous emissions monitoring data, rather than assuming a constant emission rate for each facility throughout the entire simulation.
3) Building downwash, where appropriate.
4) The latest version of AERMOD [version 11103]

The EPA's assessment of the case study facilities for the proposed rule concluded that three coal-fired facilities and one oil-fired facility had estimated lifetime cancer risks greater than one in a million. For the final rule, revisions were made to the case studies based on comments received, and the results indicate that five coal-fired facilities and one oil-fired facility had estimated lifetime cancer risks greater than one in a million.

Regarding peer review, the risk assessment methodology for the case studies was consistent with the method that the EPA uses for assessments performed for Risk and Technology Review (RTR) rulemakings, which underwent peer review by the SAB in 2009. The SAB issued its peer review report in May 2010 (U.S. EPA-SAB, 2010). The report endorsed the risk assessment methodologies used in the program, and made a number of technical recommendations for the EPA to consider as the RTR program evolves. Also, in July 2011, the EPA completed a letter peer review of the methods used to develop inhalation cancer risk estimates for Cr and Ni compounds.

[213] Appendix W to 40 CFR 51

1H - Local-scale Hg Case Study

Commenters: 17777

Comment 1: Commenter 17777 states that the EPA's own analyses are consistent with the results of EPRI's analysis. The EPA's third risk assessment involved two site-specific case studies conducted to assess the potential near-field exposures and health risks associated with Hg emissions from individual EGUs as a result of consuming fish caught in nearby lakes. The EPA concluded that for these two facilities, risks associated with local Hg exposures may be relatively low.

Response to Comment 1: The EPA agrees that the two case studies provide some important information about the possible local impacts of Hg, but disagrees with the commenter's allegation that the EPA attempted to "downplay" the results. On the contrary, the EPA chose to interpret the results and describe the limitations of the assessment in an effort to be as transparent as possible about what the assessment might and might not mean. The EPA agrees that the two site-specific case studies conducted to assess the potential near-field exposures and health risks associated with Hg emissions from U.S. EGUs did not show particularly high local Hg exposures or risks. The EPA notes that these case studies are for a very limited subset of EGUs, and may therefore not represent the full range of possible results for all U.S. EGUs. Further, the commenter's claim that the EPA did not evaluate longer-range Hg impacts is misplaced. While it is true that the EPA did not evaluate long-range Hg impacts in the two case studies, the EPA did conduct an extensive evaluation of long-range cumulative impacts of Hg emissions from multiple EGUs in the national-scale Hg assessment, the ultimate result of which was the determination that Hg emissions from U.S. EGUs could indeed pose significant health risks.

1I - Ecosystem Impacts from HAP

Commenters: 17621, 17775, 17696, 17855, 19536/19537/19538

Comment 1: Commenters 17696 and 17855 state that the EPA has not justified regulating acid gases based on hazards to public health as required by the statute. Instead the EPA supported is decision to regulate EGU acid gas emissions based on concern about the potential of such emissions to aggravate ecosystem acidification, but the EPA expressly acknowledges that direct quantification of ecosystem acidification impacts is an uncertain process. Moreover, HCl's contribution to acidification of water bodies is de minimis, estimated to be only about one percent by the technical community.

Response to Comment 1: While the EPA agrees that quantification of acidification effects has remaining uncertainty, the science and methodology has progressed in recent years. Based on recent peer reviewed research including Evans et al. (2011),[214] acid gases can significantly contribute to acidification. The EPA published a comprehensive risk assessment of acidification effects of nitrogen and sulfur deposition (U.S. EPA, 2009)[215] and a Policy Assessment (U.S. EPA, 2011).[216] Given the extent and importance of the sensitive ecosystems evaluated in the review of nitrogen and sulfur deposition any substance that contributes to further acidification must be considered to be affecting the public welfare.

Comment 2: Commenter 17855 states that in addition to looking beyond the statutory limitation to consider public health, the EPA's environmental impacts analysis includes relies on "recent research" which includes a paper published in the journal Environmental Science and Technology on February 2, 2011. The commenter notes that from the date of publication is such that it is hard to believe that the agency had sufficient time to obtain this paper, digest its results, and determine that it provides a sufficient basis to regulate HCl in advance of the date that the Utility MACT was submitted to OMB for regulatory review (February 19, 2011). The commenter also questions the relevancy potential impacts of HCl deposition on sensitive ecosystems (focusing on peat bogs) in the United Kingdom.

Response to Comment 2: The EPA disagrees that the peer reviewed study mentioned by commenter by Evans et al. (2011) is not relevant to U.S. ecosystems. The paper presents evidence that shows 1) that HCl is highly mobile in the environment, transferring acidity easily through soils and water, 2) that HCl can transport longer distances than previously thought (given its presence in remote ecosystems, and 3) that it can be a larger driver of acidification previously thought. The fact that this study took place in the

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[214] Evans, Chris D., Don T. Monteith, David Fowler, J. Neil Cape and,Susan Brayshaw. 2011. "Hydrochloric Acid: An Overlooked Driver of Environmental Change." *Environmental Science & Technology* 45 (5), 1887-1894.

[215] U.S. Environmental Protection Agency (U.S. EPA). 2009. Risk and Exposure Assessment for Review of the Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Oxides of Sulfur (Final). The EPA-452/R-09-008a. Office of Air Quality Planning and Standards, Research Triangle Park, NC. September. Available on the Internet at <http://www.epa.gov/ttn/naaqs/standards/no2so2sec/data/NOxSOxREASep2009MainContent.pdf>.

[216] U.S. Environmental Protection Agency (U.S. EPA). 2011. Policy Assessment for the Review of the Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Oxides of Sulfur. The EPA-452/R-11-005a. Office of Air Quality Planning and Standards, Research Triangle Park, NC. February. Available on the Internet at < http://www.epa.gov/ttnnaaqs/standards/no2so2sec/data/20110204pamain.pdf>.

U.K. is itself irrelevant. The chemical interactions of HCl in water are the same the world over and sensitive ecosystems exist in the U.S. as well as in Europe as illustrated in the ecological risk assessment for NO_X and SO_X (U.S. EPA, 2009). Furthermore, the commenter is factually incorrect that the EPA is justifying that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs based on this one study.

Comment 3: Several commenters (19536, 19537, 19538) state that several new studies further support the EPA's 2000 Finding. According to the commenter, several of these newer studies are included in a special issue published by the journal *Ecotoxicology* in 2008 devoted to the effects of MeHg on wildlife. Although the EPA has not quantified the potential impacts of HAP from U.S. EGUs on the environment, a qualitative assessment conducted by the agency reviewed existing literature reporting effects of Hg on fish and wildlife and acid gas contribution to ecosystem acidification. The potential adverse environmental effects associated with HAP are well documented and reaffirm the EPA's determination that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs.

Response to Comment 3: The EPA agrees that Hg exposure in wildlife is responsible for various adverse health effects in many species across the U.S. and recognizes that research is ongoing in this area. As discussed in the Appropriate and Necessary Finding, the EPA agrees that there are potential environmental risks from exposures of ecosystems through Hg and non-Hg HAP deposition. The benefits to ecological health remain unquantified in the assessments for this rule due to data and methodological limitations. The EPA cited relevant articles from the special edition of *Ecotoxicology*[217] mentioned by the commenter in the ecosystem effects CAA section on Chapter 5 of the RIA for this rule, which is available in the docket.

The EPA agrees that acidification poses a significant risk of adverse effects to fish and wildlife in aquatic and terrestrial ecosystems (U.S. EPA, 2009). Based on recent peer reviewed research including Evans et al. (2011), acid gases can significantly contribute to acidification and the EPA agrees that those acid gases pose a risk for acidification of ecosystems. However, due to data and methodological limitations, the EPA was not able to quantify those risks and benefits for this rule.

Comment 4: Commenters 17621 and 17775 state that the EPA's use of the U.K. study results is inappropriate to apply in the U.S. because U.S. coals differ from U.K. coals in chloride content (U.S. coals have much lower chloride concentrations) and U.S. soils differ from U.K. soils (U.S. soils are limited in areas containing histosols). Further, the study claims that chloride is not taken up by plants and soils; however, other researchers are finding that there is some retention that would lessen chloride impacts even further. Lastly, HCl emissions are negligible compared to other primary emissions (such as SO_2) that can lead to potential acidification of ecosystems. According to the commenters, anthropogenic emissions of HCl in the U.S. are negligible compared to emissions of SO_X, NO_X and NH_X. Total HCl emissions have been consistently less than 0.7% of the sum of SO_X, NO_X and NH_X emissions on a molar equivalent basis. (EPRI Comments § 3.16; using data from the NEI and the Toxics Release Inventory). In addition, NADP [National Atmospheric Deposition Program] monitors have showed a clear reduction in sulfate deposition but no comparable HCl reductions, even though power plant emissions of SO_X and HCl have been reduced by similar amounts from 1998 to 2009 - 56%. According to the commenter, HCl is a negligible contributor to environmental acidification in the U.S.

[217] *Ecotoxicology* 17:83-91, 2008

Response to Comment 4: The EPA disagrees that the peer reviewed study mentioned by commenter by Evans et al. (2011) is not relevant to U.S. ecosystems. The paper presents evidence that shows 1) that HCl is highly mobile in the environment, transferring acidity easily through soils and water, 2) that HCl can transport longer distances than previously thought (given its presence in remote ecosystems, and 3) that it can be a larger driver of acidification previously thought. The fact that this study took place in the U.K. is itself irrelevant. The chemical interactions of HCl in water are the same the world over and sensitive ecosystems exist in the U.S. as well as in Europe as illustrated in the ecological risk assessment for NO_X and SO_X (U.S. EPA, 2009). Furthermore, the commenter is factually incorrect that the EPA is justifying that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs based on this one study.

1J - Legal: Request for Extension of Comment Period

Commenters: 10167, 10569, 10750, 10821, 10942, 10943, 10987, 12996, 13178, 13529, 13827, 14017, 14069, 14070, 14368, 16402, 16403, 16404, 16405, 16626, 16627, 16822, 16857, 16861, 16872, 16873, 17003, 17123, 17174, 17254, 17627, 17682, 17689, 17702, 17712, 17743, 17747, 17761, 17774, 17775, 17776, 17777, 17790, 17807, 17817, 17856, 17871, 17885, 17904, 17912, 18018, 18428, 18484, 18489, 6543, 6584

1. Request for extension.

Comment 1: Several commenters (10167, 10569, 10942, 12996, 13529, 14017, 14069, 14070, 16402, 16403, 16405, 16626, 16627, 16822, 16857, 16861, 16872, 16873, 17123, 18489, 6584) request an extension of 60 days.

Comment 2: Commenter 10750 requests the comment period be extended for an additional 60 days if the proposed rule is not withdrawn.

Comment 3: Commenter 13178 requests an extension of the comment period.

Comment 4: Commenter 13827 requests an extension to and including September 5, 2011.

Comment 5: Commenters 14368 and 17003 request an extension of 90 days.

Comment 6: Commenters 12996 and 14017 request an extension because data supporting the rulemaking was late in being released.

Comment 7: Commenter 17254 requests that the agency extend the comment period to 90 or 120 days.

Comment 8: Commenters (17743, 17747, 17912) request an extension of 120 days from the date of publication.

2. Overlap with other regulatory activities.

Comment 9: Several commenters (10942, 12996, 10750, 17003, 6584) reference the proposed rule's overlap with other recent or imminent rulemaking activities as a reason to grant an extension.

Comment 10: Commenter 10750 cites the overlap between the proposed HAP Rule and the 316(b) proposal as causing a strain on resources.

Comment 11: Commenters 10942 and 17002 emphasize the need to evaluate the cumulative impact of the proposed rule in conjunction with other rules under consideration.

Comment 12: Commenter 17123 states the proposed rule must be considered in conjunction with the Clean Air Transport Rule (CATR) and the Coal Combustion Residuals (CCR) Rule.

Comment 13: Commenter 6584 states that limited resources are available as they are implementing rules recently promulgated in March 2011.

3. Calls to reconsider or re-propose rule.

Comment 14: Commenter 17123 suggests the agency reconsider the regulation.

Comment 15: Commenter 10821 requests that the agency withdraw and re-propose the rule or, as an alternative, extend the comment period for 90 days.

Comment 16: Several commenters (10943, 6543, 17871) request that the agency withdraw the proposed rule in order to correct errors in the rule. If this can be accomplished and all information made available within the next 60 days, these commenters request an additional 60-day extension.

Comment 17: Commenters 10943 and 6543 state that the errors in the proposal and lack of certain information cause it to fall short of the requirements set forth in section 307(d)(3) of the CAA with respect to what is required of the agency for issuing a proposed rule.

Comment 18: Commenter 10167 requests that the agency re-propose the rule to provide additional time to facilitate a final rule.

Comment 19: Commenter 17003 suggests re-proposing the rule as an alternative to an extension.

Comment 20: Commenter 10750 cites pervasive and critical errors in their request for an extension.

Comment 21: Commenters 17123 and 17776 mention significant technical errors as a factor in the current comment period being insufficiently long.

Comment 22: Multiple commenters (10167, 10569, 14368, 16626, 16857, 18428) cite an error in the EPA's analysis of Hg data as being potentially significant and warranting additional time.

Comment 23: Several commenters (10167, 10569, 10987, 16857) suggest that the error in data analysis may warrant revision of the proposal.

Comment 24: Commenter 14368 requests that the agency provide a scientifically sound final rule that corrects this error before moving forward.

Comment 25: Commenters 10943 and 6543 cite significant errors in their requests for an extension and/or a withdrawal of the proposal, including a widespread error the agency used to convert historical emissions data to common emission data which lead to measurements being incorrect by a factor of 1000. Commenters state that this error affects the new source MACT limit for Hg and the Hg MACT floor analysis for existing units, claiming that more than half the units identified as "best performing" have actual emissions 1000 times higher than the agency used in the MACT floor analysis. Commenters add that the conversion error draws into question the EPA's decision to base its Hg MACT floor calculations on the top 12% of all units for which the EPA has data instead of the top 12% of all units in the category. Commenters assert that parties commenting on the proposed MACT limits have no way of knowing what standards would have been proposed had the emissions information been used correctly.

Comment 26: Commenter 10987 suggests that the agency has underestimated the impacts of the potential errors including uncovered discrepancies in determination of the Hg limit which result in a 20-

fold decrease in stringency of the MACT standard for a major subcategory of new units. Commenter asserts that these inconsistencies must first be corrected to allow meaningful comment.

Comment 27: Commenter 16626 suggests the public should have the opportunity to examine and comment on the revised Hg calculations.

Comment 28: Commenter 17003 references an error, cited by the Utility Air Regulatory Group (UARG), in which actual Hg emissions from units the EPA used to set new and existing unit floors are 1000 times higher than the emissions identified in the dataset for those units.

Comment 29: Commenter 17682 specifically references the conversion error in the agency's calculation of Hg emissions as warranting extending the schedule for developing and implementing the proposed rule.

Comment 30: Commenter 17871 requests that the agency withdraw the rule and re-propose it because critical parts of the proposed rule are based upon numerous and significant errors in the agency's technical analysis of HAP emissions data, including a widespread error involving the agency's proposed new and existing source MACT limits for Hg.

Comment 31: Commenter 18428 states that important errors in data interpretation and manipulation have been discovered in addition to the well-known error that occurred in the agency's calculation of the MACT floor for Hg from existing coal-fired EGUs.

Comment 32: Commenter 18484 states that the conversion error in the EPA's calculation of Hg emissions is proof that short cuts were taken as a result of the rushed schedule for developing and implementing the proposed rule.

Comment 33: Commenters 10943 and 6543 state that there are heat rate errors, transcription errors, data assignment errors and a lack of outlier quality control in spreadsheets used by the agency to calculate MACT floors.

Comment 34: Several commenters (14017, 14069, 16402) state that numerous potential errors that significantly affect the emissions floor calculations and standards have been uncovered which will warrant an extension in order to correct and translate into comments.

Comment 35: Several commenters (14017, 14069, 16402) state that the release of revised floor analysis spreadsheets has slowed the review process by requiring reevaluation in light of the corrections.

Comment 36: Commenter 14069 adds a footnote stating the EPA did release a 'master' database of the Part III data; however, prior to the release of the ERT files, commenters would have been unable to assess whether the agency properly compiled the data and if the data was properly translated to the spreadsheets, and only those adept at manipulating databases would have been able to identify the data for a particular source and therefore be able to make inquiries about the data quality.

Comment 37: Commenter 16822 cites concerns that there may be significant errors in the agency's analysis of underlying data used to set standards in the rule.

Comment 38: Commenters 17702 and 18018 state that the serious questions as to the data relied upon by the EPA in formulating this rule justifies an extension of 30 days in addition to the 30-day extension already granted.

Comment 39: Commenter 17776 states that even after the correction issued on May 18, 2011, after the start of the comment period, apparent technical errors and uncertainties remain. As an example, the commenter adds that the proposed emissions standards for new liquid oil-fired-units appear to be less stringent than for existing units.

Comment 40: Commenter 17871 states that the proposed Hg standards are wrong and parties have no way of knowing what standards the EPA would have proposed if the emissions information was used correctly; and therefore, the proposal does not comply with the requirements of section 307(d)(3) of the CAA.

4. Magnitude and complexity of proposed rule.

Comment 41: Several commenters (10167, 10569, 10821, 10943, 10987, 13529, 13827, 14069, 14070, 14368, 16402, 16403, 16405, 16626, 16822, 16857, 16861, 16873, 17003, 17123, 17682, 17689, 17702, 17712, 17743, 17747, 17817, 17871, 17885, 17904, 18018, 18428, 6543, 6584) request an extension because the magnitude and complexity of the proposed rule warrants more time to evaluate the information and the proposed rule's potential impacts.

Comment 42: Commenter 10821 states that the effects of the proposed rule on existing facilities will almost certainly be greater than the EPA predicts.

Comment 43: Commenter 16403 states that the impact of the proposed rule will have significant economic and energy impacts on many states and the nation as a whole, and an extension is warranted to allow sufficient time to provide comments.

Comment 44: Several commenters (16403, 16626, 17003) raise the issue of the estimated compliance costs of over $10 billion that are projected to be a result of the proposed rule in their requests for an extension.

Comment 45: Commenter 16626 raises the issue of electricity rates increasing by 3.7% annually in their requests for an extension.

Comment 46: Commenter 16405 states that the issues to be considered in reviewing the proposed rules includes impact on reliability, impact on all classes of customers, and impact on a state's fuel mix and fuel costs.

Comment 47: Commenter 16626 mentions the impacts on the way our country generates and consumes electricity and the economic impacts the new regulation could have.

Comment 48: Commenter 16873 states that the proposed rule will have a disparate impact even within the same state .

Comment 49: Commenter 17003 requests an extension due to the impact in terms of applicability and compliance costs which requires a comment period sufficient to ensure thorough consideration of the

proposed rule's impacts, the EPA's conclusions, and facility compliance options as a basis for developing meaningful input for the EPA on the rules. Commenter further states that due to the economic impact the rules will have, affected parties need to have the opportunity to thoroughly review the proposal and fully raise issues before they must commit to a particular path to compliance and therefore need sufficient time to prepare comments that will fully preserve their ability to challenge the administrative decisions that underlie the rules.

Comment 50: Commenter 17123 mentions the economic impact of the proposed rule and the need to provide time for energy providers to understand the regulations, determine effects on the cost of energy production, rates, and develop mitigations plans.

Comment 51: Multiple commenters (10167, 10569, 10821, 10943, 13529, 16403, 16861, 17003, 17807, 17871, 18428, 6543) cite the proposed rule length of pages as well as a large amount of supporting documentation in their request for an extension.

Comment 52: Commenters 10750 and 18484 state that the time provided to comment is inadequate given the complexity of the proposed rule.

Comment 53: Several commenters (17689, 17712, 17817, 17885) state that the proposal requires analyzing many underlying documents directed at MACT standards, individual HAP health effects, monitoring and compliance obligations, and work practice standards. Commenters add that the comment period is inadequate in light of the complexity of the proposal and the confusion regarding how the agency arrived at many of the regulatory conclusions in the proposal.

Comment 54: Commenter 17871 mentions an extensive new interpretation and justification for the agency's regulatory finding under CAA section 112(n)(l)(A) as adding to the complexity of the proposed rule and being a factor in requiring more time to prepare comments.

Comment 55: Commenter 17856 compares the proposed rule to the Transport/Cross-State rulemaking in technical extent. Commenter adds that the technical extent of the document warrants more time and research to fully review in a meaningful manner.

5. Need for additional data and information.

Comment 56: Several commenters (10167, 10569, 13529, 16857, 17807) request an extension to collect additional information providing critical data to fill key information gaps. This information would help to better understand the proposal's impacts on operations when reviewing and developing comments.

Comment 57: Several commenters (10167, 10569, 13529, 16857, 17807) state that the ICR in 2010 for the purpose of developing the rule did not provide all the information necessary to fully understand the implications of the proposal. Additional information necessary includes data representing full span of operational periods including low loads, startups, and shutdowns.

Comment 58: Several commenters (10167, 10569, 10943, 6543) state in their request for an extension that the agency has not provided key supporting documentation.

Comment 59: Several commenters (10569, 13529, 16857) state that a number of units were not tested in the ICR; therefore, the utilities may not have sufficient information to determine the extent of needed comments.

Comment 60: Several commenters (10167, 10569, 13529) suggest this additional information may reveal the need for revisions to the proposal or further investigation.

Comment 61: Several commenters (10821, 10987, 17627, 17790) reference the continual release of supporting documents in their request for an extension.

Comment 62: Commenter 16857 requests an extension because they have scheduled additional emissions testing which may warrant further investigation.

Comment 63: Commenter 16861 mentions that several technical documents have not yet been released by the agency for public review.

Comment 64: Several commenters (14017, 14069, 16402) state that the agency did not provide details necessary to verify the agency's final emissions calculations until May 26, 2011 which has restricted the remaining time in the comment period for the review of data.

6. Additional time needed for coordination.

Comment 65: Several commenters (10942, 16627, 16861, 16872) request an extension because the impact of the rule will have a varied effect on individual utilities such that they will need more time to coordinate with their regulated community, assess member company comments, and use that information to develop comments on behalf of those they represent.

Comment 66: Several commenters (10942, 16627, 16872) cite NARUC informational sessions occurring in May, June, and July as being useful for their development of comments.

Comment 67: Commenter 6584 states that most coal-fired power plants in North Carolina are in the final stages of being equipped with control technologies in response to a 2002 statute resulting in emission reductions for criteria air pollutants (CAPs) and HAP. Commenter and utilities in the state are still learning what is achievable in optimizing CAP and HAP emission control performance.

7. Other arguments.

Comment 68: Commenter 16861 states that the spirit of the President's new Executive Order justifies a lengthy comment period for a proposal of this magnitude and complexity.

Comment 69: Commenter 16404 requests that the agency reject calls to extend the public comment period and delay the final rule and states that the ruling is a matter of life and death. Commenter states that the comment period of 111 days (from March 16, 2011 to July 5, 2011) and public hearings provide more than enough time to assess the proposal and provide comments.

Comment 70: Commenter 17003 states that the comment period of 2 months is insufficient in contrast to the time it has been in development since the DC Circuit vacatur in February 2009. Further,

commenter 17003 requests that their request for a 90-day extension and the agency's response be included in the rulemaking docket for each of the two rules at issue (76 FR 25073 and 76 FR 24976).

Comment 71: Commenter 17790 states that while the 30-day extension was useful, an additional 30 days for public input would allow for better input to be provided by commenters.

Comment 72: Several commenters (17807, 17817, 17904, 18428) state that while an extension has been granted for comment, it is still inadequate.

Comment 73: Commenter 6543 states that it is a member of UARG and supports the UARG's request for re-proposal or extension.

Comment 74: Commenter 10987 cites an unreasonably abbreviated SBREFA process mandate as a reason for an extension.

Comment 75: Commenter 17003 states that sources are conducting the first QA/QC of the data. Commenter adds that the 2010 ICR information so closely preceded the proposal of the rule that the EPA has not had a chance to reconcile that information with proposed standards. Commenter states that the EPA has continued to accept data post proposal and continues to make data available. Commenter adds that the EPA has not yet compiled complete data under the ICR; therefore, it is not possible that the agency has undertaken a meaningful analysis of the 2010 emissions for coal- and oil-fired EGUs.

Comment 76: Commenter 17174 states that the agency should provide appropriate process and time to comment on any significant changes to the proposed rule.

Comment 77: Commenter 17774 agrees with the agency's extension of the comment period but states that the 90-day comment period is the bare minimum needed to review the material. Commenter adds the EPA still needs more time to re-evaluate the agency's flawed data-gathering approach and standard-setting methodology and re-propose rules that comply with the requirements of the CAA.

Comment 78: Commenter 17776 believes that 90 days was insufficient to allow a meaningful opportunity to review and comment on the proposed rule.

Comment 79: Commenter 17871 requires more time in order to conduct review of the ICR data.

Comment 80: Commenter 18428 states that the ambitious schedule for completion of the rulemaking is counter-productive and compares it to the Industrial Boiler MACT which is now being reconsidered.

Comment 81: Commenter 17003 references *Environmental Integrity Project v. EPA*, 425 F.3d at 992, 996 (D.C. Cir. 2005); *Unemployment Compensation Comm'n v. Aragon*, 329 U.S. 143, 155(1946); *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 552-54 (1978); *Ohio v. EPA*, 997 F.2d 1520, 1528-29 (D.C. Cir. 1993); *United States v. L.A. Tucker Truck Lines, Inc.*, 344 U.S. 33 (1952); and *1000 Friends of Maryland v. Browner*, 265 F,3d 216, 227 (4th Cir. 2001) in order to emphasize the importance of the comment period to the affected parties. Commenter adds that the deadline for the comment period does not allow sufficient time to comment on a proposed rule of such complexity and impact, and therefore violates the parties' fundamental constitutional statutory protections. Commenter states that protections are further deprived when comments are rejected as inadequate when the comment period does not allow for sufficient time to fully support the comment.

Comment 82: Commenter 17775 references *Small Ref. Lead Phase-Down Task Force v. EPA*, 705 F. 2d 506, 519 (D.C. Cir. 1983) and *Kennecott Corp. v. EPA*, 684 F. 2d 1007, 1118 (D.C. Cir. 1982) in emphasizing the importance of the agency providing documents that explain the agency's data and methodology. Commenter states that the agency has not made much of the factual data and methodology in analyzing the data available at the time the proposal was published. Commenter adds that much of the information made available was presented in such a cursory fashion that it deprives commenters from performing a meaningful evaluation.

Commenter 17775 states that the rushed proposal process has resulted in the agency truncating the assessment of the information supplied in response to the ICR. Commenter adds that errors in the proposal are evidence of this statement.

Commenter 17775 strongly disagrees with the EPA's proposed Hg limit. According to the commenter, the EPA has not resolved discrepancies in the MACT floor calculations or corrected certain errors in the underlying emissions data, and it is very difficult to comment on the substance of the EPA's ("adjusted") proposal, because the MACT floor may very well change once the identified errors are corrected. Commenter strongly asserts that the rule should not be finalized without resolving these discrepancies as it violates CAA section 307(d)(3), specifically the Assistant Administrator's letter addressed to their counsel. Commenter cited *Sierra Club v. Costle*, 657 F.2d 298, 398 (D.C. Cir. 1981). Congress "intended to provide thorough and careful procedural safeguards . . . [to] insure an effective opportunity for public participation in the rulemaking process."

Commenter 17775 states that the EPA placed the proposed rule documents into the rulemaking docket after May 3, which was too late to allow for meaningful public comment prior to promulgation of the final rule. The RIA and the Mercury TSD were not included in the rulemaking until June 7, 2011 (i.e., less than 30 days before the original comment deadline). Finally, it was only on June 3, 2011 (i.e., 30 days after the proposed rule was published) that the EPA placed in the docket a memorandum setting forth what purports to be "documentation of the ecosystem effects of mercury deposition."

Comment 83: Several Commenters (17681, 17881, 17919, 18831) state that even with a 30-day extension on the comment period, it was insufficient to examine the numerous additions that the EPA has added to the docket, many of which address and correct errors pointed out by EPRI and UARG, as well as additional errors found by the EPA.

Comment 84: Commenters 17638 and 18033 state that the EPA has given insufficient time for public comments on the proposed rule. This has resulted in at least one significant error in setting the MACT standards. Commenter sent a letter to the EPA on May 5, 2011 citing a calculation error in Hg emissions resulting in new and existing MACT floors that were 1000 times higher than the emissions identified in the dataset for those units. The EPA admitted the error and proposed to correct it, but has not done so until the comment period ended.

Comment 85: Commenters 17638 and 17681 disagree with the EPA's claim that the public had 140 days to review the proposal because many critical supporting documents were not available until well after the draft was released.

Response to Comments 1 - 85: On July 1, 2011, the EPA announced an extension to the public comment period (76 FR 38590). The comment period closed on August 4, 2011. Further, we reject the idea that the rule needs to be withdrawn and/or reconsidered before it is even final. The errors in the

proposed rule noted by certain commenters are more fully addressed elsewhere in this document but, in any event, were addressed within one month of proposal and the revised limits were available for public comment for over 30 days, a period of time we believe sufficient for the public to review them and provide comment. In total, the public was provide more than 100 days in which to review the proposal and the vast majority of supporting materials. We maintain the time provided was sufficient and that it was consistent with the time required in CAA section 307(h).

8. Comparison to other rule comment periods.

Comment 86: Numerous commenters (10167, 10569, 10750, 10821, 10943, 13529, 13827, 14368, 16857, 16861, 17003, 17254, 17871, 17904, 6543) assert that an extension is warranted as rules of similar or less complexity and importance are routinely afforded longer comment periods.

Comment 87: Multiplel commenters (10167, 10569, 10750, 10943, 13529, 13827, 14368, 16857, 17871, 6543) reference the CCR Rule's comment period as being longer.

Comment 88: Several commenters (10167, 10569, 13529, 13827, 16857) reference the Reciprocating Internal Combustion Engines (RICE) NESHAP's comment period as being longer.

Comment 89: Several commenters (10750, 10943, 16857, 17871, 6543) reference the 316(b) Rule as being afforded a longer comment period.

Comment 90: Several commenters (10750, 10943, 17871, 6543) reference the Boiler MACT as being afforded a longer comment period.

Comment 91: Commenter 17003 references the Boiler MACT as an example of a rule with an inadequate comment period for the development of data and analysis, resulting in the agency dismissing several comments on the grounds that the commenters did not provide specific information or data to allow the agency to thoroughly consider the comments.

Commenter 17003 includes a table in docket entry EPA-HP-OAR-2009-0234-17003. The table compares recent MACT Rules, their impacts, original comment period, and extension, if applicable. Commenter references the table in stating that the hospital, medical, infectious waste incinerator (HMIWI) MACT received the same comment period length and the Portland Cement MACT, RICE MACT, and Boiler MACT received longer comment periods.

Comment 92: Commenter 17904 references the Cement MACT Rule as being afforded a longer comment period.

Comment 93: Commenters 16469 and 18912 reference the time periods for completing rulemaking for the Boiler MACT and the Portland Cement MACT and add that failure to consider the comments received will violate the APA and CAA.

Response to Comments 86 - 93: As noted elsewhere in this document, on July 1, 2011, the EPA announced an extension to the public comment period (76 FR 38590). The comment period closed on August 4, 2011. Given the period of time prior to proposal that the rule was posted on the agency's website and, thus, available for public review, over 100 days were provided during which time the public could review both the proposed rule and the vast majority of the supporting documents. We

believe that this is sufficient time. Further, the fact that different rulemakings have comment periods of different lengths is immaterial in establishing the length of the comment period for this rulemaking.

1K - Legal: Other

Commenters: 10167, 10750, 10821, 13526, 14368, 15182, 16122, 16469, 16549, 16626, 16705, 17003, 17110, 17114, 17265, 17400, 17627, 17629, 17638, 17639, 17640, 17654, 17656, 17681, 17682, 17689, 17697, 17698, 17712, 17714, 17724, 17728, 17734, 17739, 17740, 17751, 17756, 17757, 17761, 17771, 17772, 17775, 17776, 17782, 17790, 17806, 17807, 17813, 17817, 17821, 17833, 17834, 17837, 17842, 17844, 17854, 17856, 17867, 17868, 17871, 17877, 17881, 17882, 17884, 17901, 17902, 17903, 17904, 17909, 17911, 17912, 17913, 17919, 17928, 17930, 18025, 18027, 18033, 18037, 18039, 18422, 18424, 18428, 18433, 18436, 18437, 18486, 18488, 18498, 18500, 18539, 18575, 18759, 18831, 19211, 19536/19537/19538, 18932

1. Comments that the November 16, 2011 deadline is not reasonable.

Comment 1: Multiple commenters (10167, 10569, 10942, 10943, 10987, 13529, 14069, 16402, 16626, 16822, 16872, 17003, 6543) acknowledge the deadline to finalize the rule by November 16, 2011.

Comment 2: Several commenters (10167, 10569, 13529, 14069, 16402, 17003) state that the regulated community was not a party to the Consent Decree agreement which set the deadline for the final rule.

Comment 3: Multiple commenters (10167, 10569, 10943, 10987, 16402, 16626, 16822, 17003, 6543) acknowledge that the deadline can be changed.

Comment 4: Several commenters (10167, 10569, 13529, 16822, 17003) request the agency extend the final rule deadline.

Comment 5: Commenter 6543 states that the schedule the agency agreed to under the Consent Decree is posing an undue restriction of the public comment period.

Comment 6: Commenters 10167 and 18424 state that the court-ordered deadline of November 16, 2011 for finalization of the rule is not reasonable or necessary in light of the complexity of the proposal and burden it would place on the electric utility industry and its rate payers.

Comment 7: Commenter 14368 states that it only recently been made aware that the EPA agreed to finalize the proposed EGU NESHAP rule by November 16, 2011. Commenter stated it was never party to such as agreement, despite the impacts that the rule will have on its members and constituents. The deadline is thus not reasonable, in light of the magnitude of the burden this rule will place upon the middle class and working poor of this country. The commenter requests that the EPA not allow an arbitrary deadline to cause the EGU NESHAP and NSPS to be finalized without careful consideration of the impacts it will have on our families. Commenter believes it is arbitrary and capricious to adhere to a November 16, 2011 promulgation of this rule.

Comment 8: Commenter 10821 also requests that the EPA petition for an extension. The commenter points out that it was recognized numerous times in the opinion recognizing the consent decree that the timeline can be extended, and that Provisions 6 and 7 of the Consent Decree clearly contemplate the ability of the Court to extend this time period “for good cause.” The commenter argues that providing adequate time for an industry that provides roughly 45% of the country’s energy supply to analyze and thoroughly comment on this proposed rule is just the type of “good cause” that the Consent Decree contemplates. And by granting a comment extension now and petitioning the Court for additional time,

it would assist in satisfying the timeline requirements found in Provision 7 of the Consent Decree and also be in line with other previous actions where the EPA has extended Consent Decree timelines.

Commenter 10821 went on to say that stakeholders such as themselves should not be prejudiced by the EPA setting an artificially short timeline in its Consent Decree and the EPA waiting until the final day of the Consent Decree timeline to propose a rule, when it could have acted earlier.

Comment 9: Commenter 17930 notes that the EPA has the authority, both in the Court Order outlining the rulemaking timeline and in precedent, to extend the finalization date beyond November 16, 2011. There are many substantive issues in the current version of the rule that would require re-proposal in order to be addressed properly. To do otherwise would result in an incomplete and inaccurate rule.

Comment 10: Commenter 17265 urges the EPA to take the time necessary – beyond this November – to increase the credibility and defensibility of the rule. The commenter is concerned that additional errors will occur if the EPA adheres to the current deadline. The commenter notes that this is an important, complicated and potentially burdensome rule, and the EPA should take the necessary time to carefully consider the public comments and integrate necessary revisions.

Comment 11: Commenter 17629 asks that the EPA not proceed with this rulemaking until a full analysis has been made on the cumulative impacts to affected sources of this rule and all other rules and standards directed at the power generation sector currently being contemplated and/or implemented by the EPA. The commenter requests that the EPA, at a minimum, extend the rulemaking for one year in order to allow the various states and their respective affected sources time to evaluate not only the full impacts and benefits of these rules, but also the practicability of installing controls to meet this rule nearly simultaneously with installing controls to meet other existing and pending rules and standards. The commenter expresses concern that the combined effects of meeting all requirements at the same time may create unintended consequences, and in fact, be impossible to accomplish. The commenter is required to implement SO_2 and NO_X reductions to fulfill the objectives of the Regional Haze Rule and of the various controls will either compliment or confound each other places a large uncertainty on how best to proceed. In addition, the impact of the Tailoring Rule is not yet known, and could also lead to complications. The commenter went on to point out that final implementation of the new NO_2 and PM standards and the pending ozone standard confound things even further. Therefore, the commenter asks that the EPA place the rulemaking on hold while reviewing the cumulative impacts, checking the assumptions made by the EPA in its analyses, and exploring ways to allow states more discretion in the implementation of these rules. The commenter strongly believes that the EPA should develop a "Multi-Pollutant" strategy.

Comment 12: Commenter 17640 urges the EPA to slow promulgation of the rule and extend the time frame for compliance. The commenter states that these actions will provide manufacturers with more certainty that electricity and natural gas prices will remain stable in the near future.

Comment 13: Several commenters (10821, 17654, 17739, 17740, 17904) cite the court ruling in *American Nurses Association v. Lisa Jackson*, Civ. No. 1:08-cv-02198 (April 15,2010) as a basis for allowing more time for proper analysis.

Commenter 17654 notes that the Court anticipated that "science and analysis require more time," and believes that for this reason the Court would likely support a motion by the EPA for additional time to promulgate the Utility MACT rule.

Commenter 17739 notes that the Court's opinion stated "The Court appreciates industry's concerns that this schedule may be too hasty for the critical and expensive regulatory decisions that will be made; however, the proposed Consent Decree allows for a change in schedule if need be." The judge further added, "if the science and analysis require more time, EPA can obtain it" and "if EPA needs more time to get it right, it can seek more time."

Commenter 17654 points out that Congressional efforts are underway to prevent the EPA from promulgating the final Utility MACT and other air regulations affecting the utility sector for two additional years (i.e., until 2013). The commenter believes the EPA could achieve the same result by petitioning the Court for additional time to promulgate the rule consistent with the terms of the Consent Decree.

Comment 14: Commenter 17656 notes that the EPA entered into the Consent Decree voluntarily, thereby voluntarily obligated itself to a truncated timeline. However, the EPA has the right to seek a judicial extension of the rule deadline, and should exercise that right immediately.

Comment 15: Commenter 17724 suggests that the EPA seek a 6- to 12-month delay in the promulgation of the final rule, in order to properly consider all comments and properly address the myriad of issues the proposed rule will raise.

Comment 16: Commenters 17757 and 18424 are concerned that the November 16, 2011 date for issuance of the final rule does not allow sufficient time for agency consideration of the comments.

Comment 17: Commenter 17771 believes that the EPA should take the time necessary to give ample opportunity for review and dialogue with affected industry, and provide for adequate quality assurance of the data including its development and use. While the 30-day extension of the comment period is a move in the right direction, the commenter believes it is not sufficient for the EPA to take into careful consideration all the public comments prior to issuing a final rule. Also, the November 16, 2011 rulemaking deadline should also be extended to allow for more discussion opportunities and for everyone to better understand the proposed standards and thoughtfully develop comments.

Comment 18: Commenter 17837 states that the EPA should apply the lesson from the recent Industrial Boiler MACT rule – where public comments revealed numerous deficiencies in the proposed rule – and request permission from the Court of Appeals to extend the date for final promulgation by at least 6 months. The commenter argues that the current deadline for promulgation does not allow sufficient time for the EPA to consider and respond to the thousands of substantive comments that will be submitted.

Comment 19: Commenter 17856 urges the EPA to not rush this rule process but to develop a well thought-out, understandable and workable approach based on accurate data obtained by working with the states and regulated entities. Commenter 17904 urges the EPA to seek an extension for its court-ordered deadline to finalize the rule, in order to satisfy its obligation to "ensure a reasonable period for public participation" as stated in the Consent Decree.

Comment 20: Commenter 17868 states that the EPA has rushed its own regulatory schedule and is under no court order. The commenter believes it is simply not true that the EPA must propose/finalize the MACT rule as quickly as suggested in the proposal, and that the judge who presided over the Consent Decree for proposal and timing made it clear that the EPA would be given more time if technical or scientific issues necessitated it.

Comment 21: Commenter 16469 suggests that the EPA seek a 6-12 month delay in the promulgation of the final rule due to the technical complexity.

Comment 22: Multiple commenters (17638, 17681, 17790, 17813, 17842, 17909, 17912, 18428, 18486, 18500, 18831, 18912) assert that the November 16, 2011 deadline does not allow the EPA adequate time to evaluate and respond to comments.

Comment 23: Commenter 17627 states that some technical support documents used by the EPA were developed under budgetary and time constraints and the agency should afford more time so that the claims in the technical support documents can be verified.

Comment 24: Several commenters (17689, 17712, 17817) request that the agency consider supplemental comments filed after the comment period expires in light of the short time period provided for comments, the complexity of the rulemaking, lack of complete and accurate information, and the agency's abuse of procedures for garnering small entity input.

Response to Comments 1 - 24: The EPA is subject to a Consent Decree in the matter of *American Nurses Ass'n v. EPA*, 08-2198 (D.D.C.). That decree requires the EPA to sign the final MATS rule by December 16, 2011.[218] Commenters' non-participation in the litigation that lead to the Consent Decree deadline for signing this final rule does not undermine the legitimacy of that deadline.

CAA section 112(c)(5) requires the agency to establish CAA section 112(d) standards for sources not listed pursuant to CAA sections 112(c)(1) or (3) within "10 years after November 15, 1990, or within 2 years after the date on which such category or subcategory is listed, whichever is later." The EPA listed EGUs on December 20, 2000, therefore, pursuant to the statute, the EPA should have established CAA section 112(d) standards for EGUs no later than December 20, 2002.

On December 18, 2008, a number of public health and environmental organizations filed a complaint alleging that the EPA had failed to perform a mandatory duty because the agency had not issued air toxics standards for utilities. *American Nurses Ass'n v. EPA*, 08-2198 (D.D.C.). On February 24, 2010, the EPA and plaintiffs signed a Consent Decree that, at that time, required the agency to sign final standards by November 16, 2011.[219] This date is almost 3 years after plaintiffs sought to require the EPA to comply with the statutory mandate to issue CAA section 112(d) standards, and almost 9 years after the time provided in CAA section 112(c)(5) for issuing CAA section 112(d) standards for EGUs.

Commenters' non-participation in the development of the Consent Decree does not create a flaw in the agreement or make our actions consistent with the decree invalid. In rejecting the rights of intervenors to prohibit settlement of claims, the Supreme Court has stated:

> A consent decree is primarily a means by which parties settle their disputes without having to bear the financial and other costs of litigating. It has never been supposed that one party – whether an original party, a party that joined later, or an intervenor – could preclude other parties from settling their own disputes and thereby withdrawing from

[218] The Consent Decree initially required EPA to sign the final rule by November 16, 2011; however, on October 21, 2011, the parties to the Consent Decree extended the deadline consistent with the modification provisions of the Consent Decree.
[219] Subsequently modified to December 16, 2011.

> litigation. Thus, while an intervenor is entitled to present evidence and have its objections heard at the hearing on whether to approve a consent decree, it does not have power to block the decree merely by withholding its consent.

Local No. 93 v. City of Cleveland, 478 U.S. 501, 529 (1986).

The EPA determined that it was appropriate to settle the litigation in the American Nurses Case given the statutory direction to establish CAA section 112(d) standards within 2 years of listing, and we determined that the proposed schedule was reasonable, as we had already issued the ICR to the industry. In addition, while this commenter was not a party to the litigation, the UARG intervened as a defendant in the litigation and opposed entry of the Consent Decree in part on the grounds raised by the commenter. The District Court signed the Consent Decree despite those objections.

The EPA must finalize the rule by December 16, 2011, unless the agency seeks to further extend the deadline. To do this, the agency must follow the requirements of the modification provisions of the Consent Decree. If Plaintiffs object, the agency must file a motion with the Court seeking an extension of the deadline. Consistent with governing case law, the agency must demonstrate in its motion for extension that it is impossible to finalize the rule by the deadline provided in the Consent Decree. *See Sierra Club v. Jackson*, Civil Action No. 01-1537 (D.D.C.) (Opinion of the Court denying the EPA's motion to extend a consent decree deadline). The EPA committed sufficient resources to review and respond to the comments on the proposed rule so that it can sign the rule by December 16, 2011. Nothing in the Court's opinion approving the Consent Decree alters the EPA's responsibility to seek an extension consistent with the Consent Decree terms and the governing case law. Accordingly, the EPA could not claim in response to these comments that it was impossible to comply with the Consent Decree.

In addition, the EPA disagrees that it can or should wait to finalize the rule until new NAAQS and other rules are implemented. The EPA listed EGUs over a decade ago and it would not be reasonable to wait based on the fact that other rules may impact EGUs in some undefined manner. NAAQS revisions occur on a periodic basis so there is always the potential that new standards will be in the offing and under commenter's theory the agency would always have to defer the CAA section 112 standards. Furthermore, the controls that are required for compliance with the MATS will in some cases be the same as the controls that may be required by states for NAAQS compliance. By promulgating this rule now, EGUs will be able to design modifications that account for all the various rules.

The EPA is also confused by the comments that state the EPA erred by waiting until March 16, 2011, to sign the proposed rule. The EPA did not act improperly.

2. Comments that the EPA should withdraw the proposed rule and re-propose.

Comment 25: Multiple commenters (17782, 17817, 17627, 17728, 17639, 17756, 17868, 17871, 18033, 18488) state that numerous errors in the proposed rule have denied the regulated community an adequate opportunity to comment and references the UARG re-proposal petition dated May 6, 2011. Commenters add that they reserve the right to revise any portions of the comment document based on EPA action to correct the errors. Failure to do so would be a disservice to the public and regulated community and would be a breach of due process.

Comment 26: Commenter 10750 requests that the EPA withdraw the proposed HAP rule and release a new proposal after errors are corrected and the data is re-evaluated. The commenter notes that the utilities have been advised that there are serious errors in the analysis underlying the proposed HAP Rule. One such error involves conversion of test data that understates the results (and thereby increases the stringency of the proposed standards) by a thousand fold. The commenter goes on to note that other errors occur in the assumed heat rates for all types of fossil fuel-fired units, and ongoing review suggests that additional errors may have occurred in the risk calculations that underlie the fundamental finding upon which the rule is based. This suggests that insufficient time was spent analyzing and properly evaluating the massive amounts of data collected by the EPA prior to developing this proposal. Because the errors directly impact the calculation of the HAP floor, commenters are faced with the impossible task of attempting to derive a legitimate floor based on data that contains known errors.
The commenter states that the EPA has a responsibility to assure that the standards it proposes are based on the very best science, free of errors that compromise the validity of its conclusions.

Comment 27: Commenter 17739 expresses concerns about the lack of QA/QC of the ICR data due to the tight schedule that the EPA voluntarily committed to in the Consent Decree. The commenter states that the EPA should have sought additional time when it was warned about the obviousness of the erroneous data in the proposed Hg floor during interagency review, because that signaled a troubling lack of very basic QA/QC. It should have also sought more time so that it could reissue its corrected Hg MACT floor in the Federal Register, since as it stands, the EPA's actual proposed Hg MACT emissions limits for new and existing sources is not set forth in the Federal Register generally available to the public, but rather only in some revised memorandum placed in the docket. Finally, the EPA should now seek an extension from the Court to fulfill its fundamental duty to issue a rule based on data subject to basic QA/QC review.

Commenter 17739 also cites the ruling in Portland Cement Association vs Ruckelshaus [486 F.2d 375, 393-94 (DC Cir. 1973)]: "It has not It is not consonant with the purpose of a rule-making proceeding to promulgate rules on the basis of inadequate data, or on data that, to a critical degree, is known only to the agency. . ." and the National lime Association vs EPA [627 F.2d 416, 430-31 (DC Cir. 1980)]: "promulgation of standards based on inadequate proof [[defies the APA's] mandate against action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."
The commenter states that this obligation to provide adequate data and an adequate factual basis for a rule includes an obligation of the agency to examine the data it intends to use. The EPA's actions can be found arbitrary and capricious if it has failed to "examine the relevant data and articulate a satisfactory explanation for its action." [*State of NY v. EPA*, 413 F.3d 3, 43 (DC Cir. 2005)] The commenter points out that the CAA specifically obligates the EPA to assess its data and explain this assessment in its proposal. Sections 307(d)(2)-(3) require the agency's proposal to include a summary of the factual data on which the proposal is based and the "methodology used in obtaining and analyzing the data."

Comment 28: Commenter 17740 states that the EPA should not promulgate the final EGU MACT until the agency is confident that the data underlying the rule is arithmetically sound and accurate. The commenter goes on to say that the EPA must closely examine its proposed standards and underlying data before issuing the final rule and, if necessary, obtain an extension from the district court to ensure that it corrects any errors in the data.

Comment 29: Several Commenters (17834, 17751, 17884, 17901, 18437) state that the proposed rule should be withdrawn as it exceeds the authority vested in the agency under the CAA, imposes substantial costs on private industry and the states, and constitutes unlawful interpretation of the CAA.

Commenter adds that the proposed rule will not withstand the legal challenges. It represents a danger to public health and welfare.

Comment 30: Commenter 17911 recommends that the rule should be suspended and re-proposed for only Hg and Ni.

Comment 31: Commenter 17697 states that the proposed rule includes many additional controls beyond those to reduce Hg emissions. These controls are not required under the CAA or the EPA's own HAP study. Commenter requests that the EPA withdraw the rule and re-propose it to solely address Hg emissions. Guam Power Authority's Hg emissions are significantly lower than for a coal-fired power plant. They are 1/10,000 of the most stringent limit proposed for coal-fired power plants.

Comment 32: Commenter 17003 states that the EPA has introduced such fundamental error in its baseline calculations that the EPA should re-propose the rule.

Comment 33: Commenter 17775 states that the EPA's rush to issue the proposed rule has resulted in a rulemaking process that violates the procedural requirements of CAA section 307(d). The opportunity for public comment has been compromised by numerous calculation errors in MACT standard setting, by hastily assembled technical support documents that fail in their mission to describe the analyses and reasoning underlying the EPA's proposal, and by the EPA's late-filing of important documents in the rulemaking docket. The EPA has failed to provide a meaningful opportunity for public comment on the proposed rule. Therefore, the commenter states that the EPA should withdraw the proposed rule, correct and revise its analyses in the light of the comments submitted, and then re-propose the rule.

Commenter 17775 further states that the EPA has failed to provide a meaningful opportunity for the public to comment on the proposed rule, contrary to the requirements of CAA section 307(d). Given this, the EPA's only lawful option, should the agency persist in seeking to regulate EGUs under CAA section 112, is to withdraw the proposed rule and issue a new, corrected proposal for comment. The commenter cites paragraph (d)(3) of CAA section 307 that states that a "notice of proposed rulemaking . . . shall be accompanied by a statement of its basis and purpose," and that this statement "shall include a summary" of the "factual data on which the proposed rule is based" and the "methodology used in obtaining the data and in analyzing the data." Paragraph (d)(3) concludes by specifying that "[a]ll data, information, and documents referred to in this paragraph shall be included in the docket on the date of publication of the proposed rule."

Commenter 17775 states that under CAA section 307(d)(8), a court reviewing a final EPA rule may invalidate that rule where the agency's procedural errors during the rulemaking – including its failure to comply with the requirements of CAA section 307(d)(3) – are "so serious and related to matters of such central relevance to the rule" that there is a "substantial likelihood that the rule would have been significantly changed if such errors had not been made." Given the serious errors that the EPA itself has made in the developing the proposed rule – many of which the agency has already acknowledged – and the likelihood of other such errors that commenters have not been able to identify given the unduly truncated notice-and-comment period provided for such a far-reaching and expensive rule, one is hard pressed to imagine a more egregious example of a procedural default by the agency under CAA section 307(d). The commenter states that if the EPA does not withdraw the proposed rule, correct and revise its analyses, and then re-propose, it is due to be vacated on review.

Comment 34: Commenter 17757 suggests that the EPA should issue a Notice of Data Availability in order to allow for a more thorough analysis of the agency's basis for the MACT rule.

Comment 35: Commenters 17714 and 17775 state that the EPA is required to provide a formal public notice of the Hg limit calculation error and its correction of the error by re-proposing the Hg MACT limits in the Federal Register. The commenter notes that this would have afforded all parties fair notice of the change, explaining the error, how it was corrected, and how those changed standards affect the EPA's underlying rationale for the proposed rule. The course the EPA has pursued to date – i.e., sending an abbreviated letter responding to one party, addressing a single aspect of the agency's error (the Assistant Administrator's May 18 letter) – does not satisfy the EPA's obligations under CAA section 307(d)(3).

Comment 36: Commenter 17913 suggests that the EPA re-propose the MACT rule after making revisions partly based on comments and allow for an additional round of comments prior to issuing a final rule. The commenter notes that the financial implications of this rule on the country's electric generating capacity and reliability is too vital to issue a final rule without allowing for appropriate input from the public and stakeholders.

Comment 37: Commenter 17919 states that the EPA has voluntarily committed itself to a timeframe that is insufficient for the scope of the task. It is essential that the agency ensure sufficient time to analyze the input it receives the public and industry, prepare appropriate responses, and, where necessary, make changes to the proposed rule. The commenter notes that the schedule did not allow for sufficient time to adequately analyze the data collected in the ICR, and now does not allow enough time to adequately analyze comments, coordinate appropriate responses, make necessary changes to the proposed rule, submit the final rule to OMB for analysis and interagency comments, resolve interagency comments, and promulgate a final rule. The commenter goes on to state that as the U.S. Court of Appeals for the D.C. Circuit ruled in *Sierra Club v. Thomas*, 828 F.2d 873, 798 (D.C. Cir. 1987), a rulemaking schedule is indeed reasonable in which the agency had taken just less than 3 years from proposal without final action. In so finding, the Court explained that "[a] simple reading of the Clean Air Act reveals that whether to impose a certain type of regulation often involves complex scientific, technological, and policy questions. The EPA must be afforded the amount of time necessary to analyze such questions so that it can reach considered results in a final rulemaking that will not be arbitrary and capricious or an abuse of discretion." Id. at 799. The commenter recommends that the EPA utilize the procedure afforded it under the Consent Decree to seek an appropriate extension of the deadline for issuing the final rule and formulate a realistic compliance schedule that takes into account intense competition for resources and capital. Mere rote citation of alleged benefits to the proposed rule cannot substitute for the real work necessary to produce an adequate final rule. Indeed, such a rush to judgment, as noted by the Court in Sierra Club v. Thomas, can actually undermine protections by producing a result more susceptible to judicial intervention.

Comment 38: Commenter 17761 supports rules to impose reasonable reduction requirements for Hg emissions but believes the EPA has not fully assessed the risks and benefits of reducing the non-Hg HAP and should closely examine several aspects of the Hg rules prior to implementation of the final rule. Commenter encourages the EPA to modify the consent decree to allow for more time to develop a final rule.

Comment 39: Commenter 17821 believes that the EPA should quickly seek additional time for completing the final rule so the industry can better plan for it.

Comment 40: Commenter 19211 urges the EPA to slow promulgation and extend the timeframe for compliance to provide manufacturers with more certainty that electricity and natural gas prices will remain stable in the near future.

Comment 41: Commenter 17776 states that the agency should review the data underlying the proposed MACT standards, re-propose the standards, and allow the public the opportunity to review the proposed standards. Commenter adds that the EPA can be provided with more time to complete the rulemaking and the Consent Decree should not be used to restrict public evaluation and commenting on the proposed rule.

Comment 42: Commenter 17790 advocates for a delay in order to develop critical facts to provide to the EPA that would help to better evaluate the financial and reliability impact of using HCl as a surrogate for acid gas and the potential of alternative technologies to flue gas desulfurization. Commenter adds that the Consent Decree timing should not interfere with the need to use accurate data versus assumptions.

Response to Comments 25 - 42: The EPA disagrees with the commenters' assertions that the EPA failed to adequately consider the data, that the EPA used flawed data, that there were systemic flaws in the standards due to data errors, and that information relied on in the development was not available to the public. The EPA provided all documents and data that the EPA relied on in developing the proposed rule in the docket prior to publication of the proposed rule in the Federal Register. In fact, almost all of the relevant documents were available on the EPA's website within a few weeks of the proposed rule signature date of March 16, 2011. The ICR data were made available through the docket during February and March 2011. Other support materials were made available through the docket on May 3, 2011.

A number of the commenters point to a UARG letter identifying a conversion error in a subset of the Hg data used to establish the MACT floor. Commenters allege that this error is one of many but provide no specifics (these errors are addressed elsewhere in this document). Commenters also allege that the EPA failed to provide in the docket documents relied on in developing the rule. Southern Company made similar allegations in a letter submitted to the agency during the comment period. Commenters do not identify specific information that was not available in the comments on the proposed rule. These supposed errors according to commenters are clear violations of CAA section 307(d)(3). Commenters are incorrect. CAA section 307(d)(8) states, in part, that "[i]n reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made." The D.C. Circuit Court has interpreted CAA section 307(d)(8) to place a high bar for procedural challenges to rulemakings under the CAA. *See National Petrochemical & Refineries Assn. v. EPA, et. al*., 287 F.3d 1130, 1148 (D.C. Cir. 2002). None of the commenters have provided any specific claims as to how the rule would be at all different if the alleged errors had not occurred, much less making a showing that the rule would have been significantly different.

The EPA does not agree with the commenters' assertions concerning information quality flaws in the proposed rule. The Action Development Process used by the EPA in the development of regulations and the Integrated Error Correction Process, for example, are two of the existing systems the EPA has to ensure that the information it disseminates is of high quality. The rule promulgation process provides an opportunity for the public to review the data on which the agency relies and, if errors occur, as they may

at times, the EPA is able to correct those errors in response to comments and in the final rule and neither the regulated community nor the public are unduly harmed by changes to the standard based on corrected data. *NRDC v. Thomas*, 838 F.2d 1224, 1242 (D.C. Cir. 1988) (stating that "[t]he EPA can obviously promulgate a final regulation that differs in some respects from its proposed regulation. We recognized in *International Harvester Co. v. Ruckelshaus*, 155 U.S. App. D.C. 411, 478 F.2d 615, 632 n. 51 (D.C. Cir. 1973), that 'a contrary rule would lead to the absurdity that . . . the agency can learn from the comments on its proposals only at the peril of starting a new procedural round of commentary.'"). That is particularly true for a technology-based standard that is based solely on actual performance of existing sources. In this case, the EPA used a consistent methodology for calculating MACT floors and incorporated the data provided by industry into the formula. Commenters were able to evaluate the Agency's formula for establishing MACT floors based on the emissions reports submitted in response to the ICR, and changes in the data that are entered into the formula do not make the rule flawed. We further note that while we did make a conversion error for a small subset of the Hg data, it was industry's legal responsibility to provide accurate quality assured and quality checked data consistent with the validly issued CAA section 114 ICR. The EPA readily provided extensions of time to comply with the ICR because we wanted data to be correct, but still industry made numerous mistakes in their initial filings and were making corrections to data long after the data were due. The EPA used the data it was provided by industry and reasonably assumed that industry would comply with their legal responsibility to provide accurate data in response to the CAA section 114 request. The EPA has not revised its methodology for establishing MACT floor limits based on emissions data submitted by individual EGUs in the final rule and changes in the standards are almost exclusively being made to incorporate new data or correct errors in data submissions that were legally required to be accurate when submitted.

Furthermore, the error that UARG identified was not the critical flaw that commenters allege. UARG identified a conversion error associated with a small subset of the Hg data. It is true that some units the EPA identified as best performing units were in fact not best performing units, but, once the data was corrected, the standards remained close to what the EPA established in the proposed rule. The EPA reasonably corrected the error soon after UARG identified the issue and the agency recalculated the proposed floor for Hg using the same methodology for determining the MACT floor as that used in the proposed rule. We then posted the revised MACT floor memo in the docket. Under the CAA, the EPA could have waited until the end of the comment period and properly revised the standard at that time based on the UARG's comments; however, we wanted to provide a prompt response to UARG's issue and give the public the most current information. It is clear from the comments that the regulated community was in fact aware of the corrected limit, which the EPA posted to the docket more than 60 days before the close of the comment period. Commenters allege that the Hg conversion error is one of many significant errors in the data used to establish the standards, but we have not identified and commenters have not noted any conversion or other errors similar to the Hg data issue identified by UARG and corrected by the EPA more than 60 days prior to the end of the comment period.

Commenters' allegations that the docket did not contain a number of documents necessary for review of the proposed rule until after the rule was published in the Federal Register in violation of section is also incorrect. Commenters do not identify the documents that were allegedly left out of the docket, but Southern Company made similar allegations in a letter to agency dated May 12, 2011. The EPA did add documents to the docket shortly after receiving Southern Company's letter; however, as explained in our July 12, 2011, response to Southern Company, the EPA did not rely on any of the documents added to the docket after the rule was published in the Federal Register. The EPA provides a response to all of

Southern Company's claims in our response letter which is available in the docket (entry EPA-HQ-OAR-2009-0234-16581).

The EPA strongly disagrees that our actions in response to UARG and Southern Company in any way created or demonstrated a procedural flaw in our rulemaking. In any case, however, the fact that commenters were aware of the revised mercury limit and the non-essential documents before the close of the comment period makes any error on the EPA's part insignificant. *See National Petrochemical & Refineries Assn. v. EPA, et. al*., 287 F.3d 1130, 1148-49 (D.C. Cir. 2002) (finding that actual knowledge three weeks before the close of the comment period negated the alleged procedural flaw). Commenters' reference to the conversion error correction and the documents that the EPA added in response to Southern Company's letter demonstrate they had actual knowledge of the information. All the information was available in the public docket for more than 60 days before the end of the comment period, and 60 days far exceeds the 30-day comment period required pursuant to CAA section 307(h). Commenter's rights were in no way impaired by the EPA's actions.

The EPA provided 90 days of official public comment and that time period is reasonable and more than the 30 days required pursuant to CAA section 307(h). In addition, as stated above, the EPA made the proposed rule and the vast majority of the supporting materials available to the public approximately 45 days prior to the publication in the Federal Register. The EPA is not re-proposing the rule based on these comments.

3. The EPA should not delay implementation of the rule.

Comment 43: Several commenters (16626, 17844, 17854, 17903, 18039, 18759) support Hg and air toxics standards for power plants and urge the agency to make them final on schedule.

Comment 44: Commenter 17698 supports the agency's efforts to reduce harmful Hg emissions.

Comment 45: Commenter 17844 states that the rule has essentially been in development since December 2000 and is needed to improve the health of American citizens, reduce the impact on the environment, and provide utilities with certainty as they plan for a cleaner future.

Comment 46: Commenters 17110 and 17844 state that if the EPA were to delay implementation of the Utilities Toxics Rule or Transport Rule, it would undermine participants' business decisions and confidence in future market responses based on the EPA's regulations. The commenter notes that the markets are reflecting the capital investments companies anticipate making in order to comply by 2015.

Comment 47: Commenter 17882 states that for decades the coal industry has used influence to delay implementation of strong standards to cut toxic air pollution.

Comment 48: Commenter 18436 references Administrator Jackson in emphasizing the importance of the standards on the health of the American People as well as the effect the industry has had on the State of Alabama and citizens. Commenter then references a report [David Ludder, *Toxic Air Pollution in Alabama: A Threat to Human Health*, December 2008] that emphasizes that while a regulatory system in place has reduced emissions, it is not sufficient to reduce ambient concentrations of toxic air pollutants below appropriate maximum safe chronic exposure concentrations. Commenter further discusses the definition of HAP, their related health risks, and explains the meaning of unhealthy for sensitive groups and hazardous air quality alerts.

Comment 49: Commenter 18932 states that further delaying promulgation and implementation of stringent MACT standards for coal- and oil-fired EGUs would not only be unlawful, it would constitute a profound abdication of the EPA's responsibility to protect public health and welfare from harmful air pollution. Commenter further states that the EPA has determined that, once fully implemented, every year the proposed Utility Air Toxics Rule will avoid up to 17,000 premature deaths, 4,500 cases of chronic bronchitis, 11,000 nonfatal heart attacks, 120,000 cases of aggravated asthma, 4.9 million fewer days of restricted activity due to respiratory illness, and 850,000 missed work days. Commenter also states that the EPA has further found that, annually, the rule would spare children from serious illness and injury —in the form of 110,000 fewer asthma attacks, 6,700 fewer hospital admissions due to asthma, 10,000 fewer cases of acute bronchitis, and approximately 210,000 fewer cases of upper and lower respiratory illness. Commenter asserts that prompt implementation of this rule is particularly critical to the low-income and minority communities who are disproportionately burdened by pollution from coal-fired power plants. Thus, to protect people and the environment from dangerous power plant hazardous air pollution, the commenter states that it is imperative that the EPA resist industry efforts and political pressure to derail, delay, and weaken this vital and long-awaited rule.

Comment 50: Commenter 18027 states that the agency must establish a compliance schedule, per the requirements of CAA section 112, that ensures compliance as expeditiously as practicable for each category or subcategory, and no later than 3 years from the standard's promulgation. The commenter also states that where a specific source encounters particular issues in installing the necessary control technologies, the EPA is authorized under section 112(i)(3)(B) to grant such a source an extension of up to 1 additional year to comply.

Response to Comments 43 - 50: The EPA appreciates the comments in support of this final rule.

4. The EGU rule should be reviewed more frequently.

Comment 51: Commenters 16122 and 17846 state that the EPA should commit to reviewing the final rule more frequently than the maximum 8-year cycle allowed by the CAA. As Administrator Jackson has noted environmental regulations "spark innovation" and create markets that lead to lower compliance costs. Once this rule is promulgated, it will be the first time we have a national standard addressing EGU Hg emissions. Consequently, this rule will drive the creation of effective, low-cost compliance strategies. Thus, in complying with its obligations under the Trust Responsibility and Environmental Justice Doctrine, the EPA must ensure that MACT standards for EGU s keep pace with available technology. Therefore, the commenter believes that the EPA should review the rule's MACT standards at least every 4 years to make sure that the EGU MACT Rule's Hg standard reflects the latest available control technologies.

Response to Comment 51: The EPA appreciates the support of the commenters. The agency developed the final standards consistent with the requirements of CAA section 112(d). Consistent with CAA section 112(d)(6), the EPA will review the availability of new technologies for regulating mercury and other HAP no less often than every 8 years.

5. Failure to comply with regulations.

Comment 52: Commenter 17638 states that if the EPA does not change the schedule to provide sufficient time for the public to participate in the rulemaking and the EPA to meaningfully understand and respond to comment, it will be a violation of the Administrative Procedure Act.

Response to Comment 52: As noted elsewhere in this document, the EPA believes that sufficient time was provided for the public to review the proposed rule and supporting materials and that the provisions of the Administrative Procedure Act have been followed.

6. Miscellaneous comments.

Comment 53: Commenter 17640 states that the EGU rules are unachievable and place the affordability of power in the U.S. at risk.

Comment 54: Commenter 17682 believes that the rule will cause irreparable harm to the nation's economy and national security by increasing the cost of energy in the U.S., negatively impacting the nation's ability to compete in the international marketplace, and increasing unemployment; and requests the agency withdraw the current proposal and develop a new rule.

Response to Comments 53 and 54: The EPA does not agree with the commenters that the proposed standards are unachievable. The EPA based the standards on the actual emissions of existing sources and we believe that approximately 6% of EGUs are currently meeting all of the existing source standards issued today. Comments related to the impact of the final rule on the affordability of electricity, etc. are responded to elsewhere in this document.

Comment 55: Commenter 17681 notes that Hg emissions are a worldwide problem, and asks if the EPA is willing to petition Congress to develop specific legislation much in the same way the EPA did with greenhouse gases.

Response to Comment 55: The EPA acknowledges that global Hg emissions contribute to risk in the U.S. We would note that as a federal agency, the EPA is forbidden by statute from petitioning or lobbying Congress.

Comment 56: Commenter 17698 states that if the EPA does not provide relief for the commenter in the final rule, the commenter intends to request a territorial waiver.

Response to Comment 56: The territorial waiver mentioned by the commenter is outside the scope of this rulemaking. We would note, however, that a subcategory has been established in the final rule for non-continental liquid oil-fired EGUs.

Comment 57: Commenter 17884 maintains that given the number of retirements of coal plants that the EPA's power sector rules will cause combined with the effective ban on new coal plant construction under the new-unit MACT standards, the EPA is effectively asserting control of electric utility resource decisions reserved under the Constitution for states and under the Federal Power Act for the Federal Energy Regulatory Commission (FERC). *See Federal Power Comm'n. v. Florida Power & Light Co.*, 404 U.S. 453 (1972); *Jersey Cent. Power & Light v. Federal Power Comm'n.*, 319 U.S. 61 (1943); *U.S. v. Lopez*, 514 U.S. 549 (1995); *United States v. Morrison*, 529 U.S. 598, 619 (2000); *Iroquois Gas Transmission Sys., L.P.*, 52 FERC 61,091 at 61,374 (1990); *Arkansas Electric Coop. v. Arkansas Pub. Serv. Comm'n*., 461 U.S. 375 (1983); *Devon Power LLC*, 109 FERC 61,154 at P 47 (2004). The CAA does not give the EPA the authority to regulate electric utility fuel choice, and the EPA may not do indirectly what it lacks the authority to do directly. *See Office of Consumers' Counsel v. FERC*, 655 F.2d 1132, 1142 (D.C. Cir. 1980); *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.*, 531 U.S. 159, 174 (2001).

Response to Comment 57: The EPA disagrees with the commenter's assertion. The EPA's final rule is consistent with the CAA. We do not agree with the commenter's assertion that this final rule constitutes an effective ban on new coal construction and the record does not support such a claim. Based on data available to the agency, at least one EGU is able to meet all of the new-source emission limits.

Comment 58: Commenter 15182 supports the passage of the proposed Air Toxics Rule but adds that the agency must further reduce Hg emissions beyond the current proposed regulation if it is to eliminate the environmental and human health effects associated with Hg. Commenter favors an aggressive schedule to eliminate Hg emissions.

Response to Comment 58: No U.S. regulation can eliminate environmental and health effects associated with Hg due to deposition from global emissions. However this regulation would substantially reduce emissions from the largest domestic source.

Comment 59: Several commenters (17627, 18037, 18539) state that the inclusion of an NSPS proposed rule within a proposed EGU MACT is inappropriate and circumvents the appropriate comment period. Commenters add that the release of both rules in the same proposal suggests that the EPA is short-circuiting the regulatory process, overwhelming the regulated community, and lessening the focus on NSPS provisions. Commenters assert that each rule should have been proposed separately with separate comment periods.

Response to Comment 59: Commenter asserts that the EPA acted improperly by combining in one Federal Register notice the proposed NESHAP and NSPS for EGUs. The commenter implies that the EPA's comment period was insufficient because the two rules were combined. The commenter is wrong. First, CAA section 307(h) requires only a 30-day comment period, and the EPA initially provided a 60-day comment period and extended it by 30 days for a total of 90 days of official comment period. In addition, the proposed rule was signed on March 16, 2011, and the EPA posted the rule along with the vast majority of supporting documents that day or within the following week. The rule was published on May 3, 2011, so commenters were provided approximately 48 days of informal review time to consider the proposed rule. Second, the EPA thinks it is appropriate to combine these rules so the regulated community can consider all the sector-wide requirements. The EPA could have issued separate rules but we believe that would have been inefficient and have unnecessarily increased the costs to the agency.

Comment 60: Commenter 17734 states that there are a large number of related rulemaking efforts coming out in the near term, including revisions to the NAAQS for $PM_{2.5}$, O_3, and 1-hour SO_2; a new GHG NSPS; and the recently promulgated CSAPR, which will make it difficult for implementing agencies and affected facilities to determine the most efficient use of resources to allocate in order to cost-effectively achieve compliance. Commenter suggests that if the agency can coordinate, reconcile, and harmonize the overlapping regulatory requirements, it will help to lessen these difficulties.

Comment 61: Commenters 17806 and 17833 state that the proposed rule, in addition to the NSPS for GHGs, new regulations for handling coal ash, and new revisions to the ozone and PM National Air Quality Standards, will have a negative impact on the economies of many regions. Commenter adds that the EPA has not described how the regulations interrelate or whether they have a collective benefit. Commenter requests the agency to withdraw all the proposals mentioned and conduct a cumulative impact assessment.

Response to Comments 60 and 61: The EPA believes that it has coordinated the rules, to the extent permitted by the different underlying statutory mandates, as the commenters suggest. Further, contrary to the opinion of the commenter, we believe that by having basically all of the rules "active" at one time, industry and states are better able to see the full range of requirements and, thus, be better able to plan.

Comment 62: Commenter 17821 states that the EPA needs to consider the future impact of carbon capture on the ability of new EGUs to meet the proposed standards for HAP and criteria emissions. Commenter states that carbon capture is energy intensive and causes increases in parasitic loads, heat rates, and changes in output-based emissions rates. Commenter states that if this technology becomes required, it will result in inability of EGUs to meet net output standards. Commenter adds that the rule as proposed would be a disincentive for carbon capture and conflict with the EPA's goal of reducing GHG emissions. Commenter asserts that the EPA needs to provide clarity in the final rule as to how carbon capture will be accommodated and states that emissions standards should continue to be based on a gross output basis.

Response to Comment 62: Commenter is incorrect. The EPA complied with CAA section 112(d) in proposing and issuing the final standards set forth in this rule. Commenter has provided no legal support for its suggestion that the EPA needs to consider the possibility that carbon capture will be required at some point in the future.

Comment 63: Commenter 17824 states that, while the new ozone limit is aimed toward reducing asthma rates, from 1980-2009, asthma rates increased while two of the key emissions from coal-fired plants (SO_2 and NO_X) decreased. Commenter asserts that such evidence raises doubt as to the link between air quality and asthma.

Response to Comment 63: The final rule is mandated under CAA section 112 which addresses HAP emissions, not ozone. Thus, this comment is outside the scope of the present rulemaking.

Comment 64: Commenter 17867 states that the rulemaking could affect plans to retire a power plant on a schedule that ensures regional electric reliability on an economically rational basis, and instead either install expensive emission controls or retire the plant early and risk uneconomic electric supplies or reliability problems. Commenter believes the EPA can structure the rule in a way to avoid these results:

a. The EPA could establish alternative emissions standards for coal-fired EGUs that are based upon health thresholds that would have an adequate margin of safety.

b. The EPA could create subcategories within the universe of coal-fired EGUs and establish separate emissions standards for each subcategory which take into account the following:

i. The rulemaking affects a wide range of facilities that are critical to the nation's infrastructure and productive capacity.

ii. Many of the facilities already operate a variety of pollution control devices and are heavily regulated.

iii. Geographic issues are present that affect feasibility of different control devices.

c. The EPA could adopt a phased approach to issuing standards for HAP emitted from EGUs which have not yet been found to present a threat that builds upon the regulation of Hg.

Comment 65: Commenter 18498 states that the EPA should establish a health-based standard for acid gas HAP in the preamble. Commenter adds that the fact that the EPA is suggesting they do not have sufficient information at this time to establish the health-based emission standards for a chemical such as HCl suggests the EPA is not focused on whether acid gases pose any health risk, which would be appropriate under NESHAP rulemaking.

Response to Comments 64 and 65: The EPA does not agree with the commenters' suggested approaches.

First, as we stated in the proposed rule, the EPA does not have sufficient information to establish CAA section 112(d)(4) health-based emission standards and we did not receive such data during the comment period. In addition, we stated in the proposed rule that there were also policy reasons why we would decline to impose such standards even if we had sufficient data. Additional comments related to the health-based emission limits are responded to elsewhere in this document and in the preamble to the final rule.

Second, the EPA can create subcategories based on class, type, and size pursuant to CAA section 112(d)(1). The EPA maintains that it is not reasonable to establish a subcategory based on these various factors unless the differences in the sources also cause the sources to have different emissions profiles. We determined that for coal-fired EGUs the emissions were not different with the exception of Hg emissions from a specific type of unit. We have not identified any differences in emissions from existing units that intend to retire and units that intend to install controls and the commenter has not provided any such information. In any case, we question whether a subcategory for older minimally controlled units would be consistent with our authority to subcategorize under CAA section 112(d)(1). Even if it were, we could still exercise our option not to create such a subcategory as a category for older, lesser controlled EGUs would lead to less stringent standards for such EGUs that might incentivize and artificially extend their operation because it could be cheaper to do so.

Finally, even if we could subcategorize these units, the EPA does not have the authority to extend the compliance period beyond that set forth in CAA section 112(i)(3) for any subcategory of regulated sources.

Comment 66: Commenter 17881 states that in addition to material handling operations and possible changes in boiler flue gas characteristics, it is possible that air quality modeling will be required even when new source review (NSR) permitting is not triggered.

Response to Comment 66: The EPA is unclear as to the commenter's intent and, thus, cannot respond to this comment.

Comment 67: Commenter 17902 asserts that the agency must allow for appropriate external review of the volumes of technical supporting documentation posted for this rule.

Response to Comment 67: The EPA believes that it has followed agency practice and allowed appropriate external review. The public was provided with over 100 days to review the proposed rule

and vast majority of the supporting materials. Further, the EPA conducted two external peer reviews; these reviews are discussed elsewhere in this document.

Comment 68: Commenter 17909 states that the rule is complex, convoluted, and appears to contradict itself and provides some explanation and examples of contradictions in the rule. Commenter has serious unanswered questions about the details of the proposed rule and how it will be applied.

Response to Comment 68: The EPA has reviewed the language in the preamble and regulation and made clarifying corrections where necessary.

Comment 69: Commenter 18033 requests that the EPA disclose records of all meetings between the EPA, CEQ and FERC, data, files and FERC's responses regarding the proposed rule. Commenter recommends that the EPA extend the comment period and provide an opportunity for public inspection and comment. Critical errors are directly at odds with the rulemaking requirements under section 307(d). Under paragraph (d)(3), a "notice of proposed rulemaking…shall be accompanied by a statement of its basis and purpose," and this statement "shall include a summary" of the "factual data on which the proposed rule is based," and the "methodology used in obtaining the data and in analyzing the data." In addition, "all data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule." This type of rulemaking does little to instill confidence that the agency is conducting an open and transparent process consistent with President Obama's EO 13563.

Response to Comment 69: As stated above, the EPA has complied with section 307(d) in establishing these final standards. The EPA has included in the docket all interagency communications that are required to be included in the rulemaking docket. The EPA is not seeking an extension of the comment period based on this comment,

In addition, the EPA has also complied with applicable Executive Orders in promulgating this final rule.

Comment 70: Commenter 13526 is analyzing the proposed regulations, RIA, and technical support documents and intends to provide formal detailed comments on the proposed regulations at a future date. The commenter requests that the EPA hold additional public hearings for the proposed rule with at least one public hearing at a location in Texas. The commenter notes that the EPA is only holding public hearings in Atlanta, Chicago, and Philadelphia, whereas the proposed regulations affect the entire country, and the EPA should not be limiting the opportunities for public input to just the eastern third of the continental U.S. The commenter believes that the proposed NESHAP regulations may have a disproportionate impact on Texas because Texas generates more electricity than any other state and a significant amount of the electric power generation in Texas is from coal-fired EGUs. Thus, the commenter considers a public hearing in Texas necessary for the EPA to adequately receive input from the public as well as the potentially impacted industries.

Response to Comment 70: The EPA does not believe that opportunities for public input were limited to the eastern third of the U.S. Although a public hearing was not held in Texas, the EPA provided an extension to the public comment period (comment period closed on August 4, 2011). Given the period of time prior to proposal that the rule was posted on the agency's website and, thus, available for public review, over 100 days were provided during which time the public could review both the proposed rule and the vast majority of supporting documents. We believe that this offered sufficient opportunity for

the public and potentially impacted industries, including those in Texas, to provide input regarding the proposed rule.

CHAPTER 2: APPLICABILITY

2A - Applicability: Treatment of area sources

Commenters: 15678, 17608, 17620, 17621, 17648, 17756, 17772, 17775, 17817, 17818, 17821, 17846, 17868, 17871, 18031, 18487, 19114, 8443, 19536/19537/19538, 18932, 18023

1. Opposition to separate major and area source standards.

a. The Appropriate and Necessary Determination requires EPA to regulate all EGUs.

Comment 1: Commenter 17648 states that the EPA properly established emissions limitations based upon the performance of all EGUs, rather than distinguishing between major sources and area sources. Congress did not intend the EPA to distinguish between "major source" EGUs and "area source" EGUs in determining whether and how to regulate EGUs under CAA section 112. Commenter states that the EPA's decision not to distinguish between major source EGUs and area source EGUs is consistent with section 112's plain meaning and its underlying purposes. Nothing in section 112 requires the EPA to distinguish between "major source" EGUs and "area source" EGUs when it sets emissions limitations for EGUs. On the contrary, the definition of EGU in section 112 applies to "any" EGU without distinguishing between "major source" and "area source" EGUs. It defines EGU with respect to output capacity, without regard to the mass of HAP emitted, so that smaller units that might properly be regulated as area sources are excluded by definition. EGUs are the only source category specifically defined in section 112, suggesting that Congress did not view EGUs as subject to segregation initially by relative mass of HAP emissions apart from what is provided in the statutory definition. Congress also specified a prerequisite "appropriate and necessary" determination for EGUs before those units may be regulated under CAA section 112, which applies to no other source category. The provisions of section 112(n), which establish that requirement, do not distinguish between major source EGUs and area source EGUs. Instead, the statutory language calls for a determination regarding the threat from emissions of HAP from EGUs. Once the "appropriate and necessary" determination is made, then the EPA is required to regulate all EGUs.

Commenter 17648 continues, had Congress wanted the EPA to distinguish between "major sources" and "area sources" with respect to regulating EGUs, it would have made that direction clear in the statute. When Congress wanted the Agency to treat or consider "major sources" and "area sources" separately, it clearly specified. For example, in sections 112(c)(1) and 112(c)(3), Congress created separate criteria for listing major sources and area sources. By contrast, section 112(n)(1) makes no distinction between major and area source EGUs. Nothing in section 112(n) suggests the EPA should distinguish between EGUs based upon relative size of HAP emissions for purposes of regulating those emissions after making a finding that those emissions present threats to public health and the environment.

Commenter 17648 adds that section 112(c) deals with definitions of "categories" and "subcategories" of sources. EGUs clearly fall within a single category that applies to major sources and must be regulated as such under the statute. Thus, the EPA's treatment of "major source" and "area source" in the Toxics Rule accords with the plain meaning of the statute.

Commenter 17648 states that the EPA's interpretation of the CAA is reasonable. Even assuming section 112 were ambiguous, the EPA's proposal to create MACT standards for EGUs without making any

distinction between "major" and "area" sources is a reasonable interpretation consistent with the statute's purpose entitled to substantial deference under Chevron. Differentiating major source and area source EGUs for purposes of setting emissions standards is inappropriate in light of the 2000 Finding, re-affirmed in this proposed rule, regarding the threat posed by the absence of regulation of HAP emissions from EGUs. The Finding is based upon studies whose conclusions regarding the impacts from EGU emissions do not depend upon any relevant distinction between major source and area source EGUs.

Commenter 17648 continues that Congress distinguished "area sources" in section 112 in at least two ways: (1) Congress created separate prerequisite criteria for listing area source categories that are not required to list categories of major sources, and (2) Congress authorized the Agency to establish less stringent emission standards for area sources based upon GACT. Neither of these distinctions has any relevance in regulating EGUs under CAA section 112. First, according to commenter, the separate listing provision cannot apply. Commenter maintains that ssection 112(n) does not permit the EPA to avoid regulating "area source" EGUs after making the Finding. The language of section 112(n)(1)(A) is mandatory, not permissive. Moreover, it would be an odd bit of statutory construction to require the EPA to separately make a determination under CAA section 112(c)(3) that "area source" coal-fired or oil-fired EGUs "present" a threat of adverse effects to human health or the environment (by such sources individually or in the aggregate) . . . " after determining in accordance with section 112(n)(1)(A) that it was appropriate and necessary to regulate EGUs under CAA section 112. Once the EPA made the Finding, it would be inappropriate to read the statute as requiring the EPA to make an additional determination under CAA section 112(c)(3) before it could regulate "area source" EGUs.

Commenter 17648 states, second, the purpose behind providing the EPA with discretion to establish GACT standards for area sources is entirely inapposite to EGUs. When Congress amended section 112 in 1990 to create a technology-based requirement that the EPA promulgate MACT standards for regulated source categories, on a more expeditious timeframe than contemplated in the pre-1990 CAA, it did so to spur the EPA into regulating HAP emissions. However, Congress was concerned that the EPA might delay regulating relatively smaller sources of HAP emissions due to the potential costs those regulations might impose, and therefore provided the Agency with discretion to adopt GACT standards that would be less stringent than MACT. This legislative purpose behind differentiating area sources is inapplicable to EGUs, which are statutorily defined based upon their output capacity rather than their HAP emissions and which required a finding before the category could be regulated. No electric generating unit with a nameplate capacity greater than 25 MW is a "small" source of emissions, like a dry cleaner or an institutional boiler. Rather, EGUs are the largest source of HAP emissions in the United States. Any "small" EGUs already have been segregated from regulation by the statute's definition of EGUs. Moreover, some "major source" EGUs have relatively small nameplate capacity but no emissions controls and some "area source" EGUs are relatively large generators that are well controlled. Therefore, the size distinction that underlies the statutory distinctions between major and area sources is inapplicable to EGUs.

b. Separate regulation of major and area sources would produce absurd results.

Comment 2: Commenter 17648 states that treating "major source" EGUs as distinct from "area source" EGUs for purposes of setting emissions standards in the Toxics Rule would produce absurd results. Regulating "major source" and "area source" EGUs separately under CAA section 112 would undermine the very purpose of setting MACT emission standards. Segregating "major source" and "area source" EGUs would have the perverse effect of eliminating some of the best performing sources from

the MACT pool of sources that constitute the "best performing" twelve percent. Many of the best performing sources have employed control technology that brings their emissions below the major source threshold, despite the fact that they are larger units. As a result, if the EPA created standards for "major source" EGUs based only upon those units, the MACT standards for "major source" EGUs would be less stringent for each of the pollutants than proposed in this rule. At the same time, the less polluting sources, the "area source" EGUs, could face limits more stringent than those proposed in the rule.

Commenter 17648 states that this absurd result is evident from analysis of the ICR database. For example, if one divides coal-fired EGUs in the ICR database into hypothetical "major" and "area" source categories using HCl emission data in the database, and recalculates separate MACT floors for each of these two source categories, then the floors and limits for HCl, mercury, and PM for "area source" EGUs would all be lower (i.e., more stringent) than the limits the EPA proposes for coal-fired EGUs, with HCl being an order of magnitude lower. By contrast, the limitations for all three pollutants for "major source" EGUs would all be higher (i.e., less stringent) than those the EPA proposes for coal-fired EGUs, with the mercury limit being an order of magnitude higher. Because the limits are based upon emissions per Btu rather than absolute size of the unit, this confirms that many of the best controlled sources would be "area sources" only because of the level of control that they are achieving.

Commenter 17648 states, thus, such a division would create an absurd result contrary to Congressional intent to compel sources to use the "maximum" control technology available. The EPA is therefore right to reject any approach that would treat EGUs differently based upon the relative mass of HAP they emit.

c. There is no significant difference between major and area source EGUs.

Comment 3: Several commenters (19536, 19537, 19538) state that there is no significant difference between major and area sources that would warrant exercise of the EPA's discretion to establish different standards for area sources. The EPA's proposed Utility Air Toxics Rule properly sets MACT emission standards for all coal- and oil-fired EGUs greater than 25 megawatts ("MW"), without further distinguishing between "major" sources and "area" sources.

Commenters state that the CAA does not require, or even promote, different emission control standards for major and area source EGUs that have an electric generation capacity of greater than 25 MW. For purposes of HAP regulation under CAA section 112, the CAA defines "electric utility steam generating unit" as "any fossil fuel fired combustion unit of more than 25 megawatts that serves a generator that produces electricity for sale." 42 U.S.C. § 7412(a)(8). The EPA has, thus, appropriately limited the scope of the Utility Air Toxics Rule to EGUs as defined by section 112. The CAA separately defines "major source" as "any stationary source . . . that emits or has the potential to emit considering controls . . . 10 tons per year or more of any hazardous air pollutants or 25 tons per year or more of any combination of hazardous air pollutants." 42 U.S.C. § 7412(a)(1). And the CAA defines "area source" simply as "any stationary source that is not a major source." 42 U.S.C. § 7412(a)(2). Unlike the case-by-case provisions of CAA section 112(g), which apply only to major sources, CAA section 112(d)(1) imposes on the EPA a nondiscretionary duty to promulgate HAP emission standards that apply to both major sources and area sources. 42 U.S.C. § 7412(d)(1). The MACT emission standards required and defined in CAA section 112(d)(2) and (3), respectively, likewise are not limited to "major sources," and apply presumptively to new and existing major and area sources alike. 42 U.S.C. § 7412(d)(2), (3). As an alternative to this presumption, CAA section 112(d)(5) provides the EPA discretion to promulgate GACT standards in lieu of MACT standards for area sources. After reviewing the substantial record in

this rulemaking, the EPA has correctly determined that major and area source EGUs greater than 25 MW have similar HAP emissions and use the same control technologies and techniques to reduce HAP emissions. Thus, the record demonstrates that there is no technical basis for distinguishing between major and area source EGUs for purposes of establishing HAP emission control standards under CAA section 112(d).

Commenters state that experience in recent permit proceedings for large new EGUs under the case-by-case MACT regime of CAA section 112(g) confirms the basis and emphasizes the importance of the EPA's decision to hold both major and area source EGUs to MACT standards pursuant to CAA section 112(d)(2) and (3). These permit proceedings further demonstrate that: (1) major and area sources are not appreciably different with respect to boiler size, HAP emissions and pollution controls; and (2) setting different standards based on such a distinction would further encourage recent attempts by large, highly polluting HAP sources to evade MACT emission standards for the HAP of greatest concern by claiming minor (or area) source status. In fact, distinguishing between major and area sources, and holding the latter to less rigorous GACT standards, would undermine the HAP program for EGUs.

Commenters state that following the D.C. Circuit Court of Appeals vacatur of the EGU Delisting Rule and Clean Air Mercury Rule in *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008), several proposed new EGUs have attempted to circumvent the case-by-case MACT requirements that apply to new and expanded major HAP sources under CAA section 112(g) by claiming that the units are minor sources of HAP and, as such, are exempt from the case-by-case MACT requirements of section 112(g). Table V-1 [in document] summarizes pertinent design details for five EGU projects that have claimed minor HAP source status in the wake of *New Jersey v. EPA*. As this table illustrates, each of these sources is a large EGU and, individually and as a class, they include the full array of pollution control technologies found on major source EGUs. Thus, recent experience supports the EPA's determination that "similar . . . control technologies are found on both major and area sources greater than 25 MWe."

Comment 4: Commenter 17648 concludes that even if section 112 authorizes the EPA to consider major source EGUs as distinct from area source EGUs, there is no basis for the EPA to make that distinction in the Toxics Rule. Assuming that the EPA could distinguish between major source and area source EGUs for purposes of setting section 112 emission limitations, the actual emissions data from EGUs counsel against doing so. Although section 112(d)(5) authorizes GACT standards for area sources, it does not require them. Here, GACT standards would be inappropriate. When the EPA conducts GACT determinations for categories of area sources, the Agency identifies control technologies and management practices that are generally available to area sources, and determines whether those same technologies are available to major sources, to evaluate whether the control technologies generally are transferrable and available. EGUs greater than 25 MW have similar HAP emissions and use similar control technologies, regardless of whether they qualify as "major sources" or "area sources." Thus, in the case of EGUs, control technologies are generally available and applicable regardless of the mass of HAP emissions from EGUs. There is no reasonable basis for the EPA to separately regulate "major source" and "area source" EGUs.

Comment 5: Commenter 18487 states that area sources do not differ significantly from major sources for purposes of HAP emissions and control. The EPA's proposal properly sets MACT emission standards for all coal- and oil-fired EGUs greater than 25 megawatts, without further distinguishing between "major" sources and "area" sources. The Agency correctly refuses to exercise its discretion under CAA section 112(d)(5) to set alternative GACT standards for area source EGUs. The EPA's data show that similar HAP emissions and control technologies are found on both major and area sources

greater than 25 MW, and there is no essential difference between area and major source EGUs with respect to emissions of HAP. The EPA's decision to establish MACT emission limits for both major and area source EGUs is well-grounded in fact and is necessary to implement the CAA's HAP control requirements for EGUs.

d. Distinguishing major and area sources would perpetuate a loophole.

Comment 6: Several commenters (19536, 19537, 19538) state that the case-by-case permit proceedings subsequent to *New Jersey v. EPA* also highlight a more insidious problem that, if not resolved by the Utility Air Toxics Rule, would undermine the fundamental purpose of the HAP control provisions with respect to EGUs: any rule that establishes separate and less rigorous HAP control standards for area sources would spur dubious minor source claims by large new and modified EGU sources attempting to skirt highly protective MACT emission standards for the HAP of greatest concern to public health and the environment. Several cases following *New Jersey v. EPA* underscore this danger and mandate the EPA's decision to hold major and area source EGUs alike to MACT standards.

Comment 7: Several commenters (19536, 19537, 19538, 18932) state that since the D.C. Circuit handed down its decision in *New Jersey v. EPA*, a pattern has emerged in which large EGUs previously designated as major HAP sources have claimed minor source status to avoid MACT emission limits for all of the 60 or more HAP the sources will emit. In each of these cases, the EGUs asserted that the suite of pollution controls planned for the units would reduce HCl and HF emissions below the 10-ton per year major source threshold for individual HAP, and that the combination of all HAP emissions would fall below the 25-ton per year threshold. Commenters state that these cases reaffirm the EPA's conclusion that there is no material difference between major and area source EGUs insofar as HAP emissions and controls are concerned. The putative area sources discussed above have large capacity boilers, they emit the same HAP as major sources, and they include the full range of pollution controls available for major sources.

Comment 8: Several commenters (19536, 19537, 19538, 18932) state that additionally, these minor source case studies provide a compelling justification for the EPA's proposal to establish MACT emission limits for both major and area source EGUs. To avoid MACT emission limits that apply to major HAP sources pursuant to CAA section 112(g), large, highly polluting EGUs have sought and obtained designation as minor HAP sources based on projected control of two pollutants – HCl and HF – and blanket limits for HAP emissions. In so doing, these sources have evaded stringent MACT emission control requirements for all the HAP they will emit, including the HAP of greatest concern to people and the environment. Commenters state that distinguishing between major and area sources would perpetuate this loophole and threaten public health and welfare in the process.

Comment 9: Commenter 15678 agrees with Commenters 19536, 19537, 19538 and 18932 and says that, for consistency and to avoid potential loopholes, the EPA should propose MACT standards that apply to both major and area sources.

e. Given the large variability in HAP emissions, even small units have the potential to emit substantial quantities of HAP.

Comment 10: Commenter 17620 states that the EPA has proposed to set MACT standards, as distinct from standards based on GACT, for EGUs that have a heat capacity greater than 250 million Btu/hr, even though such sources may not have been shown in the past to emit HAP above the major source

thresholds for these pollutants. Units of this size are indeed very large. Given the variability in HAP emission rates and HAP fuel content demonstrated by the record, it is clear that these units have the potential to emit substantial quantities of HAP. For this reason, Commenter supports application of MACT standards, rather than the less stringent GACT standards that would otherwise apply.

f. General opposition to separate major and area source standards.

Comment 11: Commenter 17818 agrees with the EPA that there is no reason to differentiate the control of HAP emissions between major source and area source EGUs, and that it is appropriate to set MACT standards for both major and area source EGUs.

2. Support for separate area source standards.

a. About 12 percent of coal-fired facilities are potential area sources.

Comment 12: Commenter 17621 reviewed the emissions from each EGU included in the 2010 Part II and III ICR to determine which coal-fired facilities potentially could be classified as area sources. These determinations were based on the maximum potential to emit, taking into account actual annual heat input values developed as part of a previous emission modeling project and using actual capacity factor data from the EEI. The final list of potential area source coal-fired facilities is provided in Appendix C. Of the approximately 439 coal-fired facilities listed in EPA's Part II and III ICR database, 51 (approximately 12%) are potential area sources. Note that this list includes only those facilities with emissions data reported in response to the EPA's 2010 ICR. Additional facilities that were not tested in either the Part II or III ICR could also potentially be classified as area sources; however, Commenter does not have the necessary emissions data to make this determination. Such additional sources would likely include stations with smaller total MW capacity that fire coals with low chlorine and fluorine content, such as PRB subbituminous or western bituminous coals.

Commenter 17621 states that HCl and HF are the HAP emitted in the largest quantities; these are the compounds that typically cause coal-fired EGUs to exceed the 10 and 25 tpy major source criteria. Therefore, Commenter's analysis focused on using measured emissions data for HCl and HF from units tested as part of the 2010 ICR to calculate maximum annual emissions for each ICR test unit. Since the 10 and 25 tpy criteria for major sources apply at the facility level rather than the unit level, Commenter summed emissions across all units at a facility to derive an annual facility total. If emissions were not available for all units, ICR test data for similarly configured sister units were averaged and used to estimate emissions for units not tested. The reported lb/MMBtu emission factors for HCl and HF were then used—in conjunction with 2007 actual annual heat input data per unit (i.e., trillion Btu heat input for 2007) from a previous project and corresponding EEI capacity factor data from 2007—to estimate a maximum annual emission rate per unit. Facilities with total HCl and HF emissions less than 10 tpy of each species or less than 25 tpy in aggregate were classified as potential area sources.

Commenter 17621 states that emissions of HAP metals, although individually much smaller than HCl and HF emissions, can contribute a few tons per year in aggregate at the largest MW capacity facilities. Therefore, as a final check, facilities that were identified as potential area sources and were also large MW capacity stations with HCl plus HF emissions greater than or equal to 10 tpy were evaluated further. Commenter investigated whether adding total HAP metal emissions from the ICR database (where available) to the acid gas emissions would put any of the facilities over the 25 tpy limit. None of

the facilities that qualified as potential area sources based on their HCl and HF emissions exceeded the 25 tpy limit when metals were included.

Comment 13: According to commenter 17621, about 12 percent of the coal-fired facilities that submitted HAP data to the EPA in response to the ICR may qualify as area sources.

b. The EPA has promulgated area source standards for other source categories.

Comment 14: Several Commenters (17756, 17775, 17821, 18023) state that section 112(d)(5) provides the EPA with the option of setting GACT limits for area sources. Commenters 17756, 17775, and 17821 state that the EPA has promulgated area source limits for many source categories of HAP emissions, including most recently industrial boilers.

Comment 15: Commenter 17868 states that GACT controls have been used successfully in many other EPA MACT rules, including the following industries: Iron & Steel Foundries, Electric Arc Steelmaking, Coatings Operations Area Source Controls Rule, Clay Ceramics Manufacturing, Glass Manufacturing, Secondary Nonferrous Metals Manufacturing, Paint Stripping & Miscellaneous [sic].

Comment 16: Commenter 17868 states that GACT has been used in the electroplating, dry cleaning and halogenated solvents industries MACT rulemakings in order to reduce costs and regulatory burdens.

Comment 17: Commenter 19114 states that the EPA should continue with the precedent it has set in past MACT rulemakings by allowing for an area source subcategory. Congress has given the EPA the ability to subcategorize area sources because of their low HAP emissions and low potential impact on human health. The EPA should move area sources away from the stringent MACT limit setting approach under CAA section 112 and set GACT limits for area sources.

c. Area source decision is not the same as subcategorization.

Comment 18: Commenters 17756, 17775, and 18023 state that in the preamble to the proposed rule, the EPA appears to have considered setting area source standards but rejected that approach because "the data show that similar HAP emissions and control technologies are found on both major and area sources. . . . Moreover, EPA believes the standards for area source EGUs should reflect MACT, rather than GACT, because there is no essential difference between area source and major source EGUs with respect to emissions of HAP." Commenters 17756 and 17775 say that the problem with the EPA's rationale is that it appears little different from the considerations the EPA uses in deciding whether to subcategorize a source category. Yet, nothing in the alternative area source provisions of section 112(d)(5) suggests that the EPA's area source decision is, or should be, the same as a subcategorization decision. Commenters 17756 and 17775 say that Congress created an area source alternative to provide the EPA a means of removing facilities with low HAP emissions, and presumably lower public health impacts, from the rigid construct of the MACT provisions of section 112(d)(2) and the residual risk provisions of section 112(f). Commenter 17775 noted that, in regard to the lower public health impacts, "where Congress was concerned about the health impacts of specific pollutants it knew how to specify that MACT limits be promulgated" and cited to CAA section 112(c)(6). Commenters 17756 and 17775 state that as the EPA has recognized in other rulemakings, "[c]onsistent with the legislative history, we can consider costs and economic impacts in determining GACT, which is particularly important when developing regulations for source categories that may have many small business."

Comment 19: Commenter 17608 states that the EPA "solicit[s] comments on whether there would be a basis for considering area sources to be significantly different from major sources with respect to issues relevant to standard setting." However, the CAA does not require that major sources and area sources be different in order to justify setting area sources standards.

d. Separate area source standards would lessen the burden on small entities.

Comment 20: Commenter 8443 agrees with Commenters 17756, 17775, and 18023 stating that the EPA should exercise its discretion, as it has done in other section 112 rulemakings and set separate area source standards for coal- and oil-fired units. Commenter says that area source rules would lessen the regulatory burden of a section 112 EGU rule on many small entities. Commenter states that many EGU's owned by small public power entities are area sources, and goes on to say that one of the most positive moments of the SER SBREFA panel meeting on December 2, 2010 was the point where the option of using area source standards was discussed. Commenter strongly encourages the EPA to use area source standards for controlling mercury from smaller coal-fired power plants.

Comment 21: Commenter 17608 states that SERs suggested that EPA establish separate emission standards for EGUs located at area sources of HAP and that the standards be based on GACT as allowed under CAA section 112(d)(5) of the CAA. Specifically, SERs recommended that the EPA establish management practice standards for area source EGUs. The EPA representative on the SBAR panel recommended considering this flexibility, the OMB representative recommended proposing this flexibility, and Advocacy supported considering the flexibility but again stated that there was insufficient information upon which to recommend a specific regulatory alternative. The EPA did not propose area source standards. Based on the record available and the limited discussion of possible area source standards in the preamble, Advocacy sees no evidence that the EPA seriously considered separate area source standards.

Comment 22: Commenters 17775 and 18023 state that EPRI estimates that about 12% of the facilities containing coal- or oil-fired EGUs would qualify as area sources. Many of these sources are municipal utilities that qualify as small businesses. Commenters state that the EPA should exercise its discretion under CAA section 112(d)(5) and promulgate GACT limits for area sources.

Comment 23: Commenter 17821 states that EPRI estimates that 50 or more coal-fired generating stations could currently qualify as area sources. Creating this category would recognize those facilities whose emissions are at the lowest end of the spectrum and provide for them a reduced compliance burden under a GAT standard.

Comment 24: Commenter 17868 states that the EPA failed to avail itself of its ability to use GACT controls and subcategorize adequately (especially for ≤ 100 MW units) to help either the smaller utilities or the larger utilities.

Commenter 17868 does not believe that the EPA sufficiently considered its ability within the CAA to use GACT for smaller emitters of air toxics. Section 112(d)(5) of the CAA authorizes the EPA to use less stringent emissions standards or work practices for area sources of HAP. The EPA has broad authority to set GACT standards that are less stringent than MACT standards. Alternatively, the EPA should make GACT available for smaller plants. The proposed Utility MACT blurs the distinction between pollutants and the sections where they should be regulated in the CAA. This is problematic because Commenter has many member plants that would qualify as area sources had the EPA not

combined two sections of the CAA. Commenter had, along with NRECA, requested the use of GACT during the Dec. 2, 2010 SBREFA SER panel and this reasonable request was ignored.

Commenter 17868 states that it seems inexplicable that the EPA would not use GACT in this rulemaking after being advised by both electric cooperatives and Commenter member utilities that this would be an optimal way to reduce regulatory costs and achieve a reduction in toxic air pollutants. Additionally, Commenter thinks it is strange that the EPA did not include GACT in the EGU MACT proposed rule after having allowed GACT and using GACT in the ICI Boiler MACT. Commenter and NRECA filed comments and discussed GACT during the December 2, 2010 SBREFA SER meeting so the EPA had plenty of notice to accommodate this option, which is provided for small emitters in the CAA.

Comment 25: Commenter 17817 states that in further support of the options available to the EPA for alternative strategies for small businesses and small sources, it is significant that Congress itself clearly distinguished between major sources of HAP and area sources of HAP in the statute. If Congress felt it appropriate to make that distinction, it is not appropriate that the EPA failed to acknowledge the distinction and provide appropriately proportional standards for them. Area sources of HAP, such as Commenter's existing H1 and permitted H2, simply do not present as serious a threat to human health as do major sources. Congress acknowledged and allowed for that unassailable fact when it adopted the CAA, and at a minimum, area sources should be provided an additional 3 years to plan, permit, and construct the requisite control technology necessary to come into compliance.

e. Separate area source standards would afford flexibility and still achieve the desired emissions reductions.

Comment 26: Commenter 17805 states that for Lewis & Clark Station, the MACT standard is very restrictive. It would result in a very high compliance cost, and provide a very insignificant benefit since HAP emissions have been shown in the recent stack test to be already very low. This then supports further consideration be given to subcategorizing smaller, area source units and to providing a GACT standard that would allow for more flexibility in achieving HAP emission reductions, as opposed to the one-size-fits-all approach evident in the proposed MACT standards. The EPA has allowed much more flexibility in other rules, such as the recently proposed 316(b) rule, in order to achieve more cost effective environmental improvements. Commenter believes that the EPA can apply more flexibility in the proposed rule, possibly through additional subcategorization, and still achieve the desired emissions reductions.

f. GACT and MACT too similar to distinguish.

Comment 27: Commenter 17608 states that the EPA further asserts that GACT and MACT would be too similar to justify the effort to distinguish between emission standards set using GACT and standards set under MACT. Although perhaps true, Commenter would have preferred a demonstration of this fact, showing the public what factors the EPA would consider in setting a GACT standard for area source EGUs. Nonetheless, this neglects the EPA discretion to set management practices for area sources instead, an option the EPA appears not to address at all, despite a specific call by the SERs that it do so.

g. Regulating area and major sources at the same time.

Comment 28: Commenter 17608 states that the EPA states that since this rule regulated both major and area sources at the same time, it makes sense for them to meet the same requirements. Commenter does not believe this is a reasonable justification for declining to exercise its discretion. The EPA has in the past set different standards for major and area sources on the same day in parallel rulemakings.

h. General support for separate area source standards.

Comment 29: Commenter 17756 states that it has facilities with EGUs that could qualify as area sources. The EPA should exercise its discretion under promulgate GACT limits for area sources.

Comment 30: Commenter 17871 states that contrary to the plain language of section 112 and its legislative history, the EPA made no attempt in the proposed rule to distinguish between major sources and area sources for purposes of listing or setting standards.

Comment 31: Commenter 18031 states that the EPA should give consideration to developing a separate area source rule for low emitting EGU's, applying GACT standards to these sources.

Comment 32: Commenter 17846 supports the EPA's decision to regulate both area sources and major sources under MACT standards.

Comment 33: Commenter 17871 states that EPA cannot automatically impose MACT standards on all area sources without consideration of the necessity of such action. *See* 64 Fed. Reg. 6496, 6958 (Feb. 11. 1999) (regulating all HAP emitted by area sources "could result in applying MACT to all HAP emitted by area sources under circumstances where control would not otherwise be warranted.") According to the commenter, Congress, in allowing EPA to use a GACT standard for area sources, recognized that area sources are different from major sources in both the level of emissions and the level of scrutiny to which their emissions should be subject. 74 Fed. Reg. 69194, 19199 (Dec. 30, 2009). The risks presented by the emissions of HAP from EGU area sources are appropriately regulated under a GACT standard or "management practices." 42 U.S.C. section 112(d)(5). In most cases, area source EGUs are either very small or, like the TS Power Plant, they have already installed state-of-the art control technology that reduces HAP emissions to well below major source thresholds. The costs of applying a MACT standard to area source EGUs are simply not justified where the non-mercury emissions and associated risk to public health are negligible.

Commenter 17871 states that EPA failure to account for the important differences between major and area sources as part of this rulemaking is contrary to the plain language of section 112 of the Clean Air Act ("CAA") and results in the imposition of standards on sources whose emissions present negligible risk to public health and the environment. According to the commenter, nothing in section 112(n) gives EPA discretion to read out of the statute the provisions in section 112 requiring the EPA to distinguish between area sources and major sources when listing categories and setting standards. *See Sierra Club v. EPA*, 551 F.3d 1019, 1028 (D.C. Cir. 2008) (rejecting "EPA's claim of retained discretion in the face of the plain text of section 112" where Congress had "confined the Administrator's discretion...[and] was explicit when and under what circumstances it wished to allow for such discretion..."). The commenter notes that whether an area source is "large" or "small" in terms of size is not the defining characteristic under the plain language of the statute.

Commenter 18033 states that EPA should reconsider promulgating GACT standards for area sources under CAA section 112(d)(5). According to the commenter, many EGUs owned by small power utilities

are area sources and pose low risk to public health. The commenter disagrees with EPA's finding that *"there is no essential difference between area source and major source EGUs with respect to emissions of* HAP." Instead, the commenter states that if the goal of the rule is public health then units that emit small amount of Hg present little of no risk to public health. The commenter noted that EPA found that the 390 smallest emitting coal units accounted for less than 5 percent of the total Hg emissions. In addition, many smaller units employ controls to reduce emissions to area source levels. According to the commenter, the proposed rule will ultimately result in a burden on the smallest units, many of which are owned by public power producers, impairing electric reliability and affordability for little environmental benefit.

Response to Comments 1 - 33: The CAA section 112(a)(8) defines EGUs as "any fossil fuel fired combustion unit of more than 25 megawatts that serves a generator that produces electricity for sale." CAA section 112(a)(8) also provides that a unit "that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 megawatts electrical output to any utility power distribution system for sale shall be considered an electric steam generating unit." This definition does not distinguish between major and area sources. Rather, it specifically states that an EGU is "*any*" fossil fuel fired combustion unit of more than 25 megawatts that serves a generator that produces electricity. Thus, any unit that meets the definition of an EGU is part of the EGU source category. In light of this statutory definition, the EPA reasonably established standards based on the EGU source category. It did not distinguish between major and area source EGUs.

Nevertheless, the agency did examine at proposal whether it would be appropriate to regulate area source EGUs differently by issuing GACT standards for such units, as opposed to MACT standards. As the agency explained at proposal, it is appropriate to treat major and area source EGUs similarly because the data available to the EPA show that similar HAP emissions and control technologies are found on both major and area source EGUs. For example, EGUs, irrespective of size, employ the same suite of technology options for controlling air pollutant emissions (e.g., fabric filters, electrostatic precipitators, wet and dry scrubbers, etc.). Indeed, there are well-controlled EGUs of all sizes and many EGUs (both major and area) have a full suite of emission controls. There is also no essential difference between area source and major source EGUs with respect to emissions of HAP, and the commenters have not provided any data to rebut this conclusion. Instead, commenters make various qualitative statements. They assert, for example, that many EGUs owned by small entities are area sources and that an area-source GACT standard would "lessen the regulatory burden" on many small entities. Notwithstanding the lack of data and analysis conducted by the commenters, we have reevaluated the issue of whether to set GACT standards for area sources, and we decline to do so in the final rule for the reasons set forth below. See also 76 FR 25021.

We have reviewed the "Nationwide Emission Estimates" spreadsheet prepared at proposal and updated that spreadsheet based on comments received to determine the number of area source facilities. The spreadsheet associated with the proposed rule is posted to the Agency's project website (http://www.epa.gov/ttn/atw/utility/utilitypg.html) and to the docket (EPA-HQ-OAR-2009-0234-2986). The updated spreadsheet may be found in the docket for this rulemaking. This additional review reinforces our decision to regulate all EGUs in the same manner and to set MACT standards for such sources.

The data show that there are approximately 79 potential area source EGU facilities comprised of 141 coal- and oil-fired EGUs (this number could be lower if these facilities have other HAP emitting processes that cause the facilities to exceed the major source thresholds). Of these facilities, 16 are oil-

fired (29 EGUs), leaving 63 facilities that are either all coal or a mix of coal- and oil-fired EGUs. At proposal, we explained that there is essentially no difference between major and area source EGUs. That assessment is correct, as confirmed by the data in the record. For example, we have identified individual EGUs as large as 900 MW that may be synthetic area sources (i.e., units that were major sources and installed controls to emit at levels below the major source thresholds), and units as small as 40 MW that are major sources.

Based on our additional analysis, we determined that only 8 of the 63 coal–fired facilities that are potential area sources are "natural" area sources (i.e., the level of emissions is not achieved through the use of add-on controls). Thus, the reason that the vast majority of these sources are potential area sources is because they are well controlled (i.e., "synthetic" area sources). In addition, 67 of the 112 coal-fired EGUs are in the acid gas MACT floor pool; 20 are in the Hg MACT floor pool; and 21 are in the filterable PM MACT floor pool. These conditions confirm our position, presented at proposal, that there is no essential difference in the level of control or in the emissions profile between potential area sources and major sources.

Moreover, under CAA section 112, the "source" for purposes of determining major vs. area source status is determined by evaluating the facility as a whole, not the individual EGUs. Generally speaking, EGUs are not co-located with other HAP-emitting sources (i.e., are not located within a contiguous area and under common control with another HAP emitting process). All the individual EGUs (and any other HAP emitting processes, if any) at a facility must be considered when determining whether a facility as a whole is a major source or an area source. Thus, the primary determinant as to major vs. area source status is not the size of the individual EGUs, but instead whether there are multiple EGUs at a given facility. Given that the emissions characteristics of different sized EGUs are the same, we believe that establishing an area source GACT standard for facilities that have only 1 or 2 EGUs, would not be reasonable because the EGUs at the facilities with 1 or 2 units are the same as those at facilities with more EGUs, in that they have the same emissions profile and either have the same or are capable of employing the same controls. Given that we are regulating major and area sources at the same time, and the EGUs themselves are similar notwithstanding their location at a major source vs. an area source facility, we believe a common control strategy is warranted.

Based on all of the foregoing, we set MACT standards for all EGUs and declined to set GACT for those sources that may meet the definition of an area source. Some commenters suggest that the EPA is required to establish GACT standards for area sources. This is incorrect. Although EPA has the discretion to set GACT standards for area sources, it declined to do so here after fully assessing the facts and circumstances, as described above.

Some commenters note that there could be as many as 12% of the total population that could be classified as area sources. But, this fact does not render the agency's treatment of EGUs as a source category unreasonable. As noted above, major and area sources were represented in the floors for each pollutant, which confirms that major and area source EGUs are similar – as they have similar HAP emissions and control technologies.

Commenters also note that the agency has exercised its discretion in other NESHAP rulemakings to establish area source limits. Although true, the fact that the EPA has established area source limits in some source categories is irrelevant to similar decisions for different source categories. Commenters have not shown that the circumstances applicable to those other source categories are similar to the circumstances identified for major and area source EGUs (e.g., similar controls, similar emission

characteristics, large number of synthetic minor area sources). Further, those other source categories are not statutorily defined in a manner that includes both area and major sources. EGUs are the only source category defined in CAA section 112 and, in establishing the definition of an "electric utility steam generating unit" under CAA section 112(a)(8), Congress included in the EGU source category both area and major sources. Thus, it is reasonable to regulate the EGU category in the manner Congress defined the category. Commenters have provided no legal support for the contention that the EPA must regulate area and major sources in the same category in separate rulemakings, and the EPA has in fact regulated both major and area sources in the same rulemaking even absent a statutory definition that includes both major and area sources. (*See* National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants; 75 FR 54970; September 9, 2010.)

The EPA considered the totality of the circumstances when determining whether to establish GACT standards for areas sources in the proposed rule and we maintain that it is reasonable to consider whether emissions characteristics of major and area sources are different when determining whether to establish GACT standards, notwithstanding commenters' implication that consideration is not correct. That we also consider emission characteristics in subcategorization decisions is of no moment. Commenter's point concerning CAA section 112(c)(6) is also odd because EGUs emit several of the CAA section 112(c)(6) HAP (i.e., lead, mercury, dioxin, furan). Although EGUs were exempted from that provision, the fact that they emit some of the HAP called out for MACT control supports our decision to not establish GACT standards for any EGUs. Commenters also state that many EGUs owned by small entities are potential area sources. However, commenters fail to note that there are also EGUs owned by small entities that are NOT potential area sources, and, thus, would not accrue any "lessened regulatory burden" benefit from such a decision by the EPA. (EPA's discussion of comments requesting a "less-than 100 MWe" subcategory are addressed elsewhere.)

Some commenters state that the EPA's mere assertion that there would be no difference between GACT and MACT to justify an area source finding does not provide sufficient documentation for the decision. But EPA did not say there would be no difference between MACT and GACT. Instead, it stated that it would be difficult to make a distinction given the similarities between the EGUs at major and area source facilities.

Specifically, as noted by other commenters, and observable by a review of the MACT Floor Analysis spreadsheets, potential area sources range in size from units near the CAA section 112(a)(8) defined lower size limit to units of hundreds of megawatts. Further, these larger area source units are, for the most part, controlled with the full suite of emission control technologies available (e.g., fabric filters, scrubbers).

As stated above, there are a number of EGUs that are quite large that are area sources and others that are small that are major sources. See "Evaluation of Area Source EGUs" TSD, Docket #EPA-HQ-OAR-2009-0234. This is the case because the acid gas HAP emissions are what drive EGUs to have HAP emissions exceeding the major source threshold. With a few exceptions, the EGUs located at area sources have FGD or other acid gas controls that reduce the acid gas HAP to area source levels. *Id*. Thus, the majority of sources that currently qualify as area sources were, in fact, major sources prior to installing controls. The exceptions are those units that would likely be able to achieve the MACT level of control for acid gas with minimal use of DSI at a reasonable cost. *Id*.

In addition, the data show that a number of area sources for which we have data are high emitters of Hg and non-Hg metal HAP. *Id*. For example, the area source facilities comprised of only oil-fired EGUs include the Hawaiian Electric Company Waiau facility, which was the facility exhibiting the highest modeled risk in the assessment done for the appropriate and necessary analysis discussed in the preamble and elsewhere in the record for this rulemaking. In addition, we have identified 13 facilities that use low Btu, virgin coal that are potential area sources. While these facilities are potential area sources, the sources are among the highest emitters of Hg. Specifically, the Hg emissions of these units range up to 0.667 tons per year (tpy) for one facility (Limestone Unit 1 – 0.32 tpy; Limestone Unit 2 – 0.34 tpy) with at least 4 facilities using the same coal with Hg emissions greater than 0.20 tpy and 2 additional facilities that use other coals with Hg emissions greater than 0.10 tpy. Pursuant to our appropriate and necessary finding, Hg and non-Hg metal HAP pose a significant threat to human health. Thus, even were we to distinguish between major and area sources, which we do not believe is appropriate given the similarities between such sources, we would still decline to set GACT standards for these HAP, and as such we maintain that MACT standards are appropriate. Moreover, for acid gas HAP, as discussed above, the data indicate that the level of control would likely be the same even if we did establish GACT standards under CAA section 112(d)(5). See "Evaluation of Area Source EGUs" TSD, Docket #EPA-HQ-OAR-2009-0234.

We fully evaluated the nature of EGUs, and we do not see a basis on which to distinguish these sources for purposes of setting standards. Thus, we maintain that we reasonably exercised the discretion afforded the agency under the statute and declined to set separate standards for area source EGUs.

3. The Rule should apply only to major sources.

Comment 34: Commenter 17772 states that the proposed regulations should clarify that subpart UUUUU is only applicable to major sources of HAP emissions as defined by section 112(a)(l) of the CAA. The proposed rule does not recognize explicitly that sources that already have federally enforceable requirements such as mercury limitations in their state SIP or consent decrees may no longer be major sources for HAP. An ESP or fabric filter in conjunction with an FGD or other control systems may be able to maintain the unit below the major threshold of 10 tpy individual HAP emissions or 25 tpy of any combination of HAP emissions.

Commenter 17772 states that sections 63.9981 and 63.9982 should clearly state that: (1) if an EGU is subject to a federally-enforceable requirement to operate certain pollution control equipment; and (2) the operation of that equipment would result in emissions below the major source threshold of HAP as defined in section 112(a)(l) of the CAA; then (3) that EGU is exempt from subpart UUUUU. This result is consistent with CAA section 112(d), which excludes non-major sources of HAP.

Response to Comment 34: As noted above, the CAA section 112(a)(8) definition of EGU does not distinguish between major and area sources and we maintain that EGUs are a single source category that contains both major and area sources. The EPA listed coal- and oil-fired EGUs as that term is defined in the statute and, therefore, we must issue standards for both major and area sources pursuant to CAA section 112(d). See CAA section 112(c)(2). Nothing in CAA section 112(d) excludes area source EGUs as the commenter suggests. We believe this position to be correct even in the presence of "federally enforceable requirements such as mercury limitations in their state SIP or consent decrees" or "a federally-enforceable requirement to operate certain pollution control equipment." The EPA cannot rely on such standards even if they exist because those standards are not established consistent with CAA section 112(d). In addition, these requirements do not address all HAP emitted from EGUs as required

by CAA section 112(d). To the extent sources complying with such standards are meeting the standards in this final rule, the sources will be in compliance with the limits in this rule.

4. Other.

Comment 35: Commenter 17871 states that EPA failed to comply with the notice-and-comment provisions of the APA by failing to include in the docket any indication of which sources within the EGU category emit HAP at levels below the major source thresholds. Additionally, the commenter notes that the emission data in the docket are based on emission rates, rather than mass emissions of HAP and, therefore, it is extremely difficult to calculate annual mass emissions from these units. According to the commenter, where the Agency has failed to make this distinction and the record does not provide an adequate basis on which to make this distinction, the onus cannot be on the public to comment on how area sources should be treated as part of this process. *See Portland Cement Ass 'n v. Ruckelshaus*, 486 F.2d 375, 393 (D.C. Cir. 1973), cert denied, 417 U.S. 921(1974). *See also Connecticut Light & Power Co. v. N.R.C.*, 673 F.2d 525,531 (D.C. Cir. 1982).

Response to Comment 35: The materials noted by the commenter were posted in the docket on May 3, 2011 (EPA-HQ-OAR-2009-0234-2986). In addition, the underlying nationwide emissions estimate spreadsheets were also posted in the docket on May 3, 2011 (EPA-HQ-OAR-2009-0234-2943 and -3035); a similar spreadsheet was also made public on the Agency's website within days of signature of the proposed rule (http://www.epa.gov/ttn/atw/utility/utilitypg.html; March 21, 2011). These spreadsheets were in a tons/year format.

Comment 36: Commenter 17767 states that EPRI evaluated the HAP emissions of plants representing the MACT pool, specifically those that were among the lowest emitters. EPRI identified two sources on that list operated by We Energies, Elm Road Generating Station and Pleasant Prairie Power Plant. Commenter agrees with EPRI's comments that all sources identified by EPRI, including commenter's, are area sources and should be removed from the EGU MACT pool and the emissions from the remaining sources be used to calculate MACT limits for existing major sources. Further, commenter fully agrees with UARG's comments that GACT limits be established for area sources.

Commenter 17772 states that the Elm Road Generating Station and Pleasant Prairie Power Plant are area sources and should be removed from the MACT pool.

Response to Comment 36: We disagree with the commenters. The EGU source category is defined in CAA section 112(a)(8) in a manner that includes both major and area sources, and EPA is regulating EGUs as a single source category consistent with the statutory definition at CAA section 112(a)(8).

2B - Applicability: Section 112 rules, Industrial Boiler MACT (DDDDD and JJJJJJ)

Commenters: 17174, 17691, 17796, 17818, 19040, 18023

1. Units should not transition between Boiler MACT and Utility MACT.

Comment 1: Commenter 17691 is concerned with the proposed structure of regulatory applicability for cogeneration units. Commenter does not concur with the concept of applying certain applicable requirements when facilities meet the definition of a cogeneration facility (i.e., producing and selling one-third of their generated power that is greater than 25 MWe) and other applicable requirements when the facility is operated as an industrial boiler. Using the proposed approach, Commenter predicts that the process of permitting cogeneration facilities will become complicated, overly burdensome, and result in confusion during compliance determinations.

Comment 2: Commenter 18023 states that a unit should not be forced to switch between compliance with the Industrial Boiler MACT and the Utility MACT. There are some indications in the preamble that a unit could switch immediately from being an industrial boiler to an electric utility steam generating unit if it increases its electricity production beyond a given threshold. The unit would remain an EGU for at least six months but after that period, if the electricity output dropped, the unit would revert back to being an IB. This would be extremely problematic and confusing from an emissions control and monitoring perspective. The emission standards in both rules are different, which would likely require different emission control designs. In addition, the monitoring and reporting requirements are different for these classes of units. In order to be in compliance, a source would have to install the monitoring equipment under both rules. This is nonsensical and could not have been intended.

2. Once-in, always-in.

Comment 3: Commenter 17174 notes that the EPA should address how the "once-in-always-in" policy applies to sources subject to the Boiler MACT that become subject to the Utility MACT when the source meets the EGU cogeneration criteria.

Comment 4: Commenter 17818 is of the opinion that this provision has the potential to have affected units periodically bounce in and out of the necessity of meeting certain compliance requirements. This has the potential of causing regulatory compliance and permitting issues for the source and the permitting organizations. It is Commenter's opinion that once a unit becomes classified as an EGU, that unit remains an EGU until such time that permit restrictions for the affected units are finalized that prohibit the unit from again attaining the output necessary for the unit to potentially reach the EGU output criteria at any time in the future.

3. Units should be subject to the more stringent of the two regulations.

Comment 5: Commenter 17796 suggests that the facility [with combustion units that are at times IB units or solid waste incineration units subject to other standards under CAA section 112 or to standards under CAA section 129] be subject to the more stringent of the two regulations should this situation occur for the same unit at the same facility. Thus, no matter what operating scenario the unit is in, it will be in compliance with either NESHAP. In addition this would eliminate any possible confusion about the applicable regulatory requirements for both the regulator and source owner.

4. The EPA should clarify the details of transition.

Comment 6: Commenter 17174 states that there are several cogeneration units in South Carolina that could potentially follow this scenario. Commenter says that the EPA did not address the regulatory logistics on how this would be implemented. Commenter requests that the EPA provide in the final rule a clear process to demonstrate initial and continuous compliance for cogeneration units changing section 112 applicability. This process needs to provide the specific period or deadline when the cogeneration unit stops compliance with the Boiler MACT and starts complying with the Utility MACT and vice versa, include notification requirements when changing rules, and specify testing and NOCS deadlines.

Comment 7: Commenter 17818 states that it is not clear what period of time is related to the portion of the statement "potential electric output capacity." In the statement, the EPA indicates that if any unit exceeds the one-third potential (and also meets the 25 MWe criteria) during any portion of a month, the unit is subject to the proposed rule. Commenter questions what averaging period is proposed for the determination criteria of "any portion of a month" (hourly, 24-hr avg., etc). Commenter also questions the appropriateness of an averaging period of less than monthly if such a provision is to be retained in the final rule.

5. The EPA should base the threshold on becoming an EGU on a 12-month rolling average.

Comment 8: Commenter 19040 states that at numerous locations throughout the preamble and in the proposed regulation the difference between a cogeneration and an EGU is discussed. It is consistently mentioned that a cogeneration facility can become classified as an EGU if the facility in question puts more than 25 MW on the grid and the 25 MW is more than one-third of the rated capacity of the generator.

When a coal-fired cogeneration unit stops being a cogeneration unit and becomes an EGU, the emission requirements for the unit switches from the EGU emission requirements to the IB emission requirements. Aside from the differences in emission levels that have to be met, the pollutants that need to be controlled are different.

It appears, from the manner the proposed regulation is written, that if a non-EGU crossed the threshold to becoming an EGU for even an hour, it would have to meet the emission requirements for an EGU for the next six months. It might be more equitable and allow a non-EGU to plan better if the threshold to becoming an EGU were based on a 12-month rolling average. That way, if the facility crossed over the threshold for one or two hours, they would not be penalized for six months of operation as an EGU.

Commenter 17880 states that in addition to any cogeneration facility that sells electricity to any power distribution system equal to or more than 1/3 of their potential electric output capacity is considered an EGU if it meets the proposed definition of fossil-fuel-fired, the definition would also apply to any cogeneration facility capable of combusting enough coal or oil to generate 25 MWe from fossil fuels alone. The commenter also states that any units subject to Boiler NESHAP that increase their electricity output supply to meet peak energy demand to the extent that they meet the EGU cogeneration criteria should be subject to the proposed EGU NESHAP for a six month period from the initial increase of production.

Response to Comments 1 - 8: Congress in CAA section 112(a)(8) defined the EGU source category; for all other source categories, the EPA defined the source category in the listing decision. Thus, sources

that meet the CAA section 112(a)(8) definition are EGUs and, therefore, must comply with this final rule; however the EPA believes that it has some flexibility with regard to restricting the "movement" between source categories under CAA section 112. We maintain that units with the potential to periodically meet the definition of an EGU should generally be subject to the EGU NESHAP. This is particularly pertinent to EGUs that cogenerate steam and electricity where the production of electricity for sale may vacillate above and below the "one-third of its potential electric output capacity" and "more than 25 megawatts electric output" thresholds mandated in CAA section 112(a)(8).

As explained in the preamble to this final rule, we are finalizing that you are subject to the requirements of the final rule at least 6 months following the last date you met the definition of an EGU subject to the final rule (e.g., 6 months after a cogeneration unit provided more than one third of its potential electrical output capacity and more than 25 megawatts electrical output to any power distributions system for sale). In addition, we requested comment on the need for provisions to account for sources that move between different standards and several commenters indicated a need for such provisions. For this reason, we are finalizing a provision whereby you may opt to remain subject to the provisions of the final rule beyond the 6 months if you continue to have the potential to meet the statutory definition of an EGU in the future, unless you combust solid waste in which case you are a solid waste incineration unit subject to standards under CAA section 129 (e.g., 40 CFR Part 60, subpart CCCC (New Source Performance Standards (NSPS) for Commercial and Industrial Solid Waste Incineration Units), or subpart DDDD (Emissions Guidelines (EG) for Existing Commercial and Industrial Solid Waste Incineration Units)). We believe the provision to opt to remain subject to this final rule will ameliorate conditions where EGUs may potentially move between NESHAP on a relatively frequent basis. Notwithstanding the provisions of this final rule, an EGU that starts combusting solid waste is immediately subject to standards under CAA section 129 and the unit remains subject to those standards until the unit no longer meets the definition of a solid waste incineration unit consistent with the provisions of the applicable CAA section 129 standards.

We believe this situation is different from that of an EGU that may periodically combust materials defined to be "solid waste" under the rule entitled "Identification of Non-Hazardous Secondary Materials That Are Solid Waste" (Solid Waste Definition Rule; 76 FR 15456; March 21, 2011). CAA section 129 defines "solid waste incineration unit" as "a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial establishments or the general public." *See* CAA section 129(g)(1). The plain reading of CAA section 129(g)(1), and the emphasis placed on the word "any" by the Court in its decision on the September 22, 2005, CAA section 129 "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units" (CISWI; 76 FR 15704; March 21, 2011) rule, precludes the Agency from exempting EGUs that combust materials determined to be "solid waste" from complying with the applicable CAA section 129 standards (e.g., the CISWI rules). However, we do believe that procedures need to be provided whereby an EGU may transition in and out of CAA section 129 standards. For example, the CISWI rule contains provisions similar to the ones included in this final rule to address the requirements for sources that stop being solid waste incineration units.

In addition, the once-in-always-in policy does not apply to sources that move between NESHAP applicability to separate source categories (e.g., boilers and EGUs). Sources that must comply with multiple NESHAP at different times should work with their permitting authorities to include alternative operating scenarios in their Title V permits to ease the transitions between different standards. Finally, we are not adopting provisions that authorize sources to comply with the more stringent of alternatively applicable standards. We believe the approach we have adopted in this final rule and in the CISWI rules

provide sufficient flexibility for sources that may at times be subject to different standards.

2C - Applicability: Section 129 rule, CISWI

Commenters: 17174, 17402, 17754, 17796, 17838, 18963

1. Transition between CAA section 112 and CAA section 129 rules.

Comment 1: Commenter 17174 addresses transitioning from CAA section 112 to section 129 and vice versa. Commenter notes that the EPA solicits comment on whether they should include provisions similar to those included in the final CISWI rule to address units that combust different fuels at different times. Commenter states that several utility boilers in South Carolina have the potential to combust materials that could be considered solid waste under the proposed RCRA definition. Commenter states that these are utility boilers that do not meet the exemption under CAA section 129 (g)(1)(B) for qualifying small power production facilities or qualifying cogeneration facilities. Commenter recommends that the EPA include provisions similar to those included in the final CISWI rule to address units that combust different fuels at different times.

Comment 2: Commenter 17402 states that the EPA should clarify the interactions between the Utility MACT and the Solid Waste Incinerator and Definition Rules. Commenter supports the EPA's general goal of reducing risks to human health and the environment from emissions from combustion facilities; however it believes that regulation of the combustion of secondary materials under CAA section 129 of the CAA should be carefully applied so as to encourage the safe reuse of materials that were previously used for different purposes, and in a flexible manner that does not impose unnecessary regulatory burdens in exchange for insignificant benefits. Commenter believes the EPA should provide flexibility to EGUs that attempt to use nontraditional fuels, and encourage those with beneficial emissions profiles.

Commenter 17402 states that under CAA section 129, 42 U.S.C. section 7429, facilities combusting materials that are determined to be non-hazardous solid waste under the RCRA are regulated as incinerators and required to meet the emissions standards under CAA section 129 of the CAA, rather than under other sections of the CAA, including section 112 on which this Utility MACT rule is based. The EPA had originally attempted to exempt energy recovery facilities from this requirement (no matter what they combust), but that approach was found to be invalid in *NRDC v. EPA*, leading to a revised rule covering incinerators. In response to the NRDC decision, the EPA promulgated the new Non-Hazardous Secondary Materials Rule ("Solid Waste Rule"), defining non-hazardous solid waste under RCRA. The EPA released the Solid Waste Rule along with standards for CISWI and major source boiler standards ("Boiler MACT"), among other rules. All of these rules were published in the Federal Register on March 21, 2011. The EPA delayed the effective dates of both the CISWI and Boiler MACT rules as part of its ongoing reconsideration of those rules on May 18, 2011, but did not reconsider or stay the Solid Waste Rule.

Commenter 17402 offered comments in response to the proposed Solid Waste Rule on August 2, 2010. Those comments are hereby incorporated by reference. Although the final Solid Waste Rule represents an improvement over the proposed rule, two specific areas for concern remained, on which Commenter requested reconsideration. Commenter also requested reconsideration of related issues under the CISWI rule. Both petitions were filed on May 20, 2011, and are also incorporated by reference here. Commenter requested that the EPA treat existing coal rejects identically to currently generated coal rejects, as they are chemically largely identical. In fact, legacy coal rejects may be of higher fuel value, as coal processing technology has improved to reduce the amount of energy-bearing coal that must be rejected. Commenter also requested a de minimis exemption from both the definition of solid waste

under RCRA, and treatment as an incinerator under CISWI, for combusting de minimis quantities of boiler cleaning wastes and demineralizer resins.

Commenter 17402 appreciates that the EPA requested comments on the relationship between section 129 and the comparable EGU standards in the proposed Utility MACT rule. However, the EPA's initial approach does not adequately account for the challenging interaction between uncertainty in the Solid Waste Rule with a lack of flexibility in the proposed rule. In part, because the impacts of the Solid Waste Rule can only be measured by comparing the impacts different rules, i.e.,the CISWI, Boiler MACT, and Utility MACT rule operating under different scenarios, the EPA has not attempted to address the true costs of the Solid Waste Rule. In response to concerns Commenter raised in the Solid Waste Rule context, the EPA responded that the comments were beyond the scope, but then did not address those concerns in the CISWI rule or in the current proposal. As a result, the EPA has created an uncertain, and potentially onerous and burdensome, process for using materials which may or may not be solid wastes. The EPA should review the interactions of the Solid Waste Rule, the CISWI Rule, Boiler MACT, and this proposed rule and apply the principles of E.O. 13653 to the whole integrated system. By dividing its treatment and analysis of the different aspects of the rule, it is impossible for the Agency, or the public, to have a clear picture of the true impacts of the rule.

Commenter 17402 states that the risks of error are extremely high in that, under the proposal, if an EGU combusts any solid waste, it automatically becomes an incinerator for regulatory purposes. However, it is a virtual certainty that no EGU has permits that allow it to operate as an incinerator, nor are they sited as an incinerator, nor do they have in place the additional monitoring and testing required under CAA section 129. Without those items, an accidental combustion of a styrofoam peanut at a coal-fired EGU could require the unit to cease operations for six months, the period it takes for a CISWI to revert to an EGU.

Commenter 17402 states that as a result, the operator of an EGU is faced with a choice: preemptively become a solid waste incinerator before any planned burning of materials that may trigger the rule, or avoid any materials whose provenance under the Solid Waste Rule is not entirely clear. This outcome is exactly crosswise with the statutory intent behind both RCRA and section 129 of the CAA. RCRA was developed and passed to assist the nation with responding to mounting volumes of solid wastes. RCRA's specific purpose was to encourage the removal of usable materials from the waste stream, create a cradle-to-grave regulatory scheme for hazardous wastes, and to encourage the generation of energy from solid waste. Section 129 of the CAA was created to regulate municipal and other waste incinerators. Perhaps because the EPA has only previously enacted federal regulations with respect to the hazardous waste aspects of RCRA, which occupy the central role at the federal level, it has adopted the "cradle-to-grave" mentality associated with it for all secondary materials. This can be seen in the proposed rule by the monitoring and tracking requirements imposed on those plants which combust secondary materials that are determined not to be a solid waste through a variety of mechanisms.

Commenter 17402 states that instead, the EPA should be encouraging EGUs that seek to develop alternative clean sources of energy. When a material is present in large quantities in the environment with high heating value, similar contaminants and emissions to traditional fuels, and that is currently creating an environmental problem, the EPA should encourage its removal and use for fuel. Similarly recycled wood products and other materials that can generate electricity should be made easier for operators to consume, not harder. The EPA should focus on the intent of the statutes in question – improving emissions and encouraging resource recovery. Instead, the Agency has gotten sidetracked by a quest to regulate all potentially "discarded" material. This proposed rule, along with the

reconsideration of related rules affecting combustion units, provides an opportunity for the EPA to correct that focus. Commenter urges the EPA to do so.

Commenter 17402 states that to that end, it proposes two principles for the EPA to consider as it goes about clarifying the relationship between the various categories of EGUs: (1) EPA should provide certainty to EGUs that combust secondary materials regarding their permit status; and (2) EPA should provide flexibility to EGUs that attempt to use nontraditional fuels, and encourage those with beneficial emissions profiles.

Commenter 17402 states that applying those principles to its own operations, two issues of concern remain as potential obstacles to its continued economic operations. The first is the treatment of legacy coal rejects. Commenter's Grant Town plant was built to use, and currently operates in large part using, coal rejects from abandoned coal piles within a relatively short distance of the plant. However, the final solid waste rule, combined with the proposal at issue in these comments, raises questions about Grant Town's continued permit status as an EGU. Without a viable, and continuing permit and adequate cost-effective fuel supply, Grant Town cannot continue operations.

Commenter 17402 states that the second issue is the treatment of materials generated in the normal course of boiler operations. Under longstanding utility practice in North America, boilers typically combust their boiler cleaning wash. Commenter also combusts other materials generated in the normal course of boiler operations, such as demineralizer resins. Although the resins may have sufficient fuel value to qualify as processed materials, and thus not solid wastes, under the EPA's legitimacy tests, boiler wash would not. The combustion of these materials is an economic disposal option; one that prevents the land-based disposal of numerous gallons of water and solvents.

Response to Comments 1 and 2: Consistent with *NRDC v. EPA*, any source combusting any solid waste is a solid waste incineration subject to standards issued pursuant to section 129. 489 F.3d 1250, 157-58 (D.C. Cir. 2007). The EPA may not subject sources subject to standards under CAA section 129 to standards issued pursuant to section 112. See CAA section 129(h)(2). For these reasons, EPA may not exempt from section 129 standards EGUs that combust solid waste as that term is defined in the recently issued Solid Waste Definitions rule. This includes units that are burning what commenters describe as di minimis levels of solid waste or solid waste that has significant fuel value. As to the commenter that expressed concern about its unit burning coal refuse, we concluded in the proposed rule that all EGUs burning coal refuse were either burning newly mines coal refuse such that it is not solid waste or sufficiently processing previously discarded coal refuse such that the coal refuse is not a solid waste. The commenter expressed concern that their unit might be subject to section 129 because it was combusting coal refuse but it did not indicate that it was not in fact sufficiently processing the coal refuse it uses. We continue to believe that all coal refuse units, including the unit identified by the commenter, are EGUs because it is our understanding that all coal refuse, newly mined and previously discarded, is processed in the same manner.

In response to comments, the EPA is including provisions in the final rule similar to those included in the final "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units" (CISWI; 76 FR 15704; March 21, 2011) rule to address units that combust different fuels at different times. The requirements contained in the final CISWI rule generally govern how units must comply when they begin and cease combusting solid waste, but, as described above, the new provisions in this final rule will address how units move between different NESHAP.

2. The EPA should exempt boilers combusting small amounts of secondary materials.

Comment 3: Commenter 17402 respectfully requests that the EPA use its inherent de minimis authority to exempt boilers combusting small amounts of materials generated in the normal course of boiler operation from treatment as an incinerator when the materials are generated and combusted onsite. Combustion of these materials does not appreciably impact contaminant emissions, but the economic and environmental costs of alternative disposal are significant. Commenter's facilities are more properly regulated as EGUs under the Utility MACT rule, and standard operating procedures should not cause those units to be considered as incinerators.

Commenter 17402 states that the EPA should allow a de minimis exemption from treatment as an incinerator for units burning materials generated in the normal course of boiler operation. Commenter states that the EPA has a long history of de minimis authority, with the seminal case being Alabama Power Co. v. Costle. In Alabama Power, the court held that the EPA has inherent de minimis authority to exempt small sources from all but the most rigidly prescribed statutes as long as the legislative intent of the statute is not frustrated. The D.C. Circuit expressively stated that, "It is commonplace . . . that the law does not concern itself with trifling matters, and this principle has often found application in the administrative context. Courts should be reluctant to apply the literal terms of a statute to mandate pointless expenditure of effort . . . . The ability, which we describe here, to exempt de minimis situations from a statutory command is not an ability to depart from the statute, but rather a tool to be used in implementing the legislative design."

Commenter 17402 states that this authority has been applied by the EPA and upheld by the courts in a variety of different circumstances. Similar to the examples described below, the EPA has the inherent authority under RCRA to limit the application of the incinerator standards in situations where the intent of the statute would not be frustrated, and imposing the regulation would produce no or trivial benefits. It should do so here with respect to boiler cleaning wastes, spent demineralizer resins, and the other minor constituents generated in the normal course of boiler operations.

Commenter 17402 requested in its comments on the proposed Solid Waste Rule, and again in its reconsideration, that the EPA clarify that burning de minimis amounts of non-hazardous boiler cleaning wastes and other traditional byproducts of boiler operation does not transform a boiler into an incinerator, even if the byproducts have a low heat value. The same principle applies to an EGU. As discussed below, and in more detail in EME's CISWI and Solid Waste Rule petitions, the EPA has sufficient de minimis authority to prevent applications of the law which would have trifling benefits at extremely high cost.

Commenter 17402 states additionally, reconsidering the interaction between the CISWI, Solid Waste, and Utility MACT Rules in the manner we seek will promote the principles of the recent regulatory Executive Order 13563, which was issued after the rules were signed. The EPA should use the reconsideration of the Solid Waste Rule as an opportunity to apply the principles of the Executive Order. Specifically, the EPA should incorporate a cost-benefit analysis into its application of the solid waste definition, and avoid illogical results that treat identical materials differently and create a greater potential for harm to the environment. The EPA should also allow regulatory flexibility in continuing existing utility practices by allowing de minimis exemptions from the solid waste definition under RCRA. The EPA failed to address EME's request for an exemption in the final rule, and should correct that oversight here. Both of EME's requests are in line with the principles of the Executive Order and will reduce unnecessary regulatory burdens.

Commenter 17402 states that an exemption for materials generated in the course of normal boiler operations would fit squarely within the scope of the EPA's de minimis authority. Commenter states that on the whole, Courts have found broad authority for the EPA to exempt minor sources of contaminants when a strict legal application would provide little or no benefit. Given the limited emissions impacts and low contaminant levels inherent in materials generated in the regular operation of the boiler, the EPA's de minimis authority allows it to exempt those materials from treatment as solid wastes, and to exempt EGU's combusting small amounts of those materials from incinerator standards.

Commenter 17402 states that the EPA allows similar de minimis exemptions under the solid waste rule and other rules under RCRA. The EPA already uses its de minimis authority under RCRA and, indeed, has applied it in the Solid Waste Rule. The EPA allows a de minimis exemption for contaminants, including paper, insulation, and other items which may be included in construction wastes demolition derived wood ("C&D wood"): "C&D-derived wood can contain de minimis amounts of contaminants and other materials provided it meets the legitimacy criterion for contaminant levels."

Commenter 17402 states that the EPA has also applied its de minimis authority under RCRA in the hazardous waste context, allowing listed wastes to be discharged to a wastewater treatment facility as long as the total concentration of the chemicals does not exceed a certain threshold. The EPA allows similar exemptions from characterization as solid wastes for condensates derived from overhead gases from Kraft mill steam strippers that are used to comply with 40 CFR § 63.446(e) where the exemption applies only to combustion at the mill generating the condensates, 40 CFR § 262.4(a)(16), or pulping liquors that are reclaimed in a pulping liquor recovery furnace and then reused in the pulping process, 40 CFR § 261.4(a)(6). One of the requirements under 40 CFR § 63.446(e) is for the condensate to be treated so it is either managed in specified equipment or in a manner that ensures the HAP are destroyed to specified levels. Similar requirements could be used in a de minimis exemption under CAA section 1004, limiting any exemption to onsite materials that do not significantly increase the level of contaminants.

Commenter 17402 states that the emissions impacts of an exemption would be trivial. Combusting and evaporating boiler cleaning wastes and other materials generated in the course of normal boiler operations is standard practice, and currently part of most electrical generating units' air permits in North America. Allowing this practice to continue would not increase emissions. Further, without a de minimis exemption to maintain their status as generators, not incinerators, generating unit operators would be required to transport cleaning wastes and other materials to an offsite disposal site, incurring additional expenses, generating more emissions in the process, creating potential safety issues associated with transportation of materials, and disposing of the wastes without necessarily destroying them.

Commenter 17402 states that there is little to no environmental benefit to requiring alternate disposal of materials in control of the generator that have only a de minimis impact on emissions. The emissions impact from evaporating boiler cleaning materials, for example, is comparatively small and the resulting total variation in emission of pollutants from their combustion would likely be similar to that from normal variation resulting from differences in coal composition. Emissions tests of the ESP outlet flue gas conducted by EPRI during evaporation of boiler cleaning wastes showed no statistically significant increases in metal concentrations over baseline data. In addition, the concentrations of NOx, HCl, and HF present in the flue gas were also not statistically affected. In monitoring studies conducted by EPRI on evaporation of boiler cleaning wastes in utility boilers, chromium levels in the stack gas were 0.076 lb/hr at baseline vs. 0.080 lb/hr during evaporation. Chromium is the metal typically of the highest concentration in boiler cleaning wastes and the boiler cleaning wastes are tested prior to combustion to

ensure the concentrations are below the hazardous level. Results for other metals, PM, and trace organics were similarly low.

Commenter 17402 states that water treatment resins are used to demineralize boiler feed water. Like home water softeners, utility-scale water treatment resins are used to remove minerals and other compounds that would lead to corrosion and premature failure of boiler pressure parts. Although resins can be reused multiple times, they eventually become spent and can no longer effectively cycle to capture minerals and release them, at which point they must be replaced. Resins typically have significant fuel value, and are relatively low in contaminants, as they are repeatedly flushed to remove mineral contents. Further, any contaminants they contain would be from the water supply, not the fuel supply, and thus with limited potential for hazardous materials to be included.

Commenter 17402 states that boiler cleaning wastes and other non-hazardous materials have routinely been allowed to be evaporated in onsite utility boilers because they do not appreciably increase emissions and thus pose minimal risk to the environment. As an example, Commenter provides the following permit condition, included in its Illinois facility air operating permits: "The permittee is allowed to burn boiler cleaning wastes only when the boiler is in a normal mode of operation and generating no less than 105 megawatts (gross). Burning of boiler cleaning wastes is not allowed during startup, shutdown, malfunction or breakdown."

Commenter 17402 states that operating information submitted by the generating station to obtain the permit indicates that to ensure steady boiler operations the maximum boiler cleaning waste feed rate to the boilers of up to 200 gpm depending on the size of the unit.

Commenter 17402 states that with respect to the volumes of onsite generated materials such as boiler cleaning wastes that would be evaporated in the boilers, Commenter's experience is that the waste volumes range from approximately 250 to 1835 tons per boiler per boiler cleaning event, but would only be fed to the boiler at a rate of up to 0.8 tons per minute. This contrasts with a total amount of coal burned on average in each boiler of between 1,420 and 8,220 tons per day. The boiler cleaning frequency can vary from every two to ten years, depending on the type of boiler and amount of contaminants introduced into the boiler water cycle. Other materials generated include resins from water treatment; however, those materials are even more limited in amounts than the boiler cleaning wastes. Regardless, the annual amount of boiler cleaning wastes generated for each individual boiler is relatively small.

Commenter 17402 states that the application of de minimis authority where emissions impacts are trivial is consistent with how courts have addressed the authority in the context of similar situations. As in EDF, here a de minimis exemption for materials generated in the normal course of boiler operation would have minimal or no impact on the level of emissions. Since this does not affect the purpose of the CAA, i.e., reducing emissions, allowing such an exemption would be a proper exercise of the EPA's de minimis authority.

Commenter 17402 states that requiring application of section 129 to de minimis amounts of secondary materials would be a mandate of pointless expenditure. Although the volumes of solvents are relatively small compared to the overall volume of fuel burned, the costs of the disposal for a boiler cleaning event can exceed $1 million per event in Commenter's experience and, as a result, the costs to the industry may exceed $50 million per year. The volumes generated per year that would require offsite disposal are estimated at 125,100 tpy. This compares to annual coal burned of over 1 trillion tpy. Commenter

questions whether there is sufficient treatment capacity for this volume of material, which the EPA may not have considered because the volumes and frequency of occurrence per facility are relatively low. As in Alabama Power, the flexibility to prevent these kinds of needless expenditures and unnecessary burdens are exactly the reasons that the courts originally applied de minimis exemptions. Given the trivial impact on emissions, the environmental and economic costs generated by treating generators as incinerators because of common utility practice is simply not justified. Commenter requests that the EPA apply its de minimis authority to prevent this unnecessary regulatory burden.

Commenter 17402 states that the text of section 1004 Of RCRA and section 129 of the CAA is not "uncompromisingly rigid." In section 1004, "solid waste" is defined as: "any garbage, refuse, sludge from [treatment facilities] and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities . . . "

Commenter 17402 states that a similarly expansive definition is the basis for treatment as an incinerator under CAA section 129 of the CAA, where "solid waste incineration unit" is defined as: "a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial establishments or the general public (including single and multiple residences, hotels, and motels)."

Commenter 17402 states that although clearly broad, these definitions are not so restrictive as to prevent a de minimis exemption, and are similar to the provisions for which courts have allowed exemptions under the CAA and CERCLA. Specifically, in *New York v. EPA*, the court recognized the EPA's inherent de minimis authority notwithstanding the language "any modification." The D.C. Circuit in EDF also allowed an exemption from the broad "any activity which does not conform to an implementation plan after it has been approved or promulgated" when increases in emissions were trivial. Finally, in *Ohio v. EPA*, the court upheld the EPA's de minimis authority to only monitor sites with minimal contamination despite the language of CERCLA that required monitoring of any sites with "any hazardous substances."

Commenter 17402 states these definitions also include several more general exemptions, such as materials in domestic sewage, irrigation return flows, certain industrial discharges, or radioactive materials, further supporting a conclusion that Congress did not intend an "uncompromisingly rigid" application of the provision. Applying the EPA's de minimis authority will not frustrate, and has the potential to further, the goals of the statute. EME respectfully requests that the EPA do so here.

Commenter 17402 states that with appropriate limitations to ensure that the intents of both RCRA and the CAA are not harmed, a de minimis exemption for boiler cleaning materials would allow compliance at a level that would increase emissions less than the natural variation in a power plant's regular coal supply. As a fairly irregular procedure, with a relatively small impact on emissions, boiler cleaning materials are exactly the kind of "trifling matter" considered in Alabama Power that are not worth the undue expense or complication of additional regulation. Commenter respectfully requests that the EPA reconsider its request for a de minimis exemption for boiler cleaning materials generated under the course of regular operations and that remain in possession of the generator.

Response to Comment 3: Although we are mindful of commenter's concerns, particularly as they relate to the boiler cleaning waste, we believe that the statute and case law limit our ability to exempt units that *combust* solid waste. CAA section 129 defines "solid waste incineration unit" as "a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial

establishments or the general public" *See* CAA section 129(g)(1). In *Natural Resources Defense Council v. EPA*, the Court held that the term "solid waste incineration unit" in CAA section 129(g)(1) "unambiguously include[s] among the incineration units subject to its standards any facility that combusts any commercial or industrial solid waste material *at all* – subject to the four statutory exceptions identified [in CAA section 129(g)(1)]." 489 F.3d 1250, 1257–58 (D.C. Cir. 2007) (*emphasis added*). Combustion units located at commercial or industrial facilities that combust solid waste as that term is defined in the rule entitled "Identification of Non-Hazardous Secondary Materials That Are Solid Waste" (Solid Waste Definition Rule; 76 FR 15456; March 21, 2011) are subject to standards under CAA section 129, unless the unit is expressly exempt pursuant to CAA section 129(g)(1). Facilities that include EGUs would generally be considered commercial or industrial facilities and the EPA established standards for "energy recovery units" in the CISWI rules. Because the Agency defines solid waste under RCRA, comments requesting we include a de minimis level exemption into the RCRA Solid Waste Definitions Rule are outside the scope of this rulemaking. For these reasons, we are not including a de minimis exemption in the final rule. We need not respond to the remainder of the de minimis comments as they also pertain to the RCRA Non-Hazardous Solid Waste rulemaking and are, thus, outside the scope of this rulemaking.

3. The EPA should treat legacy coal rejects as fuels.

Comment 4: Commenter 17402 states that the EPA should treat legacy coal rejects as fuels, since they are chemically identical, if not superior fuels, to those coal rejects which are currently generated that the EPA recognizes as a fuel under the rule. The EPA mistakenly concludes that it is required to do so under the statute because of the length of time the materials have been unused, but the actual language of the statute and the applicable case law demonstrate that Resource Conservation and Recovery Act ("RCRA") is not so rigid as EPA has presumed.

Commenter 17402 appreciates the fact that in the Solid Waste Definition Rule the EPA improved its treatment of coal rejects from the proposal by allowing currently generated coal mining rejects to be treated as fuel. Unfortunately, when the EPA defined existing or "legacy" coal mining reject piles as solid waste, it potentially subjected facilities that burn legacy coal rejects and their suppliers to citizen suits and other enforcement under RCRA. By increasing that risk, the EPA greatly reduces an electricity generating facility's ability to utilize legacy coal fuel resources in a cost-effective manner, also reducing the simultaneous removal of the blight of such coal piles from the landscape. CFB electrical generating facilities were constructed, once the technology was developed, specifically to burn coal rejects as a primary source of fuel or as a secondary fuel to coal. As such, this interpretation will impose economic and environmental costs on electricity generators using coal rejects for fuel and return to the public little to no benefit, in terms of either emissions reductions or resource recovery. As discussed in more detail in Commenter's petition for reconsideration of the Solid Waste Rule, this result is not compelled by the law, and the EPA should have reconsidered this aspect of the Solid Waste Rule and its impacts on the CISWI, Boiler MACT, and ultimately the Utility MACT rule that is the subject of this comment. By not treating legacy coal as solid waste, the EPA could remove a requirement that is excessively burdensome, hampers the use of innovative technology and less costly methods for remediation, represents poorly coordinated rulemakings, and has a high cost-to-benefits ratio.

Commenter 17402 states that using coal from legacy piles in electricity generating units provides numerous environmental benefits. If not economical for use as a fuel in electricity generation, legacy coal piles are expensive to remove and treat, and would likely remain a dangerous feature of coal country landscape. Legacy coal piles can leach contaminants, similar to acid mine drainage. Replacing

the legacy coal in the nation's electricity supply requires mining fresh coal, which requires resources and economic expense and poses its own environmental concerns. Some of the fuel replacing legacy coal may also be burned in plants with less effective emissions controls than the fluidized bed reactors used for legacy coal. If legacy coal piles are required to upgrade their environmental performance in order to be accessed by generators, then that fuel asset will become more expensive as compared to newly mined coal, with the net result that the piles are likely to remain untreated, and continue damaging the environment. The economic costs associated with mitigating the impacts of legacy coal piles can be quite significant, and coal rejects combustors play an important role in addressing those areas. Legacy coal operators will either face increasing competition for currently generated mining rejects, or will be forced to use more expensive grades of coal, thus affecting the economics of operating the CFB units. As a result of the potential negative impacts to this environmentally beneficial use of a troubled resource, Commenter encourages the EPA to reconsider the treatment of legacy coal piles in the Solid Waste Rule.

Commenter 17402 states that, as issued, the final Solid Waste Rule treats coal mining rejects from prior mining operations as solid waste unless they are sufficiently "processed" into a fuel product. Yet, this treatment is distinct from that of coal mining rejects that are currently generated by mining operations, which are not required to be processed to be considered fuel. The materials are identical, and should be treated so. Fortunately, the law does not mandate the result the EPA reached in the final rule that the EPA treat these legacy materials as solid waste under RCRA.

Commenter 17402 states that section 129 (g) (6) of the CAA indicates that the term "solid waste" shall have the same meaning as established by the Administrator under the Solid Waste Disposal Act, 42 U.S.C. §6901 et. seq., also known as RCRA. In RCRA Section 1004, solid waste is defined as, "any garbage, refuse, sludge from [treatment facilities] and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities . . . "

Commenter 17402 states that the EPA's authority over solid waste is focused almost entirely on hazardous wastes, with the states retaining authority over non-hazardous solid wastes subject to certain exceptions. As a result, although the EPA has published extensive regulations with regard to hazardous solid waste, those regulations explicitly exclude non-hazardous wastes. The EPA has not previously promulgated detailed regulations regarding the definition of non-hazardous solid-waste.

Commenter 17402 states importantly, the EPA (correctly) does not attempt to apply all of the principles of those hazardous waste regulations in the proposed rule; the EPA, however, does attempt to incorporate case law based on the EPA's central RCRA role of regulating hazardous wastes to the definition of non-hazardous solid waste, with mixed results. Although the hazardous waste case law may add guidance as to how courts might interpret a non-hazardous waste definition, because "cradle-to-grave" hazardous waste authority is central to the EPA's purpose under RCRA, those interpretations may not be applicable to the non-hazardous solid waste definition, where the EPA plays a far less central statutory role.

Commenter 17402 notes that the 2007 decision in *NRDC v. EPA*, which invalidated the EPA's prior interpretation of the solid waste incinerator definitions in the CAA, did not address the RCRA definition of "solid waste." As a result, the EPA retains significant discretion and little on-point case law in its creation of a "solid waste" definition. This discretion is applied inconsistently in the final rule, resulting – in the case of legacy coal piles in particular – in a needlessly burdensome rule that produces some

illogical results. The EPA should add the Solid Waste Rule to the list of the related rules issued simultaneously that the EPA wisely moved to immediately reconsider (and subsequently stayed.) When it does so, the EPA should exercise the discretion afforded it under the statute and apply the principles of Executive Order 13563 to produce a more thorough, reasoned, cost-effective, and ultimately beneficial rule.

Commenter 17402 states that the EPA treats legacy coal piles as solid waste based on a presumption that everything discarded is necessarily solid waste. The EPA should reconsider this presumption for three core reasons: (1) EPA recognizes in the rule that certain materials which are discarded are not solid waste; (2) EPA did not consider in its analysis support in both the statutory language and case law that suggests that although a material must be "discarded" to be considered solid waste, not every material that is discarded is necessarily solid waste; and (3) the case law that suggests a more expansive approach is explicitly premised on the "cradle-to-grave" nature of the RCRA hazardous waste regime – a regime which is utterly inapplicable to the non-hazardous materials at issue in this rule. Each of these points is discussed in more detail in Commenter's reconsideration petition.

Comment 5: Commenters (17754, 17838, 18963) state that within the preamble to the proposed rule, the Agency reiterates its position, as originally stated in the EPA's recently promulgated final rule, "Identification of Non-Hazardous Secondary Materials That are Solid Waste," that currently mined coal refuse should not be considered a solid waste under the RCRA, as long as it is not discarded. By contrast, the EPA appears to indicate within the Solid Waste Definition Rule that legacy coal refuse qualifies as a solid waste in the first instance, because it has been discarded. The EPA makes clear, however, that if legacy coal refuse is processed in the same manner as currently mined coal refuse, the legacy coal refuse would not be a solid waste at the point of combustion, and therefore the combustion of such material would not be subject to regulation under CAA section 129. Instead, the relevant combustion unit would be subject to the Utility MACT regulation, if the unit meets the definition of EGU.

Commenters (17754, 17838, 18963) state that the information available to them is consistent with the EPA's assumption that all units that combust coal refuse and otherwise meet the definition of a coal refuse fired EGU combust either newly mined coal refuse or legacy coal refuse that has been processed such that it is not a solid waste. In fact, Commenters are not aware of any unit combusting coal refuse that qualifies as solid waste, such that the unit would be a solid waste incineration unit instead of an EGU.

Commenters (17754, 17838, 18963) state that in May 2011, they submitted to the EPA a Petition for Regulation regarding the Solid Waste Definition Rule. Among other comments raised in its Petition, Commenters argued that, even prior to any processing activity, legacy coal refuse should be classified as a traditional fuel under the Solid Waste Definition Rule, rather than as a solid waste. Commenters offered several justifications in support of this argument. First, legacy coal refuse is indistinguishable from currently mined coal refuse, based on the definition of "traditional fuels" in the Solid Waste Definition Rule. Second, the segregation of legacy coal refuse from other usable coal fuel during the initial mining operations did not reflect any contemporaneous determination that such legacy coal refuse did not have value as a fuel. Third, operations processing legacy coal refuse to produce fuels are separately regulated as mining activities by the Office of Surface Mining Reclamation and Enforcement ("OSM"), pursuant to the Surface Mining Control and Reclamation Act, 30 U.S.C. § 1201 et seq. ("SMCRA"), and the EPA has consistently determined to exclude from regulation under the solid waste regime those material processing activities subject to regulation by OSM as mining activities. For these

reasons, Commenters requested that the EPA revise the definition of "traditional fuels" in the Solid Waste Definition Rule to expressly identify legacy coal refuse as an alternative traditional fuel.

Commenters (17754, 17838, 18963) also argued in their Petition that, to the extent that the EPA does not agree to regulate legacy coal refuse as a traditional fuel under the Solid Waste Definition Rule, the Agency should revise the Solid Waste Definition Rule to expressly provide that legacy coal refuse is a legitimate non-waste fuel at the point of combustion, because it is processed in the same manner as coal is today. Consistent with the EPA's assumption stated in the preamble to the proposed rule that any legacy coal refuse being combusted in EGUs has been processed such that it is not a solid waste, the EPA unequivocally acknowledges within the preamble to the Solid Waste Definition Rule that legacy coal refuse is processed in the same manner in which virgin coal is processed, thereby meeting the EPA's standard for "sufficient processing." The EPA also clarifies under the Solid Waste Definition Rule that legacy coal refuse satisfies the applicable legitimacy criteria at the point of combustion.

Commenters (17754, 17838, 18963) believe that the EPA's intent to characterize legacy coal refuse as a non-waste fuel at the point of combustion is clearly stated within the preamble to the Solid Waste Definition Rule. The EPA's discussion of the combustion of legacy coal refuse in EGUs in the preamble to the proposed rule provides even further evidence of the EPA's intent to regulate such material as a non-waste fuel product at the point of combustion, rather than as a solid waste pursuant CAA section 129. Commenters expressly endorse this assumption, and request that the EPA achieve consistent promulgation and implementation of regulatory language in each of the relevant rulemakings to ensure that this regulatory conclusion is reflected in the Agency's standards.

Response to Comments 4 and 5: Comments on the status of "coal refuse" in the Solid Waste Definition Rule and reconsideration of that rule are not within the scope of this rulemaking and, thus, are not considered here. As noted elsewhere, combustion of any materials determined to be "solid waste" under the Solid Waste Definition Rule (76 FR 15456; March 21, 2011) would subject the unit to applicability under the CAA section 129 standards (e.g., for units at commercial or industrial facilities the "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units" (CISWI; 76 FR 15704; March 21, 2011)). However, as one commenter noted, the EPA indicated in the proposed rule that, pursuant to the Solid Waste Definition Rule, coal refuse in legacy piles is not a solid waste if it is processed in the same manner as currently mined coal refuse. The commenter also agreed with the EPA's statement that all EGUs combusting coal refuse from legacy piles processed the coal refuse in the same manner as currently mined coal refuse such that it would not be a solid waste. We received no comments that stated that our assumption in the proposed rule was incorrect. The commenter that requested a determination in the Solid Waste Definition Rule that all coal refuse in legacy piles be considered to be a traditional fuel in all cases did not indicate that that commenter used unprocessed coal refuse and, for this reason, we believe the commenter's concern may be unfounded.

4. Units should be subject to the more stringent of the two.

Comment 6: Commenter 17796 suggests that the facility [with combustion units that are at times EGUs or solid waste incineration units subject to other standards under CAA section 112 or to standards under CAA section 129] be subject to the more stringent of the two regulations should this situation occur for the same unit at the same facility. Thus, no matter what operating scenario the unit is in, it will be in compliance with either the NESHAP or the CAA section 129 standard. In addition this would eliminate

any possible confusion about the applicable regulatory requirements for both the regulator and source owner.

Response to Comment 6: Assuming EPA has this authority, we decline to finalize such a provision because CAA section 129 regulates both criteria (including NO_X) and HAP which is inconsistent with the requirements of CAA section 112. Further, CAA section 129 standards do not address all HAP listed under CAA section 112(b) which, again is inconsistent with the requirements of CAA section 112. With regard to units that may be, at times, subject to different CAA section 112 rules, including the EGU NESHAP, we believe that because the term EGU is defined in section 112(a)(8), we do not have the discretion to allow sources to comply with other standards if the unit meets the statutory definition of an EGU. Similarly, EPA may not subject a unit to section 112 standards if the unit is a solid waste incineration unit subject to standards issued pursuant to section 129. See CAA section 129(h)(2). Further, we believe it would be more difficult than commenter suggests to require sources to comply with the more stringent of the potentially applicable standards because one standard could be more stringent for one pollutant and less stringent for another pollutant. Sources are authorized to comply with more stringent provisions and could petition the Administrator to approve alternative monitoring procedures if the monitoring requirements of the different rules varied. See 40 CFR 63.8(f). Sources can also work with their permitting authorities to include alternative operating scenarios in their Title V permits to account for the different standards that may at times apply to the source. As explained above, we have included in the final rule provisions that address units that move into and out of applicability to this final rule. For these reasons, we are declining to include provisions similar to those suggested by the commenter.

2D - Applicability: Exemptions or de minimis size threshold

Commenters: 17316, 17386, 17681, 17689, 17696, 17718, 17725, 17733, 17740, 17760, 17775, 17796, 17803, 17805, 17808, 17820, 17881, 17902, 17911, 17913, 17920, 17928, 18020, 18024, 18450, 18498

Commenters have made several comments regarding applicability and exemptions.

1. Exemption for units that fire 10% or less oil or coal.

a. The EPA should clarify whether this exemption can be applied dynamically.

Comment 1: Commenters 17316 and 17386 strongly support the allowed exemption from the MACT rule for units whose annual average heat input on coal or oil is less than 10 percent of their total annual heat input, as a 3-year average. Commenters add, however, that the rule should clarify whether this exemption can be applied dynamically. In particular, if a unit should initially qualify for this exemption, but subsequently have a utilization that exceeds the qualification threshold (i.e., has a 3-year average utilization >10% or a 1 year utilization >15%), thereby losing its exemption status, can the unit re-gain exemption status if its utilization should later drop below the qualification thresholds? Commenters support the idea that this exemption should be determined dynamically, allowing a source to re-qualify for exemption status if its operating usage should drop below this exemption threshold after exceeding it. Commenters note that this would be consistent with peaking unit status determination under 40 CFR 75.

Comment 2: Commenter 17881 asks is qualification for the provisions of 63.9983(c) a onetime determination which is made just prior to the compliance date, or can units qualify for 63.9983(c) at any time after the applicable compliance date (as well as lose the exemption at any time)? For example, if the final rule is issued 01/01/2012 (such that existing units must comply starting on 01/01/2015), could an existing unit qualify for the provisions of 63.9983(c) based upon the three calendar year period 2013, 2014 and 2015?

Commenter 17881 states that it is assumed that qualification for 63.9983(c) would consist of both an initial demonstration and an ongoing demonstration to be completed following the end of each calendar year. If this assumption is correct, the proposed rule should have provisions which address the loss of the exemption. If the exemption is lost after the applicable compliance date, how long would such a unit have to demonstrate compliance with the proposed rule? In the absence of such provisions, it is assumed that 63.9982 would require compliance immediately upon loss of the exemption, and this is not realistic in cases where additional controls must be installed and/or significant changes must be made to the fuel blend.

Commenter 17881 asks whether the provisions of 63.9983(c) allow EGUs to re-qualify for the exemption if the exemption is lost following the initial compliance date. For example, if an EGU qualifies for the exemption in years 1 and 2 following the compliance date, loses the exemption in year 3, and then once again meets the criteria in year 6, would such a unit once again be exempt from the rule in year 6? Many standards under 40 CFR Part 63 utilize a “once in, always in” approach, and the proposed rule is not clear in this regard.

Commenter 17881 believes that 63.9984 should contain one or more paragraphs devoted to the applicable compliance date for those units that lose the exemption provided at 63.9983 following the

applicable initial compliance date. In those cases where additional control technology will be installed to ensure compliance, it seems reasonable to allow at least 3 years for completing such installations.

b. Units that stop combustion of coal and/or oil prior to the compliance date should not be subject to the rule.

Comment 3: Commenters (17696, 17740, 17775, 17820) state that the EPA should clarify that an EGU can qualify as a natural gas-fired unit (or biomass unit) and not be subject to the rule if, as of the compliance deadline, the unit has a federally enforceable permit limit that requires use of natural gas fuel (or biomass) for at least 90 percent or more of the average annual heat input during any three calendar year period and 85 percent or more of the annual heat input during any calendar year. That is, the EPA should not require an owner/operator to switch an EGU to burning natural gas (or biomass) in the requisite amounts 3 years prior to the compliance deadline in order to avoid applicability of the rule as of the compliance deadline. Rather, the rule should clearly allow an owner/operator to switch to burning natural gas (or biomass) as of the compliance deadline and thereby avoid applicability of the rule so long as a federally enforceable permit condition requiring natural gas (or biomass) use is in effect as of the deadline.

Comment 4: Commenter 17820 states that for units that cease burning oil or coal (conversions to natural gas or to biomass), the proposed rule needs to be modified to allow a more flexible transition process that assures that units converting to biomass or natural gas are not penalized for having burned oil or coal in the period before compliance and are assured exemption from the rule as long as they stop combusting oil or coal prior to the compliance date.

Commenter 17820 states that the EPA should revise the definition to change the "look-back" period to begin 3 years after the unit's final compliance date. This change would not penalize a unit that switches to natural gas and retains the ability to combust coal or oil (a desirable outcome to provide system reliability) for having burned coal or oil in the period before compliance. The EPA should also clarify that a unit that switches to natural gas or biomass and later switches back to highly controlled coal use would not be in violation of the 3-year average for the years it was burning natural gas or biomass.

Comment 5: Commenter 17902 requests that section 63.9983(b) and (c) be amended to also exclude units that will burn more than 10 percent natural gas as of the required compliance date for subpart UUUUU. This exclusion should apply even if the prior year combustion of coal or oil was greater than the percent thresholds given in section 63.9983. If an EGU is primarily natural gas-fired then it should not be subject to the MACT emissions limits or associated compliance MRR that are intended for coal- or oil-fired units.

Response to Comments 1 - 5: In the proposed rule, the EPA stated through the definition of "fossil fuel-fired" that an electric steam generating unit would not be considered fossil fuel-fired such that it would be an EGU subject to this final rule unless it burned more than 10% fossil fuel over the previous 3 years or more than 15% fossil fuel in any one of those years. We included this definition because the statute does not define the level of fossil fuel combustion necessary to make a unit subject to the CAA section 112(a)(8) definition. We do not consider the definition an exemption from the rule, instead it was included to assist sources in determining applicability. Sources that do not meet the definition of an EGU as established in the final rule are not subject to the rule. Thus, a unit may cease to be an EGU subject to this rule if over a 3-year period it combusts less than 10 percent fossil fuel. Such a unit would then be subject to an otherwise applicable standard. As stated above, we are adding provisions to the

final rule that address the situation where sources become subject to this rule after the compliance date. In addition, we added a provision to 40 CFR 63.9984 as suggested by the commenter.

Partly based on comments, the EPA has revised several definitions, including the definition of "fossil fuel-fired," in the final rule to make clear that units must only look at the present capability and utilization of the unit to determine if it is an affected source on the compliance date. Sources will have to evaluate ongoing applicability of the standards based on their utilization of fossil fuels over annual and tri-annual periods. For example, an EGU that on the first substantive compliance date meets the definition of fossil fuel-fired will no longer be subject to the NESHAP if in subsequent years its utilization of coal or oil falls below the threshold levels to satisfy the definition of fossil fuel-fired. A source could also obtain a Title V permit requirement that prohibits the utilization of coal or oil at levels sufficient to satisfy the definition of fossil fuel-fired. Sources that violate a Title V permit limit would not only be in violation of Title V, but also in violation of the requirement to comply with this NESHAP if it exceeded the applicability thresholds and was not complying with the standards during the relevant periods. A unit that spends the 3 year (or 4 years if necessary for the installation of controls) compliance period converting the unit to natural gas or biomass will not be subject to this rule based on our revised definition of fossil fuel-fired.

The EPA believes that the current definitions adequately indicate that natural gas-fired units are not subject to the final rule, and we are adding a definition for natural gas-fired EGU in the final rule.

c. Permit limits with specific fuel caps.

Comment 6: Commenter 17796 does not believe it is appropriate to allow facilities that fire less than a certain percentage of coal or oil or only natural gas to be exempted from this regulation unless the facility has permit limitations with specific fuel usage caps that do not allow operation above these fuel use percentages.

Response to Comment 6: In the final rule, the EPA provides as an alternative compliance assurance measure that sources may include in their Title V operating permit a practically enforceable limit on the authorized fossil fuel utilization to demonstrate that the source is not an affected source under the final rule; however, we do not believe it is necessary to require sources to include such limits in their Title V permits.

d. The EPA should clarify that predominantly gas-fired units are not subject to the rule.

Comment 7: Commenter 17913 states that the regulation should clearly indicate that it is not applicable to predominately gas-fired units. From information given in the proposed rule preamble, the intent was that a facility that predominately burns natural gas would not be subject to the regulation based on the percentage of natural gas used at the facility (natural gas more than 90 percent of heat input average over previous 3 years or more than 85 percent in anyone of three previous years). However, these applicability criteria don't appear in the proposed rule itself. The applicability section (paragraph 63.9982) or the definitions section (paragraph 63.10042) should be revised to clearly state that predominately gas-fired units are not subject to the regulation.

Response to Comment 7: The EPA believes that sections 63.9981 and 63.9982 of the proposed rule clearly indicate that only coal- and oil-fired units are subject to the rule. In addition, section 63.9983(b) states that "any EGU that is not a coal- or oil-fired EGU and combusts natural gas more than 10.0

percent of the average annual heat input during the previous 3 calendar years or for more than 15.0 percent of the annual heat input during any one of those calendar year" is not subject to this final rule.

e. The EPA should allow units firing less than 50% fossil fuels to be exempted.

Comment 8: Commenter 17911 states that the EPA in the proposed rule requested input about the level of biomass that must be used before a plant would be considered other than coal-fired or oil-fired. Commenter understands the Agency's reasoning for wanting to establish a significant upper limit on the use of biomass fuel sources before exempting the unit from the emission requirements of this rule. Commenter agrees that allowing a marginal heat input from sustainable biomass, e.g., 5 percent to 10 percent of total heat input per year, would encourage some generators to make a marginal switch to a reformulated fuel stream without making any significant difference in their general operation.

Commenter 17911 states, however, requiring an 85 percent or greater heat input from biomass in any given year, or 90 percent over 3 years may significantly reduce the potential for a significant transition from coal to biomass. As an example, before this rule was announced the City of Columbia, MO was already in the process of retrofitting their +/- 40MW coal-fired power plant to burn a mixture of coal and biomass in an effort to effectively reduce the amount of CO_2 being released into the atmosphere. As written, the draft rule may discourage the city from moving ahead with its efforts. The cost of conversion to a coal/biomass mix and compliance with the EGU MACT may not be financially sustainable. In this case, the rule may actually make total emissions higher.

Commenter 17911 states that the Agency should consider language allowing power plants with less than 50.0 percent heat input from fossil-fuel to be exempted, if the remaining heat input comes from biomass. In this manner, the rule will encourage a transition to biomass-fueled generation, and will further encourage development of a robust biomass fuel generation sector. Over time the amount to qualify for the exemption could be modified as the sector capacity increases.

Response to Comment 8: The EPA believes that the criteria currently in the definitions in the final rule adequately protect biomass-fired EGUs that limit coal or oil use for start-up or flame stabilization to the 10 and 15 percent usage limits. We believe fossil fuel combustion above these levels makes the unit"fossil fuel-fired" and we are maintaining these thresholds in the final rule. The EPA believes that exempting coal or oil use at levels greater than those in the final rule would be inconsistent with the decision to list coal- and oil-fired EGUs, particularly given the fact that the HAP of greatest concern from EGUs are fuel borne HAP.

2. Exemption for limited-use oil fired units.

All comments have been moved or combined with other comments.

3. Exemption for all oil-fired units.

Comment 9: Commenter 17316 suggests that the EPA should consider exempting existing oil-fired EGUs from the Electric Utility MACT, or at least limiting compliance to a periodic tune-up. Commenter notes that Table 2 in the preamble shows that oil-fired boilers emit minor to insignificant amounts of HAP, except for Ni. Commenter states that because of the manner in which the CAA section 112 law is formulated, once a category is listed the MACT, emission limits are very stringent, and cannot be relieved. Commenter states that the small environmental reduction in HAP, particularly key HAP such

as mercury, to be gained from regulating existing oil-fired EGUs does not justify the substantial cost that would be incurred, including the likelihood that uncontrolled oil fired boilers will have to be shutdown entirely.

Comment 10: Commenter 17386 states that Table 2 in the preamble of the proposed rule identifies that oil-fired EGUs emit minor amounts of HAP, except for Ni. The minor benefit to be gained from regulating existing oil-fired EGUs does not warrant the substantial cost that would be incurred to meet the MACT rule, including the need to retrofit many additional controls that are not covered by the CAA or the EPA's own HAP study. Commenter, therefore, requests the EPA consider exempting existing oil-fired EGUs from the MACT rule or limiting compliance to a periodic tune-up based on the minor amounts of HAP produced by such EGUs.

Comment 11: Commenter 17920 urges the EPA to reconsider its decision to regulate oil-fired units. Based even on the EPA's very conservative risk assessment, the risks posed by Ni emissions from oil-fired generators are very low and do not justify a finding that the regulation of such units is appropriate and necessary. A more realistic analysis based on recent data from oil-fired units shows the risks to be even less than the EPA estimated. Thus, the EPA should rescind its finding that oil-fired units should be regulated.

Comment 12: Commenter 17648 supports commenter 17808's comment that oil-fired EGUs firing No. 2 oil should not be included in the rule because, under the EPA's Appropriate and Necessary Finding, those units are properly included in the natural gas category of EGUs that the EPA found inappropriate to regulate, rather than in the coal- and oil-fired units that the EPA found warranted regulation. No. 2 fuel oil is a lighter fraction of petroleum than No. 6 fuel oil. Because No. 6 fuel oil represents the less volatile materials with a higher boiling temperature "left behind" in the distillation process, No. 6 fuel oil contains many HAP precursors such as nickel and other heavy metals which are not present in No. 2 fuel oil or natural gas. Thus, the emissions characteristics of No. 2 fuel oil are most similar to those of natural gas and units burning No. 2 distillate should be treated in the same way. This would not be subcategorization but, rather, a recognition that units burning No. 2 fuel oil should be treated in the same manner as units burning natural gas.

Comment 13: Commenters 17803 and 17808 recommend that the EPA reevaluate its decision to include distillate oil-fired EGUs in the Utility MACT Rule. After reevaluating the risk assessment, if the EPA confirms that it is "appropriate and necessary" to regulate distillate oil-fired EGUs under CAA section 112, Commenters recommend that the EPA recalculate the Total HAP Metals standard for oil-fired generating units based on all existing oil-fired EGUs, not simply the sources for which the Administrator has information (i.e., with the MACT floor calculated as the average of 12 percent of 154 units, or 19 units). This is consistent with the approach that the EPA used in calculating the HCl and Total PM standards for coal-fired EGUs. Commenters recommend this approach based on the fact that the ICR dataset is clearly biased toward very low-emitting units, burning a distinctly different fuel type (distillate fuel oil). If the EPA concludes that this is not a viable option, Commenters recommend, at a minimum, that the EPA subcategorize between residual- and distillate-oil fired EGU.

Comment 14: Commenter 17870 states that the EPA should re-evaluate its decision to include distillate oil-fired EGUs in the Toxics Rule. The EPA's 1998 Report to Congress on HAP Emissions from Electric Utility Steam Generating Units focused exclusively on "residual" oil-fired EGUs. There is no discussion or analysis in the report supporting the inclusion of distillate oil-fired EGUs in the December 2000 Appropriate and Necessary Finding. In fact, the only reference to distillate oil in the 1998 Report

to Congress is a statement suggesting that distillate oil is more similar to natural gas than residual oil. The EPA indicates that "natural gas and distillate oil" both contain relatively little fuel-bound nitrogen. For natural gas-fired EGUs, the EPA found that regulation of HAP emissions is not appropriate or necessary because the impacts due to the HAP emissions from such units are negligible based on the results documented in the Report to Congress. Commenter would also note that the Report to Congress is clear that its inhalation risk analysis - which the EPA uses to justify the regulation of oil-fired EGU - is specific to No. 6 residual oil. As indicated in Table 6-25 of the Report to Congress (the basic parameters used in the inhalation risk assessment for utilities), the EPA assumed an "average HAP concentration in test data of residual fuel oil No. 6." Also, among the 11 oil-fired EGUs listed as potentially posing inhalation risks above the threshold of concern, none rely on distillate fuel oil. The EPA lists only three power plants in the entire U.S. that rely on distillate fuel oil for the production of electricity. As a result, Commenter strongly recommends that the EPA reevaluate its decision to include distillate oil-fired EGUs in the final Toxics Rule.

Comment 15: Commenter 17928 requests that the EPA exempt distillate fuel oil-fired units from the proposed rule. Commenter believes the ICR data shows a statistically significant difference in emissions from residual and distillate fuel oil units and these differences justify exemption of distillate fuel oil-fired units.

Commenters 18025 and 17808 stated that EPA should reevaluate its decision to include distillate oil-fired EGUs in the Utility Toxics Rule. According to the commenters, both the updated risk assessment and the 1998 Report to Congress focus exclusively on residual oil-fired EGUs. The only reference to distillate oil in the 1998 Report to Congress is a statement suggesting that distillate oil is more similar to natural gas than residual oil. The EPA indicates that "natural gas and distillate oil" both contain relatively little fuel-bound nitrogen. For natural gas-fired EGUs, EPA found that regulation of HAP emissions is not appropriate or necessary because the impacts due to the HAP emissions from such units are negligible. Additionally, in Table 6-25 of the Report to Congress EPA assumed an "average HAP concentration in test data of residual fuel oil No. 6". With respect to the risk assessment, the commenters note that among the 11 oil-fired EGUs listed as potentially posing inhalation risks above the threshold of concern, none rely on distillate fuel oil.

Response to Comments 9 - 15: As noted and discussed in further detail elsewhere in the final record, the EPA disagrees with the commenters' assertion that the risks from oil-fired EGUs are "very low," and also disagrees with the assertion that this determination is based on a "very conservative risk assessment." The EPA listed oil-fired EGUs in December 2000 and we are not able to delist such units based on the refined risk assessments we conducted that show clearly that at least one oil-fired EGU poses a cancer risk greater than 1 in 1 million. *See* CAA section 112(c)(9)(B) (providing criteria that must be satisfied before the Administrator may delist a source category).

The EPA also disagrees with the commenters' assertion that distillate oil was included in the natural gas "category" in the December 2000 regulatory finding. In that notice (65 FR 79825), the EPA made no distinction between distillate and residual oils, referring only to "oil-fired" units. In the Report to Congress, the similarities between natural gas and distillate oil were in the discussion of NO_X, not HAP. Distillate oil may be generally considered to be "cleaner" than residual oil but, based on data received through the 2010 ICR, emissions of some HAP are greater from distillate than from residual oil. Because the EPA listed all oil-fired EGUs and the Agency is not able to delist such sources, the final standards applicable to liquid oil-fired EGUs also apply to distillate oil-fired units.

As a result of comments received on this rulemaking, the EPA contacted all oil-fired EGUs that conducted testing under the 2010 ICR to confirm the type of oil that was used. Based on this effort, the MACT Floor spreadsheets have been revised to reflect the corrected oil use. The EPA does not believe that the data set is biased toward very low-emitting units as only 6 of the 55 total oil-fired units required to conduct testing were distillate oil-fired EGUs. Also, because the best performing sources in the floor are burning both residual and distillate oil we believe it is not appropriate to subcategorize such units. Based on our information, the EPA believes that oil-fired units may either install a PM control device or switch to burning distillate oil and be able to comply with the final standards.

Commenter is incorrect that the Agency should base the MACT floor standards using data from sources that represent 12 percent of the population of oil-fired units instead of 12 percent of the available data. The EPA used data from sources that represent 12 percent of the EGU population for coal-fired units for the acid gas and non-mercury metallic HAP proposed limits because, as was noted in the Supporting Statement for the 2010 ICR, the EPA identified the best performing 15 percent of sources and required them all to test. The EPA could not identify the best performing oil-fired units (EPA similarly could not identify the best performing coal-fired EGUs for mercury either). For this reason, the EPA used 12 percent of the available data to establish the limits.

4. Allow an opt-out provision.

Comment 16: Commenters 17316 and 17386 state that it would be beneficial if the MACT rule clarified whether an EGU can opt-out of the MACT rule by de-rating below the 25 MW applicability threshold for classification as a "Electrical Utility Steam Generating Unit." It is the Commenters' understanding that MACT rules do in general allow a source to de-rate below applicability thresholds, so long as the de-rating is completed before the rule compliance deadline. Commenters request that the EPA provide explicit language clarifying whether this option is allowed.

Response to Comment 16: To be a non-cogeneration EGU, a unit must have a capacity of greater than 25 MW.

5. Exemption for EGUs that fire oil rather than natural gas during periods of natural gas curtailment.

All comments have been moved or combined with other comments.

6. Applicability determination at either the unit level or facility level.

a. Fossil fuel-fired.

Comment 17: Several commenters (17808, 17870, 18025) recommend allowing companies to determine whether they are "natural gas-fired" or "fossil fuel-fired" at either the individual unit level or across all electric utility steam generating units larger than 25 MW at a single plant location. For example, a power plant with multiple steam generating units may be combusting limited amounts of oil across the plant as a whole, but with an individual unit burning oil in excess of the EPA's proposed thresholds. This would avoid situations where a relatively small oil unit might be designated a fossil fuel-fired EGU despite the fact that the plant as a whole is largely reliant on natural gas and its plant-average emission rates are well below the level of the proposed standards. This would seem to be

consistent with the EPA's proposal to allow emissions averaging across all affected units at a single plant location.

b. Oil-fired.

Comment 18: Commenter 17928 suggests that the EPA allow companies to determine whether they are "natural gas-fired" or "fossil fuel-fired," (i.e., "oil-fired") at either the individual unit level or across all natural gas/oil-fired electric utility steam generating units larger than 25 MW at a single plant location. As proposed, oil-based units have limited ability to take advantage of facility-wide averaging. A power plant with multiple units may be combusting limited amounts of oil across the plant as a whole with an individual unit burning oil in excess of the EPA's proposed thresholds. However, the net effect is that the plant is not "oil-fired."

Response to Comments 17 and 18: The EPA is not certain but it appears that commenter is suggesting that the EPA authorize the source to average natural gas-fired EGUs with oil-fired EGUs for purposes of determining whether the facility as a whole is fossil fuel-fired such that it would be subject to the final rule. Commenter appears to promote this approach in an effort to have certain oil-fired units become exempt from the final rule. We do not believe such a change is warranted or appropriate.

As explained in the proposed rulemaking, the EPA has generally imposed certain limits on the scope and nature of emissions averaging programs. These limits include: (1) No averaging between different types of pollutants; (2) no averaging between sources that are not part of the same affected source; (3) no averaging between individual sources within a single major source if the individual sources are not subject to the same NESHAP; and (4) no averaging between existing sources and new sources. Commenters' proposed approach violates two of these conditions because natural gas-fired EGUs and oil-fired EGUs are not part of the same affected source and the two types of units are not subject to the same NESHAP. In fact, natural gas-fired EGUs are not subject to any NESHAP.

To the extent that commenter is seeking an exemption, we think that the statute requires us to regulate oil-fired units even if located at primarily natural gas facilities. The comments themselves indicate that the oil-fired unit in the example is a relatively small unit and it implies that the unit is not run very frequently. Sources that have such units will have 3 years to either install controls, convert the unit to natural gas, limit the capacity factor to less than 8% to be included in the limited use subcategory, or find some way to replace the relatively small amount of electricity generated by the unit. Further, only the oil fired unit will be subject to the NESHAP and required to comply with the final standards. Natural gas-fired EGUs at the same facility will not be required to comply with the final rule.

7. Cogeneration efficiency standard.

Comment 19: Commenter 17733 states that the preamble to the proposed rule appears to make clear that any unit that does not meet the proposed rule's definition of a cogeneration unit will be considered an EGU if it qualifies as an EGU. Commenter strongly agrees that units that do not meet the efficiency standards required to be a cogeneration unit should still qualify as EGUs if they otherwise meet the definition of an EGU. Otherwise, owners of coal- and oil-fired units would be encouraged to avoid the EGU MACT requirements by reducing their units' efficiency. This result would clearly be contrary to the intent of the CAA, and also clearly violate the EPA's Trust Responsibility and its obligations under the Environmental Justice Doctrine. Accordingly, in the final rule, the EPA should make clear that any

unit that does not meet the efficiency requirements of a cogeneration unit will still qualify as an EGU if the unit otherwise meets the CAA EGU definition.

Response to Comment 19: The EPA believes that the commenter has misunderstood the provisions of the rule. There are no "efficiency standards required to be a cogeneration unit." There is only the requirement contained in CAA section 112(a)(8) that the cogeneration unit supply "more than one-third of its potential electric output capacity and more than 25 megawatts electrical output to any utility power distribution system for sale..."

8. The 3-year lookback should apply to cogeneration units.

Comment 20: Commenter 17733 states that the rule should use the same 3-year review to determine whether a unit qualifies as an EGU under the second sentence of the CAA's EGU definition. Accordingly, a cogeneration unit that over the past 3 years has at any time supplied more than one-third of its potential electric output capacity and more than 25 megawatts electrical output to any utility power distribution system for sale should be considered an electric utility steam generating unit. This capacity/output test should be applied on an instantaneous basis (i.e., if at any given time over the prior 3-year period the unit meets the one-third and 25 megawatt tests, the unit would be considered an EGU). This is required by the statute since the statutory EGU definition is based on a unit's capacity or megawatt output (i.e., its electrical power), not the unit's energy production over time. The EPA appears to recognize this point, since it notes that "a cogeneration facility that meets the above definition of an EGU during any portion of a month would be subject to the proposed EGU rule."

Commenter 17733 states that applying a 3-year lookback test to the second sentence, as well as the first sentence, of the EGU definition is necessary to ensure that short-term modifications to a unit do not allow it to avoid or delay the requirements of the EGU MACT Rule. This is especially important, since the very units that may be able to otherwise avoid regulation under the EGU MACT Rule by temporarily reducing their output below one-third of their capacity are also likely older, dirtier, and less efficient coal or oil plants that are operating at a lower capacity factor precisely because of their inefficiencies. Accordingly, allowing those units to avoid the requirements of the EGU MACT Rule based on temporary modifications to their historical operation would clearly fail to meet the intent of the CAA and in particular, the EPA's obligations under its Trust Responsibility and the Environmental Trust Doctrine.

Response to Comment 20: As stated in the proposed rule, a unit that meets the cogeneration definition of an EGU during any period of a month is an EGU subject to this final rule and must comply with the rule for the following 6 months. In addition, in response to comments, we included provisions to address units that may at times meet and not meet the definition of an EGU, and we allow sources that may periodically meet the EGU definition to remain subject to this final rule after that 6 month period. We believe cogeneration units in particular may take advantage of the new provisions as these units are more likely to have flexibility under the CAA section 112(a)(8) definition.

As stated above, the EPA has revised several definitions, including the definition of "fossil fuel fired," in the final rule to make clear that units must only look at the present capability and utilization of the unit to determine if it is an affected source on the compliance date. Sources will have to evaluate ongoing applicability of the standards based on their utilization of fossil fuels over annual and tri-annual periods. For example, an EGU that on the first substantive compliance date meets the definition of fossil fuel-fired will no longer be subject to the NESHAP if in subsequent years its utilization of coal or oil

falls below the threshold levels to satisfy the definition of fossil fuel-fired. A source could also obtain a Title V permit requirement that prohibits the utilization of coal or oil at levels sufficient to satisfy the definition of fossil fuel-fired. Sources that violate a Title V permit limit would not only be in violation of Title V, but also in violation of the requirement to comply with this NESHAP if it exceeded the applicability thresholds.

2E - Applicability: Other

Commenters: 17627, 17719, 17722, 17754, 17775, 17800, 17803, 17808, 17810, 17812, 17820, 17821, 17838, 17845, 17868, 17870, 17883, 17913, 17928, 18032, 18963, 19536/19537/19538

1. Coal Refuse Units.

Comment 1: Several commenters (17754, 17838, 18963) state that the EPA should revise the proposed provisions relating to the two subcategories of coal-fired EGUs to clarify the regulatory standards applicable to an EGU that combusts coal refuse with a heating value of greater than 6,000 Btu/lb on a dry basis. It appears from the EPA's preamble discussion to the proposed rule that the Agency intends for coal refuse fired EGUs to be covered by the proposed rule. Based on the ambiguity in the language of the relevant definitions and the apparently inconsistent language within the preamble to the proposed rule, the EPA should revise the proposed rule to expressly clarify how an EGU that combusts coal refuse with a heating value of greater than 6,000 Btu/lb on a dry basis is regulated under the proposed rule (i.e., under which of the two subcategories of coal-fired EGUs would such unit fall?).

Several commenters (17754, 17812, 17838, 18963) state that the proposed rule defines coal refuse, in relevant part, as having "a heating value less than . . . 6,000 [Btu/lb] on a dry basis." On its face, this definition would appear to indicate that a CFB unit combusting coal refuse cannot fit within the subcategory of sources comprising "unit[s] designed for coal >8,300 Btu/lb," because the heating value of coal refuse is, by definition, too low. It follows then, that, in order for a coal refuse fired EGU to be subject to the proposed rule, such unit must fall within the only other subcategory for coal-fired EGUs – i.e., a combustion unit designed for coal <8,300 Btu/lb. However, the "unit designed for coal <8,300 Btu/lb subcategory" is defined as including, in relevant part, "any EGU designed to burn a non-agglomerating virgin coal." This definition would appear to exclude coal refuse on the basis that coal refuse is generally considered to be distinct from virgin coal. Indeed, in the context of the EPA's Solid Waste Definition Rule, the EPA clearly takes the position that coal refuse and virgin coal are two different materials. For these reasons, it is unclear how a coal refuse fired combustion unit would be characterized for purposes of the proposed rule, because such a unit does not appear to fit within either of the two subcategories for coal-fired EGUs under the proposed rule.

Commenters 17812 and 18963 state that the proposed provisions relating to the two subcategories for coal-fired EGUs should be revised to clarify that an EGU combusting coal refuse with a heating value of less than 8,300 Btu/lb on a dry basis is regulated as a coal-fired EGU under the Utility MACT in accordance with the emission standards applicable to sources combusting coal exhibiting such lower heat content. The EPA has created only two categories for coal: >8,300 Btu Ash Free Moisture Free, and <8,300 Btu Ash Free Moisture Free virgin non-agglomerating coal. Most anthracite and bituminous waste coal (coal refuse) would have a heating value >8,300 Btu/lb.

Response to Comment 1: Partly based on comments, the EPA has revised the definitions of the two coal-fired EGU subcategories in the final rule. Under the new definitions, units burning coal refuse are included in the "[u]nit designed for coal > 8,300 Btu/lb subcategory" because such units do not meet the definition of the newly defined subcategory of "units designed to burn low rank, virgin coal."

2. The EPA should include an opt-in provision.

Comment 2: Commenter 17845 owns and operates two facilities located in the Commonwealth of Virginia, one a coal-fired cogeneration plant and the other a coal-fired electric generation plant. Each plant consists of two "three-on-one" boiler-to-generator units, in which each set of three boilers provides steam to one of two 55-MWe electric generators. Although each unit has a generator capacity of more than 25 MWe, each of the boilers has a thermal capacity of less than 250 MMBtu/hr. All boilers are equipped with dry scrubbers and bag houses. Both plants have opted into the acid rain program. The three-on-one boiler-to-generator configuration presents a novel, and perhaps unique, issue regarding applicability of proposed or final NESHAP and the proposed Cross State Air Pollution Rule (CSAPR). Specifically, it appears that the boilers at both sites could be subject to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters ("Boiler MACT"), rather than the Utility MACT, although simultaneously being subject to the CSAPR, which is intended to be applicable only to EGUs, not industrial boilers.

Commenter 17845 urges the EPA to include in the Utility MACT an opt-in provision to allow units that have a generator capacity of greater than 25 MWe and that generate electricity for sale, but have a combustion rating of less than 250 MMBtu/hr, to choose the Utility MACT rather than be subject to the Boiler MACT. The EPA has previously included similar compliance options for MACT regulations in order to widen the compliance options for regulated sources (e.g., 40 CFR §63.3082(c); National Emission Standards for Hazardous Air Pollutants: Surface Coating of Automobiles and Light-Duty Trucks). By adding such a compliance option, the EPA would allow Commenter to meet the same emissions requirements as its peers, thus avoiding an economically disadvantaged scenario where only Commenter's boilers would be mandated to reduce both NO_X and carbon monoxide (CO).

Commenter 17845 states that in keeping with the statutory definition in CAA section 112 (a)(8), the Boiler MACT excludes EGUs from applicability of that rule. *See* 40 CFR § 63.7491(a). Both the CAA and the Boiler MACT define the term "electric utility steam generating unit" to mean – [A] fossil fuel-fired combustion unit of more than 25 megawatts that serves a generator that produces electricity for sale. A fossil fuel-fired unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 megawatts electrical output to any utility power distribution system for sale is considered an electric utility steam generating unit. This definition appears to be premised on the familiar, conventional arrangement of one boiler to one generator. But it is ambiguous as applied to the unusual "three-on-one" boiler-to-generator configuration used by the Commenter's plants. Since each of its boilers contributes less than 25 MWe to Commenter's generators (each boiler contributes approximately 18 MWe), it appears from the first part of the definition that Commenter's boilers might not meet the EGU criterion for exclusion from the Boiler MACT. On the other hand, the second sentence above clarifies that such units with a potential electric output of more than 25 MWe are excluded from the Boiler MACT if they supply more than one-third of that capacity to an electric distribution system for sale. Since Commenter's units meet that criterion, they are excluded from Boiler MACT by its terms, consistent with the intent of the CAA definition. The EPA's descriptions of the intended effect of the proposed Utility MACT are consistent with the definition of excluded EGUs in the Boiler MACT. For example, the EPA stated in its Fact Sheet for the Utility MACT that the proposed rules "will affect EGUs that burn coal or oil for the purpose of generating electricity for sale and distribution." Yet the specific language of the definitions in the proposed Utility MACT would contravene both the CAA's and the EPA's apparent intent. It would have the unintended effect of excluding Commenter's units from the definition of EGU and leaving them instead to be covered by the Boiler MACT.

Commenter 17845 states that specifically, the proposed Utility MACT's definition of EGU would add a new, inconsistent threshold element to the definition. For a coal-fired unit that otherwise meets the definition to qualify as a covered EGU under the Utility MACT, it would first have to qualify as "Fossil fuel-fired." The proposed Utility MACT then defines "Fossil fuel-fired" as "an electric utility steam generating unit (EGU) that is capable of combusting more than 73 MWe (250 million Btu/hr, MMBtu/hr) heat input (equivalent to 25 MWe output) of fossil fuels." Since each of Commenter's boilers is rated at only 200 MMBtu/hr, those boilers would be omitted entirely from the Utility MACT. They would therefore be forced to comply with the Boiler MACT instead. Given the inconsistency with other requirements applicable to these units under the CSAPR, Commenter believes this effect is unintended and should be corrected. One way would be to allow Commenter and any other similarly-situated electric generators to opt in to the Utility MACT, just as Commenter has done for the Acid Rain Program.

Commenter 17845 states that in contrast to the NESHAP rules, the proposed CSAPR would base applicability on the size of the generator, rather than on the size of the combustion unit. As proposed, 40 CFR section 97.404(a)(1) would apply the CSAPR to any fossil-fuel-fired boiler serving a generator with a nameplate capacity of more than 25 MWe: The following units in a state shall be TR NO_X Annual units, and a source that includes one or more such units shall be a TR NO_X Annual source, subject to the requirements of this subpart: Any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale. Since each generator operated at both of Commenter's sites is 55 MWe, the proposed CSAPR would restrict NO_X emissions from Commenter's boilers serving those generators, based on allocations to be provided by the EPA.

Commenter 17845 states that by subjecting them simultaneously to Boiler MACT and the CSAPR, the EPA would impose on the company an unnecessary and unproductive burden and disadvantage it competitively. The Boiler MACT requires reductions in emissions of CO and dioxins and furans (D/F), Although the proposed Utility MACT does not. Commenter's boilers are already able to comply with the proposed Utility MACT standards; indeed, these boilers participated in the Utility MACT ICR. The proposed CSAPR, on the other hand, requires EGUs either to reduce NO_X emissions or to buy credits to meet their annual and ozone-season allocations. Emissions of CO and NO_X have proven to be inversely related. Therefore, Commenter would face greater challenges to comply with both NESHAP and CSAPR than its Utility MACT peers: both Commenter and its peers would have to reduce NO_X emissions but only Commenter would have to do so although simultaneously reducing CO and D/F. There is no public policy or other rationale that can support such disparate treatment. The Utility MACT does not require reductions in CO or D/F because low concentrations of chlorine in the fossil fuels and the presence of sulfur inhibit the formation of D/F. Hence there is no need to use CO as a proxy. Commenter's boilers are utility boilers that operate with sulfur to chlorine (S:Cl) ratios comparable to other utility boilers, and hence would not produce D/F. They should therefore be treated the same as other EGUs and be likewise subject the Utility MACT. Commenter urges the EPA to include a compliance option to allow it and any other EGU units subject to the CSAPR to opt in to the Utility MACT.

Response to Comment 2: The underlying statutory provisions for the electric utility NESHAP, NSPS, Acid Rain, and CSAPR programs have differing applicability definitions. For the electric utility NESHAP, the statutory definition applies to size of the boiler whereas for the Acid Rain and CSAPR programs, the statutory definition applies to the size of the electric generator. Thus, as Congress defined

the EGU NESHAP source category in CAA section 112(a)(8) rather than the EPA, we do not believe that we have the flexibility to alter the applicability with regard to the size of the combustion unit through any type of "opt in" provision for the EGU NESHAP rulemaking. In addition, there is no gap between this rule and the Industrial Boiler NESHAP. An electric utility steam generating unit that does not combust solid waste is either an Industrial Boiler or an EGU. Thus, the combustion units at the two facilities are subject to the Industrial Boiler NESHAP rather than the EGU NESHAP because they do not meet the size requirement of the CAA section 112(a)(8) definition of an EGU.

Further, the EPA does not believe that the definitions in either the Industrial Boiler or EGU NESHAP contravene the intent of the CAA, and we have removed the definition of a "non-cogeneration unit" in the final rule because we determined the definition was not necessary given the clarity of the statutory definition. In the proposed rule, we improperly defined the term "non-cogeneration unit" as "a unit that has a combustion unit of more than 25 MWe and that supplies more than 25 MWe to any utility power distribution system for sale." The proposed definition is not consistent with CAA section 112(a)(8) because that provision does not require EGUs that are non-cogeneration units to sell 25 MWe to the power distribution system. We have corrected the error in the final rule. Based on the revised definitions, it is clear that any EGU greater than 25 MW is properly covered under the EGU NESHAP if the EGU is also a "coal-fired" or "oil-fired" EGU as those terms are defined in the final rule. Also, as noted elsewhere in this document, commenters have pointed out that the "73 MWe (250 million Btu/hr, MMBtu/hr) heat input" equivalency to 25 MWe output does not apply to all EGUs because of differences in efficiency; commenters indicated that the electric utility industry was familiar with the "MW" concept as being thermal MW and the EPA should remove the equivalency from the final rule. Based on these comments, the EPA has made that correction to the final rule.

Commenter also notes that the EPA has used opt-in provisions in other NESHAP actions, specifically the Automobile and Light Duty Truck Surface Coating NESHAP (40 CFR Part 63, subpart IIII). In that rule, the EPA allowed co-located facilities subject to the Surface Coating of Miscellaneous Metal Parts and Products NESHAP (40 CFR Part 63, subpart MMMM) or the Surface Coating of Plastic Parts and Products NESHAP (40 CFR Part 63, subpart PPPP) to "opt in" to the Automobile and Light Duty Truck Surface Coating NESHAP. However, there are a number of differences between the two actions that the EPA believes are pertinent. First, the operations had to be co-located (i.e., coating operations subject to 40 CFR subparts MMMM or PPPP had to be co-located with coating operations subject to 40 CFR Part 63, subpart IIII) to be able to "opt in." Such is not the situation in the cases the commenter notes; the subject EGUs are not co-located with units subject to another NESHAP. Further, the provisions of 40 CFR Part 63, subpart IIII, are more stringent in every detail than those of either 40 CFR Part 63, subparts MMMM or PPPP. As the Industrial Boiler NESHAP is currently in reconsideration, such a statement cannot be made at this time. Finally, as noted above, Congress defined the EGU source category whereas the EPA defined the coatings categories and, thus, the Agency had the flexibility to alter the applicability definitions. The EPA does not believe it has such flexibility to redefine the source category in this case where the statute is clear as it is with the 25 MW provision, and, thus, the Agency cannot allow a source to "opt in" to the EGU NESHAP.

3. The EPA should clarify that the rule does not apply to simple cycle combustion turbines.

Comment 3: Commenter 17883 owns at least one liquid-fired facility that meets the definition of a liquid-fired EGU. However, section 63.9983 excludes any "unit designated as a stationary combustion turbine, other than an integrated gasification combined cycle, covered by 40 CFR Part 63, subpart YYYY." The liquid-fired facility in question is a stationary combustion turbine; however, since it is a

minor source of HAP, it is not subject to YYYY. The EPA states in the preamble that stationary combustion turbines are not considered EGUs for the purposes of this rule. However, the language in the section assumes these stationary units are otherwise covered in a separate subpart. Commenter is requesting confirmation that stationary combustion turbines are not subject to this rule regardless of whether they are subject to Subpart YYYY.

Comment 4: Commenter 17913 says that the regulation should clearly state that it does not apply to simple cycle combustion turbines (SCCTs). Since the name of the rule includes "electric utility steam generating units," it implies that it would not be applicable to SCCTs since there is no steam generation with these units. However, the definition of EGU in paragraph 63.10042 of the regulation does not specify that the term applies only to steam generating units. This is further confused by giving the acronym EGU within this definition. The definition of electric utility steam generating units should clearly state that it includes only units that produce steam and should apply the acronym EUSGU to the definition. This could also be clarified by indicating that SCCTs are not subject to the regulation in paragraph 63.9983 of the proposed regulation.

Response to Comments 3 and 4: The EPA believes that the definitions are sufficiently clear as proposed. First, paragraphs 63.9980 and 63.9981 provide that affected units must be coal- or oil-fired EGUs. Natural gas-fired EGUs are not subject to the rule. Further, the definition provided in paragraph 63.10042 is the statutory definition from CAA section 112(a)(8) and contains the word "steam" in the title, thereby indicating that a unit must generate steam in order to be an EGU. This requirement excludes simple cycle combustion turbines which generate no steam. The EPA has not changed these definitions in the final rule.

4. Support for the exclusion of natural gas-fired units.

Comment 5: Commenter 17810 supports the Agency's exclusion of natural gas-fired EGUs from the CAA section 112 regulations, and also from the PM and opacity requirements under applicable New Source Performance Standards.

Response to Comment 5: The EPA appreciates the support of the commenter.

5. Definition of new unit.

a. Commenced after May 3, 2011.

Comment 6: Commenter 17820 supports the EPA's proposal to define an EGU as a "new" unit if construction is commenced after May 3, 2011 (date this rule was published in the Federal Register) as opposed to the date MACT limits were initially proposed for EGU's (January 30, 2004), prior to the EPA's subsequent decision not to regulate under CAA section 112. In addition, the initial proposal in 2004 included limits for mercury and nickel, although this proposal seeks to impose MACT limits for several other non-mercury and metal HAP.

Comment 7: Commenter 17821 takes the position that the EPA's choice of May 3, 2011 as the new unit cutoff date is the only one permissible date that would be in keeping with the CAA and the actions of the courts. A "new source" is defined in CAA section 112(a)(4) as a stationary source the construction of which is commenced "after the Administrator first proposes regulations under this section." Some would argue that MACT limits were first proposed for EGUs on January 30, 2004 when the EPA proposed the

Clean Air Mercury Rule. However, the EPA subsequently decided not to regulate EGUs under CAA section 112. That decision was vacated by the D.C. Circuit in *New Jersey v. EPA*. That court has previously said that "to vacate, as the parties should well know, means 'to annul; to cancel or rescind; to declare, to make, or to render, void; to defeat; to deprive of force; to make of no authority or validity; to set aside.'" Therefore, the EPA is correct in treating the May 3, 2011 proposal as the first for purposes of defining whether a given EGU is a new source.

b. Commenced after January 30, 2004.

Comment 8: Commenter 19536/19537/19538 states that the rule must define as "new sources" all sources which commenced construction after January 30, 2004. The CAA defines a "new source" to include any "stationary source the construction or reconstruction of which is commenced after the Administrator first proposes regulations under this section establishing an emission standard applicable to such source." 42 U.S.C § 7412(a)(4) (emphasis added). The Agency first proposed emission standards applicable to oil- and coal-fired electric generating units on January 30, 2004. 69 Fed. Reg. 4,652 (January 30, 2004). All coal- and oil-fired power plants that commenced construction or reconstruction after that date, consequently, are "new sources" under CAA section 112, and the rule should define them as such.

Commenter 19536/19537/19538 states that the clear text of the statute requires that result. The Agency's withdrawal of the standards proposed in 2004 is irrelevant; the statute specifies proposal of standards as sufficient to bring subsequently constructed sources within the ambit of the "new source" definition. And likewise, the Agency's subsequent proposal of different emissions standards is irrelevant; the statute expressly provides the first proposal as point dividing new from existing sources. [Footnote: Indeed, EPA's effort to replace its section 112 standards with standards under CAA section 111 is a legal nullity that has no effect at all. "When a court vacates an Agency's rules, the vacatur restores the status quo before the invalid rule took effect. . . ." Envtl. Def. v. Leavitt, 329 F. Supp. 2d 55, 64 (D.D.C. 2004) (citing Indep. U.S. Tanker Owners Comm. v. Dole, 809 F.2d 847, 854 (D.C. Dir. 1987)).] That command cannot be reasonably understood to allow the Agency to move that point to the second (or third, or fourth) proposal.

Commenter 19536/19537/19538 states that the statutory definition, especially in light of the strict deadlines by which the CAA requires the EPA to establish effective standards, reflects Congress' intent to ensure maximal reductions in air toxics. It further reflects Congress' desire to prevent industry from relying on administrative lobbying and judicial challenges to delay installation of pollution controls, or to secure weaker restrictions on their hazardous air pollution. And finally, the CAA discourages manipulation of construction schedules in a similar pursuit of lesser restrictions.

Response to Comments 6 - 8: CAA section 112(a)(4) states that a new source is a stationary source if "the construction or reconstruction of which is commenced after the Administrator first proposes regulations under this section establishing an emissions standard applicable to such source." "First proposes" could refer to the date the EPA first proposes standards for the source category as a whole, or could refer to the date the Agency first proposes standards under a particular rulemaking record, or first proposes the particular standards at issue. We believe that the May 3, 2011, proposal date is the proper date under CAA section 112(a)(4) because the intent of the new source provision is to provide sources with sufficient notice so that new source control requirements can be considered in the initial design. Sources coming into existence between the January 30, 2004, proposal date and the May 3, 2011, proposal date would have no reasonable means of ascertaining the standards' for this final rule and so

lacked notice of what controls and strategies to adopt. Because this is antithetical to the policy underlying new source standards, the EPA is maintaining May 3, 2011, as the date which determines if a source is existing or new. In addition, major source EGUs constructed after December 20, 2002, are subject to the case-by-case MACT requirements of CAA section 112(g). We believe it would be unreasonable to require these sources to comply with the new source limits in this final rule when such limits were not even available for consideration at the time the units were constructed.

6. The EPA should define a new source category for IGCC units.

Comment 9: Commenter 17821 recommends a different approach for regulating IGCC units under MACT. There are major differences between IGCC units and conventional coal-fired units. No individual IGCC unit by itself is a major source of HAP. As a matter of fact, the Air Quality Analysis performed for the Edwardsport Generating Station IGCC (SSM 083-23529-00003. Appendix C) IDEM states "Based on the HAP modeling results, the source will not pose a health concern."

Commenter 17821 believes that IGCC's are not included as part of the EGU category of the EPA's 2000 listing decision. This is because the IGCC process is so different from conventional coal boilers that they do not resemble the conventional electric utility steam generating unit. As a result it would be reasonable for the EPA to go beyond their subcategory determination and place IGCC units in a separate source category altogether. Although the EPA has previously created a separate source category for combustion turbines including units that generate electricity, it would not be appropriate to place IGCC units in that source category either.

Commenter 17821 states that the EPA has repeated that it intends to finalize a Utility MACT standard in November, 2011; however the proposal is particularly lacking in its discussion and treatment of IGCC units. Commenter strongly believes that the EPA needs to take the time necessary to properly review all the information provided during the comment period, make the appropriate changes, conduct an internal and an interAgency review before finalizing a standard. Commenter argues that it would be especially difficult to properly finalize final IGCC standards by November, 2011.

Response to Comment 9: The EPA disagrees with the commenters that state IGCC units should be in a separate source category from other coal- and oil-fired EGUSs. IGCC units generate steam from coal- and oil-derived fuel and, thus, fall within the CAA section 112(a)(8) definition of an EGU. The EPA listed coal- and oil-fired EGUs and such units, including IGCC units, cannot meet the statutory criteria for delisting. The EPA is establishing the final IGCC MACT limits on data from existing IGCC units or on permit limits provided for IGCC units currently under construction, thus, we maintain we have sufficient data on which to establish valid section 112(d) standards.

7. The EPA should exempt units already permitted under 112(g).

Comment 10: Commenter 18032 states that the EPA should exempt units from new source HAP requirements if they are already permitted and have complied with valid state-imposed section 112(g) HAP control requirements. Commenter is particularly concerned that the proposal (and potential finalization of) section 112 MACT limits for new sources under this rulemaking will make it impossible for them to build a new, highly-efficient, low-emission plant to replace a much less clean plant, which is critical to the Commenter and major community institutions.

Commenter 18032 is actively exploring the possibility of replacing the existing, coal-fired DeYoung Unit 3 with a much more efficient and low-emitting circulating fluidized bed boiler that will burn a blend of fuels including renewable wood and biosolids biomass, tire-derived fuel, coal and other fuels. If constructed, this 78-MW plant could also be a combined heat-and-power unit to provide multiple benefits to the community, including an expansion of the successful downtown snow melting system under the streets and sidewalks. Commenter has been through a laborious permitting process, which began 55 months ago to obtain a construction permit (known as a "Permit to Install" or "PTI" under Michigan Department of Environmental Quality regulations under its delegation of Clean Air Act authority from EPA). That permit was obtained in February 2011. During the permitting process, Michigan DEQ conducted an intense process of identifying the Maximum Achievable Control Technologies for HAP including acids, metals, and PM, pursuant to CAA section 112(g). Under that section 112(g) permitting review, MDEQ imposed requirements on the proposed new plant that went beyond the already efficient and clean combustion advantages of a circulating fluidized bed boiler, including the application of a high-performing baghouse for PM and metals, and sorbent injection for mercury.

Commenter 18032 states that it would be highly unreasonable and unnecessary for the EPA, with the proposal and potential finalization of the MACT limits for new sources, to require Holland to unwind its Michigan Permit to Install and its HAP controls. Moreover, Commenter's plant will be technically unable to meet the proposed new unit standards – as it is not technologically feasible for any plant. And Although Commenter could perhaps embark now on an impossible effort to revise its entire plant and permit for newly proposed MACT requirements, the community will in reality be hamstrung and stalled as it waits for the proposed requirements to be finalized – a process that will require Commenter to wait to commence construction until the time that its current PTI permit becomes invalid and disappears in one year, August 2012.

Commenter 18032 states that without clean generation capacity additions, Commenter may be forced to make additional purchases from a volatile wholesale market to serve its community, including the electric vehicle batteries that will be constructed in new plants that President Obama launched last year (and will revisit the week of August 8) to create thousands of jobs in struggling Michigan.

Commenter 18032's proposed and permitted plant is unique in so many ways – it is smaller than most new coal-fired plants, it is multi-fuel, it is a CHP unit, and it applies a medley of pollution control technologies. It really can't be categorized with other units (or "Franken-Plants") that the EPA has suggested should set the standard for the new EGU's. And as it has already undergone a major HAP review under CAA section 112(g) that will result in reduced emissions impact, it shouldn't be subjected to new, unachievable requirements.

Response to Comment 10: CAA section 112(a)(4) defines a new source as "a stationary source the construction or reconstruction of which is commenced after the Administrator first proposes regulations under this section establishing an emission standard applicable to such source." The EPA is constrained by this definition such that any source that "commenced" construction after the May 3, 2011, proposal date is considered a new source under the statute and the source must comply with the new source standards even if the source received a CAA section 112(g) permit before proposal. The EPA's regulations implementing the CAA section 112 general provisions define "commenced" to mean "with respect to construction or reconstruction of an affected source, that an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of

construction or reconstruction." *See* 40 C.F.R. 63.2. It is unclear from the comments whether the sources identified in the comments have commenced construction as defined in the regulations; however, the identified sources are existing sources, not new sources, under the final rule if construction was commenced prior to the proposal date. Existing sources have 3 years to come into compliance with the final standards if the source's CAA section 112(g) limit is not consistent with the existing source limits applicable to the source.

Under the final rule, new sources must comply with the standards on the date of promulgation or at startup, whichever is earlier, and existing sources have 3 years to come into compliance with the final standards. Pursuant to EPA's regulations at 40 C.F.R. 63.44(b)(1), however, we may provide in a final section 112(d) standard a specific compliance date for those sources that obtained a final and legally effective section 112(g) case-by-case MACT standard and submitted the information required by 40 C.F.R. 63.43 to the Agency before the close of the comment period. The EPA does not believe it has received such information during the comment period and we are not establishing a separate specific compliance period for sources that obtained final and legally effective section 112(g) standards prior to promulgation of the final rule. In the absence of EPA action on this issue, state Title V permitting authorities are required to "establish a compliance date in the [Title V] permit that assures that the owner or operator shall comply with the promulgated standard [ ] as expeditiously as practicable, but not longer than 8 years after such standard is promulgated . . . ." 40 C.F.R. 63.44(b)(2). Sources with final and legally effective section 112(g) standards should work with their permitting authorities to determine the appropriate compliance date consistent with the EPA regulations.

CHAPTER 3: SUBCATEGORIZATION

3A - Subcategorization: Coal (>8,300 Btu/lb) (Proposed)

Commenters: 17740, 17807, 17818, 17820, 17873, 17878, 17885, 17912, 17927, 18033, 18034, 18424, 18429, 18450, 18483, 18539, 19041, 19114

1. Clarify subcategory for units combusting coal and petroleum coke.

Comment 1: Commenter 17740 states that the EPA should clarify the appropriate category for coal-fired EGUs >8,300 Btu/lb that also combust petroleum coke ("pet coke"). According to the commenter, based on the language in the preamble, it appears that a unit combusting coal and pet coke would be regulated as a coal-fired unit in the >8,300 Btu/lb subcategory. The commenter states that however, subsequent language discussing solid oil-fired units suggests that it might be regulated in that category. According to the commenter, a fuel-flexible unit designed and permitted to burn both pet coke and coal that burned more than a de minimis amount of coal would have significant difficulties.

Response to Comment 1: The EPA has revised several definitions in the final rule to clarify when units are considered coal-fired, oil-fired, or natural gas-fired EGUs, including changes to the definition for solid oil-fired EGUs. The definitions of "Coal-fired electric utility steam generating unit," "Integrated gasification combined cycle electric utility steam generating unit," "Oil-fired electric utility steam generating unit," and "Unit designed to burn solid oil-derived fuel subcategory" have been modified as follows to clarify applicability for units co-firing coal and petroleum coke:

> Coal-fired electric utility steam generating unit means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that burns coal or coal refuse *for more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years* or for more than 15.0 percent of the annual heat input during any one calendar year.
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> Integrated gasification combined cycle electric utility steam generating unit or IGCC means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that burns a synthetic gas derived from coal and/or solid oil-derived fuel more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year in a combined-cycle gas turbine. No coal or solid oil-derived fuel is directly burned in the unit during operation...
>
> Oil-fired electric utility steam generating unit means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that is not a coal-fired electric utility steam generating unit and that burns oil more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year.
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> Unit designed to burn solid oil-derived fuel subcategory means any oil-fired electric utility steam generating unit that burns solid oil-derived fuel.

2. Clarify how to determine "designed" to burn.

Comment 2: Commenter 17927 asks the EPA to clarify how it will determine if an EGU is "designed" to burn coal having a calorific value of greater than or less than 8,300 Btu/lb. The commenter states that it seems that most boilers would be capable of burning coal in a range of fuel heat contents greater than or less than 8,300 Btu/lb. The commenter asserts that perhaps the definition of these sub-categories should be revised so that it is clear what is meant by "designed to burn."

Commenter 17677 states that the coal-fired unit designation related to "Coal fired unit designed for coal ≥ 8,300 Btu/lb" is very confusing. The commenter asks where did the EPA come up with this cut-off? According to the commenter, boiler design information is most likely not available to the EPA and was not part of the 2010 ICR. The commenter asks could the cut-off be more simply defined? Such as coal type? According to the commenter, after considerable research on Commenter's equipment design and reading most of the proposed rule, Commenter emailed Bill Maxwell of EPA and he responded with this statement "the 8,300 BTU/lb definition is taken from ASTM Designation D388-05, Standard Classification of Coals by Rank." Commenter researched this with their coal lab and the lab performed an analysis and found that the commenter's subbituminous coal is significantly above the 8,300 BTU/lb threshold. The commenter states that however, finding the design information for these relatively new boilers, in the context of D388-05 specifications was not possible without considerable assumptions. According to the commenter, the EPA should consider a different approach for this critical applicability cut-off.

Response to Comment 2: The EPA has clarified the subcategory definitions in the final rule as explained in the preamble to the final rule.

3. Clarify the subcategory for units >8,300 Btu/lb and height-to-depth ratio greater than 3.82.

Comment 3: Commenters 17878 and 18483 state that the EPA defines the two coal-fired unit subcategories as based on 1) the calorific value of the coal the boiler is designed to combust and 2) the boiler dimensions in terms of height-to-depth ratio. According to the commenter, the EPA should clarify in which subcategory a unit belongs when it is designed to combust a coal with a calorific value greater than 8,300 Btu/lb and it simultaneously has a height-to-depth ratio of greater than 3.82. The commenter asserts that such a boiler would not fit neatly within either of the two subcategories as currently defined. The commenter states that the EPA should state explicitly which category a unit belongs if it is designed to burn coals having a calorific value of both >= 8,300 Btu/lb and < 8,300 Btu/lb. The commenter asks is it correct that in this case, the applicable subcategory is based solely on the boiler height-to-depth ratio?

Response to Comment 3: The EPA has clarified the subcategory definitions in the final rule as explained in the preamble to the final rule.

4. General support for the subcategory.

Comment 4: Commenter 17722 fully supports the subcategory of "coal-fired unit designed for coal greater than or equal to 8,300 Btu/lb."

Commenter 18450 supports the EPA's proposed subcategories for coal fired EGUs. According to the commenter, the EPA has proposed two basic subcategories for coal-fired EGUs: (l) EGUs designed for coal >8,300 Btu/lb, and (2) EGUs designed for coal <8,300 Btu/lb. The commenter asserts that the results of EPA's ICR clearly justify the creation of only two subcategories.

Response to Comment 4: The EPA appreciates the commenters' support. We note that we have clarified the subcategory definitions in the final rule as explained in the preamble to the final rule.

5. Further subcategorization by coal rank.

a. Support for further subcategorization by coal rank.

Several Commenters (17623, 17627, 17712, 17716, 17736, 17739, 17757, 17761, 17774, 17805, 17807, 17817, 17818, 17820,17885, 17898, 17912, 18018, 18033, 18034, 18424, 18429, 19041, 19114) support further subcategorization by coal rank.

i. Subcategorization by coal rank is consistent with past practice.

Comment 5: Commenter 17716 states that the bases for determining which subcategories and sources would be regulated under the proposed NESHAP are explained in the rule. The commenter asserts that one category that has been suggested is for "Units designed for coal < 8,300 Btu/lb," apparently to distinguish lignite sources. According to the commenter, although other subcategories had been evaluated, including subcategorization of other coal ranks, no other coal rank subcategorization was proposed. Commenter submits there should be subcategories for the coal rank: bituminous, subbituminous, and lignite. According to the commenter, such treatment would be consistent with past practice. According to the commenter, see Proposed National Emissions Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units; Proposed Rule. 69 FR 4652, 4692 (Jan. 30, 2004), discussing differences in the type of emissions of Hg due to the different chemical properties of coal within differing fuel ranks. The commenter states that as a result, the EPA proposed different Hg limitations: for new sources burning (1) subbituminous coal - 20 x 10-6 lb/MWh (output basis), (2) bituminous coal - 6 x 10-6 lb/MWh (output basis), and (3) coal refuse - 1.1 x 10-6 lb/MWh (output basis). According to the commenter, the marked difference for coal refuse was justified by coal refuse combustion characteristics: "Available data indicate that emissions from the combustion of coal refuse tend to result almost entirely in particulate-bound Hg (greater than 99 percent for both units tested in the 1999 EPA ICR). The commenter asserts that with few exceptions, particulate-bound Hg can be removed with PM controls, Hg++ can be removed with wet SO2 controls (flue gas desulfurization (FGD) scrubbers), but elemental Hg usually shows little to no removal with any existing conventional type of APCD used on utility boilers." According to the commenter, coal rank differentiation in mercury emission limits was proposed in the Clean Air Mercury Rule (CAMR).

Commenter 17716 states that the advent of newer control technologies, such as activated carbon injection (ACI), allows further effective control of elemental Hg. The commenter states that nonetheless, there still remains varying degrees of reduction necessary to achieve equivalent emission levels when using different coal ranks. According to the commenter, if combustion of a material such as coal refuse will inherently achieve an almost 99 percent reduction in Hg with use of minimal controls, such sources should be considered separately from sources burning other coal ranks (i.e., bituminous coal) that achieve different levels of reduction with the same amount of controls. The commenter asserts that no reason has been advanced why past precedent of making coal rank subcategorizations should not continue here. According to the commenter, the difference in effectiveness of Hg control for different coal ranks was noted in the current rulemaking as well. The commenter asserts that AC has been shown to be very effective when used in combination with low chlorine coals (such as U.S. western subbituminous coals). The commenter states that activated carbons can suffer from poor performance

when used with high sulfur coals. According to the commenter, firing high sulfur coals (especially when an SCR is also used) can result in sulfur trioxide (SO3) vapor in the flue gas stream. The commenter asserts that the SO3 competes with Hg for binding sites on the surface of the AC (or unburned carbon) and limits the effectiveness of the injected AC. According to the commenter, an SO_3 mitigation technology—such as dry sorbent injection (DSI, e.g., trona or hydrated lime)—applied upstream of the ACI can minimize this effect. The commenter asserts that particle-bound Hg can be effectively removed along with other flue gas PM (including non-Hg metal HAP) in primary or secondary PM control devices. The commenter states that electrostatic precipitators (ESP), FF and wet FGD scrubbers are all effective at removing Hg, with the degree of effectiveness depending on the specific characteristics of the EGU and fuel types.

Comment 6: Commenter 17757 states that boilers typically are designed to burn a particular class of coal and were not designed with the capability or intention of switching to another rank of coal. According to the commenter, just as Btu/lb has been deemed an appropriate criterion for sub-categorization, so too should the EPA establish different MACT limits for bituminous, sub-bituminous, eastern, western, and lignite coals, and recognize, as the EPA has done in the past, that the substantial differences in emission characteristics and heating value for the various coal ranks impact the reasonably anticipated reductions that can be achieved.

Commenter 17757 states that many coal-fired units utilize a blend of bituminous and sub-bituminous coals. According to the commenter, the MACT rule should allow for adjustment of emission limits to account for blended coal usage, rather than its current rigid scheme. The commenter states that the EPA should add subcategories for various coal ranks and provide for flexibility in addressing the blending of coals.

Comment 7: Commenter 18033 states that the EPA explicitly acknowledged the need for subcategorization based on coal ranks in CAMR. According to the commenter, the Agency stated, "EPA continues to believe that it has the statutory authority to subcategorize based on coal rank and process type, as appropriate for a given standard." The commenter asserts that here the Agency recognized the need to subcategorize based on coal rank by providing separate emissions standards for lignite. According to the commenter, although Commenter is supportive of the EPA's decision to subcategorize for lignite, the Agency needed to further subcategorize especially given the stringency of the proposed acid gas standard.

Commenter 18033 states that in the proposed rule, the EPA declined to further subcategorize beyond lignite because "the data did not show any difference in the level of HAP emissions." According to the commenter, based on the information the EPA provided to UJAE, however, emissions data demonstrate that the proposed acid gas standard will in fact create differences in the level of emissions. The commenter states that thus, without further subcategorization the proposed rule will fundamentally discriminate between coal types.

Commenter 18033 states that without further subcategorization the economic impacts on individual midwestern states will be particularly acute as huge segments of the U.S. coal reserve will be disenfranchised by this rule. According to the commenter, the EPA did not even attempt to legitimately analyze this issue. The commenter asserts that thus, the Agency's proffered rationale for declining to further subcategorize based on the acid gas standard is belied by the record. According to the commenter, the EPA needs to better align with its previous position in CAMR and further subcategorize based on coal type.

Comment 8: Commenter 19114 states that the design of a coal-based generating unit is driven by the characteristics of the coal supply. According to the commenter, a wide variety of combustion technologies and unit designs have been deployed and are available that contribute varying strengths with respect to unit efficiency, system performance, expected emissions profile, and commercial maturity. The commenter asserts that in general, combustion technologies for coal-based units can be classified as pulverized coal, fluidized bed, and coal gasification. According to the commenter, further, the fuel type selected, anticipated emissions profile and chosen combustion technology drives the selection of emission controls, such as wet vs. dry flue gas desulfurization or selective catalytic vs. selective non-catalytic reduction systems. The commenter asserts that all of these design differences, and subsequent operating variables and emissions performance, are a result of varying coal characteristics. The commenter asserts that these differences were recognized in prior EPA rulemakings, and have consistently been used to create different categories and subcategories of units and tailor emission standards. According to the commenter, a similar approach should have been used in the current EGU-MACT rulemaking.

Comment 9: Commenter 17807 proposes that the EPA develop permit limits based on coal basin subcategorization classifications. According to the commenter, the EPA has applied subcategorization limits based on heating values < 8,300 Btu/lb for and > 8,300 Btu/lb for subbituminous and bituminous coals. The commenter states that the proposed categorizations do not address the wide range of chemical compositions and variability with HAP emissions for coals in the category > 8,300 Btu/lb. The commenter asserts that for example, Powder River basin (PRB) coals have generally lower SO_2 and HCl emissions due to very low concentrations of chlorides and sulfur in the coal. According to the commenter, llinois basin coals can have substantially higher SO_2 and HCl emissions due to higher concentrations of chlorides and sulfur in the coal. The commenter asserts that the proposed emission limits for HCl penalize utilities for using coals with higher chloride and sulfur. According to the commenter, higher chlorides in coal contribute to Hg reduction by supporting the oxidation and subsequently easier removal of mercury in existing control devices. Commenter requests that the EPA publish the coal blends in the top 12 percent of each category and develop specific non-metal HAP and HCl permit limits based on chemical composition from each major coal region. According to the commenter, the subcategorization can be similar to the proposed CAMR (70 FR 28653, May 18, 2005), standards for Hg.

Response to Comments 5 - 9: The EPA disagrees with the commenters' suggestion that the EPA must establish new subcategories. The EPA may create subcategories which distinguish among "classes, types, and sizes of sources." *See* CAA section 112 (d)(1). The EPA reads this provision to provide the Agency with discretion to subcategorize, and the EPA may exercise that discretion if sources are rationally distinguishable due to some difference in class, type, or size. *See Lignite Energy Council v. EPA*, 198 F. 3d 930, 933 (D.C. Cir. 1999) ("EPA is not required by law to subcategorize--section 111 [b] [2] merely states that 'the Administrator *may* distinguish among classes, types, and sizes within categories of new sources'" (emphasis in original)). Moreover, as we noted at proposal, any basis for subcategorizing should be related to an effect on emissions, rather than to some difference among sources which does not affect emissions performance. 76 FR 25036. The EPA may also exercise this discretion on a pollutant-specific basis, because the difference in class, type, or size may only have practical significance for certain HAP. In this final rule, the EPA carefully considered the possibility of creating different subcategories of EGUs and concluded that it was reasonable to establish six subcategories.

The EPA also disagrees with commenters that additional subcategories are warranted and we have not established additional coal-fired EGU subcategories in the final rule. Commenters are correct in that additional subcategorization was proposed in January 2004. Without agreeing with commenters that such subcategorization was warranted or reasonable at that time, the EPA believes that the current conditions are such that, even if appropriate at that time, such further subcategorization is no longer appropriate based on the information available to the Agency, and we have reasonably exercised our discretion in declining to further subcategorize EGUs.

With the exception of Hg, the EPA does not believe that the HAP emissions to the atmosphere from coal-fired EGUs are sufficiently different to warrant further subcategorization. EGUs firing bituminous, subbituminous, and coal refuse are all among the top performing units for Hg and EGUs firing bituminous, subbituminous, lignite, and coal refuse are all among the top performers for the acid gas and non-Hg metallic HAP indicating that the MACT floor limits established based on these units would be achievable. We have identified approximately 69 EGUs that, based on the data available, comply with all the existing-source standards (i.e., Hg, PM, and HCl) and among those sources are both PC and FBC EGUs, and EGUs burning bituminous, subbituminous, lignite, and coal refuse.

The EPA disagrees with commenters that elemental Hg usually shows little to no removal with any existing conventional type of air pollution control used on utility EGUs. As noted by other commenters, ACI, not fully developed in 2004, is now able to effect mercury control levels on subbituminous coals (which emit relatively more elemental Hg) such that similar emissions to the atmosphere may be achieved as those achieved by higher-chlorine bituminous coals when FGD systems are used or by coal refuse units with fewer controls. The EPA also agrees with commenter that there are means available for addressing the adverse impact that SO_3 may have on ACI performance, whether it be by using a carbon specially formulated to address the issue, or by some other method. Thus, in looking at the total system, similar emissions to the atmosphere are achieved by all of these coal ranks. The EPA has addressed elsewhere in this document its rationale for not subcategorizing by coal chlorine content but, in any event, the EPA does not believe that any fundamental discrimination between coal ranks will result as a result of the final rule. Sources have a wide array of control options available to comply with the final standards and it is likely that different units will employ different controls and other HAP emission reduction options to comply with the final standards.

The EPA agrees, in theory, that EGUs are designed around a basic set of coal characteristics. However, it was learned during the 1999 ICR that numerous EGUs have conducted trial burns and gained sufficient experience such that co-firing blends of bituminous and subbituminous, and to a lesser extent lignite and subbituminous, is now common practice. In fact, the EPA believes that such blends may be modified daily, depending on the characteristics of the coal being burned and on the level of generation needed. The extent of blending, and the ability to switch the blends on short-notice, does not lend itself (or, in fact, argue for) additional subcategorization. Furthermore, to the extent there are any differences in HAP emissions for different types of boilers or coal, with the exception of mercury for the subcategories we established, we would decline to exercise our discretion in any case because we believe based on the data that the existing source standards are achievable for all EGUs in both coal-fired EGU subcategories. For these reasons, we decline to further subcategorize coal-fired EGUs.

ii. Subcategorization by coal rank is necessary to account for the feasibility and effectiveness of controls.

Comment 10: Commenter 17716 concludes that subcategorization allows the EPA to account for feasibility and effectiveness of a control technology due to differences in fuel rank. According to the commenter, the wide range of coals found in the U.S. contain a plethora of chemical properties, including widely varying percentages of the three relevant species of Hg (elemental, particulate and gaseous ionic). The commenter states that in addition, the content of Hg, sulfur and chlorine present in any coal rank greatly affects the species of Hg created during combustion. The commenter states that similar differences in content and emissions for other HAP, such as HCl, are also found in different coal ranks. According to the commenter, these factors warrant providing different sets of controls and limits tailored to fit the characteristics of the different coal types. The commenter states that the EPA should reconsider the proposed subcategorization as currently established and allow subcategorization based on differentiation of coal rank.

Comment 11: Commenter 17805 agrees with the EPA's approach of subcategorizing oil-fired and lignite-fired facilities, however, the company recommends that the EPA further research the differences between coal types and how additional controls for mercury may already reduce other HAP as a potential additional subcategorization method. According to the commenter, for instance, Commenter's Lewis & Clark Station, an approximate 50 MW capacity lignite-fired unit, began controlling mercury emissions in late December 2009 utilizing oxidizing agent and activated carbon injection. The commenter states that a wet scrubber is also used for particulate control, as opposed to an electrostatic precipitator or a baghouse. According to the commenter, from review of preliminary stack test results from non-mercury metals testing conducted at the unit this summer, it appears that Lewis & Clark Station would be able to pass the proposed total non-mercury metals limit, but would not pass all of the proposed individual metals limits nor the proposed total PM limit.

Comment 12: Commenter 17627 states that there are significant and documented differences in halide (chloride) and Hg concentrations in sub-bituminous coal (e.g., PRB coal) versus bituminous coals (i.e., eastern bituminous coal). According to the commenter, chloride concentrations are much lower in sub-bituminous coals than in bituminous coals yet there is no distinction between the two fuels in the proposed rule. The commenter asserts that a target reduction percentage, say 80 percent, from a low starting concentration is a significantly harder and costlier endeavor than extracting the same percent reduction from bituminous coal. The commenter states that conversely although Hg concentrations tend to be lower in sub-bituminous when compared to bituminous coals it is more difficult to remove because of the lower chlorine content. According to the commenter, due to these widely varying constituent concentrations, a separate set of limits and controls should apply to each.

Commenter 17627 states that the subcategorization of coal is based on a heat input value of 8,300 Btu/lb or essentially the separation between lignite and all other coals. According to the commenter, there is a significant difference, however, between sub-bituminous (>8,300 Btu/lb but <10,000 Btu/lb) and bituminous coal (>10,000 Btu/lb) in constituent concentrations; namely chloride and Hg. The commenter states that these two constituents vary markedly between these coal classes, defining the type and extent of necessary emission controls. According to the commenter, further subcategorization between subbituminous and bituminous coal is necessary.

Comment 13: Commenter 19114 states that coal characteristics drive the design and operation of boilers, as well as the selection and performance of associated emissions control equipment. The commenter states that the proposed rule is insufficiently structured to appropriately address the range of coal types, unit designs, and equipment performance capabilities of coal-based electric generation processes. According to the commenter, further, the EPA has ignored the technical feasibility, and

potentially exorbitant costs of boiler modifications and control technology retrofits by not considering the impacts of coal rank on unit design and performance. The commenter asserts that such distinctions were taken into account in determining emission rates for the acid rain program and the prior mercury proposals issued by the Agency, and should not be ignored in this rulemaking. The commenter states that to address these concerns regarding the substantial differences in emission characteristics and heating value for the various coal ranks on the emission reductions that can be achieved in practice, the EPA should establish separate subcategories and corresponding separate MACT standards for bituminous, sub-bituminous, and lignite coals. The commenter states that numerous state agencies have performed CAA section 112(g) case-by-case MACT determinations and have determined that such subcategorization is technically and legally appropriate.

Comment 14: Commenter 17885 states that the EPA should either develop a section 112(d)(4) health based standard for HCl or develop EGU subcategories based on bituminous and sub-bituminous coal use to accommodate the different emission control capabilities based on coal rank. According to the commenter, the proposed HCl limits are based on several questionable assumptions. The commenter asserts that available information does not support the contention that dry-sorbent injection (DSI) technology can achieve the levels of reduction necessary on EGUs using high chlorine eastern bituminous coals to meet the proposed MACT HCl limits.] The commenter states that the EPA takes the position that establishing a section 112(d)(4) HCl standard is inappropriate because information is not available to show acute exposures will not pose health concerns. According to the commenter, it appears, however, from the EPA's analysis and preamble discussion that it believes that health risks due to acids gas exposures including HCl is minimal. The commenter asserts that in view of these circumstances we believe it is appropriate to at the very least establish EGU subcategories for HCl controls based on coal rank such that represent levels achievable based on DSI installation and coal rank.

Comment 15: Commenter 17820 states that there are also significant and documented differences in halide (chloride) and Hg concentrations in sub-bituminous coal (e.g., PRB coal) versus bituminous coals (i.e.,eastern bituminous coal). The commenter states that chloride concentrations are much lower in sub-bituminous coals than in bituminous coals yet there is no distinction between the two fuels in the proposed rule. The commenter asserts that a target reduction percentage, say 80 percent, from a low starting concentration is a significantly harder and Hg concentrations tend to be lower in sub-bituminous when compared to bituminous coals it is more difficult to remove because of the lower chlorine content. The commenter states that these widely varying constituent concentrations imply that a separate set of limits and controls should apply to each and that these two coal classes should be a basis for sub-categorization.

Commenter 17820 states that similar issues prevail for acid gases as well. The commenter asserts that as noted earlier, the difficulty and cost associated with removing acid gases from higher chlorine coals (such as eastern bituminous) as compared to lower chlorine (PRB coal). According to the commenter, therefore, a separate set of limits and controls should apply to bituminous and sub-bituminous coals for acid gases.

Response to Comments 10 - 15: We do not agree with the commenters' assertions concerning subcategorization for the reasons set forth above in this document and in the preamble to the proposed and final rules. In addition, we note that although the commenters make recommendations for subcategories, the commenters do not provide facts, data, or analysis to support the claims that units combusting different coals ranks will be unable to meet the standards in this final rule, and the

comments of different commenters are often virtually identical, including being identical in the lack of any support for their claims. We question the bases for the claims in the comments and believe the data support our subcategorization decisions in the final rule.

The EPA's response to comments related to the establishment of standards under CAA section 112(d)(4) are set forth elsewhere in the final rule and this response to comments document.

iii. The EPA has already subcategorized based on coal rank (lignite).

Comment 16: Commenter 17739 states that in the EPA's response to inter-Agency comments during OMB's review, the EPA was asked about whether it had considered subcategories based on coal rank. Commenter states that the EPA replied: "It is the Agency's policy that the rank of coal being used (or other material input) not be the basis for subcategorization." Commenter believes that this declaration is inconsistent with the EPA's stated approach to subcategorization made in the December 2000 finding, where the EPA declared: "In developing standards under CAA section 112 (d) to date, the EPA has based subcategorization on considerations such as: the size of the facility; the type of fuel used at the facility; and the plant type."

Commenter 17739 states that although they do not believe announcement of an Agency policy suffices to explain why the EPA has not exercised the discretion that statute undoubtedly confers upon the EPA to subcategorize on the basis of coal rank, to the extent the data support such a decision, Commenter also notes that the EPA has already crossed that bridge because it has issued a Hg subcategory for lignite in its proposal. The commenter asserts that this is so, even though the EPA attempts to masquerade the lignite subcategory as a boiler size/energy content subcategory. According to the commenter, we note that the EPA is proposing a Hg subcategory for lignite coals that in essence turns on the high amount of Hg in those coals. The commenter asserts that the mean Hg content of lignite coals is substantially higher than that of other coal ranks. The commenter states that the EPA decided to establish a Hg subcategory for lignite fuels, based on their heat input (< 8,300 Btu/lb) and the boiler size (height-to-depth ratio of 3.82 or greater) "because Hg emissions are different" than from other types of units. The commenter states that the EPA further opined that "any basis for subcategorizing (e.g., type of unit) must be related to an effect on emissions." According to the commenter, however, there is no evidence that the size of the boiler or the heat content of the fuel (< 8,300 Btu/lb) has anything to do with poorer performance of lignite units, and the EPA offers none. The commenter asserts that rather, the only relevant "effect on emissions" of this subcategory stems from the Hg coal rank characteristics of lignite. The commenter asserts that the fact that lignite boilers are "larger" has not been shown by the EPA or anyone else to have a relevant impact on Hg emissions. According to the commenter, consequently, although the EPA did not describe or call this subcategory one based on coal rank, it is in fact one based on coal rank, and can only be justified, from the key "effect on emissions" criterion, as one based on coal rank.

Comment 17: Commenter 17912 states that the EPA has no basis to conclude that any source burning any coal or liquid fuel can meet all of the individual emission limits that it has proposed in the EGU MACT. According to the commenter, although the EPA believes that prior court decisions may limit its ability to make distinctions based upon differences in fuel-borne HAP, unlike the Brick MACT decision, the CAA distinguished EGUs from other sources of HAP emissions. See 42 U.S.C § 7412(n). The commenter states that consequently, the EPA should consider the differences between fuel-borne HAP because the Agency has already distinguished certain solid fuels on the basis of their Btu content, which necessarily results in other regulatory distinctions.

Response to Comments 16 and 17: The EPA disagrees with the commenters. Notwithstanding the unattributed statements of an EPA employee, the EPA does not have a policy against subcategorization based on input materials, but the EPA still maintains that such a difference without a difference in emissions characteristics argues against subcategorization. Furthermore, the EPA did not establish subcategories in the 2000 Finding, instead we simply noted what the Agency could consider when establishing subcategories, and, in that notice, we do not specifically discuss coal rank and could have easily been considering a distinction between coal, oil, and natural gas. We also disagree with the commenter that suggests that the EPA has no basis to conclude that existing sources are able to meet the existing source standards. We have identified approximately 69 EGUs that, based on the data available, comply with all the existing-source standards (i.e., Hg, PM, and HCl) and among those sources are both PC and FBC EGUs, and EGUs burning bituminous, subbituminous, lignite, and coal refuse.

The EPA provides its response to comments related to lignite coal elsewhere in this document. In addition, the EPA has clarified the subcategory definitions in the final rule as explained in the preamble to the final rule

iv. Subcategorization by coal rank will improve the achievability of emission limits.

Comment 18: Commenter 17623 encourages the EPA to develop certain additional subcategories in the final Utility MACT to adequately reflect the diverse population of regulated sources. Commenter states that historical testing has shown that coal rank has a significant effect on Hg and HCl emissions. The commenter asserts that therefore, given that the EPA has wide latitude in the subcategories that can be created in a MACT standard and the impact coal rank can have on HAP emissions such as Hg and HCl, the EPA should consider developing more subcategories in the final Utility MACT if they can improve the achievability of the emission limits.

Comment 19: Commenter 17736 asserts that contributing to MACT standards that will be difficult, if not impossible, to achieve is EPA's failure to recognize the need for, and propriety of, additional subcategories. Specifically, the Commenter suggests providing subcategories based on coal rank in order to establish more realistic MACT standards and feasible compliance options. According to the commenter, the technology selection and design of a coal-based EGU is driven by the characteristics of the coal supply. The commenter asserts that although the EPA recognized the operational variances among unit designs and acknowledged that "the amount of fuel-born HAP is primarily dependent on fuel composition," the Agency rejected a coal-rank subcategory without explanation. The commenter states that coal is not a homogenous substance and the concentration of constituents, particularly Hg and HCl, can vary dramatically from region to region. The commenter states that proposing such stringent emissions limitations in the Utility MACT indicates an assumption that low sulfur coal is (or will be) burned. The commenter states that however, low sulfur coal is not compatible with wet-bottom units. The commenter asserts that as such, not one of Ohio Valley Electric Corporation's Kyger Creek units- all available emissions controls being installed- will be able to achieve the emissions limits under the proposed rule. According to the commenter, the EPA has recognized that complete structural re-construction is not a viable option. The commenter asserts that therefore, the EPA should establish an additional subcategory based on coal rank or, in the alternative, propose health based standards.

Comment 20: Commenter 17761 states that at a minimum the EPA should provide for additional subcategories to include a subcategory based on coal rank (bituminous, sub-bituminous, lignite) or general coal characteristics. The commenter states that both PRB (sub-bituminous) and lignite coals have very low chlorine content resulting in primarily elemental Hg which is inherently difficult to

effectively control even with a full suite of pollution control equipment (including ACI). According to the commenter, as such, in a final rule, the EPA should provide for higher Hg emissions limits for a new subcategory of sub-bituminous and other low chlorine coals.

Comment 21: Commenter 17774 strongly recommends that the EPA develop additional subcategories in the final Utility MACT to adequately reflect the diverse population of regulated sources, including subcategories potentially based on fuel type. Specifically, Commenter recommends that the EPA further consider differences in coal rank. According to the commenter, by establishing additional subcategories and recognizing the inherent differences in types of EGU units, the EPA could provide more achievable standards for some units, reduce the number of expected plant closures, and still significantly reduce emissions from this source category. The commenter asserts that information gathered for the first proposed Utility MACT showed that coal rank can have a significant effect on Hg and HCl emissions. According to the commenter, because the EPA has wide latitude to create subcategories of sources for a given MACT standard and coal rank can have major implications on Hg and HCl emissions, the EPA should further consider whether coal rank subcategories in the final Utility MACT could result in more achievable standards. The commenter states that additional subcategories could better enable facilities to meet emission limits and avoid plant shut-downs that could greatly impact electric reliability.

Comment 22: Commenter 18424 states that the EPA can remedy these potential issues by establishing MACT limits that contain distinct categories and limits for bituminous and sub-bituminous coal-burning EGUs. The commenter states that separate categories would enable the EPA to utilize a different data set for establishing a MACT floor for units burning bituminous coals, and thus present an opportunity to establish MACT limits that may be more achievable.

Comment 23: Commenter 18429 states that the MACT should subcategorize by coal rank. In particular for Hg control, the level of achievable control is highly dependent on chlorine content which varies greatly by coal rank and source.

Comment 24: Commenter 17807 requests that the EPA develop a subcategory of emission units based on coal type to accommodate varying emission rates attributable to typical components of specific coal types impacting levels of HAP emissions. According to the commenter, recent stack testing shows compliance with the proposed HCl limit will be difficult to achieve. The commenter states that Big Bend Station is designed to operate on bituminous eastern Illinois Basin coals. The commenter asserts that these coals are generally higher in chloride concentrations and tend to have higher HCl emissions. Other coal blends such as PRB, Appalachian, and Lignite coals are lower in chloride concentration, but the Big Bend Power Station is not designed to operate with these coals. According to the commenter, for example, PRB coals have lower sulfur content but the lower ash resistivities will cause operating problems with ESPs. The commenter asserts that similarly, the lower coal fusion temperatures cause slagging and reduced boiler efficiencies. The commenter states that the lower heating value will require more coal to produce roughly the same power output. According to the commenter, ppalachian coals will not cause ESP operating problems, but the fusion temperatures do not make this coal blend a viable option. The commenter asserts that consequently, PRB and many Appalachian coal blends are not practicable for Big Bend Power Station.

Response to Comments 18 - 24: The EPA does not agree with the commenters that additional subcategories are appropriate, and we explain our reasons for that conclusion and address many of these comments in responses above. The EPA specifically disagrees with the commenter that stated that the EPA assumes low sulfur coals will be burned. Units with higher chlorine content coal may have to

employ different control strategies to comply with the acid gas HAP standard, and sources with high sulfur content coal may not be able to utilize the alternative equivalent SO_2 standard that the EPA has included in the final rule. Coal blending would be one means, but not the only means, of achieving the standards (and, based on the 2010 ICR data, the Kyger Creek units noted by commenter are firing a blend of bituminous and subbituminous coals). The EPA agrees that the level of chlorine in the coal is a factor in Hg control. However, there are other means of adjusting the chlorine content; the EPA has information that indicates that such means (e.g., spraying a halogen such as chlorine or bromine on the coal as it is fed to the EGU) were employed by an unknown number of EGUs during the period of time they were testing to provide data in compliance with the 2010 ICR (*see* docket entry EPA-HQ-OAR-2009-0234-2067). Thus, we believe that the performance of such means is reflected in the MACT floor analysis.

As noted elsewhere in this document, the EPA is not establishing a health-based emission limit for acid gas in the final rule, as we do not have sufficient data to support such a standard for HCl and we have even less information on the other acid gases (e.g., HF, HCN, and SeO_2).

v. Other support for further subcategorization by coal rank.

Comment 25: Commenter 17818 is of the opinion that the EPA should consider changes to the subcategorization of coal-fired units. According to the commenter, review of data in the docket (MACT Floor Analysis-Coal HG- Revised) appears to indicate that there are noticeable differences (nearly an order of magnitude in some instances) in measured Hg emissions between the three noted coal categories (bituminous, sub-bituminous, and lignite) for EGUs of similar control figurations. It is Commenter's opinion that it would be appropriate to establish emissions limitations based upon the coal fuel rank or type (bituminous, sub-bituminous, and lignite) without regard to furnace sizing or height-to-depth ratio. The commenter asserts that review of coal analysis data in the docket that was submitted as part of the ICR also seems to indicate that it would be appropriate to also consider separate limits and considerations for bituminous, sub-bituminous and lignite coals for other HAP as well.

Comment 26: Commenter 17912 states that subcategorization of coal units is insufficient. In the current proposal, the only subcategories for coal-fired units are between those units that burn lignite and those that burn all other types of coal. Commenter urges the EPA to provide for additional subcategories within the standard. According to the commenter, for example, for non-Hg metal HAP, the U.S. Geologic Survey's COALQUAL data base provides ranges of metals found in various coal types or ranks. The commenter states that not all metals are present in all coal types or ranks in equal concentrations. The commenter asserts that moreover, when the EPA set its proposed emission limits for these pollutants from new coal-fired units, it selected the lowest reported emitting unit for each non-Hg metal. The commenter states that the problem inherent in this approach is that the test data used to identify the alleged best-performing similar source was only burning one type coal during the few hours of the tests required for by the ICR. The commenter states that that coal may or may not have had concentrations of non-Hg metals similar to the concentrations found in other coals or even for coals of the same type but mined from another seam. The commenter asserts that the metal concentrations may not even represent the same values that might be measured from the same mine the next week. According to the commenter, when setting standards for new units on the basis of a single best-performing unit as the EPA has chosen to do here, the variability of the concentrations of non-Hg metals in the fuel can and will affect the results of the test. The commenter asserts that for Hg the EPA selected the Nucla plant, which only gets its coal from a single, nearby mine.

Comment 27: Commenter 18034 states that subcategorization is only done for coal units for the purposes of the mercury emissions limit. According to the commenter, however, the EPA's proposal preamble acknowledges that coal type and unit design affect emissions performance of some of the other HAP being regulated by the proposal. The commenter asserts that subcategorization for coal-fired EGUs should be extended to other pollutants. According to the commenter, the EPA's own data indicates that further subcategorization of coal-fired EGUs is warranted. The commenter states that the speciated non-mercury metal HAP limits are derived from multiple coal-fired EGUs with different designs and fuel types. The commenter asserts that in the case of the new unit non-mercury metal HAP limits, no unit used to establish the non-mercury metal HAP emission limit profile actually meets all the limits. The commenter states that this indicates that deriving emission limits across designs and fuel types is questionable and the EPA must consider further subcategorization. According to the commenter, the EPA acknowledges that there is variability in some non-mercury HAP (e.g., selenium), yet the EPA decided not to subcategorize the non-mercury metal HAP without any clear justification for this decision (76 FR 25038). This decision is arbitrary and capricious.

Comment 28: Commenter 18034 suggests that a specific subcategory for subbituminous coal-fired EGUs should be established with different emission limits for all the targeted pollutants. According to the commenter, the EPA should have developed emission standards for the subcategory of subbituminous coal based upon the data the EPA used to establish emission standards. The commenter states that for example, of the lowest emitting 40 existing coal-fired power plants used to identify the floor for Hg in the category of greater than or equal to 8,300 Btu/lb, only three of those units burned subbituminous coal. The commenter asserts that the highest ranking of the top three subbituminous units in the top 40, was 28th overall.

Comment 29: Commenter 19041 states that the EPA should allow for more subcategorization of units for different boiler types and associated coal rank, and separate emission limitations for these additional subcategories should be promulgated. The commenter states that these subcategories should allow for coal blending and additional types of coal use beyond the two simple categories that the EPA has proposed, i.e.,coal-fired unit designed for coal greater than or equal to 8,300 Btu/lb coal, and coal-fired unit designed for coal less than 8,300 Btu/lb coal. According to the commenter, there is much more variability in the industry with respect to boiler design and coal use than the two categories proposed by the EPA.

Commenter 17761 states that there is significant variability in Hg content of coal, Cl content of coal, and measured Hg emissions, which affects the emission levels. Commenter 17761 provides example data showing from November to December 2007, the Hg content of coal ranged from 0.055 to 0.319 ppmd, and the Cl content of coal ranged from less than 1 to 461 ppm. Commenter 17761 states that the variability of Hg and Cl content of fuel directly affects the variability of Hg emissions. Commenter 17761 states that there are likely unintended consequences resulting from control devices for SO2 and NOx that adversely affect performance of Hg control devices.

Commenter 17901 stated that the Proposed Utility MACT is structured to punish coals with higher sulfur and heat contents, like the bituminous coal mined in Ohio. According to the commenter, instead of structuring both the MACT and NSPS requirements in a manner that recognizes the regional characteristics of coal and that there is no "top coal" from an emissions perspective, EPA has chosen to make bituminous coal the clear loser by skewing the limits towards fuel switching to western coals and natural gas. Commenter 17901 states his disappointment that the proposed rule is biased against the coal burning EGUs, particularly from Midwestern and eastern mining states. According to the commenter,

the EPA's proposed utility MACT sets limits based on heat content, with 8,300 Btu/lb serving as the dividing line between high and low heat coals. The commenter states that the EPA is proposing more stringent regulations for high heat content coal which is mined traditionally from the eastern U.S.

Response to Comments 25 - 29: The EPA disagrees with the commenters and many of these comments are addressed above. Concerning one commenter's assertion that the new source standards for non-Hg metal HAP are flawed because of the variability of the metals in the coal, we disagree and note that commenter has provided no alternative approach for establishing the new-source MACT standards. The EPA is required by the statute to establish the standards based on the information available to the Agency. Taken to its logical conclusion, the commenter's statement would require the EPA to establish new-source MACT standards for every mine in the country and possibly even varying standards for the same mine because the commenter maintains that the same coal may have very different HAP metal content from one day to the next. The EPA thinks that approach is unreasonable and we reject it. We apply a variability factor to the MACT floor limits to account for fuel input variability in addition to other variability and we believe the final standards are achievable.

The EPA also disagrees that we acted arbitrarily by declining to further subcategorize because there is variability in the HAP content of coal. We believe it is the emissions to the air that matter and the data available indicate that, with the exception of Hg, the emissions to the atmosphere are similar for all types of EGUs burning all types of coal. It is reasonable to reject additional subcategories under these circumstances. We have identified approximately 69 EGUs that, based on the data available, comply with all the existing-source standards (i.e., Hg, PM, and HCl) and among those sources are both PC and FBC EGUs, and EGUs burning bituminous, subbituminous, lignite, and coal refuse. Further, although commenter may be correct in stating that there are few subbituminous-fired EGUs in the MACT floor pool for Hg, based on the data available, there are approximately 36 subbituminous-fired EGUs meeting the final Hg limits (which include variability considerations) and approximately 16 EGUs that report using a bituminous/subbituminous coal blend. Therefore, we conclude that no further subcategorization is necessary as all coal ranks are able to achieve the limits.

b. Opposition to further subcategorization by coal rank.

Several Commenters (17402, 17620, 17648, 17873) oppose further subcategorization by coal rank.

Comment 30: Commenter 17620 is opposed to any further subcategorization based on coal rank. According to the commenter, since many sources blend several ranks of coal on a regular basis, establishing coal rank subcategories would create numerous opportunities for sources to game the regulations and substantially increase emissions. The commenter states that there is no need for such an approach since modern pollution controls can accommodate a wide range of coals.

Comment 31: Commenter 17648 states that the EPA's decision not to subcategorize further based upon coal rank is correct. Commenter states that some have argued that the EPA should subcategorize coal-fired EGUs for purposes of setting MACT standards under CAA section 112(d) based upon coal rank, including distinguishing bituminous coal-fired EGUs from subbituminous coal-fired EGUs, and distinguishing among coal-fired EGUs firing Fort Union lignite, Gulf Coast lignite, and other coal ranks. Commenter believes that none of these proposed subcategory distinctions are appropriate. Commenter states that the EPA lacks any basis on which to set different emission limitations for sources based upon the type of solid fuel that they are firing.

Commenter 17648 states that subcategories are warranted only where differences between sources lead to differences in the nature of emissions and the technical feasibility of applying emission control techniques. According to the commenter, where a technical difference between units has no effect on emissions performance, there is no basis for subcategorizing. The commenter states that EGUs firing different ranks of coal are not fundamentally different in size, class, or type in a way that impacts emissions or that limits the availability of controls. The commenter asserts that emissions of fuel-dependent HAP can be controlled by either changing the fuel prior to combustion or by removing the HAP from the flue gas after combustion. According to the commenter, ACI systems, DSI controls, and PM controls are available for installation at units firing subbituminous coal and are equally available for units firing bituminous, anthracite, or lignite coal. As long as a control option is commercially available, that it may be costly for a particular unit is irrelevant to the EPA's development of emission standards based on MACT.

Commenter 17648 states that subcategories based on coal rank would make a meaningful consideration of fuel switching impossible, contrary to the judicial mandate to consider substitution of materials in setting the floor and the statutory mandate to consider substitution of materials in the beyond-the-floor analysis. The commenter states that if subcategories are based on coal type, the HAP levels of the fuel source would dictate the subcategories chosen and thus would preclude the EPA from considering fuel switching as control technology. According to the commenter, the practical effect of such a subcategorization scheme would be the same as if the EPA had created subcategories based on plants already equipped with a particular add-on control technology, an approach rejected by courts. The commenter states that because material substitution (i.e., coal switching) is to be considered as a control technology in the same manner as scrubbers and baghouses, coal rank cannot serve as a basis for subcategorization.

Commenter 17648 states, moreover, the best-performing coal-fired EGUs for many HAP include units firing all of these different coal ranks. The commenter asserts that sources that achieve the proposed emissions limitations for Hg, PM, or HCl do so by employing different control technologies, which often reflect differences in the type of fuel combusted. The commenter asserts that thus, even if the EPA has authority to subcategorize based upon coal rank, there is no reasonable basis for the EPA to conclude that EGUs firing different types of coal have meaningful physical differences that manifest in different emissions performance that cannot be controlled with available control technologies.

Commenter 17648 states that in the proposed Toxics Rule, the EPA appropriately identified the best-performing 12 percent of units by ranking EGUs according to each unit's emissions. According to the commenter, this approach ensures that sources that may achieve emission reductions by using fuels with low HAP content are not excluded from consideration in setting MACT floors. The commenter states that the EPA also implicitly recognized that subcategorization based upon coal rank is inappropriate when it rejected the use of percent reduction standards for fuel-dependent HAP. The commenter states that percent reduction standards would not account for practices such as fuel-switching that reduce the HAP content of fuel before firing.

Comment 32: Commenter 17402 states that although they previously supported the subcategorization of coal-fired units on the basis of coal rank, it no longer objects to grouping units that burn bituminous and subbituminous coals in a single category because the prior basis for subcategorization no longer exists. The commenter states that at the time of the prior rule, it was widely recognized that Although coal-fired units combusting bituminous coal, with its higher concentration of chlorine and therefore ionic Hg, could effectively limit Hg emissions by utilizing existing control technologies such as scrubbers, units

burning subbituminous coal could not do so with the same controls because of the coal's higher levels of elemental Hg. The commenter asserts that activated carbon was only a fledgling and unproven technology at the time; today, however, activated carbon has been proven, and units burning bituminous and subbituminous coal can achieve the same levels of emissions for Hg and other HAP. According to the commenter, consequently, the prior basis for subcategorization no longer exists. Commenter therefore agrees that coal-fired units burning bituminous and subbituminous coals ought to be grouped in a single category.

Comment 33: Commenter 17873 states that further subcategorization is not necessary or appropriate. Commenter does not view further subcategorization of coals for acid gas regulatory purposes as necessary and believes that, with the exception of the lignite facilities already placed in a separate subcategory, all facilities can and should meet the same standard whether using a bituminous or subbituminous fuel. According to the commenter, the creation of a single category for both fuel types assures that EGU owners have many different options for compliance, including retrofit with controls, fuel switching or a combination thereof. The commenter states that it also assures that higher emitting EGUs (the source of the greater potential environmental impact) bear an appropriately greater burden of emission reductions under the EGU MACT.

Response to Comments 30 - 33: The EPA has not established additional subcategories for coal-fired EGUs in the final rule. We disagree with the commenter that the EPA is precluded from subcategorization based on material inputs just because material substitution is a viable control option in certain circumstances. Even if we determined that multiple subcategories were available based on material inputs, sources might still choose to comply by switching materials to comply with the standard applicable to the given subcategory. We do not agree that subcategorization by material input and material substitution as a compliance alternative are mutually exclusive as one commenter suggests. The EPA agrees with the commenters that there is no basis to subcategorize bituminous and subbituminous coal because the emissions characteristics are similar and units burning both types of coal are currently meeting all of the existing source standards and all EGUs will be able to comply with the final standards through a combination of controls and other practices (e.g., coal washing).

6. The EPA should establish a subcategory for non-continental coal units.

Comment 34: Commenter 18539 supports the establishment a subcategory for non-continental coal-fired units. According to the commenter, due to natural gas alternative not being available in HI and Puerto Rico, these sites have less opportunity to rely on gas repowering/co-firing as the continental U.S. has. The commenter states that this geographic competitive disadvantage should be rectified with a subcategory for these units.

Response to Comment 34: The EPA does not believe that establishing a non-continental subcategory for coal-fired EGUs is warranted or appropriate because some non-continental EGUs are in the MACT floor pool for some HAP (e.g., two EGUs in HI in the Hg and PM MACT floor pool; two EGUs in Puerto Rico in the HCl MACT floor pool), indicating an ability to achieve the limits in the final rule. Thus, we do not believe that they will need to rely on any form of fuel switching to achieve the final limits. In addition to evidence that some non-continental EGUs already are capable of complying with the rule, non-continental coal units are not limited in their access to different quality fuels, and there is no showing that available control etchnology cannot assure performance at or below the emission levels specified in the final rule.

3B - Subcategorization: Applicability: Coal (<8,300 Btu/lb)

Commenters: 12991, 16122, 17620, 17722, 17725, 17758, 17775, 17813, 17815, 17818, 17820, 17843, 17846, 17870, 17904, 17925, 17927, 17930, 18039, 18425, 18426, 18487, 18785, 19040, 19205, 19595, 19536/19537/19538, 18932

1. Support for the subcategory.

a. General support.

Comment 1: Several Commenters (17722, 17725, 17758, 17775, 17815, 17820, 17870, 18450) support the EPA's decision to create a separate subcategory for units burning coal with a heating content of less than 8,300 Btu/lb. According to the commenters, boilers designed to burn these coals (typically lignite) are significantly different than plants designed to burn coals with higher heat contents. The commenters states that these coals are also different in composition than other coal types.

Comment 2: Commenter 18450 supports the EPA's proposed subcategories for coal fired EGUs. According to the commenter, the EPA has proposed two basic subcategories for coal-fired EGUs: (l) EGUs designed for coal >8,300 Btu/lb, and (2) EGUs designed for coal <8,300 Btu/lb. The commenter states that the results of the EPA's ICR clearly justify the creation of only two subcategories.

b. Emissions are different.

Comment 3: Commenter 17904 strongly supports subcategorization for lignite units. According to the commenter, the EPA is correct that there is a difference in the emissions for this HAP from lignite-burning units, and Commenter commends the EPA for recognizing the propriety of creating this subcategory in order to recognize that difference and also to preserve for consumers the viability of this low-cost fuel source that provides much of the power that serves Texans. According to the commenter, section 112(c)(1) of the CAA authorizes the EPA to establish a list of all categories and subcategories of major sources, "as appropriate," and section 112(d)(1) provides that the EPA "may distinguish among classes, types, and sizes of sources within a category or subcategory in establishing" MACT standards. The commenter asserts that under this authority, the EPA has appropriately proposed a separate MACT standard for the "class" or "type" of boilers firing fuel with a heat content of less than 8,300 Btu/lb, i.e., lignite. According to the commenter, the EPA explains in the proposal that "[n]ormally, any basis for subcategorizing (e.g., type of unit) must be related to an effect on emissions, rather than some difference which does not affect emissions performance." The commenter states that the EPA concludes that "[f]or Hg emissions from coal-fired units, we have determined that different emission limits for the two subcategories are warranted," noting that "[t]here were no EGUs designed to burn a nonagglomerating virgin coal having a calorific value [of 8,300 Btu/lb] or less in an EGU with a height-to-depth ratio of 3.82 or greater among the top performing 12 percent of sources for Hg emissions, indicating a difference in the emissions for this HAP from these types of units."

Comment 4: Commenter 17930 states that it is clear that a subcategory for units designed to burn coal with a heat-input of less than 8,300 Btu/lb ("< 8,300 coal units" or "Subcategory 2 Units") is necessary; the EPA found none of the Subcategory 2 units in the overall top performing 12 percent of sources for Hg emissions.

c. Plant design and operation are different.

Comment 5: Commenter 17725 supports EPA's proposal to subcategorize low rank coal units, in part, to account for the significant impact low rank coal can have on overall plant design and the operation of pollution control equipment. According to the commenter, low rank coal, especially lignite, is substantially different from other coals and an important cost effective domestic fuel source.

Comment 6: Commenters 17930 and 18785 state that units designed to burn coal with a heat-input of less than 8,300 Btu/lb generally include the types of units that are designed to burn lignite. According to the commenters, these units are distinct from others based on the amount, type, and variability of mercury and other HAP/non-HAP content in their fuel. The commenters state that lignite burning units are substantially different in design, particularly in that they are much larger than non-lignite units, which supports the category's "designed to burn" requirement. The commenters assert that by structuring the subcategory to apply to units designed to burn <8,300 coal, it also avoids the unintended consequence of preventing the class of units that co-fire alternative fuels such as biomass, and other environmentally beneficial materials, from burning those materials in their boilers as supplements to their primarily lignite fuel.

Response to Comments 1 - 6: The EPA agrees that the proposed subcategory was reasonable. Partly based on comments received, the EPA has modified the definition for this subcategory in the final rule as explained in the preamble to the final rule.

2. Opposition to the subcategory.

Several Commenters (16122, 17620, 17818, 17843, 17846, 18039, 18421, 18425, 18426, 18487, 19205, 19595, 19536/19537/19538, 18932) oppose a separate subcategory for units burning coal with a heating content of less than 8,300 Btu/lb.

a. The record does not support the subcategory.

Comment 7: Several commenters (19536, 19537, 19538) states that the EPA's coal subcategories for existing sources are not adequately justified on the record, which shows instead that they are created to preserve poor performance and benefit and prolong the burning of low-Btu "junk" coals. According to the commenters, the EPA asserts that all of the five subcategories it creates are in fact based on the combustion technology in use at facilities burning different kinds of fuels. According to the commenters, this may justify the EPA's decision to distinguish units burning liquid fuels from units burning solid fuels, and IGCC units from those utilizing other methods of coal combustion. The commenters state that it does not, however, permit the EPA's distinction between units burning coals above and below 8300 Btu/lb. The commenters assert that although the EPA implies that its proposed Btu content-based coal subcategories are not merely set to give advantage to, or allow continued burning of low-Btu "junk coals" at new facilities, the data and the technologies for burning different coal ranks suggest otherwise. The commenters state that so does the agency's rationale: that "a distinguishable difference in [emissions] performance exists based on … coal-fired units designed to burn coal with greater than or equal to 8,300 Btu/lb (for Hg emissions only); [and] coal-fired units designed to burn coal with less than 8,300 Btu/lb (for Hg emissions only)." 76 FR 25037.

Commenters (19536, 19537, 19538) states that the EPA's selection of the 8,300 Btu/lb heating value to subdivide the coal category is not discussed or justified in the record. According to the commenters, the EPA provides no record evidence to show that sources using fuels above and below this heating value are of a different class, type or size and, indeed, does not even claim they are. The commenters assert

that in particular, the EPA has not provided a clear technical basis for its apparent conclusion that units burning coals below this heating value are of different design, or that the difference in design affects the method of pollution reduction available to such units. The commenters assert that the EPA provides no technical basis that these units have different fuel handling, burner or combustion systems. The commenters state that in fact, units burning lignite coals can burn other types of coals. The commenters assert that for example units in Texas and North Dakota (where most of these lignite burning units are located) can also burn PRB subbituminous coals as well for fuel diversity. According to the commenters, physical systems for coal handling, burners, and combustion systems are the same when either fuel is burned. According to the commenters, the controls that may be used for minimizing Hg emissions, such as ACI, baghouses, and scrubbers, can all be used on units that can burn either type of coal – regardless of heating value.

Commenters (19536, 19537, 19538) states that the sparse record underlying the agency's rationale for the junk coal subcategory suggests that the two coal subcategories are intended to preserve the ability to burn high-Hg coals, rather than truly distinguish sources based upon their "class, type, and size." According to the commenters, this is unlawful, as well as arbitrary, and defeats the CAA's directive to set standards that ensure that all sources will match the emission levels achieved by the best performers. The commenters assert that 2 U.S.C. § 7412(d)(3). The commenters state that the EPA therefore has not sufficiently justified its subcategory based on coals with less than 8300 Btu/lb heat input.

Commenters (19536, 19537, 19538) state that the EPA has not justified its decision to subcategorize the Hg MACT determinations for the group of coal-fired EGUs designed for coal with heat value less than 8300 Btu/lb. According to the commenters, the boundaries of the category are themselves poorly defined; the EPA provides no design characteristics to separate these plants from others merely capable (but not designed for) burning such low heat-value coals. The commenters assert that even if such a subcategory were justified, however, the EPA has not properly supported its proposed standard for such units.

Comment 8: Commenter 18932 states that the proposed rule improperly establishes a subcategory for low-Btu fuels. Commenter states that the EPA has proposed to establish two subcategories of coal-fired EGUs -- assigning drastically different Hg emission limits to each -- without providing a rational basis for doing so. According to the commenter, as proposed, the Utility Air Toxics Rule would distinguish the two subcategories based on (1) the heat value of the coal that the unit is designed to burn, and (2) the height-to-depth ratio of the unit. The commenter asserts that specifically, the EPA has proposed to establish one subcategory of EGUs that are "designed to burn a coal having a calorific value (moist, mineral matter-free basis) of greater than or equal to 19,305 kilojoules per kilogram (kJ/kg) (8,300 British thermal units per pound (Btu/lb)) in an EGU with a height-to-depth ratio of less than 3.82" (High-Btu Units).

Commenter 18932 states that based solely on these distinguishing characteristics, the Agency has assigned to the low-Btu units Hg emission limits that are several orders of magnitude less stringent than the emission limits assigned to the high-Btu units. According to the commenter, the EPA has not provided a rational basis or reason for this distinction. The commenter asserts that he proposed approach lacks a sound technical basis and, due to the profound difference in the stringency of the Hg emission limits assigned to the two subcategories, it provides a strong incentive for sources to design, or merely attempt to characterize, their EGUs as low-Btu units in order to skirt the more highly protective standards that apply to high-Btu units.

Commenter 18932 states though the EPA may distinguish between sizes of sources within a category or subcategory, the record does not support the Agency's proposal to establish dramatically different Hg emission limits based on whether EGUs are designed to burn coal that has a heat value of less than or greater than 8,300 Btu/lb. Commenter states that there is no indication in the record that these units have inherently different combustion systems; there is no evidence that these units cannot use the same types of post-combustion mercury pollution controls, or that those controls differ in Hg control effectiveness. Commenter states that in fact, it appears that the EPA is attempting to establish a subcategory based on coal rank for lignite coal, which is improper. Commenter adds that based on the Hg emissions data compiled as part of this rulemaking, the record shows that the best-performing low-Btu units have achieved levels of Hg emission control that fall within the range of the best-performing high-Btu units. Commenter asserts, thus, based on the data in the record, there is no basis for establishing different Hg emission limits for units based on coal heating value.

Comment 9: Commenters 16122 and 17846 assert that the EPA's subcategorization for coal-fired EGUs lacks support and creates improper incentives for EGUs to burn dirtier, less-efficient coals. Commenters state that CAA section 112(d)(l) *allows the* EPA to "distinguish among classes, types, and sizes of sources within a category or subcategory in establishing [MACT] standards" (referred to as subcategorization). According to the commenters, based on the statutory language, the EPA clearly has a choice as to whether to subcategorize sources when developing MACT standards. The commenters assert that however, where the EPA chooses to subcategorize, its decision must be supported with a reasoned justification. The commenter states that the EPA has found that subcategorization is justified when "different types of units within a category have different emission characteristics which affect the technical feasibility and effectiveness of applying emission control."

Commenters 16122 and 17846 state that the EPA's subcategorization scheme lacks support. Commenters state that the EPA's preamble and supporting memoranda provide little justification for the EPA's decision to set a separate standard for units designed to burn lignite coal. Commenters state that the EPA's only support for its subcategorization scheme is that "[t]here were no EGUs designed to burn [lignite coal] among the top performing 12 percent of sources for Hg emissions [and] . . . [t]he boiler of a coal-fired EGU designed to burn [lignite] is bigger than a boiler designed to burn [subbituminous and bituminous coal]." Commenters note, however, the EPA provides no evidence that EGUs designed to burn lignite coal have different emission characteristics that affect the technical feasibility and effectiveness of emission control. Commenters assert that the EPA should remove from the EGU MACT Rule any subcategorization between lignite and non-lignite units.

Comment 10: Commenter 18421 states that the EPA erred in its decision basis that no lignite-burning facilities included in top 12 percent warrants a separate subcategory.

Comment 11: Commenter 18426 states that in Michigan, many existing units have switched from bituminous coal to subbituminous coal combustion or a blend of both types of coals. According to the commenter, with the right combination of emission controls, the proposed Hg emission limit of 1.0 lb/TBtu or 0.0081b/GWh is achievable by existing Michigan units. The commenter asserts that due to the Clean Air Interstate Rule (CAIR) and the Cross-State Air Pollution Rule (CSAPR) which replaces CAIR, the addition of fabric filter bag houses (which would support ACI), SCRs, and wet and/or dry FGD systems is under way on many Michigan units and can be used to meet the proposed Hg emission limit. According to the commenter, however, the proposed Hg emission limit of 0.040 lb/GWh for coal-fired units designed to burn coal with a heat content of less than 8,300 Btu/lb and with a height-to-depth ratio of 3.82 or greater is too high when the 0.008 lb/GWh is achievable by existing units with additional

and Hg specific controls. The commenter states that to demonstrate the impact of keeping the 0.040 lb/GWh Hg emission limit, the following example is presented. The commenter asserts that an 800 MW unit subject to the proposed Hg emission limit of 0.040 lb/GWh would be allowed to emit up to 280 pounds per year of Hg. According to the commenter, a similar sized unit operating under the proposed Hg emission limit of 0.008 lb/GWh, would have potential Hg emissions of 56 pounds per year of Hg. The commenter states that therefore, the subcategory for coal-fired units designed to burn coal with less than 8,300 Btu/lb and with a height-to-depth ratio of 3.82 or greater needs to be eliminated as it creates an unequal bias for low rank coals, is not protective of public health, and technology exists and is in use on existing units which does not justify the subcategorization. Commenter recommends just one general subcategory of coal-fired units.

Comment 12: Commenter 17818 does not support the EPA's definition [of coal-fired EGUs of more and less than 8,300 BTU/lb] as proposed. According to the commenter, in the proposal, the EPA appears to be drawing a distinction between steam generators combusting bituminous and/or subbituminous coals with those steam generators combusting lignite coals.

Comment 13: Commenter 19205 strongly urges the EPA to strengthen standards to protect public health and our environment by requiring lignite burning facilities to control Hg emissions.

Comment 14: Commenter 19595 states that although the EPA has taken an important step toward protecting public health by drafting these rules, the rules have some major deficiencies in how they protect public health. According to the commenter, the current draft rules virtually exempt lignite coal facilities from controlling Hg emissions. The commenter states that these dirty facilities are some of the country's biggest Hg polluters, and should have to comply with strong emission standards that protect our environment and public health. The commenter states that the proposed standards are an excellent start, but don't go far enough to protect public health and our environment. According to the commenter, lignite burning facilities should receive equal treatment, and be required to control their Hg emission levels to protect public health.

Response to Comments 7 - 14: We disagree with commenters that subcategorization by fuel type is not authorized under CAA section 112. Under CAA section 112(d)(1), the Administrator has the discretion to "...distinguish among classes, types, and sizes of sources within a category or subcategory in establishing..." standards. The EPA maintains that any basis for subcategorization (i.e., class, type, or size) must be related to an effect on HAP emissions that is due to the difference in class, type or size of the units. *See* 76 FR 25036-25037. The EPA believes it is not reasonable to exercise our discretion without such a difference because if sources can achieve the same level of emissions reductions notwithstanding a difference in class, type, or size the purposes of CAA section 112 are better served by requiring a similar level of control for all such units in the category or subcategory. *See Lignite Energy Council v. EPA*, 198 F. 3d 930, 933 (D.C. Cir. 1999) ("EPA is not required by law to subcategorize--section 111 [b] [2] merely states that 'the Administrator ***may*** distinguish among classes, types, and sizes within categories of new sources'" (emphasis original)); *see* also CAA section 112(d)(1) (containing almost identical language to CAA section 111, CAA section 112(d)(1) provides that "the Administrator may distinguish among classes, types, and sizes of sources within a category or subcategory in establishing [] standards..."). Nothing in the statute prohibits EPA from subcategorizing based on material input and the case law supports it to the extent it has considered subcategorization based on such factors. *See Sierra Club v. Costle*, 657 F. 2d 298, 318-19 (D.C. Cir. 1981) (differing pollutant content of input material can justify a different standard based on subcategorization authority to "distinguish among classes, types and sizes within categories of new sources"). Furthermore, we believe

had Congress intended to prohibit EPA from subcategorizing based on material input it would have clearly stated such intent in the CAA.

We also disagree with commenters' suggestion that because units are able to blend fuels we are limited in our ability to subcategorize units that are different in class, type, or size at the time we establish the standards. If commenters are correct that different fuels will lead to less pollution, the conversion to the "cleaner" fuel will have the desired benefit of reducing HAP emissions. In addition, EPA is required to conduct technology analysis at least every 8 years so the Agency will have opportunities in the future to determine whether subcategorization remains warranted and whether more stringent standards are appropriate. We also disagree that the fact that the availability of similar control options negates the legitimacy of a subcategorization approach. In fact, the controls available to reduce HAP are generally available for all types of sources, but that does not mean that all classes, types and sizes of sources must be included in the same subcategory under a given regulation. In addition, we disagree that the final rule effectively exempts a subcategory from controlling mercury and we note that we established the MACT standard consistent with the statute and it is based on beyond-the-floor levels of control. Finally, we disagree that EGUs in the low rank, virgin coal subcategory have demonstrated that the new-source limit for the non-low rank, virgin coal subcategory is achievable as commenter alleges or that an unequal bias is established for such units. We estimate that the final rule will reduce Hg emissions from the subcategory by approximately 20 tons.

b. There is insufficient test data to support the subcategory.

Comment 15: Commenter 17620 states that the EPA has emission test data for 330 of the 1,061 units in Subcategory 1, but only for two of the 30 units in the smaller subcategory. According to the commenter, however, if the performance of the two subcategories is the same, one would expect the two tests for the small subcategory to be randomly distributed throughout the 340 results of Subcategory 1. The commenter states that thus, the fact that those two results were not in the top 40 results of the larger group does not, by itself, demonstrate that there are engineering reasons to set a separate subcategory. Commenter submits that two test results are insufficient to characterize the emission performance of a group and point out that the two sources for which the EPA has data may be among the worst performers in the lignite group. The commenter states that thus, even if it were permissible to establish subcategories based on emission test results (absent an engineering basis for doing so), the EPA test data argument does not appear to support a separate subcategory. The commenter asserts that the real basis for the EPA's proposal for a separate subcategory include the facts that (1) lignite generally has higher Hg content than other forms of coal, and (2) several lignite-burning facilities in the EPA's data base were equipped with ACI and FF and tested higher than 1.2 lb/TBtu. Commenter is also aware of the EPA's earlier assertion that all known lignite-burning units are "mine mouth" units or nearly so. According to the commenter, the EPA should simply acknowledge these facts and argue that it is entitled to treat lignite as a separate subcategory of fuel for purposes of Hg control, just as it does oil and petroleum coke.

Commenter 17620 states, as would be expected with small sample sizes, the EPA does not have sufficient data to establish a credible MACT floor for the proposed lignite group and has no way to ascertain the performance of the best performing 12 percent of the subcategory. According to the commenter, the EPA can only determine which of the few units in the subcategory for which it had data performed better. The commenter states that further, as would be expected with such small categories, small sample statistics generate excessively high variability factors and inappropriate MACT floors. The

commenter asserts that here, the variability factors employed by the EPA are so large that all of the "lignite subcategory" units apparently currently meet the proposed MACT floor.

Comment 16: Commenter 17843 agrees with Commenter17620 that there is weak support for this subcategory. Commenter states that the rationale put forward in the proposal for establishing the proposed Hg subcategory is that no unit meeting this definition was within the top 12 percent of performing sources in the larger category. According to the commenter, even if it were permissible to establish subcategories based on emission test results, absent an engineering basis for doing so, the EPA test data does not appear to support a separate subcategory in this instance.

Comment 17: Commenter 18039 agrees with Commenter 17620 on the flaws in the EPA's creation of a subcategory for "coal-fired units designed to combust coal with heat content less than 8,300 Btu per pound" (the "lignite category").

Comment 18: Several commenters (19536, 19537, 19538) state that the data do not support the proposed subcategorization of coal-fired units. The commenters assert that the chart in his comment shows the Hg data (in lb/MMBtu) that were used in the EPA's analysis. According to the commenters, the bars in red are units in the "less than 8,300 Btu/lb" subcategory, although all of the other data are for the greater than 8,300 Btu/lb subcategory. The commenters state that as shown below, there is no distinction between the two groups of data. The commenters state that in other words, the Hg data for the two subcategories do not fall into two different or distinct populations. The commenters assert that in fact, although the Hg emissions for the best performing lignite units were generally higher, the EPA's floor analysis for the greater than 8,300 Btu/lb subcategory includes suggests that some best-performing units in that subcategory have Hg emissions greater than those used in the lignite subcategory – these are the blue bars in the chart below that are to the right of the red bars.

Several commenters (19536, 19537, 19538) state that the EPA asserts that in its ICR data set there were "no EGUs designed to burn a nonagglomerating virgin coal having a calorific value (moist, mineral matter-free basis) of 19,305 kJ/kg (8,300 Btu/lb) or less in an EGU with a height-to-depth ratio of 3.82 or greater among the top performing 12 percent of sources for Hg emissions." According to the commenters, the next sentences in the preamble demonstrate clearly that this is not a combustion technology driven subcategory, but rather one designed to accommodate the EPA's conclusion that "emissions of Hg are different between these two subcategories." The commenters assert that subcategorizing an industry in order to preserve poor performance – essentially the EPA's asserted rationale – is an effort to sidestep the requirements of the statute, of the kind that the Court invalidated in *NRDC v. EPA*, 489 F.3d at 1372-73. According to the commenters, units lacking pollution controls may have poor performance; the Agency cannot, however, create a subcategory for such units so as to prevent them from installing the necessary controls.

Response to Comments 15 - 18: The EPA believes it has sufficient data to support the subcategory. The EPA has Hg and non-mercury metallic HAP data from 11 low rank, virgin coal-fired EGUs and acid gas HAP data from 7 low rank, virgin coal-fired EGUs, not just from 2 as noted by commenter. The units that were included in the MACT Hg floor for this subcategory are well controlled and have ACI, wet/dry FGD, and fabric filters, and these and other units were included in floor calculation for PM and HCl. Thus, commenters assumption that the units in the low rank, virgin coal subcategory for which we have data are not good performers is not accurate. Based on these facts, the EPA disagrees with commenter's statement that there is no distinction between the Hg emissions data from low rank, virgin

coal EGUs. Even after revising the data set partly based on comments received, there are no low rank, virgin coal-fired EGUs whose data are in the top performing 12 percent of the Hg data set.

c. The definition of the subcategory is imprecise.

i. The EPA should specify how to measure height-to-depth ratio.

Comment 19: Commenter 18932 states additionally, the proposed definitions for each subcategory are imprecise and subject to manipulation. According to the commenter, for instance, the definitions do not indicate how to measure the height-to-depth ratio of a unit; whether the ratio is based on the dimensions of the inside volume of the unit or its outside surface area. The commenter states that nor does the definition make it clear whether the height-to-depth dimensions include the structural components of the unit or merely its functional elements.

ii. The EPA should define "nonagglomerating fuel."

Comment 20: Commenter 18932 states that the Southeast Environmental Organizations have not found an established technical definition for "nonagglomerating fuel." The commenter states that the definition does not indicate how a unit that is designed to burn a mixture of agglomerating along with nonagglomerating fuels should be characterized. According to the commenter, rather, it merely states that a low-Btu unit is designed to burn a nonagglomerating fuel, not that it is exclusively designed to do so. Commenter states that the lack of precision or established standards in these definitions will allow EGU operators to misconstrue these terms to circumvent more stringent mercury emission limits that the units can and should meet.

iii. The EPA should specify whether the 8,300 Btu/lb is gross or net.

Comment 21: Commenter 18425 states that if the EPA uses the >8,300 Btu/lb coal units subcategory, it is important for the EPA to clarify the definition of such units. The commenter states that first, as the NESHAP is written currently, there is no indication whether the <8,300 Btu/lb indicates the gross calorific value or net calorific value of the coal (whether or not the heat contained in the water vapor from combustion is recovered). The commenter asserts that it is important to specify which measurement is being used so units can meet the proper emissions standards.

iv. The EPA should specify the method to determine gross or net heat.

Comment 22: Commenter 18425 states that the method to determine the gross or net heat output needs to be specified to ensure all owners/operators of EGUs properly measure and categorize their EGUs.

v. The EPA should state what types of coal are included in the subcategory.

Comment 23: Commenter 18425 states that the EPA needs to state which types of coal, aside from lignite, are included in these coal-burning units. The commenter states that the current definition of such units is units that burn "coal or coal refuse either exclusively, in any combination together, or in any combination with other fuels in any amount." According to the commenter, this definition does not sufficiently explain what constitutes "coal" for purposes of this NESHAP. The commenter states that the EPA should consider these suggestions and properly specify this subcategory if it insists upon using it at all.

Response to Comments 19 - 23: The EPA has clarified the definitions in the final rule. The height-to-depth ratio has been removed from the definition making these comments moot. The term "nonagglomerating" is contained within the American Society for Testing and Materials (ASTM) definitions which are well-known to industry. We have clarified that we are using "gross" MW in the final rule.

d. The subcategory creates an incentive to characterize as "low-Btu units" to avoid more stringent emission limits.

Comment 24: Commenter 18425 states that because these units have higher Hg emissions than other types of fuel, they should be regulated closely, not lumped into a subcategory with less stringent emissions limits. The commenter states that the proposed emissions limits for coal-burning EGUs with coal >8,300 Btu/lb is 0.000010 lb/GWh, and the emissions limit for coal-fired EGUs with coal <8,300 Btu/lb is only 0.040 lb/GWh. According to the commenter, this regulatory scheme essentially gives EGUs burning coal <8,300 Btu/lb less stringent emissions standards because they emit more Hg than units burning higher efficiency coal. The commenter asserts that in other words, they pollute more so they should get less stringent standards.

Comment 25: Commenter 18487 states that the EPA's MACT proposal includes an inadequately supported MACT subcategory for "junk fuels" which can and must be corrected in the final Rule. The commenter states that the EPA is permitted to distinguish among classes, types, and sizes of sources within a category or subcategory in establishing MACT standards, but is not required to subcategorize an industry when in standard setting. According to the commenter, where the EPA does set MACT standards based on industrial subcategories, the Agency's action must be reasonable, and well-supported. The commenter asserts that the EPA cannot use subcategories in such a way as to avoid the requirements of the statute, or as part of an effort to allow existing sources to avoid controls or standards.

Commenter 18487 states that the EPA's proposal appears at first glance not to devolve this standard setting process into one based on multiple fuel-based subcategories, as it proposed to do in 2004 with its unjustified "coal-rank" based scheme. According to the commenter, unfortunately however, a deeper look shows that the proposal does include an inadequately justified subcategory, which seems clearly designed to allow lignite burning plants to avoid more stringent MACT standards applicable to other coal-fired EGUs. The commenter states that this defect in the rule can easily be – and must be – corrected in the final rule, based on data the EPA has in the record.

Comment 26: Several commenters (19536, 19537, 19538) state that the EPA's authority to set MACT standards for subcategories of an industrial category is not unlimited. According to the commenters, the CAA provides only that the agency "may distinguish among classes, types, and sizes of sources within a category or subcategory in establishing [MACT] standards." 42 U.S.C. § 7412(d)(1). The commenters assert that it does not permit the EPA to distinguish between sources on other grounds, and does not require any subcategorization in MACT standard setting for a listed industry. The commenters state that the EPA's "subcategorization authority . . . does not authorize EPA to sidestep what Congress has plainly prohibited," or otherwise contradict section 112's basic command to require the maximum achievable reductions in hazardous air pollution. The commenters cites *Natural Resources Defense Council v. Environmental Protection Agency*, 489 F.3d 1364, 1372 (D.C. Cir. 2007) ("*NRDC v. EPA*"). According to the commenters, the plain text of the CAA demonstrates that Congress intended the EPA to create categories and subcategories in a regulated industry "as a step toward establishing emission

standards," not as part of a scheme to provide incentives for existing sources to avoid controls or standards. The commenters state that where the EPA sets MACT standards based on subcategories of an industry, the EPA must offer a reasoned justification for the subcategories it has chosen. 42 U.S.C. §§ 7607 (d)(3), (d)(6), (d)(9). See, e.g., *Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 947-950 (D.C. Cir. 2004) (remanding a decision to subcategorize in setting MACT standards because the Agency had not properly justified its subcategorization scheme).

Commenters (19536, 19537, 19538) states that sub-dividing the category according to the specified heating value is likely to cause confusion during implementation. The commenters state that for example, it is entirely possible that heating values for a number of subbituminous coals may fall above or below this break-point based on variability of heating values, mineral matter content, moisture content and the like. According to the commenters, the EPA has provided no clear standard by which to distinguish units "designed" to burn low-calorie coals, and those doing so by choice. The commenters assert that given the difference in the proposed Hg MACT limits (1.2 lb/TBtu for the greater than 8,300 Btu/lb category, and 4 lb/TBtu for the less than 8,300 lb/TBtu category), there will be a significant incentive for many sources that burn subbituminous coals to classify themselves into the less than 8,300 Btu/lb sub-category, and thereby bypass available means of reducing their pollution.

Comment 27: Commenter 18932 states that the proposed subcategorization scheme, which sets significantly more stringent Hg emission limits for high-Btu units, creates a powerful incentive for operators to characterize their EGUs as low-Btu units in order to evade more rigorous regulation. Commenter suggests that such an approach is antithetical to the fundamental goal of the CAA's hazardous air pollution provisions to "require the maximum degree of reduction in emissions of the hazardous air pollutants subject to [section 112 that] . . . is achievable for new and existing sources." Commenter provided details of a recent case (Plant Washington, Sandersville, Georgia) to demonstrate how the Agency's proposed subcategories based on coal heating value would create an opportunity for EGU operators to game the system.

Commenter 18932 concludes that establishing subcategories with markedly different MACT limits for Hg based on such imprecisely framed and manipulable characteristics as a unit's height-to-depth ratio, coal heat values, and other coal characteristics would encourage the same type of maneuvering to avoid more stringent emission limits. The commenter asserts that indeed, codifying such an approach in a NESHAP would greatly expand and magnify the risk of companies gaming the system to evade the highly protective MACT emission standards mandated by the CAA. Commenter states that the goals and requirements of CAA section 112, the evidence in the rulemaking record, and actual experience from recent cases all preclude setting separate Hg emission limits for EGU subcategories based on coal heating values, other coal characteristics, and EGU height-to-depth ratios.

Response to Comments 24 - 27: The EPA believes the revised subcategory definitions in the final rule clearly delineate the subcategory populations. We also believe the definitions in the final rule will prevent sources from potentially gaming the system. Responses to the remainder of the comments are set forth above and in the preamble to the final rule.

e. The subcategory creates an incentive for existing units to switch to dirtier coal.

Comment 28: Commenter 16122 states that the EPA's subcategorization scheme provides incentives for existing EGUs to switch to dirtier lignite coal. Commenter states that the proposed rule creates incentives for existing coal-fired EGUs to switch to a less efficient fuel (i.e., lignite) to fit into a

subcategory with a higher emissions standard. Commenter says that this is very concerning since it could effectively result in a substantial weakening of the EGU MACT Rule. According to the commenter, the EPA defines EGUs designed to burn lignite coal as "any EGU designed to burn [lignite coal] in an EGU with a height-to-depth ratio of 3.82 or greater." The commenter states that this definition provides too much flexibility for EGUs to switch categories by simply changing their fuel source.

Comment 29: Commenter 18425 states that the <8,300 Btu/lb coal subcategory also fails to incentivize future emissions reductions. The commenter asserts that the EPA is correct to emphasize point-of-use reductions in this NESHAP in the form of numeric emissions limits. The commenter states that such emissions limits will reduce the amount of HAP released into the atmosphere. According to the commenter, regulating point sources through the use of numeric emissions limits will result in an overall reduction in HAP, especially for Hg because there has never been a federal standard limiting Hg emissions. The commenter states that however, in implementing this NESHAP, the EPA's goal should be to promote future emissions reductions from using cleaner fuel types in addition to creating point-of-use reductions. The commenter asserts that the EPA attempts to equalize the energy sector through this NESHAP by subjecting all covered EGUs of the same type to the same emissions limitations. According to the commenter, however, the subcategory designation for EGU units designed to burn coal <8,300 Btu/lb incentivizes the use of lower-quality fuels by permitting lower standards for those units. The commenter states that the EPA instead should incentivize the use of cleaner fuels.

Commenter 18425 states that the EPA should not use a special subcategory for coal-fired EGUs that burn coal <8,300 Btu/lb. Commenter believes that grouping these units with coal-fired EGUs that burn coal >8,300 Btu/lb will encourage units using low-efficiency coal to upgrade to cleaner fuel types. According to the commenter, such incentivizing will result in future emissions reductions, which will provide benefits to public health as well as wildlife and the environment.

Response to Comments 28 and 29: The EPA does not agree with commenters that establishment of this subcategory will incentivize the use of low-rank, virgin coals because of the definition in the final rule.

f. The subcategory creates an incentive to build new units that burn dirtier coal.

Comment 30: Commenter 16122 states that the EPA's subcategorization scheme also provides incentives for power generators to construct new sources that burn dirtier lignite coal. Commenter states that the EPA's subcategorization scheme for new coal-fired sources is even more disturbing since it strongly encourages EGU developers to construct new EGUs that are designed to burn inefficient, dirty coal. According to the commenter, this is because the EPA's proposed rule creates a MACT standard that is *4,000* times higher for EGUs designed to burn lignite than the MACT standard for EGUs designed to burn other ranks of coal. The commenter asserts that again, the CAA does not require the EPA to set MACT standards for different subcategories, and the EPA provides no justification in the preamble for creating two vastly different standards based solely on the rank of coal.

Commenter 16122 states that the perverse incentives created by the EPA's subcategorization scheme for new coal-fired EGUs frustrate the purpose of the CAA - to achieve the greatest reduction of HAP that is achievable. According to the commenter, when Congress enacted section 112 it purposely created two standards - one for existing sources and another for new sources. The commenter states that Congress realized that new sources could achieve significantly lower emissions of Hg because it is more cost

effective to implement Hg control strategies at the design stage. The commenter asserts that however, in this proposed rule, the EPA frustrates Congressional intent by allowing new lignite EGUs to emit 4*,000 times* more Hg than other new coal-fired sources burning bituminous and subbituminous coal.

Commenter 16122 adds that the EPA's subcategorization scheme is also in contradiction to its intention to establish MACT standards that support a coordinated air pollution compliance strategy for EGUs. Commenter states that in contrast to this stated approach, the EPA strongly incentivizes EGU developers to invest in new EGUs designed to burn lignite, which would not only result in tremendously higher Hg emissions but significantly higher emissions of greenhouse gases and criteria pollutants. According to the commenter, on average, burning lignite coal is less efficient than other ranks and results in higher emissions of CO_2, SO_2, and NO_X. The commenter states that hence, in order to encourage EGUs to make smart investment choices that will pay off long term internally and for public health, the EPA should create a single MACT standard for all new coal-fired EGUs. According to the commenter, by doing this, EGUs will be motivated to make practical investments which will lead to long-term reductions in multiple air pollutants and lower the EGU's overall compliance costs.

Commenter 16122 states that there is no reason why the EPA should further subcategorize coal-fired EGUs. Commenter states that, as the EPA has noted in the preamble to the proposed rule, there is no rationale for the EPA to further subcategorize coal-fired EGUs. Commenter states that although the Agency has the discretion to subcategorize sources by size, class or type under CAA section 112, such subcategorization is simply not required. Commenter adds that considering the range of control technologies available to EGUs to control Hg emissions, there is no reason why well-controlled units within the subcategories the EPA has already established should differ significantly in levels of Hg emissions.

In summary, Commenter 16122 states there is no reason to create a lignite subcategory for new EGUs. Commenter states, in fact, creating a lignite subcategory would encourage the construction of significantly dirtier units. Commenter states, however, if the EPA insists on creating a lignite subcategory for new EGUs despite the adverse effects this would cause, the EPA must consider the numerous available studies regarding the effectiveness of alternative Hg control technologies, and regulate beyond the MACT floor for new lignite facilities.

Response to Comment 30: The EPA disagrees with commenter that creating such a subcategory will encourage the proliferation of new lignite-fired EGUs. Lignite is not of sufficient quality (e.g., high moisture content, low energy density) to warrant transportation over long distances and, thus, EGUs burning lignite are built at or near the mines that generate the coal. The availability of such mines is not infinite and the economics of construction of a new lignite-fired EGU would not be enhanced by the final rule. There have been less than a half-dozen such units built in the last 10 – 15 years.

g. Technology exists and is in use on existing units which does not justify the subcategorization.

All comments have been moved or combined with other comments.

h. There is no substantial design difference.

Comment 31: Commenter 18425 states that there are no substantial design differences between coal-fired EGUs that burn coal <8,300 Btu/lb and those that burn coal >8,300 Btu/lb. According to the commenter, as the EPA noted, units that burn coal <8,300 Btu/lb have larger boilers to accommodate the

larger volume of coal that must be combusted. The commenter states that however, the EPA even notes that for the rest of the regulated HAP, there is no discernable difference in emissions between units burning coal <8,300 Btu/lb and those burning coal >8,300 Btu/lb. According to the commenter, because all HAP emissions between these two types of coal-fired EGUs are the same except Hg, it makes more sense to regulate them according to the same numeric emissions limits, rather than creating two separate subcategories. The commenter asserts that the adverse environmental and public health effects of Hg demand the EPA closely regulate large sources of Hg, such as EGUs burning coal <8,300 Btu/lb. According to the commenter, the totality of these facts indicate that the EPA should regulate EGUs burning coal <8,300 Btu/lb with the same Hg emissions standards used for units burning coal >8,300 Btu/lb.

Comment 32: Several commenters (19536, 19537, 19538) states that there is no technical justification for two subcategories defined by the 8300 Btu/lb characteristic; there is no difference between the combustion technologies and pollution-control options available to facilities burning the different grades of coal. Indeed, the industry experience is one in which the same or very similar pollution-control methods are employed for a variety of coal ranks, as environmental groups pointed out previously to the Agency in comments on the 2004 MACT standards proposal. According to the commenters, the data demonstrates that EGUs commonly burn a blend of coals, above and below the 8300 Btu/lb threshold. The commenters state that moreover, Babcock and Wilcox, the manufacturer of various coal-fired power plant components, states that the majority of bituminous, subbituminous and lignite fired conventional units are adaptable to most types of coal.

Commenters (19536, 19537, 19538) states that the EPA has presented no reason why the units in its less-than-8300 Btu/lb subcategory could not alter their choice of fuels, or otherwise reduce their emissions to match the performance of units burning higher-calorie coals. See 42 U.S.C. section 7412(d)(2) (requiring the EPA to set standards which include pollution reductions achievable, inter alia, through "process changes, [or] substitution of materials."). According to the commenters, most coal plants (including their various sub-systems) are designed to accommodate coals of different properties. The commenters state that even for conventional pulverized coal fired units, the fuel storage areas, flue handling systems, pulverizers, burners and the combustion air circuit, the firebox, as well as the later heat transfer surfaces such as the superhaters, reheaters, economizer, air preheaters are all designed to accommodate coals of different properties. The commenter asserts that fluidized bed units are even more accommodating of a range of fuel properties. According to the commenters, similarly, the add-on pollution controls affecting hazardous air pollution depend mainly on the nature of exhaust gases from the unit; they can, accordingly, can be uniformly installed at coal-fired units of various designs. The commenters state that there are no significant design differences between coal-fired units to justify the proposed (or any other) subcategories.

Response to Comments 31 and 32: We respond to these comments above. In addition, the EPA has revised the definition for this subcategory.

i. The EPA should establish a single MACT limit for emissions from all new coal units.

Comment 33: Several commenters (19536, 19537, 19538) state that the EPA does not simply propose its 8300 Btu/lb distinction as defining existing source subcategories; it also extends this for use in standard setting for new sources. According to the commenters, the EPA has absolutely no rationale for selecting this subcategory for new units. New EGUs can very easily be designed to provide optimum performance – and control – when firing all kinds of coal. The commenters state that even in its

extraordinarily weak 2003 proposal, the EPA agreed that "the industry has some ability during the designing of new units to choose coal or oil that would minimize emissions of Hg and Ni and recognizes that the MACT standard for new units should, to the extent possible, encourage the industry in that direction." The commenters assert that the EPA now seems to believe that a unit combusting coal with heat values below 8300 Btu/lb and coal above 8300 Btu/lb are not "similar units," for the purpose of deriving MACT floors for new sources. According to the commenters, these units are not just similar, they frequently are units of exactly the same design, with the only difference being that their owners/operators choose different fuel suppliers as they strive to minimize the cost of coal. The commenters assert that put differently, the same units can and do burn more than one type of coal. According to the commenters, the EPA has not justified the less than 8300 Btu/lb subcategory for new units. The commenters state that the EPA should establish a single MACT limit for emissions from all new coal units.

Response to Comment 33: The EPA believes that at this time, for the reasons provided above and in the preamble, it remains appropriate to maintain two coal-fired EGU subcategories for new EGUs in the final rule.

3. Support for expanding the Btu/lb threshold for the subcategory.

Comment 34: Commenter 12991 supports the expansion of the EPA's proposed lignite-fired subcategory (coal <8,300 Btu/lb). The commenter compared the heating value of coal delivered to the 40 best-performing low-Hg units with the coal delivered to U.S. electric power plants in 2009, noting that the distribution for all plants is bimodal, with the lower peak near 8,500 Btu/lb attributed to coal from the PRB. Commenter stated that the distribution for the 40 best-performing units is also bimodal, but the PRB peak is missing and the lower peak near 6,500 Btu/lb is attributed to waste coal. Commenter states that the absence of units designed to burn virgin coal with less than 9,500 Btu/lb within the group of 40 best-performing units is noteworthy, because the EPA justified subcategorization of lignite-fired units for substantially the same reason. According to the commenter, the expanded subcategory would include "units that are designed to burn pulverized virgin coal having a calorific value (moist, as-shipped basis) of 22,100 kJ/kg (9,500 Btu/lb) or less, where the furnace has a height-to-depth ratio of 3.53 or more." The commenter asserts that the EPA's proposed lignite-fired subcategory would include up to 7 percent of the coal burned at U.S. power plants, although the expanded subcategory would include up to 50 percent. The commenter states that the suggested 3.53 furnace height-to-depth ratio is consistent with the slagging behavior of subbituminous rank PRB coal. According to the commenter, a list of measured furnace dimensions for the 1,061 affected units is needed to identify units that have height-to-depth ratios greater than 3.82 or 3.53 and would be included in either the proposed or expanded subcategories.

Alternatively, Commenter 12991 states that if the EPA decides that more than 40 units are required to characterize the Hg emissions from the best-performing 12 percent, justification for the more limited lignite-fired subcategory might be maintained. Commenter says that 19 units that burn PRB coal are within the top 127 units ranked by Hg stack emission rate, but the best lignite-fired unit (Sandow 5B) is ranked 138.

Response to Comment 34: The EPA disagrees with commenter and has not expanded the threshold for the subcategory or the basis for establishing the MACT floor standards for mercury. We have revised the definition of the subcategory in the final rule as explained in the preamble to the final rule.

4. Suggested revisions to the definition of the source category.

a. Only lignite.

Comment 35: Commenter 16122 states that if EPA keeps the subcategorization for existing EGUs, it should revise the rule's definition to limit the subcategory to "any EGU designed to burn *only* [lignite coal] in an EGU with a height-to-depth ratio of 3.82 or greater." According to the commenter, , the definition in the proposed rule, unlike the preamble to the rule, does not make clear that the 3.82 height-to-depth ratio applies to the EGU furnace and not the EGU as a whole. Accordingly The commenter states that the definition in the final rule should be revised further to state "any EGU designed to burn *only* [lignite coal] in an EGU furnace with a height -to-depth ratio of 3.82 or greater."

b. No less than 75 percent lignite.

Comment 36: Commenter 17620 states that the definition of this subcategory gives rise to some concerns that many sources, other than those contemplated by the EPA, may qualify for these relaxed limits. According to the commenter, the definition of the subcategory applies to any EGU with a height-to-depth ratio of 3.82 or greater that burns any amount of low-rank coal. The commenter states that most, if not all, coal-fired EGUs have the capability of burning some amount of low-rank coal, especially if the low-rank coal is pre-blended with higher quality coal. The commenter asserts that we have not found any information in the record that systematically identifies the number of conventional boilers that may in the past have burned small amounts of lignite, or may choose to do so in the future, to take advantage of the more lenient Hg limits proposed for lignite-fired conventional boilers. According to the commenter, to prevent such gaming, any definition of lignite-fired units should include a requirement that any such unit must have used lignite for no less than 75 percent of its heat input over each of the last 3 years. The commenter states that one Commenter member with experience in permitting lignite-fired facilities has confirmed that there are a number of facilities that do not combust lignite on a regular basis, but are in a position to take advantage of the more lenient Hg limits for lignite-fired units if the rule is adopted as proposed.

c. Remove the height-to-depth ratio.

Comment 37: Multiple Commenters (17815, 17818, 17904, 17925, 17930, 18785, 19040) request that the EPA remove the height-to-depth ratio from the definition of the subcategory.

Comment 38: Commenter 17815 states that the height-to-depth ratio criteria for subcategorization of low rank coal units should be removed. According to the commenter, the EPA has proposed a subcategory for Hg limits for low-rank coal units and a prescribed height to depth ratio of >3.82 (often referred to as "boiler aspect ratio"). Although Commenter strongly supports the EPA's use of its discretion to propose new standards that are subcategorized, Commenter recommends that the EPA remove the height-to-depth ratio criteria from the low-rank fuel boiler criteria. Commenter is not aware of any predefined height-to-depth ratio specified in regulatory or other standards to define a low-rank coal unit, and the EPA has not explained the purpose or foundation for the 3.82 height to depth ratio. Further, Commenter member companies have reviewed the aspect ratio of their low rank coal units and have identified that the EPA's proposed height-to-depth ratio does not include designs of all low-rank coal unit manufactures or types of boilers for burning such fuels. The commenter states that if the prescribed 3.82 height-to-depth ratio were to be used, at least four units (Oak Grove Unit 2, Monticello

Unit 3, Twin Oaks Units 1 & 2) from Commenter member companies' fleets that are designed to burn <8,300 Btu/lb would be erroneously excluded.

Comment 39: Commenter 17818 states that the EPA appears to be introducing a requirement for furnace sizing for determination of what emissions limitations would be applicable to the unit. It is Commenter's opinion that this is inappropriate, as furnace design and sizing is a function of the characteristics of the fuel(s) intended to be combusted in the unit. According to the commenter, even among specific coal ranks or classifications, (such as bituminous, subbituminous, or lignite), the furnace sizing (and width-to-height ratio) may differ greatly depending upon the characteristics of the particular fuel(s) the steam generator is being designed to combust. The commenter asserts that other factors that could affect the width-to-height ratio include the steam generator's design operating pressure, total output, firing configuration, etc. Further, Commenter was unable to locate any data in the docket that permitted an analysis of furnace sizing and fuel type/category. It is Commenter's opinion that the EPA should consider definitions that draw distinction only between fuel types based on ASTM or other similar coal ranking or standard, without regard to furnace sizing.

Comment 40: Commenter 17904 states that a technical clarification is needed. According to the commenter, the height-to-depth ratio specified in the proposed rule excludes some lignite burning units that have the same "difference in emissions" identified by the EPA. The commenter states that as proposed, a "unit designed for coal <8,300 Btu/lb" is defined as "any EGU designed to burn a nonagglomerating virgin coal having a calorific value. . . of less than [8,300 Btu/lb] in an EGU with a height-to-depth-ratio of 3.82 or greater." According to the commenter, a "unit designed for coal > 8,300 Btu/lb subcategory includes any EGU designed to burn a coal having a calorific value . . . of greater than or equal to [8,300 Btu/lb] in an EGU with a height-to-depth ratio of less than 3.82." The commenter states that these definitions have the unintended effect of excluding certain boilers from both definitions. Commenter has reviewed the aspect ratio of its boilers and has identified that the EPA's proposed aspect ratio does not include boiler designs of all boiler manufacturers for burning lignite.

Commenter 17904 is not aware of any predefined aspect ratio specified in regulatory or other standards to define a low rank fuel boiler. According to the commenter, the EPA has concluded from the data it gathered in the ICR that there are no EGUs burning lignite with a height-to-depth ratio of 3.82 or greater. The commenter asserts that as the EPA notes, a lignite boiler "is bigger than a boiler designed to burn coals with higher heat values to account for the larger volume of coal that must be combusted to generate the desired level of electricity." The commenter states that however, these types of boilers are taller and deeper than boilers for other fuels, all else being equal, the specific height-to-depth ratio is determined by each boiler manufacturer based on their particular design criteria.

Commenter 17904 presents Figure 19 (see docket entry), excerpted from Steam: Its Generation and Use, 40th Edition (a reference published by Babcock and Wilcox ("B&W")) that compares relative sizes and dimensions of boilers for various categories of fuel based on factors such as slagging potential of low rank fuels. Commenter believes this comparison is likely the original source of the EPA's proposed height-to-depth ratio of 3.82. The commenter states that however, as explained more fully in comments submitted by B&W, the relative height-to-depth ratio shown in this excerpt is illustrative only. The commenter asserts that B&W has designed lignite boilers with lower height-to-depth ratios, and it is the properties of lignite fuel that impact Hg emissions rather than the specific height-to-depth ratio of the boiler. B&W has specifically explained that the 3.82 ratio is not a firm design criterion.

Commenter 17904 states that although it has many tangential design, low-rank fuel boilers originally manufactured by Combustion Engineering that meet the EPA's proposed aspect ratio, Commenter also currently operates boilers originally manufactured by B&W that have a height-to-depth ratio less than 3.82. According to the commenter, these units are opposed-burner, wall-fired design, and are very tall but also have a deeper furnace to handle opposed-burner flame patterns. The commenter asserts that these units have a slightly lower aspect ratio of approximately 3.5. Even though these boilers have an aspect ratio that is not "3.82 or greater," these boilers (1) are "lignite boilers" and (2) have a boiler designed "to account for the larger volume of coal that must be combusted." According to the commenter, for instance, Commenter's Monticello Unit 3 and Oak Grove Unit 2 are designed to burn coal with a heating value of less than 8,300 Btu/lb, but have a height-to-depth ratio of slightly less than 3.82. The commenter asserts that in addition to lower heating value, variations in physical boiler design for units firing fuels less than 8,300 Btu/lb are also driven by fuel characteristics including sodium content and slagging potential. According to the commenter, therefore, in order to implement the EPA's appropriate policy choice and accurately reflect actual, existing boiler designs, and to bridge the gap between the proposed definitions for the two solid fuel subcategories, Commenter urges the EPA to remove the height-to-depth ratio from the definition of "unit designed for coal < 8,300 Btu/lb." According to the commenter, the EPA's basis for the lignite subcategory would remain undisturbed – no "lignite boilers" were "among the top performing 12 percent of sources for Hg emissions." The commenter asserts that significantly, the EPA's discretion to establish a standard for a class or type of boiler is not limited to this circumstance. The commenter states that in other words, regardless of whether some few units registered a given value on an individual "snapshot" stack test, the EPA can determine that a separate standard is appropriate for a class or type of boiler in light of what level of control is "actually achieved" under all operating conditions by that class or type of unit.

Commenter 17904 states that if the EPA determines however, that an aspect ratio must be part of the definition of the low-rank subcategory, then the ratio should be lowered from "greater than 3.82" to "greater than 3.5" to at least cover the ratios for existing lignite units currently operated by Commenter.

Comment 41: Commenter 17925 states that the definitions of subcategories of units designed for coal >8,300 Btu/lb and units designed for coal <8,300 Btu/lb should be changed to remove combustion unit geometry from the definitions. According to the commenter, the EPA has defined five categories for existing units depending on design fuel and fuel type. The commenter states that the proposed rule places a unit within one of these five categories. The commenter asserts that some boilers, such as Cleco's Madison 3 Circulating Fluidized Bed (CFB) Boiler, are designed and permitted to burn multiple fuels such as pet coke, subbituminous/bituminous coal, lignite, biomass and other fuel types. According to the commenter, the unit's fuel mix is generally not set long term since it is dependent on multiple factors such as availability and cost. The commenter states that under the proposed rule, the definition of a "coal unit" is one that burns any amount of coal. According to the commenter, the coal unit is subcategorized into units that are designed to burn fuels >8,300 Btu/lb and units designed to burn fuels <8,300 Btu/lb. The definition of a "solid-oil" unit is one that burns petroleum coke. The commenter states that outside of the lignite subcategory's furnace height to depth ratio of 3.82, Madison 3 meets all three fuel categories.

Commenter 17925 states but since Madison 3 can burn lignite, that is, a fuel in the subcategory of fuels <8,300 Btu/lb, it would be unfair to penalize the unit because it does not meet a furnace height-to-depth ratio that was apparently taken from an example lignite boiler dimension in a Babcock & Wilcox book, Steam and It's Uses. According to the commenter, the book's discussion in Chapter 20 at Figure 19 clearly shows that the primary purpose of the height to depth ratio for this type of coal is to reduce the

potential for slagging and not for emission control. In fact, Commenter understands that B&W built lignite boilers that don't meet this ratio. The commenter states that if a unit can burn lignite without modifications, it should be eligible for the lignite category. Therefore, Commenter proposes that the EPA remove the combustion unit geometry description from the definitions of the two subcategories of coal.

Comment 42: Commenter 17930 supports the creation of this subcategory but believes the proposed unit characteristics within this category should be modified. Commenter strongly supports the EPA's decision to design a subcategory for these units, but objects to the use of the height-to-depth ratio of 3.82 or greater. The commenter states that this ratio should be removed from the definition. According to the commenter, the new definition should state: Unit designed for coal < 8,300 Btu/lb includes any EGU designed to burn a nonagglomerating virgin coal having a calorific value (moist, mineral matter free basis) of less than 19,305 kJ/kg (8,300 Btu/lb).

Commenter 17930 states that the EPA has provided no basis in the rulemaking regarding the purpose or foundation for the 3.82 ratio. None of Commenter's members have seen 3.82 as a common measure within the lignite-fired EGU industry. The commenter states that further, boiler height-to-depth ratio has no effect on Hg and non-Hg HAP removal.

Commenter 17930 states that the apparent source of the 3.82 ratio is the Standard Handbook of Powerplant Engineering, which contains a graphic displaying side-by-side height/depth/width dimensions of bituminous, subbituminous, and lignite furnaces. The commenter states that the graphic is entitled "Influence of coal ash slagging potential on furnace size." According to the commenter, the purpose of this graphic is not to demonstrate a standard height-to- depth ratio. The commenter states that its purpose is only to demonstrate that typically, units burning lignite require larger furnaces than those burning bituminous or subbituminous coals. The commenter asserts that the graphic is clearly not applicable to CF) boilers which may have a lower height-to-depth ratio. The commenter asserts that further, even though the graphic may generally be depicting a wall-fired boiler, at least two Commenter member wall-fired boilers (Oak Grove Unit 2 and Monticello Unit 3), designed to burn <8,300 Btu/lb coal, would be excluded if the ratio was set at 3.82.

Commenter 17930 states that it is apparently based on this 3.82 ratio that the EPA in its Beyond-the-Floor Memorandum excludes, at a minimum, four of Commenter's units from Subcategory 2 that were designed to burn <8,300 Btu/lb coal. According to the commenter, these units were originally designed to burn lignite with a heat value of <8,300 Btu/lb, are mine-mouth lignite-fired power plants, and are classified in the EPA and U.S. Energy Information Administration (EIA) databases as lignite units. The commenter states that they are: Big Brown (EPA ID 3497) Units 1 and 2, and Monticello (EPA ID 6147) Units 1 and 3. Monticello Unit 2, a similarly designed lignite-burning unit to the other lignite units, is included in the EPA's Beyond-the-Floor Memorandum Subcategory 2 listing.

Commenter 17930 states that Although removing the 3.82 ratio would likely include all units originally designed to burn <8,300 coal, any finalized rule proposal should include within Subcategory 2, at a minimum, all of the units identified in Attachment A: Texas, Mississippi, and Louisiana Existing EGUs Designed to Burn <8,300 Btu/lb Coal. Attachment A is a non-exhaustive list and does not include the EPA recognized, or potentially recognized, Subcategory 2 units in North Dakota, Montana, and other states where <8,300 Btu/lb coal is burned.

Comment 43: Commenter 19040 states that to the author's knowledge, the EPA has never specified a technology for complying with a regulation. The EPA has always allowed the EGU to select the technology that will satisfy the regulatory requirement and allows the EGU to address unique situations the EGU may have. The commenter states that by specifying the height-to-depth ratio for EGUs that are firing a coal with< 8,300 Btu/lb, the EPA is essentially specifying a control technology, which the EPA has never done before. According to the commenter, if an EGU is designed to fire coal with< 8,300 Btu/lb and has a height-to-depth ratio of 3.82 or greater, the EPA has essentially limited the control options for the EGU. The commenter states that by specifying the height-to-depth ratio and the calorific value of the fuel in a single definition, the EPA has created a subcategory of EGUs that is not covered by this regulation. The commenter asserts that f an EGU is firing a coal that is > 8,300 Btu/lb and the EGU has a height-to-depth ratio that is 3.82 or greater, the EGU is not covered by this regulation. According to the commenter, this is also true if an EGU is firing a coal with< 8,300 Btu/lb and the height-to-depth ratio is less than 3.82. The commenter states that this last scenario is not addressed in this proposed regulation. The commenter asserts that it is suggested that the EPA eliminate the height-to-depth ratio in the regulation. According to the commenter, this ratio is going to be dictated by the fuel the EGU is going to fire and should not be regulatory requirement for determining the emission limitation. The commenter states that the fuel higher heating value on a moisture and ash free basis should determine the regulatory requirement, not the fuel's higher heating value and some arbitrary height-to-depth ratio.

Comment 44: Commenter 18785 generally supports the EPA's effort to create a subcategorized Hg category for units designed to burn coal with heat-inputs of less than 8,300 Btu/lb, but the subcategory's 3.82 height-to-depth ratio criterion must be removed. Commenter owns and operates two Paint Leg CFB boilers designed by Alstom and the EPA has recognized that the units are in the Hg subcategory for units designed to burn coal with heat-inputs of less than 8,300 Btu/lb. According to the commenter, this is evident in the technical document describing the beyond-the-floor requirements for the subcategory. Twin Oaks is included in Table 5: Subcategory 2 EGUs BTF Option Impact Estimates of this technical document. The commenter states that however, we outline the following points regarding the subcategory for clarification and to ensure that CFB boilers are not inadvertently excluded from the subcategory due to the 3.82 height-to-depth ratio criterion. The commenter asserts that we also fully support the "designed to" element of the definition, as it will allow Twin Oaks to continue to co-fire environmentally beneficial alternative fuels, allowing emissions reductions and compliance with future EPA regulations and standards.

Commenter 18785 states that the dimensions of a CFB combustor are not determined based on a ratio of height-to-depth, and are not a control feature for managing Hg emissions. According to the commenter, dimensions of a CFB are the result of process parameters that must be met in order to fluidize and circulate the fuel and sorbent particles in the combustor.

Commenter 18785 states that the depth of a combustor is determined by its plan area. The commenter states that the plan area of a CFB combustor is proportional to unit capacity since design fluidizing velocity is fixed. According to the commenter, the relationship between combustor plan area and fluidizing air velocity is: Plan Area of the Combustor = Volumetric Fluidizing Air Flow/Fluidizing Air Velocity. The commenter asserts that for a CFB the velocity of fluidizing air is 15-30ft/sec with an average bed particle size of 100-300 μm [footnote 1], According to the commenter, although the volumetric fluidizing air flow is determined by air flow required for the fuel to be burned. The commenter states that with the fluidizing air flow and velocity being known the combustors plan area can be calculated.

Commenter 18785 states that the height of a CFB combustor varies with its steam generating capacity, and the height of a CFB increases as its steam generating capacity increases in order to absorb the required heat in its walls.' According to the commenter, CFB combustor heights greater than 100-110 ft offer diminishing returns because the heat-transfer rates are low in the upper combustor and additional fan power is required to achieve a desired solids loading at the combustor outlet. The commenter states that the dimensions of the cyclone collector and fluid bed heat exchanger have a large influence on establishing a CFB combustor's height. The commenter asserts that since the combustion temperatures of CFBs are below the ash fusion temperature slagging is not an issue, and therefore is not a factor in determining the combustor's height.

d. Subcategorization should be based on original boiler design.

Comment 45: Commenter 17725 recommends that the applicable subcategory is based on the boiler's original design to combust a low-rank coal (e.g., lignite) with a calorific value less than 8,300 Btu/lb and the boiler remains in this subcategory, provided low-rank coal continues to be burned in the boiler, even if blended with higher-rank coal.

e. Expand the subcategory to other pollutants.

Comment 46: Commenter 17725 requests that the EPA give additional thought to expanding the low rank coal (<8300 Btu/lb) subcategory for other trace metals subject to regulation under the proposed rule. According to the commenter, the relevant fuel and unit design properties that support a separate low-rank coal subcategory for Hg emissions also support including the other trace metal emissions subject to regulation in this subcategory.

Comment 47: Commenter 17813 states that to the extent that the EPA finalizes a rule to reduce non-Hg HAP, subcategorization should be extended to emissions limits for non-Hg metal HAP and averaging time should be expanded to recognize the variability. The commenter states that it appears clear that the EPA will promulgate emissions limits for non-Hg HAP, despite no measured benefits of reducing non-Hg HAP. To the extent that the EPA promulgates these emissions limits, Subcategory 2 should be expanded beyond Hg and apply to all HAP. According to the commenter, the emissions limit for non-Hg metal HAP, with total PM as a surrogate, is believed to be unattainable for lignite-fired EGUs.

Comment 48: Commenter 17813 states that continuing with the currently proposed PM limits poses a dual problem for lignite units, as compared to other types of coal units. The commenter states that first, lignite has a higher ash content than other types of coals. According to the commenter, for every pound of lignite burned, there will simply be more PM generated. The commenter asserts that second, due to the lower heating value of lignite, more must be burned in order to generate the same level of energy produced as other types of coals. According to the commenter, in a comparison of our Texas lignite mine to PRB subbituminous coal, Texas lignite could have in the range of 9 times more ash than PRB coal. (Our mine has coal with a heat content of 5,250 Btu/lb, containing 27.8 percent ash or 52.9 lb of ash/millionBtu. The commenter states that this is compared to typical PRB coal, which has a heat input of 8,400 Btu/lb, containing 5 percent ash or 5.9 lb of ash/millionBtu.) According to the commenter, these numbers also demonstrate that due to the lower heating value of lignite, more must be burned in order to generate the same level of energy produced as other types of coals. The commenter asserts that he EPA has already acknowledged this difference in supporting Subcategory 2 for Hg. A non-Hg metal HAP subcategory would have the same legal and technical basis and be the same in practice as the modified Subcategory 2 for Hg.

Commenter 17904 asks the EPA to reconsider its calculations. The commenter states that moreover, the commenter urges the EPA to establish a separate standard for non-Hg metallic HAP emissions from lignite units if the EPA retains total PM as the surrogate. The commenter asserts that although they fully support the EPA's proposal of separate Hg limits for lignite boilers, the commenter believes the EPA has not provided a sufficient basis for the proposed beyond-the-floor standard. Finally, the commenter believes the 3-year compliance schedule is inadequate and unworkable. Commenter 17904 states that on review of ICR database for lignite boilers for total PM and for each of the non-Hg metals it has determined there is a substantial difference in the measured emissions from lignite boilers than from other types of boilers, justifying the establishment of alternate MACT limits for total PM.

Commenter 17930 states that Subcategory 2 should be expanded beyond Hg and apply to all non-Hg metal HAP as PM. According to the commenter, the emissions limit for non-Hg metal HAP, with total PM as a surrogate, is unattainable for lignite-fired EGUs.

Commenter 17904 requests that the EPA establish a separate PM standard for lignite units.

Response to Comments 35 - 48: Partly based on comments received, the EPA recognizes that the proposed definition was inadequate to fully characterize the subcategory. Therefore, the EPA has revised the definitions in the final rule and the revised definition does not include a boiler height-to-depth ratio. However, the EPA does not believe that there is sufficient justification to expand the subcategory to additional HAP given that low rank, virgin coal-fired EGUs are among the top performing 12 percent in each of the acid gas and non-Hg metallic HAP groups. In addition, the EPA has included alternative equivalent total metal and individual metal standards so that units have compliance options for the final PM standard. Comments related to beyond-the-floor and compliance time issues are addressed elsewhere in this document.

5. Specific questions/clarifications regarding the subcategory.

Comment 49: Commenter 17927 says that the EGU Revised MACT Floor Memo developed by RTI International and dated May 18, 2011, states that Subcategory 2 contains fewer than 30 sources. Commenter asks the EPA to please provide the list of the sources included in this subcategory and the reason(s) why they are included in Subcategory 2.

Commenter 17927 asks the EPA to clarify how the height-to-depth ratios used in the definitions for these subcategories were determined. According to the commenter, it does not appear that any information related to specific boiler design was submitted to the EPA as part of the CAA section 114 ICR used to establish the emission limits in the proposed rule.

Commenter 17927 asks the EPA to clarify the definition of height-to-depth ratio as it applies to affected EGUs in the proposed rule. According to the commenter, this definition is not commonly used by boiler manufacturers or operators.

Comment 50: Commenter 17761 requests clarification about unit applicability and the current subcategorization approach. The commenter states that specifically, several units were designed to burn less than 8,300 Btu/lb coal, but do not appear to meet the boiler height-to-depth ratio requirement. However, Commenter cannot absolutely establish the boilers' height to depth ratios as the EPA has not provided information on how to calculate this ratio. According to the commenter, if it is the EPA's intent that this provision only apply to lignite-fueled units, then the section should be redrafted to clearly

state this objective, versus including a convoluted, undefined boiler size calculation methodology. The commenter states that again, the most straightforward approach would be to provide specific emission limits for each fuel subcategory (bituminous, subbituminous, lignite, etc.).

Comment 51: Commenter 19040 states that the definition of this subcategory creates some unintended consequences that may need to be addressed by the EPA. Commenter asks, what if an EGU is designed to fire a nonagglomerating coal having a calorific value <8,300 Btu/lb and has a height-to-depth ratio of 3.82 or greater and the EGU is not firing the fuel the EGU was designed to burn? Commenter asks, what if the fuel being fired has a calorific value >8,300 Btu/lb? Commenter asks if the EGU is designed to fire a lignitic fuel and is currently firing a subbituminous fuel, does the EGU meet the emission requirements for the lignitic fuel or the subbituminous coal? According to the commenter, this will encourage EGUs that are designed to fire a lignitic fuel to possibly switch to a subbituminous coal because the EGU can fire a higher caloric fuel and have a less strict requirement for Hg emissions. The commenter states that instead of basing the regulation on the way the EGU was designed it is suggested the definition be changed to what the EGU is firing.

Response to Comments 49–51: The EPA erred in stating that there were only 30 EGUs in the subcategory; there are 36. The EPA believes it is following the mandate of CAA section 112 by using 12 percent of the data available to the Administrator in calculating the MACT floor (i.e., 2 sources) rather than 5 sources as explained elsewhere in response to comments and in the preamble to the final rule. As noted elsewhere in this document, the EPA has revised the definitions applicable to this source category in a manner that we believe addresses commenters' concerns.

3C - Subcategorization: IGCC (Proposed)

Commenters: 17191, 17775, 17801, 17821

1. Support for IGCC subcategory.

Comment 1: Commenters 17775 and 17821 agree with the EPA's proposal to create a separate subcategory for IGCC units. Commenters state that it is well understood that IGCC units use a process that is fundamentally different from that used by conventional pulverized coal-fired boilers and that, therefore, IGCC units should be placed in their own subcategory. According to the commenters, IGCC units consist of two distinct parts: a gasifier and a combined cycle unit. IGCCs do not burn coal in its solid form, rather the coal is converted to a combustible gas that is then burned in a turbine. The commenters state that the synthetic gas is cleaned and conditioned before being burned in a gas turbine. Commenters agree that if IGCC units are to be regulated under the EGU MACT, then IGCC units belong in a separate IGCC-only subcategory.

Comment 2: Commenter 17402 agrees that subcategorization of IGCC units is warranted because of the unique process employed by such units. According to the commenter, IGCC units are specialized units in which no coal is directly combusted during operation. The commenter assert that instead, coal is first converted to synthetic coal gas (i.e., syngas) comprised of hydrogen (H_2) gas and carbon monoxide (CO), which is then burned in a combustion turbine. The commenter states that the combustion turbine drives an electric generator that produces steam, which is then fed into a steam turbine connected to a second electric generator. According to the commenter, because of the fundamentally different design and operation of IGCC units, it is well within the EPA's authority to treat IGCCs as a separate subcategory.

Comment 3: Commenter 17801 states that the EPA has properly proposed a separate subcategory for IGCC units. The commenter states that the EPA proposes to subcategorize IGCC units as a distinct type of EGU for this proposed rule. According to the commenter, the EPA bases this approach due to the differences in process and emission characteristics as compared with conventional coal plants. Commenter agrees with this approach of establishing IGCC as separate subcategory and notes also that it allows for (1) provisions that are necessary to deal with IGCC's unique pre-combustion contaminant treatment and (2) the need for a single standard with unambiguous regulatory provisions as they apply to combustion turbines that are specifically designed for IGCC's coal-derived fuel versus other applications such as natural gas units.

Response to Comments 1 - 3: The EPA has maintained the IGCC subcategory in the final rule.

2. Coal and petroleum coke IGCC are similar.

Comment 4: Commenter 17191 says that in the preamble of the proposed rule, the EPA reports "Based on information available to the Agency, although the fuel characteristics of coal and petcoke are quite different, the synthetic gas products are very similar from both feedstocks." Commenter adds that the Agency cites a DOE 2002 study of the WVPA-owned facility as the source basis for the statement. Commenter supports the determination that the syngas products are similar whether coal or petcoke is used as feedstock. Commenter urges that the MACT rule makes no regulatory emissions distinction (aka "subcategories") for IGCC facilities whether the fuel source is coal, petcoke, or combinations of the two. Commenter emphasizes that blending of coal and petcoke should also be free of subcategorization under

the final MACT rule. According to the commenter, if the use of either feedstock represents a similar result, surely a combination of the two will as well.

Response to Comment 4: The EPA proposed standards for one IGCC subcategory. The EPA proposed to define IGCC unit, in part, as an EGU "that burns a synthetic gas derived from coal or solid oil-derived fuel in a combined-cycle gas turbine." We intended this definition to apply to units that burn gas derived from coal or solid-oil derived fuel both alone and in combination and we have revised the definition slightly to make clear our intention by stating that the gas burned is derived from "coal *and*/or solid oil-derived fuel..." (emphasis added).

3. The EPA should establish a subcategory for IGCC units designed for coals <8,300 Btu/lb.

Comment 5: Commenter 17801 states that a concern with respect to the Hg standard is the absence of a new source subcategory specific to IGCC designed and used for coals with <8,300Btu/lb (characteristic of certain U.S. subbituminous coals and lignite). The commenter asserts that no data or relevant references are contained in the proposed rule that explain the EPA's justification for this exclusion. According to the commenter, the only mention on the effect of feedstock effect is (page 25027) "Based on information available to the Agency, although the fuel characteristics of coal and petcoke are quite different, the syngas products are very similar from both feedstocks" derived from the DOE final report on the Wabash IGCC repowering. The two fuels (coal and petcoke) used had heating values (>10,000Btu/lb) and although major syngas constituents (CO, CO_2, H_2) are similar, the Wabash data does not include Hg speciation data nor is there relevance of the Wabash data for low rank coal. The commenter states that the EPA determined the floor of 0.04lb/GWh for boilers based on the assumed application of ACI and a criteria of a height to depth ratio (H/D) >3.82 – a characteristic design parameter for lignite boilers. According to the commenter, IGCC must also be purpose-built to use subbituminous coals or lignite of <8,300Btu/lb to accommodate their specific characteristics of moisture, sulfur and ash content. The commenter states that although such a purpose-built IGCC will similarly use activated carbon for Hg capture, the effectiveness of activated carbon will be dependent on the speciation of Hg following gasification which can be fundamentally different than obtained with bituminous coal or petroleum coke. According to the commenter, the verifiable IGCC design features specific for sub-bituminous and/or lignite are (1) dry feed, (2) ash handling capacity for 10 percent ash or higher, (3) capacity of the acid gas removal system and (4) sizing of the sulfur recovery system. The commenter asserts that these features will exclude operation to any coal other than subbituminous or lignite. The commenter states that we therefore recommend that a subcategory be provided for IGCC for coals with <8,300Btu/lb with a floor of 0.04lb/GW/h and consistent with that allowed for combustion coal units.

Response to Comment 5: The EPA has no information to suggest that an IGCC unit being built to burn synthetic gas derived from a nonagglomerating virgin coal having a calorific value (moist, mineral matter-free basis) of less than 19,305 kJ/kg (8,300 Btu/lb) could not meet the same emission limits as an IGCC designed to burn synthetic gas derived from any other coal or solid oil.

3D - Subcategorization: Oil - Liquid (Proposed)

Commenters: 17316, 17623, 17775, 17870, 17912, 18024, 18025, 18428, 18477, 18502

1. The EPA should establish separate subcategories for distillate and residual fuel oil.

a. Support for further subcategorization by oil type.

Comment 1: Numerous Commenters (17316, 17386, 17621, 17623, 17690, 17725, 17760, 17775, 17803, 17808, 17870, 17912, 18025, 18428, 18477) support the development of separate subcategories for distillate and residual fuel oil.

i. Fuels are different, boiler design is different, boiler operation is different, emissions are different.

Comment 2: Commenters 17316 and 17386 state that distillate oil, and in particular ultra-low sulfur diesel (ULSD) oil, has fuel characteristics closer to that of pipeline gas than to residual oils. The commenter states that the metals, as well as the ash and nitrogen content, of distillate oils are very low, and the sulfur content of ULSD is approximately the same as that of pipeline natural gas (0.5 grains Sulfur/100 scf gas; 15 ppm sulfur on a wt/wt basis). According to the commenter, separating liquid oil-fired EGUs in Tables 1 and 2 into two subcategories (distillate and residual oil) would be consistent with the discussion of subcategory differentiation in the rule's preamble. According to the commenter, Page 25037 of the preamble indicates that the division of a category into subcategories is justified if the two subcategories have very different emissions, which is true for distillate vs. residual oils. Distillate and residual oils are also differentiated by their operating requirements. The commenter asserts that residual oil must be heated to ~120 deg F for operational use, Although no heating of distillate oil is required. The commenter states that residual oil systems normally employ steam atomization, rather than air atomization, for proper combustion. According to the commenter, conversion of a burner system designed for residual oil firing to allow combustion of distillate oil can require significant hardware and control changes.

Comment 3: Commenter 17621 reviewed the ICR data and concludes that emissions of trace metals, including nickel, differ between distillate (No. 2) and residual (No. 6) oil. The commenter states that distillate and residual oil are different grades of fuel oil produced by refining crude oil. According to the commenter, they contain different levels of ash, sulfur and trace metals, and thus would be expected to have different emission characteristics. The commenter asserts that in the proposed rule, the EPA used emissions data from all liquid oil-fired units (excluding sites that co-fired natural gas) to develop the MACT standard for new and existing units. According to the commenter, ICR data from distillate and residual oil were combined to develop proposed regulations for total metals (including Hg), as well as for HCl and HF.

Commenter 17621 states that in developing the MACT standards for the liquid oil category, the EPA grouped emission results from distillate and residual oil together: the seven EGUs used to calculate the MACT floor included five that burned distillate and only one that burned residual oil. According to the commenter, two units from Mitchell Power Station [Office of Regulatory Information Systems (ORIS) Code 3181] were incorrectly reported as firing residual oil when they in fact burned distillate oil. The commenter asserts that figure 2-10 shows the cumulative frequency distribution of total metal emissions

from the six test sites firing distillate oil versus the 40+ units firing residual oil. According to the commenter, the "best-performing" 12 percent of the residual oil-fired EGUs have emissions that are nearly ten times higher than those of the five distillate oil-fired units. The commenter states that this trend is directly related to fuel metals content, as none of the distillate oil EGUs employs particulate emission controls. The commenter asserts that in contrast, about one-third of the residual oil sites have some form of PM control. Figure 2-11 shows that emissions of nickel, the major metallic element present in fuel oils, are also far lower from distillate oil-fired EGUs than from residual oil-fired EGUs. (See EPA-HQ-OAR-2009-0234-17621 for Figures 2-10 and 2-11.).

Comment 4: Commenter 17623 states that the EPA should create separate subcategories for distillate and residual oil. Commenter states that distillate oil is a more refined product than residual oil and thus burns cleaner. Commenter notes that due to the high cost of distillate oil, however, six of the distillate oil ICR test sites report capacity factors of less than 1 percent. According to the commenter, se of residual oil, on the other hand, is significantly higher than use of distillate oil, with more than 40 units in the ICR using residual oil. Commenter notes that despite this discrepancy, the EPA grouped emission results from both distillate and residual oil to determine the floor level. Commenter adds that, residual oil-fired units produce more PM emissions, for example, than distillate oil-fired units even though some residual oil-fired units have controls and no distillate oil-fired units in the ICR pool have controls. Commenter states that based on these differences, the EPA should have created subcategories within the oil category for residual and distillate oil.

Comment 5: Several Commenters (17690, 17760, 17803, 17808, 17870, 18025) recommend that the EPA consider subcategorizing residual and distillate oil-fired EGUs. According to the commenters, residual and distillate oils are distinctly different fuels with different physical characteristics, heat content, and emissions profiles. The commenters state that most of the fuel oil used in the electric power sector is residual fuel oil, a general classification for the heavier oils, including Grades No. 5 and No. 6, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in the refining process. The commenters assert that the lighter distillate fuel oils (No. 1 and No. 2) are characterized by lower viscosities and lower pour points. According to the commenters, these grades of oil are used in most domestic burners and in many medium capacity commercial-industrial burners where ease of handling and ready availability justifies the higher fuel costs.

Several Commenters (17690, 17760, 17803, 17808, 17870, 18025) state that the formal classification of fuel oil grades is specified in ASTM Standard D396-10 (Standard Specification for Fuel Oils), providing a clear basis for subcategorizing the two fuel types. The commenters assert that according to the standard, Grades No. 4 to No. 6 are generally residual fuels of increasing viscosity (resistance to flow) and boiling range. ASTM Standard D396-10 lists the viscosity of residual No. 5 and No. 6 fuel oils in the range of 5.0 to 50.0 square millimeters per second (mm2/s) at 100°C. According to the commenters, in contrast, ASTM Standard D396-10 lists the viscosity of distillate No. 1 and No. 2 fuel oils in the range of 1.3 to 4.1 mm2/s at 40°C. The commenters state that we would also emphasize that the handling and use of residual and distillate fuel oils requires a different set of equipment and technologies. The commenters assert that residual fuel oils must be stored, shipped, and transferred in heated tanks, vessels, and heat traced piping. According to the commenters, further, in order to burn residual fuel oil, it is necessary to break the fuel into small droplets using steam atomization (200 pounds per square inch [psi] steam) or high pressure mechanical atomization (1,000 psi).

Commenter 17870 states that switching from a steam-electric boiler currently designed and operated to burn residual fuel oil to a unit capable of burning distillate oil may also require tile following modifications:

Oil Secondary Containment:

-According to the commenter, double-wall tank bottoms

-According to the commenter, double pipe fuel transfer/supply lines outside containment areas

Fuel Pumping System:

-According to the commenter, new oil transfer/supply pumps. The commenter states that screw pumps are typically used for transferring and supplying Fuel Oil #6 to the boiler. The commenter asserts that due to the low viscosity of light oil, new pumps (e.g., centrifugal or gear pumps) would be required at the tank farm and power block.

Oil Atomization:

-According to the commenter, new oil atomizer assemblies. The commenter states that heavy oil atomizers are too big for firing light oil with much lower viscosity.

Tanks & Storage:

-According to the commenter, review of tank venting & lightning protection systems to handle lighter hydrocarbon products present in light oil.

Boiler Performance:

-According to the commenter, shift heat absorption profile by pushing more heat toward the upper furnace and backend due to changes in flame emissivity of light oil, resulting in higher attemperation (spray) demand. Shifting of the boiler heat distribution may also require boiler surface area upgrades (e.g., superheat and reheat tube metals and possible larger economizer tube banks) in order to maintain current unit generation output.

-According to the commenter, change flame detection system (e.g., new flame scanner) with greater infrared range to safety pick up brighter flames expected with light oil firing. Current flame scanners have wider ultraviolet range to accommodate darker heavy oil flames and purely UV natural gas flames.

-According to the commenter, increase in thermal NO_X (due to hotter flames), which may upset the expected reduction in fuel NO_X (due to lower fuel Nitrogen when firing light oil), resulting in an increase of flue gas recirculation demand and/or higher total NO_X emission.

-According to the commenter, retune boiler controls to account for new fuel, air, FW, drum level, spray and emission characterizations expected with light oil firing.

Several Commenters (17690, 17760, 17803, 17808,17870) state that as a consequence of the mechanical differences between boilers designed for residual oil vs. distillate oils, and between the fuel handling requirements for the different fuels, it is not possible to interchange oil types without significant modifications to the oil storage tanks, transfer pumps, piping and valves, flow control systems, burners and burner control systems. According to the commenters, given the differences between residual and distillate fuel oils, Commenters recommend that the EPA consider subcategorizing between residual- and distillate-oil fired EGUs based on the ASTM specifications or the relative viscosities of the fuels.

Comment 6: Several commenters (17808, 17870, 18025) state that the EPA lists 147 EGU boilers in the ICR database (Part I) that rely on residual fuel oil. According to the commenters, the EPA lists only seven EGU boilers that rely on distillate fuel oil: Harding Street (9 and 10), Eagle Valley (1 and 2), and Mitchell Generating Station (1, 2, and 3). The commenters states that three of these units (Mitchell Generating Station Units 1-3) are listed for retirement in 2013. Eagle Valley Units 1 and 2 are listed for retirement in 2017. The commenter asserts that other EGU boilers will burn limited quantities of distillate fuel oil for boiler light-off or other purposes, with fuel handling equipment separate from the residual oil equipment, although using another fuel, like natural gas, for the production of electricity. According to the commenter, under this option, given that the total universe of distillate oil-fired EGUs would include fewer than 30 units, the CAA directs the EPA to calculate the MACT floor based on a minimum of five units.

Comment 7: Commenter 17725 requests that the EPA establish a total metals emission based on the subcategorization of DFO and RFO units or if the limit is based on a dataset equal to the 12 percent top performers of the universe of the 154 oil-fired EGUs rather than 12 percent of the tested oil-fired EGUs.

Comment 8: Commenters 17775 and 18428 note that the EPA has not proposed to subcategorize oil-fired units, and that EPRI's review of the ICR data shows statistically significant differences in metal HAP emissions depending on whether an oil-fired unit burns distillate fuel oil (No. 2) or residual oil (No. 6). Commenters state that these differences justify subcategorization by fuel oil type for metal HAP emissions.

Comment 9: Commenter 18024 states that No. 6 oil-fired boilers and distillate oil-fired boilers are fundamentally different emission sources, with different physical and operating characteristics as well as different emission controls, and thus should be regulated differently. According to the commenter, distillate oil-fired EGUs are not physically capable, nor are they permitted, to fire No. 6 oil and vice versa. The commenter asserts that fuel oil receiving, storage, heated recirculation (in the case of No. 6 oil), fuel forwarding systems, burners, control systems and emissions monitoring and reporting systems for these two fuels are not compatible and are not interchangeable. The commenter states that they are therefore different and distinct source categories that should not be considered "similar sources" for purposes of setting MACT Floors.

The commenter states that in addition, best available control technology (BACT) for PM from distillate oil-fired boilers is the use of ultra-low sulfur distillate oil (ULSD), Although BACT for PM for a new No. 6 oil-fired unit would require electrostatic precipitators (ESPs). The commenter asserts that these two source types differ significantly in the type and degree of control technology needed to achieve state-of-the-art emission levels.

Comment 10: Commenter 17912 states that the combustion and emissions profiles of No. 2 and No. 6 fuel oil differ significantly, including heating value, impurities and other constituents. According to the

commenter, the EPA should therefore account for those differences by subcategorizing oil-fired EGUs, acknowledging that there are significant design and operational differences that warrant additional subcategorization under CAA section 112(d) (1).18. The commenter states that these differences impact the feasibility, cost and effectiveness of control technology. The commenter asserts that the EPA has provided no explanation for treating these fuels the same. The commenter states that indeed, none of the discussion in the preamble to the proposed rule concerns the merits of additional subcategorization of oil-fired units.

ii. Combined limits are unachievable for residual oil-fired units.

Comment 11: Commenters 17316 and 17386 state that by combining distillate and residual oil into a single MACT category effectively results in MACT standards that cannot be satisfied by a boiler firing residual oil without substantial add-on controls. As a result, Commenters request that the EPA separate liquid oil-fired EGUs into 2 subcategories, consistent with that done for coal-fired EGUs.

Comment 12: Commenter 17623 suggests that the EPA create separate subcategories for oil-fired units that distinguish between residual and distilled oil. The commenter states that in so doing, the EPA would render the standards more achievable for distinct subcategories of units and reduce the number of potential plant closures, although still advancing the goal of reducing overall emissions.

Comment 13: Commenter 17760 states that the proposed Liquid Oil subcategory is not sufficient for all liquid oil-fired units because it does not account for the significant differences between distillate- and residual-fired units. According to the commenter, the 2010 ICR data upon which the proposed limit is based includes six units burning distillate oil, all but one of which set the MACT floor. The commenter states that despite the disproportionate reliance on residual oil among the sector as a whole, five distillate oil-fired EGUs were included in the calculation of the MACT floor for Total HAP Metals. The commenter asserts that therefore, despite the EPA's intention of selecting a random sample of units, in fact the 2010 ICR database is biased toward very low-emitting units that burn distillate fuel oil. The commenter states that residual oil-fired EGUs represent more than 70 percent of the units in the MACT floor for the Liquid Oil subcategory. The commenter asserts that in contrast, nationwide, distillate oil-fired EGUs represent less than five percent of oil-fired EGUs. According to the commenter, the CAA requires the Administrator to establish standards that she "determines [are] achievable for new or existing sources in the category or subcategory to which such emission standard applies." The commenter states that CAA section 112(d)(1). According to the commenter, the EPA's proposal to establish a single liquid oil subcategory is inconsistent with this requirement. The commenter states that the overwhelming majority of the sources in the source category cannot achieve the resulting emissions standards, due to the insurmountable differences between distillate- and residual-fired units.

Comment 14: Commenter 18024 states that No. 6 and distillate oil-fired units are, and should be treated as, two separate and distinct subcategories. According to the commenter, the proposed MACT floor emission limits applicable to all liquid oil-fired boilers cannot all be achieved by any identified No. 6 oil-fired boiler (based on the ICR data set) because, for several of the regulated pollutants, the MACT Floor calculation was dominated by results from distillate oil-fired units.

Commenter states that combining boilers firing these two fuel types into a single subcategory effectively eliminates any potential for existing No.6 oil-fired boilers (controlled or uncontrolled) to comply with MACT floors without having to be substantially reconstructed for distillate oil-fired operations. The commenter states that we do not believe that the MACT requirements of the CAA were intended to

establish MACT floors that require reconstructing existing boilers to a physically different boiler type in order to achieve MACT floor emission levels. According to the commenter, the EPA's proposed EGU MACT Rule cites the "extensive changes" to a liquid oil-fired EGU that would be required to allow it to burn solid oil-derived fuel as the basis for establishing two subcategories of oil-fired EGUs. See 76 Fed. Reg. 24976, 25036 (May 3, 2011). The commenter asserts that likewise, the extensive changes to a No.6 oil-fired EGU that would be required to allow it to burn distillate oil justify splitting the liquid oil-fired EGU subcategory into "Existing No. 6 oil-fired EGUs" and "Existing distillate oil-fired EGUs."

According to the commenter, by combining these two subcategories into a single calculation that no existing No. 6 oil-fired EGU can meet, and offering no emission control technology that has been demonstrated in practice to continuously achieve the proposed EGU MACT limits, the EPA is essentially barring continued operation of existing No. 6 oil-fired EGUs in the U.S., including the best controlled existing No.6 oil-fired boilers. The commenter states that MACT Floors should not be used to eliminate whole classes of existing EGUs through mathematical floor calculations based on data from uncontrolled units and combining boiler subcategories that are not capable of accommodating a different fuel.

Comment 15: Commenter 18428 states that emission limits that are based on a mixture of distillate and residual oil-fired units will be difficult - if not impossible - for residual oil-fired units to meet even with pollution controls.

Response to Comments 1 - 15: The EPA has reviewed the data and determined that its proposed position of no distillate vs. residual oil subcategory is correct. Commenters had noted that the EPA's MACT Floor Analysis spreadsheet had erroneously assigned the oil type used during testing for some boilers. The EPA reviewed the data and determined that the submitting companies had miss-entered the data, or had indicated that two types of oil were fired in different parts of the 2010 ICR responses. The EPA contacted all of the companies with oil-fired EGUS in the 2010 ICR to confirm the oil used during testing. Upon review of these data, it became apparent that units using residual oil with ESPs or distillate oil were the best-performing units for PM and the HAP metals. Further, although emissions of HAP from distillate oil-fired EGUs are generally lower than those from residual oil-fired EGUS, EGUs burning distillate oil appeared to have higher emissions of some HAP but lower emissions of others. In addition, as explained elsewhere in this document, the EPA does not believe it appropriate to exclude distillate oil from regulation under the final rule because the Agency did not make a distinction when listing the oil-fired EGUs.

The EPA disagrees with commenters that by providing the distillate vs. residual oil subcategories as requested, the resultant standards would be more achievable. Were the EPA to subcategorize distillate oil from residual oil, the users of distillate oil would have no means of compliance other than obtaining "compliance" oil from their distributor (which was not indicated as an option by any commenter) or converting to natural gas and being removed from the subcategory. With no further subcategorization, oil-fired EGUs are likely able to comply with the standards by installing an ESP or burning distillate oil. Therefore, the EPA is not establishing separate subcategories for distillate and residual oil-fired units in the final rule.

In addition, as described in the Supporting Statement for the 2010 ICR, the EPA was unable to identify the pool of potential best-performing oil-fired EGUs when selecting units for testing. The EPA does not believe it has identified all the best performing EGUs for any of the HAP emitted from oil-fired EGUs

so we developed the MACT floors for oil-fired EGUs based on the top 12 percent of the available data rather than on 12 percent of the universe of oil-fired EGUs.

b. Opposition to further subcategorization by oil type.

Comment 16: Commenter 17648 states that the EPA should not subcategorize liquid oil-fired EGUs based upon different grades of liquid oil. The commenter states that although different grades of liquid oil may vary in their heat contents or viscosities, there is no indication in the rulemaking record that any physical distinction among units burning different grades of liquid oil (such as No. 2 versus No. 6 oil) affects the nature or characteristics of emissions in a way that impacts the availability of controls. The commenter states that both No. 2 and No. 6 oil-fired units can apply similar control technologies to reduce HAP emissions, and units firing these fuels do not have physical distinctions that prevent controls from operating effectively. The commenter asserts that moreover, distinctions between different varieties of liquid oil are distinctions grounded in fuel type, not in class, size, or type of source. According to the commenter, fuel switching is an appropriate control technology and is available for liquid oil-fired sources. No. 6 fuel oil contains higher levels of contaminants, including HAP, than No. 2 fuel oil, and since a regulated entity can readily burn cleaner No. 2 fuel oil in lieu of No. 6, it is inappropriate to subcategorize based on the distillation fraction of the liquid oil. The commenter states that , grade of liquid-oil fuel does not provide a reasonable basis for subcategorizing various groups of liquid oil-fired EGUs.

Response to Comment 16: The EPA agrees with commenter and, as noted above, has not subcategorized distillate vs. residual oil in the final rule.

2. The EPA should establish a non-continental liquid oil subcategory.

Comment 17: Commenters 17760 and 18477 state that if the EPA continues to believe that oil-fired units should be regulated under CAA section 112, the EPA should include a "non-continental liquid oil" subcategory in the final rule. According to the commenter, establishing a subcategory for non-continental units is consistent with the approach the EPA has taken in past rulemakings, including the final rule establishing MACT standards for Industrial, Commercial, and Institutional Boilers and Process Heaters. See 76 FR 15608, 15635 (March 21, 2011) ("Boiler MACT"). The commenter states that non-continental liquid oil-fired EGUs face the same unique challenges and limitations as non-continental boilers. The commenter asserts that non-continental EGUs have little or, in the case of group member Hawaiian Electric Company, no access to natural gas, minimal control over the quality of available fuel, and disproportionately high operational and maintenance costs.

Comment 18: Commenter 18502 states that a separate subcategory should be established for EGUs located in non-continental areas (such as the islands of Hawaii, Puerto Rico, and Guam). The commenter asserts that being a non-continental state places Puerto Rico at a time disadvantage over the continental states. According to the commenter, there are no "local" materials or equipment vendors and the purchase of emission control equipment is not as straight forward as for continental facilities. The commenter states that moreover, the prevailing atmospheric conditions make the island's environmental conditions to be extremely different than those in the continental U.S. According to the commenter, the EPA should establish a subcategory for non-continental oil-fired EGU subcategory based on the unique operating and environmental issues in these areas.

Comment 19: Commenter 17868 states that oil-fired units in Alaska, Puerto Rico, American Samoa, and Guam require special considerations. Commenter supports a waiver for oil-fired units in Guam, Puerto Rico, Hawaii, and Alaska. Commenter has member utilities in locations that are uniquely isolated including islands, or areas of the country that are not connected to the national utility or industrial infrastructure. According to the commenter, these locations have special needs for delivery of pollution control devices, installation, working around seasonal loads, scheduled outages and extreme economic impacts due to extended outages for installation.

Commenter 17868 supports the petitions presented by Guam, Puerto Rico, Hawaii, and Alaska to exempt their oil-fired power plants from the new nickel limits. Commenter defers to that petition as to the specific treatment. Commenter notes that because of the relationship between investor, electric coop and public power (municipal or state owned utilities), we believe the language offered by the petitioners should cover all utilities on those "islands" (including Alaska, which functions as an island due to its isolation).

Comment 20: Commenter 18477 expresses concern that the proposed rule mistakenly assumes that switching to natural gas or co-firing with natural gas is a valid and cost-effective compliance option for liquid oil-fired units; however, there is no natural gas or liquid natural gas resource in Hawaii. According to the commenter, as a remote island utility, Hawaiian Electric does not even have access to the small amount of refinery gas available to the refiners addressed by the Boiler MACT.

Commenter 18477 states that all oil-fired EGUs operating in Hawaii, Guam, and Puerto Rico exclusively combust residual fuel oil to generate electricity, and all are limited by the crude slates of their fuel suppliers. According to the commenter, Hawaiian Electric's contracts with on-island refineries contain fuel specifications for factors such as sulfur content, pour point, flash point, API gravity and viscosity, which the refiners are able to meet primarily by blending and some sulfur removal. The commenter asserts that however, they do not and cannot economically control for metal content. According to the commenter, as the Agency noted in the preamble to the Boiler MACT, the quality of the fuel produced by non-continental refineries is limited by the quality of the crude slate used in the refining process (76 FR 15,635).

Commenter 18477 states that it is not feasible for non-continental liquid oil-fired EGUs to comply with the proposed numeric emission standards based on their survey of equipment control vendors. According to the commenter, the vendors surveyed uniformly responded that they cannot guarantee their equipment can meet the proposed HAP limits for liquid oil-fired EGUs. The commenter states that the ability to achieve HAP control with residual fuel oil applications and ESPs or multi-cyclones in utility type boilers is currently being researched and is not a commercially demonstrated technology. The commenter asserts that bag-houses are not a suitable technology for particulate matter control for residual fuel oil applications. The commenter asserts that reputable dry and wet ESP suppliers, such as Alstom, Babcock & Wilcox, PECO, Siemens, Southern Environmental Inc., Clyde Bergemann, Hamon Research-Cottrell, and Allied Environmental Solutions, Inc. were contacted to determine their current position on providing ESP guarantees to meet the proposed emission limits for liquid oil-fired units. According to the commenter, the companies that have provided feedback thus far will not guarantee that currently available technology can achieve the proposed emissions limits for residual fuel oil applications.

Comment 21: Commenter 18502 states that because they are a non-continental facility, the availability of alternate fuels is limited. According to the commenter, there are no fossil fuel resources on the island

(Puerto Rico). The commenter states that the fuels presently used are delivered by ocean tankers, which is a possible source chloride contamination of the fuel as indicated by the erratic HCI measurements made during the ICR testing (HCI emissions varied by a factor of 20).

Commenter 18502 states that they have a long term plan for converting their steam generators, CCs, and CTs to co-fire natural gas (NG), but the infrastructure needed to deliver natural gas does not currently exist. The commenter states that the long term plan involves participation in expansion of a local LNG facility operated by EcoEiectrica and actively pursuing installation of a NG pipeline. According to the commenter, engineering evaluations and permitting for the pipeline is underway, but completion has not been established yet.

a. The EPA has sufficient data to establish a Non-Continental Liquid Oil-Fired subcategory.

Comment 22: Commenters 17760 and 18477 state that when the EPA developed the proposed rule, it had only received ICR data from a single non-continental utility – Hawaiian Electric. The commenter states that although the EPA may have determined that such limited information was an insufficient basis on which to establish a non-continental subcategory, since issuance of the proposed rule, the Agency has received 2010 ICR data from the two other island utilities with liquid oil EGUs – the Puerto Rico Electric Power Authority ("PREPA") and the Guam Power Authority ("GPA"). According to the commenter, the EPA now has 2010 ICR test data from 15 of the 31 liquid oil-fired EGUs operated by non-continental utilities, including GPA's Cabras Unit 1 and PREPA's San Juan Units 7, 8, 9 and 10, Costa Sur Units 3 and 6, and Aguirre Units 1 and 2. The commenter asserts that the additional data provided by PREPA and GPA is more than sufficient for the EPA to establish a non-continental liquid oil subcategory. The commenter states that the proposed subcategory would consist of a total of 31 units: 14 from Hawaiian Electric; 14 from PREPA; and three located on the island of Guam (two units owned/operated by GPA and a third GPA-owned unit operated by Pruvient Energy).

b. Island utilities have minimal control over fuel quality.

Comment 23: Commenter 17760 states that many island utilities have little or, like Hawaiian Electric no, access to natural gas or liquid natural gas supply. The commenter states that as a result, the combustion of liquid fuel oil is unavoidable. According to the commenter, all oil-fired EGUs operating in Hawaii, Guam and Puerto Rico combust residual fuel oil exclusively and all are limited by the crude slates of their fuel suppliers. Island utilities can contract with suppliers for certain fuel specifications, such as sulfur content, pour point, flash point, API gravity and viscosity, which the refiners are able to meet primarily by blending and some sulfur removal during the refining process. The commenter asserts that however, the suppliers do not and cannot economically control for metal content. The commenter states that as the Agency noted in the preamble to the Boiler MACT, the quality of the fuel produced by non-continental refineries is limited by the quality of the nearby crude slate used in the refining process. 76 FR 15,635. According to the commenter, the crude slate feeding the refinery determines the HAP metal content of the residual oil produced. The commenter states that because island utilities are dependent on local sources of fuel, they are equally limited by these factors.

Comment 24: Commenter 18502 states that the EPA should re-examine the logic of establishing a MACT floor for a source subcategory for which emissions variability is the result of un-measureable differences in fuel quality, and then setting MACT.

c. Establishing a Non-Continental Liquid Oil Subcategory is consistent with previous EPA rulemakings.

Comment 25: Commenters 17760 and 18477 state that establishing a subcategory for non-continental units is consistent with previous Agency rulemakings. The commenters assert that in those rulemakings, the EPA recognized that facilities operating on remote island locations or other non-continental areas face a unique set of challenges that do not apply to their mainland (continental) counterparts. The commenters state that most recently, the Boiler MACT established a separate non-continental subcategory. See 76 FR 15635 ("EPA agrees that the unique considerations faced by non-continental refineries warrant a separate subcategory for these units."). The commenters state that similarly, several NSPS contain separate standards for non-continental units: 40 CFR Part 60, Subparts Da (Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978); Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units); Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units); and KKKK (Standards of Performance for Stationary Combustion Turbines).

d. Non-continental units have limited compliance options.

Comment 26: Commenters 17868 and 18502 believe that a separate subcategory should be established for EGUs located in non-continental areas (such as the islands of Hawaii, Puerto Rico, and Guam), and potentially for continental areas that are not interconnected with other utilities and have limited compliance options due to remote locations. Commenter 17868 believes such a subcategory should apply to Alaska also.

Comment 27: Commenter 18477 states that Hawaii's RPS has two significant ramifications for commenter's ability to comply with the proposed rule. The commenter asserts that first, modification of a large percentage of commenter's generation fleet to use renewable fuel sources has the potential to substantially reduce HAP emissions. The commenter states that these modifications, however, will not be completed prior to the EGU MACT compliance date. The commenter asserts that second, compliance with both the Hawaii RPS and the EGU MACT will require massive capital investments. According to the commenter, it would be unfair to require commenter and its customers to invest in both, particularly when current resource plans indicate the retirement of at least four EGUs with relatively low capacity factors within 8 to 10 years. The commenter states that installation of costly control technology on these units to comply with the EGU MACT for the relatively short time frame before retirement would also represent significant economic inefficiency. The commenter asserts that it estimates that installation of emission control equipment for Hg, HCl, HF, and PM would cost at least $696 million, based on preliminary quotes provided by engineering consultants and equipment vendors. According to the commenter, to date, no control equipment vendor will provide performance guarantees, so this cost estimate does not address the risk associated with failure to comply with the proposed HAP emission limits. The commenter states that it is extremely difficult for companies to develop a cost-effective compliance plan without control equipment vendor guarantees. The commenter asserts that vendor guarantees allow companies to plan for prudent capital investments in control technology. The commenter asserts that without these guarantees, it is facing the untenable possibility that it will not be able to comply with the proposed standards despite the Company's best efforts and significant capital investments. The commenter states that accordingly, it urges the EPA to exercise its discretion and establish work practice standards for non-continental liquid oil-fired units.

Commenters 18433 and 19213 disagree with the assumption that all coal and fuel-oil units can be used with available control technologies. The commenters state that such fuel switching from one fuel type to another or fuel blending can be expensive and facilities in small municipalities or Guam are restricted in their fuel choices and must rely on oil currently.

Response to Comments 17 - 27: At proposal, the EPA did not have all of the data from liquid oil-fired units in non-continental areas (e.g., Guam, Puerto Rico) and solicited comment on whether a subcategory should be established, based on the data to be received, for non-continental oil-fired EGUs. The EPA agrees that the unique considerations faced by non-continental EGUs (e.g., limited access to alternative refinery supplies) warrant a separate subcategory for these units. The EPA is finalizing a non-continental subcategory for oil-fired EGUs for units in Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands. The EPA is not aware of any liquid oil-fired EGUs in any of the other U.S. territories that meet the CAA section 112(a)(8) definition but, if there are such units, they would also be part of the non-continental subcategory. The EPA has now received the late data and confirmed that no non-continental liquid oil-fired EGUs are in the MACT floor pool for PM. Therefore, based on those data, the EPA has established emission limits for the non-continental liquid oil-fired EGU subcategory in the final rule. The EPA believes that units in this subcategory will comply through the use of cleaner oils or, for PM, through the installation of an ESP (non-continental liquid oil-fired EGUs may also use the 1 percent moisture-in-oil compliance option). The EPA finds no merit in the comment that Alaska should be included in this non-continental subcategory.

3E - Subcategorization: Oil - Solid (Proposed)

Commenters: 17925, 19536, 19537, 19538

1. Opposition to a separate subcategory for petroleum coke.

Comment 1: Several commenters (19536, 19537, 19538) state that it appears that the EPA has proposed to include EGUs that burn other fuels with coal to be considered coal-fired EGUs. The commenters state that this is consistent with the definition of "coal-fired electric utility steam generating units" in the NSPS, Subpart Da (40 C.F.R. §60.41Da). Commenters support such a determination by the EPA. Coal-fired units that blend with pet coke do so in varying amounts throughout a year of operations. According to the commenters, it would be administratively impracticable to set separate MACT limits for units that intermittently burn pet coke with coal.

Commenters (19536, 19537, 19538) state moreover, that even for units that burn 100% pet coke, there is no justification for putting such units in a separate subcategory from those that burn coal or coal and pet coke. According to the commenters, all of these units are "similar sources" to coal-fired EGUs. See 40 C.F.R. section 63.41. The commenters state that specifically, such coal-fired and coal/pet coke-fired EGUs have comparable HAP emissions, are structurally similar in design and capacity, and the HAP emissions can be controlled with the same control technology [Commenters provided examples].

Commenters (19536, 19537, 19538) state that the EPA has not put forth any rationale for identifying a separate subcategory for pet coke-fired EGUs (i.e., EPA's "solid oil-derived fuel-fired EGU" category). According to the commenters, because the HAP emissions from pet coke-fired EGUs can be controlled with the same control technology and methods as can be applied at those EGUs that burn coal, there is no justification for a separate category for pet coke burning EGUs. Commenters state that the EPA should not, therefore, create separate standards for pet coke units.

Comment 2: Commenter 17925 states that petroleum coke should be placed in the coal subcategory. Commenter's Madison 3 unit is designed to burn coal from two subcategories and petroleum coke. Commenter is unclear what subcategory Madison 3 as a unit fits into under the proposed rule since the unit can burn any of the above fuels alone or in a mix. Commenter is also unclear what would trigger a subcategory change, if indeed a unit can change subcategories. According to the commenter, any subcategory changes could cause confusion and the pollution controls, injection rates and operating procedures could require change if the unit changes subcategories. The commenter asserts that it would not make sense or be practical to pro-rate limits based on the percentage fuel a unit burns, i.e., rule is unclear as to what emission limit applies when combusting combinations of fuels. Commenter strongly suggests that the limits in the coal subcategory should apply once "any¨ coal is burned. Commenter would like to maintain the fuel flexibility so that they can provide their customers with low cost and reliable power, however, the proposed rule threatens fuel flexibility and low cost power.

Several commenters (19536, 19537, 19538) state that the EPA has included EGUs that burn blends of coal and pet coke in the HCl MACT floor determination for existing pet coke burning EGUs. The commenters state that specifically, the Northside Generating Station units and the Manitowoc units burn coal in addition to pet coke. According to the commenters, such units should be considered coal-fired EGUs under the EPA's proposed definition of coal-fired electric utility steam generating unit in section 63.10042. 76 Fed.Reg. at 25122. The commenters state that it is not clear why these units were

included in the pet coke MACT floor analysis. The commenters assert that further, it is not known whether the units were burning any coal at the time of the tests but, regardless, it does not make sense to include these units that should be covered under the coal-fired EGU MACT requirements rather than under the pet coke (solid oil-derived fuel) EGU MACT requirements.

Response to Comments 1 - 2: Coal- and oil-fired EGUs were separately listed in 2000 and it is reasonable to maintain such units in different subcategories. In addition, commenters' assertions that the emissions characteristics between coal and solid oil-derived fuel are the same are incorrect. Coal and oil, including solid-oil derived fuel, contain different amounts and different pollutants and combustion of those fuels leads to different emissions of HAP for that reason. For example, Ni is found at much higher levels in oil and Hg is found at much higher levels in coal; thus, oil combustion will cause more emissions of nickel and coal combustion will cause more emissions of Hg. For these reasons, the EPA believes it reasonable to maintain coal and solid-oil derived fuel (e.g., petroleum coke) in separate subcategories.

We also maintain that it is reasonable to establish different subcategories in this rule than those contained in the Industrial Boiler NESHAP, because the industrial boilers rule regulates a more diverse universe of units burning fossil and other fuels and this rule regulates only fossil fuel-fired EGUs.

We have clarified the definitions in the final rule such that we believe commenter's concerns are addressed with regard to potential subcategory switching.

3F - Subcategorization: New suggested categories

Commenters: 16513, 16849, 17316, 17386, 17608, 17621, 17623, 17627, 17648, 17689, 17690, 17712, 17716, 17718, 17724, 17725, 17730, 17731, 17732, 17735, 17736, 17739, 17754, 17756, 17757, 17758, 17760, 17761, 17767, 17774, 17775, 17801, 17803, 17805, 17808, 17816, 17817, 17818, 17820, 17821, 17826, 17843, 17867, 17868, 17870, 17876, 17885, 17898, 17912, 17920, 18014, 18018, 18025, 18031, 18032, 18033, 18034, 18428, 18429, 18447, 18450, 18539, 18644, 19114, 19120, 18023

Commenters offered a number of alternative subcategorization approaches. These suggested subcategorization alternatives fit generally into the groups noted below.

1. The EPA should develop subcategories for high sulfur or high chlorine coal.

Comment 1: Commenter 17739 states that the EPA should establish an existing source acid gas subcategory for high sulfur or high chlorine coals since the same factors that the EPA relied on to support a lignite subcategory for Hg are also present in the high sulfur or high chlorine coal context. Commenter states that the data indicate that even well-controlled units burning high sulfur coals would not be in the top performers for acid gases even at removal rates of 95 or 96%. Commenter adds that, in addition, absent such a subcategory, about 12% of coal deliveries (2005 data), and the vast majority of coal shipped from that states of Indiana, Ohio, and Illinois (2008 data), would become unusable.

Commenter 17739 supports the alternative SO_2 standard for units unable to meet the HCl standard. However, Commenter also believes it is appropriate to establish a coal chlorine or sulfur content-based subcategory for the alternative SO_X standard. Commenter states that coal testing data indicate a clear break in chlorine concentrations in the coals burned by EGUs, as well as in sulfur content. The commenter asserts that in addition, data supplied by Unions for Jobs and the Environment (UJAE) indicate that units achieving 95% SO_2 removal would not be able to use 60-80% of coal shipped from the states of Ohio, Indiana and Illinois, and significant amounts of coal shipped from Pennsylvania. Commenter states that similar results would be obtained if the presumed 96% SO_2 removal figure from the EPA's modeling is used.

Commenter 17739 believes that there are factors supporting a high sulfur or high chlorine coal subcategory that is similar to those that the EPA relied upon to support Hg subcategory for lignite. According to the commenter, the EPA's key rationale for a Hg subcategory for lignite was that no lignite-fired unit appeared in the "top performing 12 percent of sources, indicating a difference in the emissions for this HAP from these types of units." The commenter states that the EPA did not establish other subcategories because "the data did not show any difference in the level of HAP emissions and, therefore, we have determined that it is not reasonable to establish separate emissions limits for other HAP." The commenter asserts that the EPA does not need emissions data, however, to know that even well-controlled units burning higher sulfur coals would be unable to meet the alternative SO_2 emissions rate of 0.20 lb/MMBtu, and would therefore also not appear in the top 12% of performing units. According to the commenter, that conclusion is a matter of math. As shown in the comments of UJAE, the vast majority of coal shipped in 2008 from Indiana, Illinois and Ohio would not meet the SO_2 limit at 95% SO_2 removal, and that number would not change appreciably if the 96% removal for FGD assumed in the EPA's modeling were used. The commenter states that as a consequence, if the EPA had collected data from units burning high sulfur coals, it is clear that none of them would appear in the top 12% of performing units for SO_2, and the reason would be the same as is the case with lignite units: available

controls cannot reduce emissions low enough to place units in the top 12%. The commenter asserts that consequently, an acid gas subcategory for units burning higher-sulfur coals with sulfur contents 2% or higher is consistent with the bases for the EPA's proposed lignite subcategory, and is warranted here.

Commenter 17739 states that per the data in UJAE's comments, this subcategory would be relevant to about 12% of coal deliveries to utilities or 125 million tons (2005 data) since the sulfur content of those coals would preclude SO_2 compliance at 95% removal. The commenter states that this would make the subcategory size potentially larger than the lignite subcategory (2010 U.S. lignite production was 28.8 million tons). According to the commenter, on an environmental and health impacts basis, since the EPA has made no effort to quantify health or environmental impacts from HCl or other acid gas HAP reductions, the HAP health and environmental consequences would be effectively zero. The commenter asserts that this would also be expected to be true in any case, since the subcategory would still require SO_2 reductions of 95%, and the delta between these remaining emissions and emissions that would occur when meeting a rate of 0.20 lb/MMBtu would be largely insignificant.

Comment 2: Commenter 18033 states that CAA section 112(d)(1) provides the agency discretion to distinguish "among classes, types and sizes of sources within a category or subcategory in establishing standards." According to the commenter, under CAA section 111, the agency has set prior regulatory precedence for subcategorizing coal-fired power plants based on the sulfur levels of the type of coal burned. The commenter states that this approach was subsequently validated by the D.C. Circuit in Sierra Club v. Costle. The commenter asserts that the Court observed that "[o]n the basis of this language alone, it would seem presumptively reasonable for the EPA to set different percentage reduction standards for utility plants that burn coal of varying sulfur content." The commenter states that therefore, the Court determined that the Agency could create subcategories based on the type of fuel burned.

Commenter 18033 states that UJAE stated in its comments that many well-controlled units—those with scrubbing technology—will not meet the acid gas standard burning higher sulfur coals. According to the commenter, the EPA should have developed an alternative SO_2 standard that takes fuel sulfur content into account through subcategorization. The commenter states that for example, a standard could be set for units burning higher-sulfur coals such as 2.0% and higher, with a lower standard for units consuming lower sulfur coal. The commenter asserts that additionally, the EPA should seriously consider subcategorizing the HCl standard based on coal chemistry (e.g., chlorine or sulfur) to ensure that well-controlled units equipped with scrubbers and SCRs can meet the proposed standard.

Commenter 17807 discusses the lower chloride coals ranging from 0.05 to 0.10% in the Illinois basin, but stated that it would be difficult to obtain necessary chloride levels to achieve compliance with the proposed HCl emission limit. The commenter goes on to say that other facilities will be faced with similar issues and will need to consider other coal sources to achieve compliance with the HCl limit, which will increase demand and impact long term availability of these coals and decrease fuel procurement flexibility and reliability.

Response to Comments 1 - 2: The EPA disagrees with commenters that subcategories should be established for high sulfur and high chlorine coals, and it appears from the comments that it is not in fact the chlorine content that is at issue but the sulfur content of the coal. One commenter states that they are unable to meet the HCl limit, but they only provide information that indicates it would be difficult to meet the alternative equivalent SO_2 limit. In addition, the commenter made assumptions about the ability to meet the standards and did not provide actual data. In fact, our data show that coals with chloride

contents as high as 2,100 ppm (0.16 lb/MMBtu) were burned by EGUs making up the MACT floor pool of sources for the final HCl emission limit and that the best-performing unit was burning coal with a maximum chloride content of 1,200 ppm. The median chloride level for bituminous coals identified from data submitted through the 1999 ICR was 1,030 ppm so we believe that the coals represented in the MACT floor pool indicate that the final limits are achievable with high-chlorine coals. We have determined that HCl removal is very effective using a number of different types of FGD systems. Absent information that demonstrates that sources are unable to meet the proposed HCl limit due to chloride content of the coal, we believe it is unnecessary and inappropriate to consider subcategorizing based on chloride content in the coal. In addition, as noted above, the SO_2 limit is an alternative equivalent standard that is available to sources that have an SO_2 control and CEMS and operate the controls at all times. The EPA did not provide the alternative equivalent surrogate standard for sources that could not meet the HCl limit as one commenter suggests; instead, we provided the standard as a convenience and cost saving measure to EGUs with installed FGD systems because we recognize that many EGUs have SO_2 CEMS. Sources are required to comply with the HCl limit as a surrogate for all the acid gas HAP or the SO_2 limit as a surrogate for all the acid gas HAP. If a source is unable to meet the SO_2 limit due to the sulfur content of the coal, the source must comply with the HCl limit. Commenters have not demonstrated that they are unable to meet the HCl standard and our data show that the standard is achievable even for very high chloride coals.

2. The EPA should develop a subcategory for CFB Units.

a. Support for subcategorization of CFB Units.

Comment 3: Multiple Commenters (17623, 17689, 17712, 17718, 17730, 17754, 17758, 17774, 17775, 17816, 17817, 17820, 17885, 17898, 17912, 18428, 18429, 18644, 18023) support the development of a separate subcategory for CFB units.

i. CFBs are a fundamentally different design with different emissions.

Comment 4: Commenters 17730 and 17775 encourage the agency to consider subcategorization of fluidized bed combustion ("FBC") units for Hg emissions. Commenters note that the industry has long contended that FBC units employ fundamentally different processes than conventional PC-fired boilers and should be placed in their own subcategory. According to the commenters, FBCs combust relatively large coal particles in a bed of sorbent or inert material. FBCs operate at lower temperatures than conventional boilers and have much longer fuel residence times. The commenters state that the design, construction and operation of FBCs are different than conventional boilers. According to the commenters, the selection of an FBC unit over a conventional PC boiler is driven in large part by fuel characteristics. The commenters state that ss a result, the emissions profile of FBC units generally differ from conventional PC boilers because FBC units more advantageously combust waste coals, as well as coal blends with other carbonaceous material such as tires, wood, biomass and petcoke. The commenters state that in fact, the largest FBC has a nameplate capacity of about 300 megawatts, although the largest conventional boilers have nameplate capacities of around 1300 megawatts.

Commenters 17730 and 17775 state that the EPA did not discuss the design differences between FBC units and PC units in the preamble to this proposed rule, unlike the agency did when it previously proposed Hg MACT limits in January 2004. According to the commenters, in that previous rulemaking, the EPA stated: based on their unique firing designs, FBC units employ a fundamentally different process for combusting coal from that employed by conventional, stoker-, or cyclone-fired boilers.

Fluidized-bed combustors are capable of combusting many coal ranks, including coal refuse. Commenters state that for these reasons, FBC units can be considered a distinct type of boiler.

Comment 5: Commenters 17775 and 18428 conclude that the ICR Hg data support further subcategorization of EGUs. FBCs have a fundamentally different design and utilize different fuels and combination of fuels compared to conventional PCs. The commenter states that based on the Part II ICR responses, there are 60 FBC units in the source category of coal-fired EGUs (or 6 percent of all coal-fired EGUs). According to the commenter, an examination of the 40 "best performing" units for mercury emissions shows that 14 of those units are FBC units. Had FBC units performed like conventional PC boilers then two would have been expected in the top 40. The commenter states that the far higher percentage of FBCs in the top 40 leads to the conclusion that these units are different than conventional PCs with regard to mercury emissions and, as a result, should have been placed in their own subcategory. The commenter asserts that analyses of the ICR data performed by URS for EPRI confirm that if FBC units and PC units are assumed to be in different subcategories for mercury emissions, the calculated means and standard deviations for best performing units in each group are statistically different.

Comment 6: Commenter 17754 states that the EPA appears to acknowledge through the preamble to the proposed rule that these aggressive emission standards may force the closure of certain less clean, less modern coal-fired EGUs. According to the commenter, the EPA appears to accept this outcome as necessary for the advancement of the state-of-the-art. The commenter states that however, Commenter's facilities constitute modern, state-of-the-art electric generating units, and generally emit air pollutants at materially lower rates than traditional coal-fired utility plants. The commenter asserts that because of the unique characteristics of coal refuse-fired CFB units, however, the EPA's analyses under the proposed rule do not readily apply to these facilities and therefore may inadvertently force their closure. According to the commenter, the EPA has separately acknowledged the environmental benefits afforded by operation of coal refuse-fired CFB units. The commenter states that therefore, the proposed rule should not foster the unintended closure of these plants and the adverse environmental consequences of such closures, due to the application of MACT emission limitations that do not properly consider the characteristics of these unique facilities.

Comment 7: Commenters 17758 and 17820 state that the EPA should create a new subcategory for CFB units. CFB units employ fundamentally different processes than PC boilers. The commenter states that CFBs combust relatively large coal particles in a bed of sorbent or inert material. CFBs operate at lower temperatures than conventional boilers and have much longer fuel residence times. According to the commenter, the design, construction and operation of CFBs are different than conventional boilers. Conventional boilers pulverize coal to a very fine particle size to maximize combustion efficiency and minimize unburned carbon. The commenter asserts that CFBs tend to burn larger-size coal particles at a lower degree of combustion efficiency. The commenter states that as a result, CFBs typically have higher levels of unburned carbon present in the ash, which promotes more efficient mercury removal. The commenter asserts that accordingly, analysis by EPRI indicates that Hg emissions of CFB boilers and PC boilers are statistically different, with emissions from CFBs significantly lower than those from PC boilers. According to the commenter, this statistically significant difference in the Hg emissions profiles for these two distinct boiler technologies argues in favor of the creation of a separate subcategory for CFBs, as there is no control technology that PCs could install that would result in emissions reductions similar to those achieved by CFBs. The commenter states that accordingly, the EPA should use the authority contained in CAA section 112(d)(1) to create a separate subcategory for CFB units.

Comment 8: Commenter 17689 states that the EPA should include an additional subcategory for FBC bed combustion units. According to the commenter, FBC units are of significantly different design as compared to PC unit configuration to justify a separate Hg subcategory. Commenter believes a closer look at the available data by the EPA would lead to this conclusion.

Comment 9: Commenter 17774 states that the EPA also should create subcategories based on boiler design, particularly for CFB units. According to the commenter, this approach of recognizing the inherent differences of CFB units is consistent with prior case-by-case determinations for EGUs under CAA section 112(g). The commenter asserts that furthermore, the EPA has recognized that subcategorization is appropriate to account for the dissimilarities among sources within the EGU source category.

Comment 10: Commenter 17912 states that fluidized bed boilers operate differently from PC boilers. In a fluidized bed boiler, the coal is combusted within a bed of fluidizing material, which is often crushed limestone. The commenter states that in a PC boiler, the fuel is burned in suspension in the boiler. According to the commenter, the presence of a fluidizing material affects the combustion temperature and other parameters of the combustion zone. The commenter asserts that fluidized bed units are typically smaller than supercritical PC boilers. The commenter states that for acid gases, a crushed limestone fluidizing agent may react with chlorine and remove that constituent before it must be treated in any downstream pollution control device, thereby penalizing non-fluidized bed units. According to the commenter, by classifying all solid fuel units the same, these inherent differences are ignored, and, if the "best controlled similar source" for a particular pollutant happens to be a fluidized bed device, the emissions may be difficult or impossible to meet in a different type of unit.

ii. Emissions from CFBs are different.

Comment 11: Commenter 17730 states that in the preamble of the current proposal, the EPA notes that it considered possible subcategorization by unit design type, but it only decided to subcategorize if there was a difference in the effect on emissions. The commenter states that in the case of FBC units, the EPA offers only the most cursory statement: "there is no significant difference in emissions that would justify subcategorization." The commenter asserts that however, there are significant differences in the Hg emissions of FBCs and conventional PCs. The commenter states that subcategorization of FBCs is warranted at least as to Hg limits. According to the commenter, for these reasons it is appropriate to create a subcategory for the FBC boiler within the EGU category of existing coal-fired units using coal greater than or equal to 8,300 Btu/lb.

Commenter 17730 states that the EPA should consider the subcategorization of units burning coal with a calorific heat value of greater than or equal to 8,300 Btu/lb for fluidized bed boilers, specifically for CFB boilers. The commenter states that CFB boilers are a significantly different boiler technology than the conventional wall-fired or tangentially-fired pulverized coal boilers that are in use today. According to the commenter, the fluidized bed boilers are constructed with a significantly different operational design and operate at less than half of the temperature of a conventional boiler. The commenter asserts that fluidized bed boilers control the emissions of NO_X and SO_2 by the technology of the boiler design itself without add-on emission control equipment. The commenter states that the fluidized bed boiler burns coal in larger particles and produces a residue with a larger carbon fraction creating a de facto carbon sorbent that enhances emission reductions. According to the commenter, the emissions of NO_X are reduced because the boiler operates efficiently at significantly lower temperatures than the conventional boiler. The commenter asserts that the emissions of SO_2 are reduced through the injection

of limestone or dolomite as a source of calcium carbonate that is combined with the SO_2 to produce a beneficial product - gypsum ($CaSO_4$). According to the commenter, the operational design and the overall emissions profile create a strong basis for this subcategorization.

Commenter 17730 states that the inclusion of the fluidized bed boilers in the category of EGUs that burn coal with a calorific heat content of greater than or equal to 8,300 Btu/lb artificially lowers the emission standards for conventional boilers. The commenter states that fluidized bed boilers should be in their own separate subcategory with a separate set of emission standards for all HAP categories. According to the commenter, it is reasonable to believe that given the differences in the functional design of the units, the emissions of Hg, at least, would generally be lower and this is evidenced by a review of the data. The commenter asserts that also, much of the work practice standard requirements for controlling the emissions of organic HAP would not be applicable to the design of the fluidized bed boiler. The commenter states that there are no burners to inspect or replace in the fluidized bed boiler, there is no flame pattern to optimize in the fluidized bed boiler, and the air-to-fuel ratio control system is only adjusted every 2 - 5 years as is appropriate for efficient combustion.

Comment 12: Commenter 17774 states that CFB units are very different in boiler design and combustion, which allows these units to achieve very low emissions. The commenter asserts that according to the Department of Energy (DOE), CFB combustion "evolved from efforts to find a combustion process able to control pollutant emissions without external emission controls (such as scrubbers)." The commenter states that CFB units are designed for combustion to take place in a fluidized bed of solids. According to the commenter, this bed of solids typically contains materials for absorbing SO_2, such as limestone and ash from the combustion of coal.

Commenter 17774 states that in addition, combustion temperatures are much lower in a CFB unit than in a conventional combustion boiler. According to the commenter, the temperatures for a CFB boiler typically range from 1,500° F to 1,650° F, as compared to the temperatures of a conventional boiler, which tend to be around 2,500° F or higher. The commenter asserts that at full-load operation of a conventional boiler, peak combustion temperatures in the immediate flame zone can reach 3,500° F. The commenter states that unlike conventional boilers, coal ash does not become molten in CFB boilers. The commenter asserts that this difference results in vastly dissimilar ash properties and ash handling systems. According to the commenter, most notably, a large portion of ash particles pass immediately out of conventional units, although the ash particles in CFB units are actually recirculated back into the unit for further combustion.

Commenter 17774 states that conventional boilers typically achieve in excess of 99.5 percent combustion efficiency. The commenter states that in contrast, the degree of carbon burnout for CFB boilers is in the range of 97-98 percent for bituminous coals and petcoke. CFB units tend to have higher unburned carbon levels than conventional PC boilers. According to the commenter, this unburned carbon in the flyash behaves much like activated carbon and helps adsorb Hg.

Commenter 17774 states that in addition, in CFB units, the SO_2 control is part of the process itself, which is a critical distinction for typical eastern bituminous coal. The commenter states that in a CFB unit, lime or limestone is introduced into the bed of solids. The commenter asserts that this continuous addition of limestone to the bed of a CFB unit for SO_2 control ensures that a major portion of the bed solids are limestone particles (or lime, since limestone "burns" to become lime at approximately 1,550 °F). According to the commenter, most of the sulfur in the coal chemically reacts with the lime or limestone and is neutralized, thereby releasing very little SO_2 emissions from the combustion chamber.

The commenter states that this process also eliminates SO_3 emissions that can interfere with Hg absorption on flyash or activated carbon when higher sulfur eastern bituminous coals are burned in a PC boiler system. The commenter asserts that in addition, the proportion of limestone-derived particles in typical coal-fired CFB boilers ranges from 50-95 percent. According to the commenter, the active quantity of calcium oxide (lime-CaO) available in a CFB boiler is therefore orders-of-magnitude greater than compared to a PC boiler, whose alkalinity is derived solely from the coal's mineral content. The commenter asserts that significantly higher CaO can alter the process chemistry in the boiler, including the oxidation levels of Hg.

Commenter 17774 states that CFB units' internal controls cannot be compared to units needing external controls because they were designed to emit very low levels of pollutants in comparison to other units. Naturally, facilities depending on external controls could not possibly retrofit their units to replicate the results of internal controls. This clear distinction warrants a separate subcategory for CFB units. At present, CFB units are included in the coal-fired subcategories in the proposed rule, which results in unrealistically low emissions limits for other boiler types.

Comment 13: Commenter 17898 states that PC units are fundamentally different from FBC units, with PC units inherently lower-emitting for some HAP and FBC units for others. Because each has differing fuel flexibilities and heat rates, both have a role to play in the U.S. electric power system. The proposed rule does not sufficiently distinguish them, making PC plants incapable of meeting some limits, and FBCs incapable of meeting others.

Commenter 17898 states, for example, the new source floor emission rate for Hg for all but IGCC units is based on an atmospheric FBC facility. In a FBC boiler, the temperatures are maintained at 1500-1600 °F, although a supercritical PC boiler can reach 2500 °F. Various studies have found that temperature is an important factor in mercury removal.

Commenter 17898 states that fly ash from FBC boilers also has a higher unburned carbon content (of approximately 2 to 5 percent) than does the fly ash from PC boilers (about 0.5 percent). With a FBC system, the coal stays in the bed until its weight is diminished via combustion (it starts with an approximate 0.25 inch diameter coal particle), whereas the coal fired into a PC is very fine and combusts in seconds. The extended residence time in a FBC, coupled with the higher unburned entrained carbon, provides a greater opportunity for the mercury to react with the unburned carbon, which can behave like an activated carbon system providing for lower Hg emission rates.

Commenter 17898 states that similarly, the limestone bed typical of a FBC assists with the reduction of SO_2 and acid gases, whereas that function is accomplished in a PC unit by use of add-on controls (scrubbers), which—in effect—provide the "limestone bed" downstream of the combustion process but without the benefit of extended residence and thus contact times. Also, particle movements are quite different: In a FBC, most particles are returned to the bed, whereas in a PC, all but the heaviest particles are immediately sent through to downstream particle control devices. Overall combustion efficiency is also quite different: An FBC will have inherently higher CO, volatile organic compound (VOC), and organic HAP emission levels due to the relative combustion efficiency levels between FBC and PC boilers.

Commenter 17898 states, in sum, with respect to all HAP categories (Hg, acid gases, PM and organics), there are inherent physical differences that should preclude the EPA from considering both FBC and PC boilers together when identifying the best controlled similar source. This is supported by the preamble to

the EPA's 2004 Notice of Proposed Rulemaking on Hg emissions from Electric Utility Steam Generating Units, which observed that "FBC units employ a fundamentally different process for combusting coal from that employed by conventional-, stoker-, or cyclone-fired boilers."

Comment 14: Commenter 18023 states that the EPA should evaluate additional subcategories for Hg with the goal of establishing "achievable" standards. Judge Williams' concurring opinion in *Sierra Club v. EPA* noted that "one legitimate basis for creating additional subcategories must be the interest in keeping the relation between 'achieved' and 'achievable' in accord with common sense and the reasonable meaning of the statute." *Sierra Club v. EPA*, 479 F.3d 875, 885 (D.C. Cir. 2007) (Williams, J., concurring). EPRI has evaluated the ICR data and found that the values for Hg from PC units are distinctly different from those of FBC. Thus, the EPA's failure to subcategorize pushes units "beyond-the-floor." Not only are the emissions from these units different, the types of combustion processes are also different. The EPA should reevaluate the ICR data and establish additional subcategories among "classes, types, and sizes." By refusing to subcategorize, the EPA is ignoring the "common-sense" and reasonable interpretation of the statute.

iii. Emissions from small CFBs are different.

Comment 15: Commenter 17623 suggests that EPA create a separate subcategory for small CFB units. In particular, the EPA should create a separate subcategory for CFB units that are less than 150 MW. The EPA states that CFB units have a "unique firing design" and "employ a fundamentally different process for combusting coal." As a result, CFB units achieve very low emissions. The fluidized bed process introduces relatively large coal particles to a bed of sorbent or inert material at the bottom of the boiler through which sufficient air flow is introduced to result in the mixture becoming fluidized. This bed also typically contains materials for absorbing SO_2, whereas traditional coal-fired boilers burn coal suspended in the air. This technology difference creates inherently less Hg emissions than traditional coal-fired units. Therefore, the EPA's inclusion of these unique and smaller CFB units in the MACT floor skews at least the Hg limit if not others.

Commenter 17623 adds that, moreover, most CFB units are much smaller in size than other coal-fired boilers. Although other coal-fired boilers have been manufactured in sizes up to 1,300 MW, CFB boilers currently have a maximum size of 300-350 MW gross, depending on the manufacturer. Therefore, the technology and size of CFB units differ enough to create substantial changes in emissions. This clear distinction warrants a separate subcategory for CFB units. At present, CFB units are included in the coal-fired subcategories in the proposed rule, which results in unrealistically low emissions limits for other boiler types based on these differences.

Comment 16: Commenter 17774 states that CFB units are much smaller in size than conventional boilers. Although conventional boilers have been manufactured in sizes up to 1,300 MW, CFB boilers currently have a maximum size of 300-350 MW gross, depending on the manufacturer. Only four CFB units in the U.S. exceed 300 MW.

iv. General support for subcategorization of CFB units.

Comment 17: Commenters 17712 and 17885 state that the EPA should include an additional subcategory for CFB combustion units for PM.

Comment 18: Commenter 17718 states that in setting the Hg limit, the EPA should further subcategorize by boiler type (PC and fluidized bed).

Comment 19: Commenter 17816 states that in order to fully account for the differences among fossil-fired generating units and identify appropriate limits that are achievable through currently existing technologies, the EPA should establish additional subcategories. In setting the Hg limit, the EPA should further subcategorize by boiler type (PC and fluidized bed). Commenter references a table that demonstrates the large differences in PC boilers and FBC units regarding differences in emissions from these boiler types using the available 2010 ICR data. (See EPA-HQ-OAR-2009-0234-17816-A1, page 7 for table.)

Comment 20: Commenter 17817 states two distinct furnace types, CFB and PC, must be considered.

Comment 21: Commenter 18644 states that it is entirely logical to subcategorize CFBs for Hg and HCl. CFB units are a distinct "type" or "class" of boiler that is fundamentally different from conventional boilers. It is not possible for owners of conventional boilers to switch to CFBs, as CFBs are the boiler itself. And CFBs are size-limited. The EPA subcategorized CFB units in the industrial boiler MACT. Importantly, CFBs are vastly overrepresented in the best performing 12 percent of boilers sampled for Hg. Subcategorizing CFBs would raise the Hg floor value for conventional boilers significantly. This might be considered necessary when the inappropriate upper predictive limit (UPL) procedure is dropped and replaced by a simple average.

Comment 22: Commenter 18429 states that the MACT should subcategorize by boiler type separating CFB from PC and stokers, because the technologies and emission control systems are fundamentally very different and not representative of the other boiler types. The new unit PM limit was selected from a CFB that removes the sulfur in the furnace so does not require a flue gas desulfurization back end system as is necessary on a PC boiler, resulting in a substantially lower PM emission rate for the CFB. Limits achievable by CFBs should not be applied to PC boilers and other combustion systems, and conversely, limits achievable by PC units should not be applied to CFB or other combustion processes.

Response to Comments 3 - 22: The EPA acknowledges that there are design and operation differences between conventional PC-fired EGUs and FBC/CFB EGUs; however, the commenters are incorrect in asserting that the HAP emissions levels and characteristics are sufficiently distinct from other coal-fired EGUs to support subcategorization. Further, commenters fail to note that FBC EGUs were not subcategorized in CAMR even though, as commenters note, such design and operation differences were cited there. The fact that FBC units operate at lower temperatures is of no consequence as they still operate at temperatures high enough to vaporize Hg.

Commenters assert that FBC units are disproportionately represented among the best performers, with the inference being that they were selected because of their boiler design. However, EGUs were selected for testing under the 2010 ICR based not on their boiler design but, rather, based on their age and on the age of their PM and FGD control systems (as noted in the Supporting Statement for the 2010 ICR). As many FBC EGUs, including CFB EGUs, are relatively new, they were included in the non-Hg metallic HAP group selected for testing because their PM controls were among the 175 newest, the acid gas HAP group selected for testing because FBC was considered to be an FGD system and the units were among the 175 newest, and the organic HAP group selected for testing because the newest units were expected to be the most efficient and, thus, likely to have the least amount of organic HAP formation.

The effect on Hg emissions is not what commenters suggest because, although, as noted by commenters, FBC units may be found among the better performers (among the top 10 EGUs) on the Hg MACT floor spreadsheet, they are also found in the range of 221 to 226 EGUs (of 393 data points). The fact that FBC units have "vastly dissimilar ash properties" that may contain higher levels of lime or unburned carbon in the fly ash than conventional PC EGUs does not indicate that the overall system behaves any differently with regard to emissions to the atmosphere (the key metric) than a conventional PC EGU with add-on controls. The asserted higher levels of unburned carbon result in a range of effectiveness of mercury control that is similar to that of ACI found on PC EGUs; such ACI control may be found on EGUs that are among the better performers as well as on EGUs as low as 369 on the list of data points.

We also reject commenter's allegation that CFB units' internal controls cannot be compared to units needing external controls "because they were designed to emit very low levels of pollutants in comparison to other units" and with commenter's assertion that facilities depending on external controls could not possibly retrofit their units to replicate the results of internal controls. CFB units are designed to control SO_2 (and, thus, other acid gases) internally; however, external SO_2 polishing controls are added to some CFB units and all CFB units have external PM controls. As noted above, we have looked at the performance of the total system in our evaluation. Similarly, we reject commenter's inference that we should start from the many subcategories and prove that fewer are needed. Commenter's analysis of the data supposedly indicating a statistical difference between PC and CFB performance for mercury removal is, we believe, misplaced given the facts noted above that both PC and CFB units are among the MACT floor units.

All types of coal-fired units other than those we subcategorized are represented in the MACT floors for Hg and all types of units are represented in the floors for the non-Hg HAP and acid-gas HAP. FBC EGUs are not an exception and such units are found across the range of top performing units for all of the HAP categories: acid gas, non-Hg metallic, and Hg. In addition, any assertion that non-FBC units are unable to meet the final standards because FBC units are included in the same subcategory (or vice versa) is plainly refuted by the fact that EGUs of all types are currently meeting one or more of the final standards. Thus, the EPA finds no basis for subcategorizing FBC units.

Further, as noted elsewhere in this document, the EPA does not believe there is a basis for subcategorizing small EGUs, FBC or PC. In addition, the data have been re-evaluated partly based on comments received and an FBC unit is not the basis for the new-source Hg or non-Hg metal HAP MACT floor. However, even absent the reassessment and reranking of the data, should an FBC unit have remained as the best-performing source, EPA would have selected it as the basis for the new-source limits based on the determination that subcategorization of FBC units is not warranted.

In addition, we do not agree that including CFB units in MACT floor pool equates to establishing a beyond-the-floor-standard and the commenters that make that assertion provide no data in support of it. As we noted above, the best performing sources for mercury and non-Hg metal HAP were not CFB units so the notion that PC-fired EGUs will not be able to meet the existing or new source standard is wrong. Finally, even if we determined there was some difference in emissions between the types of units, we would decline to exercise our discretion to subcategorize given the data show that all types of units burning all types of coal are able to meet the standards in the final rule.

b. Opposition to subcategorization of CFB Units.

Comment 23: Commenter 17648 states that the EPA properly declined to subcategorize units based on design type where there is no indication that any physical distinctions among unit designs have a meaningful and substantial impact on HAP emissions. It would be inappropriate to subcategorize CFB units because there is no evidence to support a determination that CFB design is responsible for a unit falling in or out of the top 12 percent for a particular HAP. Separating CFB units into a subcategory would artificially weaken the emissions performance achieved by the remaining pool of best-performers, and thus weaken the MACT floor. Although a weaker MACT floor may be favored by owners of older, uncontrolled units, Congress did not intend for section 112(d) emission standards to cater to the interests of such units.

Response to Comment 23: The EPA appreciates the support of the commenter.

3. The EPA should not develop subcategories for other boiler designs.

a. Wall-fired versus tangential-fired units.

Comment 24: Commenter 17648 states that the EPA properly rejected separate subcategories for wall-fired units or tangential-fired units because there is "no significant difference in emissions that would justify subcategorization." Without an emissions difference, there is no meaningful physical distinction upon which the EPA reasonably may conclude that these units are different classes, types, or sizes that warrant different determinations of what is achieved and what is achievable in setting emissions standards. Moreover, similar control technologies exist for both of these types of units to meet the standards that the EPA proposes in this rule.

Response to Comment 24: The EPA appreciates the support of the commenter.

4. The EPA should develop a subcategory for low capacity factor units or limited use units (all fuel types).

a. Support for a limited use subcategory for coal- and oil-fired units.

Comment 25: Multiple commenters (16849, 17316, 17623, 17689, 17736, 17774, 17775, 17776, 17816, 17817, 17821, 18014, 18034, 18429, 19114, 18023) support the development of a limited use subcategory for both coal- and oil-fired units.

i. Should also apply to coal-fired units.

Comment 26: Commenter 18014 states that in the rule preamble, the EPA solicits comments on establishing a limited use category for liquid oil-fired units that only operate a limited amount of time per year. The EPA suggests reduced monitoring requirements and acknowledges that limited operation may preclude the ability to conduct stack testing. Commenter agrees that limited operation precludes the ability to conduct stack testing, but limited operation is not a condition that is specific to only liquid oil-fired units.

Comment 27: Commenter 17821 suggests that the EPA consider a "limited use" category for existing coal- and fuel oil-fired EGUs and establish work practice standards.

ii. Consistent with Industrial Boiler MACT.

Comment 28: Commenters 17316 and 18023 state that the Electric Utility MACT rule should add a "Limited Use" Category. Commenter 17316 states that as a minimum, this category should be established for oil-fired units, as discussed in the preamble to this MACT; however preferably it should be established for all fuel type units, consistent with the Industrial Boiler MACT rule.

Comment 29: Commenter 18023 states that the EPA has not proposed a subcategory for units that operate only a limited amount of time, but the EPA has requested comment on establishing additional subcategories. The reliable supply of electricity in the U.S. results from utilities having different classes of both coal- and oil-fired power plants. Some units operate with high capacity factors whereas others operate less frequently and often during times of peak demand (i.e., limited use). In the final Industrial Boiler MACT, the EPA subcategorized based on the different classes of boilers.

Commenter 18023 states that each and every argument that the EPA made in the final Industrial Boiler MACT applies to utilities as well. Given that both rules are being adopted under CAA section 112, and given the similarity of the source categories, there is no obvious reason for fundamentally different approaches in the two rules. And, the EPA offers no reasons in the proposed Utility MACT. In light of the Industrial Boiler MACT, any decision not to create a subcategory for limited-use units would be arbitrary.

Comment 30: Commenter 17316 states that limited use units tend to be placed into service for short periods, an operating pattern which is not compatible with performance testing. Moreover these units tend to be of smaller size, because they have to come up to load relatively quickly. MACT retrofits, and compliance with ongoing MACT monitoring and testing requirements, would constitute a substantial economic and logistic burden for these units, and the testing could also represent in a significant increase in annual operating usage (and emissions). Further, the contribution of such limited use units, particularly oil fired units, to HAP emissions is minor. Other justifications for including a limited use category as part of a Boiler MACT are discussed in the Major Source Boiler MACT rule preamble.

iii. Based on annual hours firing coal or oil.

Comment 31: Commenter 17316 further suggests that the limited use category be defined, not based on total unit operating hours, but rather based on the number of hours a unit fires oil or coal, or alternatively, and preferably, based on fuel usage (e.g., oil heat input/yr or oil gallons/year). Since pipeline natural gas does not significantly contribute to HAP, use of this fuel should not affect a unit's inclusion in the limited use category, i.e., periods of pipeline gas firing should be excluded in the determination of whether a unit qualifies for limited use status.

Commenter 17316 suggests fuel usage thresholds for qualification as a limited use EGU are: (a) 500 hours/year although firing coal, oil, or any other solid fuel; or alternatively for oil fired units (b) 3.5 million gallons/year of oil (equivalent to about 500 hours of full load operation for a 1000 MMBtu/hr Boiler). Units qualifying as limited use oil units should either: (a) be given an exemption from the Electric Utility MACT rule; or (b) if not given exemption status, should only be subject to work practice requirements, i.e., the annual tune-up. The preferred option is probably to have these units subject to work practice requirements. Imposing more stringent emission standards would likely force the permanent shutdown of many of limited use oil units, as retrofits or fuel switching would be cost prohibitive due to their low utilization. These units serve a important peaking function within the utility grid, and their loss could result in essentially a near exclusive dependence gas fired units for peaking capacity on the utility grid, which could affect utility reliability in the event of any gas curtailments.

iv. Based on 10% capacity factor and 3-year average.

Comment 32: Commenter 16849 also supports the idea of subcategories, and believes an additional distinction is needed for low capacity units. Commenter suggests that this is due to the fact that low-capacity units require additional start-ups and shut-downs and is also due to increased load swings resulting in an inability to meet optimum emissions reductions because these units are peaking type units. Commenter suggests using a provision similar to the NO_X CEMS on low capacity units with a capacity factor no greater than 10 percent on a 3-year average and no greater than 20 percent for any one year. Commenter states that under the proposed regulation and due to inherently more start-ups and shut-downs, low capacity units will be placed in a situation where compliance is impossible. Commenter adds that these units are peaking units and the reliability of the grid is dependent on peaking units meeting key summer and winter peak loads.

Comment 33: Commenter 17821 states that in order to meet electricity demand in the U.S. in a reliable, and economical, fashion, utilities rely on several distinct classes of EGUs. These consist of base load units, cycling units, and peaking units. Base load units are used to provide the electricity needed to meet expected customer demand assuming standard conditions. These units typically operate continuously, and at or near their maximum output, based on their low variable cost of operation, and efficiency. Cycling units operate over a wide range of electrical output in order to absorb much of the daily variation in electricity demand. These variations arise from changes in weather, commercial and industrial customer output, and residential usage. These units tend to be older and smaller in electric generation capacity than base load units. Peaking units are EGUs that typically operate only during periods of high electricity demand. These units, typically fueled by gas or oil, can be started up and brought online quickly in order to meet spikes in electricity demand. Peaking units are also often used to provide electric generation for transmission grid stability. The EPA has the authority to create a "limited-use" subcategory of utility boilers that are operated infrequently because of their specialized nature and use. Section 112(d)(1) of the CAA, which mirrors earlier language found in CAA section 111(b)(2), allows the Administrator the discretion to distinguish among "classes, types, and sizes of sources" in establishing MACT standards. The EPA has previously created limited use subcategories under CAA section 112, such as in the recent Reciprocating Internal Combustion Engine (RICE) rule, Industrial Boiler MACT and other rules. The EPA should exercise its authority to establish a "limited-use" category for peaking unit EGUs that operate infrequently and only for a limited time period. In past rulemakings the EPA has generally created limited-use subcategories with a maximum of 876 hours per year of operation. Although this may be an appropriate limitation for RICE and some industrial boilers, Commenter suggests both that the restriction is overly burdensome for utility boilers and that two important changes are necessary. First, the limitation should be based on a 3-year averaging period instead of a single year. Second, the limitation should be based on a unit's capacity factor instead of its hours of operation. Limited use units are generally smaller and require one day or more to start up and begin generating electricity. They are needed for short term peak periods. Because they take more time to start up than other sources such as diesel generators, they would not be started unless they could be run for a minimum period such as five to seven days. For this reason, limited-use units are utilized during time periods with an extended forecast of increased electricity demand. This differs from peaking units, since peaking units such as combustion turbines and diesel generators are able to start up quickly, sometimes in a matter of minutes. They are used only for short periods of intense electricity demand. Peaking units and limited-use units are both necessary for grid support to ensure electric reliability. The EPA should consider a limited use category based on a 3-year compliance period and establish work practice standards for these units.

v. Based on 30% capacity factor.

Comment 34: Commenter 17623 states that the EPA should develop a subcategory for low capacity factor units, with 30 percent or below capacity factor, that are used primarily for seasonal peaking. Low capacity factor units may be used for only part of the year, do not run continuously, are frequently dispatched as load-following units, and a larger fraction of their operating time will be devoted to startups and shutdowns in comparison to units with average capacity factors. As a result, their use of different operating cycles justifies a separate subcategory.

Comment 35: Commenter 18023 states that the EPA has suggested that "data from the units when operating both as peaking units and as baseload units (among other information) would need to be provided to support the comment." Unfortunately, Commenters do not have such HAP data because the ICR was not designed to capture emissions from "limited use" units. The EPA's ICR was aimed at highly controlled units that operate virtually all the time. Only a handful of limited-use units were required to conduct stack sampling during the ICR and only because they happened to be among fifty randomly selected units to conduct stack sampling for all HAP. Commenter has evaluated the operation of its units and believes that a limited use subcategory for units with annual capacity factors of less than 30 percent would appropriately distinguish between units that operate regularly and those that are "limited use." Commenter believes must create a subcategory for limited-use units (i.e., those with a capacity factor of less than 30 percent) before issuing the final rule.

Comment 36: Commenter 17689 states that the EPA should include an additional subcategory for limited use units. Limited use units are by definition not base load units and are typically dispatched during very high loads on the system or follow renewable resource output, such as with wind generation. Because these types of units can ramp up and down frequently, they likely have different emission characteristics and should be in a separate subcategory. Commenter suggests EGUs with an average annual capacity factor of 30 percent or less be identified as a subcategory.

Comment 37: Commenter 17736 contributing to MACT standards that will be difficult, if not impossible, to achieve is the EPA's failure to recognize the need for, and propriety of, additional subcategories. Specifically, Commenter suggests providing subcategories based on limited use in order to establish more realistic MACT standards and feasible compliance options. The speciation of unit designs and operational variability also warrants an additional subcategory based on boiler size or capacity factor. The EPA established a limited use subcategory with separate work practice standards in the final Boiler MACT, explaining that "the fact that the nature of these units is such that they operate for unpredictable periods of time, limited hours, and at less than full load has lead EPA to determine that limited use units are a unique class of unit based on the unique way in which they are used." Limited use coal and oil-fired EGUs have a similar set of unique characteristics and, thus, should be treated no differently than the limited use units in the final Boiler MACT.

Comment 38: Commenter 17774 states that the EPA also should develop a subcategory for low capacity factor units, e.g., those with 30 percent or lower capacity factor. These units are used primarily for seasonal peaking and are frequently dispatched for load-following capability. Their operating cycles ensure that a much larger fraction of their operating hours will be devoted to startups, shutdowns, and varying load in comparison to units with average capacity factors. During these times, control equipment cannot operate at maximum efficiency. Because of this, low capacity factor units' operating cycles justify a separate subcategory.

Comment 39: Commenters 17756 and 17776 state that section 112(d)(1) provides the EPA discretion to distinguish "among classes, types and sizes of sources within a category or subcategory in establishing standards." Some units, commonly referred to as base load units, operate virtually all the time. As electrical load increases during the summer and winter months as a results of more extreme temperatures, a second class of EGUs are brought online and the capacity is adjusted up or down to meet load demands. This class of units is referred to as load-following units.

Comment 40: Several commenters (17756, 17775, 17776) state that there is no evidence in the rulemaking record that the EPA ever evaluated subcategorization based on the different classes of EGUs. Indeed, the EPA's ICR was aimed at base load units that were highly controlled. Only a handful of load-following units were required to conduct stack sampling during the ICR because they were among the unlucky 50 EGUs randomly selected to conduct stack sampling for all HAP. As a result, the rulemaking record contains insufficient data to assess whether the HAP emissions characteristics of load-following units are statistically different than base load units. Commenters believe that they are, but because of the limited time the EPA has allowed for public comment on the proposed rule, it is impossible for utilities to conduct the needed stack sampling to support a separate subcategory for load-following units.

Commenters (17756, 17775, 17776) believe that the emission characteristics of load-following units are different than base load units. The EPA should fully evaluate subcategorization based on these different "classes" of EGUs before a final rule is issued. Because load-following units are typically operated during the summer and winter months, a possible way to define a subcategory for these units would be based on limited use. Commenters suggest that this limited use subcategory apply to units with annual capacity factors less than 30 percent.

Comment 41: Commenter 17816 states that coal-fired units should be subcategorized by class of service, with units that operate infrequently to meet increased demand placed in a limited use category. The evidence in the rulemaking record indicates that the EPA's 2010 ICR and the proposed rule are aimed at "base-load" units (those units that operate virtually all of the time). As set in this proposed rule, the other classes of units (i.e., load-following and peaking-units) are being forced to comply with requirements that may not be economically feasible or justifiable based on their utilization. Unfortunately, there appears to be an insufficient amount of data available within the 2010 ICR data to evaluate what limits may be appropriate.

Commenter 17816 believes that the emission characteristics of these other classes of units are different from those of base-load units. Because these facilities are typically operated for a smaller amount of the year, a possible way to define a subcategory for these units would be based on that "limited use." One suggestion is that this "limited use" subcategory could apply to units with annual capacity factors less than 30 percent.

Commenter 17816 states that unless the EPA establishes more appropriate subcategories in the MACT Rule, companies will be forced to comply with "one size fits all" limits which greatly increase the difficulty of compliance and increase the cost on an industry-wide basis.

vi. Based on 250 MW and 25 percent capacity factor.

Comment 42: Commenter 17736 states that the emissions profiles of these smaller units are different from base load units, and the EPA should account for these differences in setting MACT standards.

Limited use units cannot be tested effectively due to their limited operating schedules. The requirement to test under full load normal operating conditions would force limited use units to operate solely for testing purposes, thereby forcing (potentially) unnecessary startups and shutdowns, creating (potentially) excessive emissions for the sole purpose of testing and, ultimately, defeating the purpose of these units. Many of these limited use units are operated primarily during periods of peak demand, and are critical components in maintaining grid reliability. Commenter proposes a maximum size of 250 MW and a 25 percent capacity factor in establishing a limited use subcategory. Without a limited use subcategory for these smaller units, facilities like Muskingum River Units 1- 4 or Picway may be forced to shut down, deteriorating grid reliability.

Comment 43: Commenter 18429 states that the MACT should also subcategorize for small (<250 MW) limited use (<25% capacity factor) boilers, that have insignificant emissions of HAP and cannot absorb the high capital cost of full controls, otherwise, these units will be forced to be retired and will be unavailable for electric reliability support when needed.

Comment 44: Commenter 19114 states that the EPA should recognize that many smaller coal- and oil-fired units are operated primarily during periods of peak electrical demand. A separate, subcategory based on boiler size and/or capacity factor would also follow the direction provided to the EPA by Congress to distinguish between sizes of sources. The emissions profiles for the smaller peaking units are different from the base load units, and the EPA should account for these differences in setting MACT standards. A maximum size of 250 MW and a 25 percent capacity factor should be utilized in setting a limited use subcategory to be applicable to smaller units, below which, only work practice standards should apply to the units.

vii. General support for limited use subcategory.

Comment 45: Commenter 17689 states that the EPA should include an additional subcategory for load following units.

Comment 46: Commenter 17775 states that the EPA appears to have spent little time considering possible subcategorization approaches, and also encourages the Agency to consider subcategories for limited use EGUs.

Comment 47: Commenter 17817 states that small units operating at low capacity factors should be evaluated for the relative health impacts.

Comment 48: Commenter 18034 states that subcategorization and alternative emission limits should be provided for peaking units. Considering that the EPA is proposing to apply the same emissions limits for normal operations to startup and shutdown periods, subcategorization of peaking units should have been considered by the EPA early in the regulatory development process for the utility NESHAP rule rather than merely taking comment on the possibility of subcategorization for this class of EGU. Peaking units are an integral and vital part of the electrical system reliability and are subject to frequent startup and shutdowns. The EPA has not properly accounted for many aspects related to applying the emission limits to periods of startup and shutdown to even base load facilities like coal-fired EGUs, rendering its standards arbitrary, capricious, and contrary to law.

b. Opposition to a limited use subcategory.

Comment 49: Commenter 17648 states that the EPA's decision not to create a limited use subcategory is consistent with the plain meaning of section 112 and is reasonable. A limited use subcategory, whether defined by hours of operation or by capacity factor, is outside the EPA's discretion. Neither EGU operating time nor capacity factor is a class, size, or type distinction. Capacity factor reflects a unit's output relative to its nameplate capacity, and is not tied to any physical or mechanical difference that distinguishes coal-fired units from one another. The level of a source's operation, whether measured by operating hours or capacity factor, reflects business judgment about how and when it is economically prudent to operate the source, and thus has no connection with the grounds upon which the EPA may subcategorize in setting emission limitations.

Commenter 17648 states that even if the EPA has discretion to subcategorize "limited use" EGUs, the Agency does not have a reasonable basis to exercise that discretion in the Toxics Rule. The emission limitations that the EPA proposes are concentration-based standards. That a particular EGU has a small capacity factor or operates less frequently—and, thus, might emit a relatively lower mass of HAP than a baseload source—does not imply that the source should not be required to meet the concentration-based standards that apply to the category of EGUs. That is particularly true in light of the evidence of health and environmental impacts.

Commenter 17648 states that if the EPA were to subcategorize on this basis, its decision would be legally vulnerable. The Agency must apply reasoned decision-making in creating a subcategory. To date, the EPA has not explained why a limited use subcategory is a reasonable interpretation of the CAA that would withstand judicial scrutiny. The rationale the EPA adopted for creating a limited use subcategory in the industrial, commercial and institutional (ICI) Boiler NESHAP does not apply to EGUs. In the ICI Boiler NESHAP, the EPA recognized that some auxiliary boilers are backup units that run in emergency situations, and the EPA explained that it created a limited use subcategory for those units because they operate for unpredictable periods of time and, because they are backup units, often do not need to run at all and would therefore operate solely to conduct emissions testing. Moreover, auxiliary boilers governed by the ICI Boiler NESHAP may be little different than boilers located at apartment buildings or other sources not regulated under CAA section 112, and have no relationship either to the operations that led to the inclusion of the larger industrial facility in the regulated category or the type of controls that are required to regulate the HAP emissions from that category.

Commenter 17648 states that this is not the case with EGUs. EGUs are nothing like apartment building heating units. Where an ICI boiler might be a very small auxiliary unit contained in a larger major source, such as a paper or chemical plant, EGUs are defined to include only larger electric generating units (greater than 25 MW nameplate capacity) and the boiler is an integral part of the major unit being regulated. Unlike the very small auxiliary boilers in the ICI Boiler NESHAP, there are cost effective ways to control some emissions from EGUs with a low capacity factor. In short, the rationale supporting a limited use subcategory in the ICI Boiler NESHAP is wholly inapplicable here.

Commenter 17648 adds that if the EPA determines that it has discretion to subcategorize "limited use" EGUs and chooses to create a limited use subcategory, the Agency should not impose a work practice standard in lieu of numerical emission limits. A work practice standard may only be appropriate when the numerical limitation cannot be determined, or whether a source is complying with a numerical limitation cannot be measured. Work practice standards should be limited to the most extreme circumstances because it is difficult to assure that those standards achieve the emission reductions that would be achieved under numerical emission standards. The rulemaking record here does not support a determination that the statutory requirements for a work practice standard for limited use EGUs are met.

5. The EPA should develop a subcategory for low capacity factor units or limited use units for oil-fired units.

a. Support for a limited use subcategory for oil-fired units.

Comment 50: Multiple Commenters (17386, 17712, 17725, 17758, 17760, 17803, 17808, 17818, 17820, 17826, 17870, 17885, 17920, 18025, 18539) support the establishment of a limited use subcategory for oil-fired units.

i. Consistent with Industrial Boiler MACT and work practice or operational standards.

Comment 51: Several commenters (17758, 17803, 17808, 17820) support the EPA's consideration of a limited-use subcategory for oil-based units that operate a limited amount of time per year on oil and are inoperative the remainder of the year. Commenters support the creation of such a subcategory, but urge the Agency to establish work practice or operational standards (i.e., tune-up) in lieu of numeric emissions limits for limited-use oil-based units. Commenters note that this approach is similar to the approach used in the final Industrial Boiler MACT rule.

Comment 52: Commenters 17386 and 17826 request a limited-use category be established for oil-fired EGUs as discussed in the preamble to this MACT, especially since the contribution to HAP emissions from oil firing is minor as Table 2 in the preamble identifies. The inclusion of a limited use category would be consistent with the Industrial Boiler MACT rule (40 CFR 63 Subpart DDDDD) recently issued. Limited-use EGUs tend to be placed into service for short periods of time to support regional electrical demands, an operating pattern which is not compatible with performance testing. In fact, such performance testing could increase limited-use EGU's annual operating time and emissions- thus, defeating the intent of the MACT rule.

Comment 53: Several commenters (17758, 17808, 17920, 18025) state that currently, the proposed rule treats oil-based units differently (i.e., more stringently) than the Boiler MACT, which provides a limited-use subcategory. The Boiler MACT defines limited use as "any boiler…that burns any amount of …liquid…fuels, has a rated capacity of greater than 10 MMBtu per hour heat inputs, and has a federally enforceable limit of no more than 876 hours per year of operation." Further, the Boiler MACT rule states that such units would be regulated "with a work practice standard that requires a biennial tune-up, which will limit HAP by ensuring that these units operate at peak efficiency during the limited hours that they do operate."

Comment 54: Commenters 17808 and 18025 believe the stack emissions testing requirements would not be feasible for these low oil capacity factor units. Such units could have specific emission limitations or reduced monitoring requirements (for example, limited operation may preclude the ability to conduct proper stack emissions testing).

Comment 55: Commenters 17808 and 17870 base their recommendation for a limited use subcategory on the same logic that the EPA articulated in the ICI Boiler MACT, that the nature of these units is such that they operate for unpredictable periods of time, limited hours, and at less than full load in many cases has led the EPA to determine that limited use units are a unique class of unit based on the unique way in which they are used."

Comment 56: Commenter 17920 supports the creation of such a subcategory that would exclude these units from compliance (similar to the final Boiler MACT rule) that: "Includes all forms of oil (i.e., distillate and residual) used to generate electricity. Allows these units to be operated up to a maximum of 876 hours (10-percent capacity factor equivalent) per year, where, if the maximum operating limit is exceeded during any given year, it is the owner's responsibility to meet any environmental emissions compliance standards or request a waiver for a special circumstance, e.g., late season hurricane recovery, curtailment of natural gas supply. Includes co-fired units that use a fuel not regulated by the proposed rule, such as natural gas for the remainder of their operations in given control period." In the proposed Utility MACT rule, the EPA used its discretion to subcategorize to a limited extent with respect to fuel and boiler type. In addition to those categories, Commenter is supportive of the EPA's consideration of a limited-use subcategory for oil-based units, for compliance with all standards.

ii. Based on 876 hours per year of operation, or 10 percent capacity factor.

Comment 57: Commenter 17386 requests that the EPA establish a limited-use category for oil-fired EGUs that is either: (a) given an exemption from the Electric Utility MACT rule; or (b) if not given exemption status, is only subject to the rules' work practice requirements (i.e., the annual tune-up). Furthermore, Commenter proposes the limited-use category determination be based on the number of hours a unit fires oil, not the total number of EGU operating hours (which may include hours a dual-fuel EGU operates on natural gas).

Comment 58: Commenter 17725 believes that a limited use subcategory for oil units is appropriate and proposes the following standard for a Limited-Use Subcategory source: "Limited-Use Source Subcategory (LUSS) means an oil-fired EGU or a group of affected oil-fired EGUs at the same property that has a 3-year capacity factor no greater than 10% on a 3-year calendar basis or operates no greater than 876 hours per 12-month period. In calculating the capacity factors and annual operating hours, periods of natural gas firing for an EGU shall be omitted from the calculation. LUSS units shall be exempt from the emissions limits, stack monitoring and reporting criteria found in Section IV."

Commenter 17725 supports a Limited Use subcategory for oil-fired EGUs but has concerns about the EPA's characterization that the units may be "inoperative the remainder of the year". Many oil-fired EGUs in the Northeast have low annual capacity factors due to their relatively high heat rates, cost of operation, and displacement by new natural gas combined cycle plants constructed over the past 10 years. These EGUs, however, still provide capacity to the area as well as energy during periods of peak demand regardless of the time of year. As capacity resources, these units must remain operative and bid into the energy market throughout the year, not just during limited times of high demand. Their operations occur sporadically throughout the year and cannot be limited to certain months or seasons.

Commenter 17725 states that these units are often brought on-line at a low (or minimum) load to provide spinning reserves and as local or regional demand increases, the Independent System Operator (ISO) may increase their output to respond to that demand. There are exceptions to this low level operation such as when the unit is operated at full load to perform capacity verification testing for its ISO or stack testing required by state environmental regulations. The EGUs' operations on a year-to-year basis also respond to factors such as natural gas versus fuel oil prices, higher/lower than normal temperatures conditions, and unplanned outages for base loaded units.

Commenter 17725 states that HAP emissions from the low operating oil-fired units are often less than the Major Source trigger for HAP therefore, these units should be regulated under a Limited-Use

subcategory that is based on a 3-year average capacity factor amongst all same subcategory EGUs at a site. To ensure that these vital resources are available, sources that meet the criteria of a Limited-Use unit should be exempt from the direct measurement of the emission standards and comply instead with practices that provide documentation of "no-change" in their use subcategory.

Commenter 17725 proposes an approach to the LUSS based on the capacity factor of a source and/or like sources at a site. The EPA established the use of an hours-per-year limit as the exemption threshold under the ICI Boiler MACT regulations. However, the use of a capacity factor limit as opposed to an hours-per-year limit as used in the ICI Boiler MACT regulations addresses the fact that the EGU sources may operate more than 876 hours per year (10 percent of the hours per year) but, hourly operations occur at any load range of the unit, and not just full output. The 10 percent capacity factor limit relates to 876 hours per year, if an EGU were to operate at full load for all 876 hours. The 10 percent limit is also consistent with the limit found in 40 CFR Part 75 for a peaking unit allowed to use Appendix E for NO_X measurement.

Commenter 17725 illustrates the predominance of low level operation, based on actual, historic operations of Commenter's oil-fired EGUs. (See Figure 2.1.1 in EPA-HQ-OAR-2009-0234-17725-A1.) The oil-fired hours for the EGUs are charted based on the CEMS load bins as defined in 40 CFR Part 75, appendix A, section 6.5.2.1 for Low, Mid, and High operating levels. The low load range is the unit's minimum operation load to 30 percent of the range between minimum and full load; mid load range is >30 percent but <60 percent of the load range between minimum and full load, and full load range is >60 percent to 100 percent of load range. As can be seen, the majority of the operations for the units occur in either the low or mid load ranges. So, although a unit may operate more than 876 hours per year, its capacity factor can be less than 10 percent. For this reason, operating hours are not representative of emissions and not the only criteria for applicability.

Commenter 17725 proposes that the limited use category be defined as an oil-fired EGU or a group of affected oil-fired EGUs at the same property that (1) has a 3-year capacity factor no greater than 10 percent on a 3-year calendar basis or (2) operates no greater than 876 hours per 12-month period. Using two standards to determine compliance will allow sources needed for their low level of operations to operate more than 876 hours per year. These sources could use the 3-year, 10 percent capacity factor limit as their compliance mechanism.

Comment 59: Commenters 17760 and 17803 state that if the EPA does not adopt the term "Oil-Affected Unit," the agency should establish a subcategory for limited use liquid oil-fired units that operate as "peaking units." Peaking units are defined in existing the EPA regulations as units with a capacity factor of less than 10% over 3 years and no greater than 20% in any single year. 40 CFR section 72.2. Such units should not be subject to the same numerical requirements as units in the Liquid Oil subcategory and the EPA should establish work practice standards. Requiring the installation of ESPs on units for the purpose of controlling emissions from firing oil when a unit operates as a peaking unit is nonsensical and will result in little environmental benefit. Such units emit less HAP than even a well-controlled oil-fired unit with a much higher capacity factor. It makes little sense to require units with limited operations, and emissions, to meet the same emissions limitations as units that operate more, and emit more, throughout the year. In addition, stack-testing at such units would be equally impracticable and likely would require the unit to operate when it otherwise would be off-line.

Comment 60: Commenter 17758 states that the subcategory should include both forms of oil (i.e., distillate and residual) used to generate electricity, and allow these units to be operated up to a maximum

of 876 hours (10% capacity factor equivalent) per year, where: if the maximum operating limit is exceeded during any given year, it is the owner's responsibility to meet any environmental emissions compliance standards or request a waiver for a special circumstance, e.g., late season hurricane recovery or curtailment of natural gas supply.

Comment 61: Commenter 17870 recommends the following definition for a limited-use oil-fired EGU: A limited use oil-fired EGU means any boiler that burns any amount of liquid oil, has a rated capacity of greater than 25 MW, and has an annual average capacity factor based on its oil use of 10.0 percent or less over the past 3 years (and not more than 20.0 percent in each of those 3 years). This is the same general approach that the EPA uses for defining "gas-fired and oil-fired peaking units" in Part 75. Borrowing from 40 CFR 72.2, Commenter would define "capacity factor" as the ratio of the unit's actual annual oil heat input to the unit's maximum design heat input times 8,760. Commenter believes that this is a reasonable threshold for defining limited use for oil-fired EGUs because of the existing regulatory precedent in the CAA and because, unlike a threshold based on hours of operation, it reflects the varying loads of an electric generating unit.

iii. Limited-use units represent a small percentage of generation.

Comment 62: Commenters 17758 and 17870 state that electricity generated from oil-based units contributes a relatively small percentage of the total generation and installed capacity on a national basis and also contributes a *de minimis* amount of emissions. Consequently, creating a limited-use subcategory for oil-based units will have a negligible impact on overall emissions. Commenter 17758 states that data from the Energy Information Administration (EIA) support this statement, indicating that: 38,937 out of 3,950,331 thousand MWH of generation came from oil, or 0.986 percent of all generation. There were 56,781 MW of installed oil capacity out of a total installed capacity of 1,025,400 MW, or 5.54 percent of all installed capacity. Calculating from the above metrics, the average capacity factor for all oil generation in 2009 was 7.83 percent. Note that on a regional or market basis, the percentage of oil-based generation/installed capacity as well as the capacity factor can be higher or lower than the national averages.

iv. Limited-use units represent a small percentage of emissions.

Comment 63: Commenter 17725 recognizes that there could be concerns that a capacity factor limit may exempt a large number of affected EGUs. To determine the potential environmental effect of using the 10 percent capacity factor limit, Commenter calculated the average HAP emissions from its four EGUs that participated in the ICR stack testing. The results are based on the units' average oil-fired heat input for years 2009 and 2010. With the exception of HCl emissions for two of the units which are addressed later in the comments, the HAP emissions from these units are de minimus. For HCl, the presence of chlorides in the fuel oil is a contaminant that can be addressed through a compliance measure for fuel deliveries.

Comment 64: Commenter 17820 states that the EPA should recognize that many oil-fired and smaller coal-fired units are operated solely during periods of peak electrical demand. Subcategorizing based on boiler size and/or capacity factor would also follow the direction provided to the EPA by Congress to distinguish between sizes of sources. The commenter asserts that the emissions profiles for peaking units are different from the base load units, and the EPA should account for these differences in setting MACT standards. (Commenter gives two examples of these types of units, Possum Point 5 and Yorktown 3.)

Commenter 17820 states that electricity generated from these oil units contributes a de minimus amount of HAP emissions. According to the commenter, for Dominion Virginia Power, for example, HAP emissions from our two large oil-fired burners account for less than 0.75% of the total HAP emissions from our generating fleet. The commenter states that the additional cost to comply with the emission limits in the proposed rule for oil units that operate infrequently would be cost-prohibitive and could force retirement of these units. The commenter asserts that a limited use category applicable to oil-fired units that would allow compliance with work practice standards should be established, consistent with the final Industrial Boiler MACT rule. According to the commenter, since these units operate infrequently and are used primarily to meet reliability needs, an annual limitation on capacity (10 percent capacity factor) should be established below which oil-fired units would qualify for limited use status. The commenter states that a limited use subcategory for oil units that are also willing to accept an operational limitation will ensure reliability of the electrical system, assure the continued use of oil as a backup fuel supply as well as limiting the overall emissions of HAP associated with these units. According to the commenter, there is precedent for a limited use subcategory in the Industrial Boiler MACT rule, and similar justification is present within the category of utility units.

Comment 65: Commenter 17870 states that there are 4,055 oil-fired generating units in operation or on standby mode, and 89 percent of these units have nameplate capacities of 25 MW or less. The commenter asserts that according to 2008 EIA data, petroleum-fired units contributed 3 percent of the total SO_2 emissions and 2.2 percent of the NO_X emissions of the power sector. The commenter states that such units run on distillate fuel oil, residual fuel oil or some combination.

v. Cost implications.

Comment 66: Commenter 17870 states that due to the already high levelized cost of generation for these units ($187.54/megawatt-hour (MWh), 10-percent capacity factor, on average), the units operate and are dispatched primarily during times of peak load/ peak demand or in emergency situations, such as hurricane recovery, curtailment of natural gas due to natural disaster disruptions, etc. According to the commenter, the levelized cost of generation for these units is significantly higher than most other forms of electricity generation, such as a coal ($94.80/ MWh), natural gas combined cycle ($66.10/MWh) and advanced nuclear ($103/ MWh). The commenter asserts that retrofitting these units with an ESP would increase the already high levelized cost of generation another 7 percent ($200.32/MWh on average) with very little environmental benefit.

Comment 67: Several commenters (17758, 17870, 17920) state that the other factor that supports creation of a limited-use subcategory for oil-based units is the fact that, because these units operate so few hours during a given year, they only have a limited number of hours over which to amortize any retrofit capital expense. According to the commenters, it is not possible to recover the capital cost of the necessary controls over the remaining life of an oil-based unit with a capacity factor at or below the 10-percent limit proposed by the EPA. The commenters assert that when determining whether it is appropriate to create a subcategory under CAA section 112(d)(2), the EPA is allowed to take into account the cost implications of achieving emissions reductions. The commenters state that the Agency is further authorized to utilize “work practice, or operational standards” when promulgating standards for such a subcategory.

Commenters (17758, 17870, 17920) conclude that unless the separate limited-use subcategory proposed by the EPA is promulgated in the final regulations, it may not be economically practical to retrofit these units with emission control technology, and their owners may be forced to shut them down. According

to the commenters, however, as already noted, these oil-based units are critical to the generation fleet to provide electricity during times of peak load or in emergency situations, and their forced retirement could lead to near-term, local energy supply problems and major cost increases.

Comment 68: Commenter 17920 states that co-fired units that operate on natural gas for the remainder of the year possibly could amortize control costs, but the costs of MACT controls for the limited-use oil function, the only function of a co-fired oil/gas unit otherwise requiring compliance with the EGU MACT rule, likely would not be economically rational. According to the commenter, the owner would, instead, likely discontinue the oil-burn option for the unit. The commenter asserts that however, as already noted above and described in detail below, these oil-fired units are critical to grid stability to provide electricity during times of peak load or in emergency situations, and their forced retirement could lead to near-term energy supply problems and major cost increases.

Commenter 17920 states that because they purchase natural gas using short term contracts and natural gas brokers on the spot market, and the suppliers are a number of competitive pipeline operators that operate in the southeast United States, price and product availability are based on production primarily from offshore interest in federal and state waters. According to the commenter, during any episodes of projected bad weather such as a hurricane entering the Gulf of Mexico, rig operators and oil companies are required to move personnel from production platforms in the interest of safety, thus triggering the operators to shut down natural gas wells and curtail production. The commenter states that in addition, pipeline operators also are required to maintain a system pressure in order to distribute natural gas to industrial users using a series of compressor stations to maintain a marketable system pressure available to the end user. The commenter asserts that many of these compressor stations are located in areas subject to storm surge. According to the commenter, in an effort to minimize equipment loss and maintain compliance with environmental and regulatory rules, these stations are idled or removed from service until the threat of impact is reduced, and thus resulting in curtailment of natural gas fuel supply to some of Commenter's facilities. The commenter asserts that once the supply is curtailed, Commenter only has the option to install secondary fuel oil burners to maintain load. The commenter states that in Louisiana this is typically No. 6 Fuel Oil or No. 2 Fuel Oil. Once the threat of bad weather ceases, pipeline operators and production operators assess damage and reinstate gas production. Depending on natural gas fuel header pressure and supply, Commenter then re-ignites natural gas burners. According to the commenter, the scenario described above occurred after Hurricanes Katrina and Rita, which caused the Gulf of Mexico production of natural gas to be near zero for 60 days Although repairs were made to production platforms.

Commenter 17920 believes that this subcategory should not be limited to those oil-fired units that operate for a limited number of hours each year and "are inoperative the remainder of the year," as the EPA states. According to the commenter, this subcategory also should include liquid oil-fired units that (instead of becoming inoperative for the remainder of the year) operate the remainder of the year by using a fuel that is not subject to this rule, such as natural gas. The commenter states that the provision should apply to oil/gas co-fired units that meet the operational limitations for oil. The commenter asserts that if this is intended by the EPA in the proposed rule (such as by intending that a unit falls within the subcategory as long as only and specifically its oil-fired capability is inoperative for the remainder of the year), the provision should be clarified.

vi. General support for a limited-use subcategory for oil-fired units.

Comment 69: Commenter 17316 also notes that the preamble seems to indicate that the EPA was planning to propose the establishment of a separate subcategory for oil-fired EGUs used on a limited basis that would be subject to less stringent HAP emission limits by Petition to the Administrator. The commenter states that however, in the rule itself, no provision was found that creates separate requirements for units that fire oil on a limited basis.

Comment 70: Commenters 17712 and 17885 state that the EPA should include an additional subcategory for oil-based limited-use units.

Comment 71: Commenter 19114 supports the provision mentioned in the preamble for those units that are capable of firing dual fuels. The commenter asserts that a 10 percent capacity factor for oil-firing as a limited use category for dual-fired units should be included in the final rule. The commenter states that dual fuel-fired units need the flexibility to deal with supply constraints that can affect these units, and for which their dual fuel firing capability was designed. Commenter believes that a 10 percent exemption for oil-firing of dual fuel units is consistent with the manner in which these units operate and will provide a cost effective manner of dealing with their HAP emissions.

Comment 72: Commenters 18539 and 19120 agree with the EPA that these units should be allowed to demonstrate compliance based on fuel analysis rather than performance stack testing. The commenter asserts that however, many of the limits established for fuel oil are below detectable limits for fuel analysis making it difficult, or impossible, to establish operating limits.

Comment 73: Commenters 16826 and 17386 consider the cost and logistic burdens to comply with the proposed rule a concern because they know of a unit containing a once-through circulating water system that much meat NPDES water discharge limits. The commenters say that these permit limits indirectly restrict the hours of operation and load and request a "Limited Use" category to relieve this and other oil-fired facilities in a similar scenario.

vii. Based on 200 hours/year of operation.

Comment 74: Commenter 17818 is generally supportive of the concept of providing some relief for limited-use liquid oil-fired units. It is Commenter's opinion that such a limitation should be in the form of a low value of operating hours per year (such as 200 hrs/yr firing any fuel, including periods of start-up and shutdown) rather than an annual capacity factor limitation. It is Commenter's opinion that any such limitation should include, as a minimum, fuel sampling requirements similar to those for all other liquid oil-fired units for all fuel(s) intended for use by the particular combustion unit.

viii. Exclude periods of "emergency operations" from the calculation of capacity factor.

Comment 75: Commenter 17870 requests that periods of "emergency operations" be excluded from the calculation of a unit's capacity factor on oil. According to the commenter, oil-fired steam units may be called upon to avoid grid instability in the State of Florida. The commenter states that their operation would be to mitigate reliability issues, including, but not limited to, capacity shortages and/ or conditions that may exceed the capability of its power generators and may lead to a Generating Capacity Emergency. The commenter states that a Generating Capacity Emergency is defined as an event where anyone of the electric generating utilities in the State of Florida has inadequate generating capability, including purchased power, to supply its firm load obligations. The commenter states that emergency operation does not include nonemergency, economic operation such as peak shaving programs.

b. The EPA should define the limited use subcategory and allow for public comment.

Comment 76: Commenters 16513 and 17843 state that the limited use subcategory described at 76 FR 25027 does not include a definition as to what constitutes a "limited amount of time," such as specific number of hours, to describe what "limited amount of time" means, and the phrase is open to interpretation. According to the commenters, the EPA should define what constitutes a "limited amount of time" and allow for public comment when it has established a framework. The ability of sources to operate under a limited use-subcategory could significantly impact compliance costs and requirements associated with the Utility NESHAP. The commenters assert that also, the breadth of a limited use subcategory could influence other state programs to address emissions from units that operate for limited circumstances. According to the commenters, the EPA needs to provide more details on the limited use subcategory and in particular include a definition that will be used consistently by affected facilities.

c. The EPA should allow capacity factor averaging for all oil-fired EGUs at the same site.

Comment 77: Commenter 17725 states that similar to EPA's proposal to allow emissions averaging, capacity factor averaging should be allowed for all affected oil-fired EGUs at the same site to determine compliance with the 3-year capacity factor limit. The commenter states that this would provide site operators an additional compliance option. The commenter asserts that also, it could prevent a situation where a more efficient, lower emitting EGU at a site is temporarily taken off line since it is at a 10 percent capacity factor and a less efficient unit with a lower capacity factor at the site must then operate. According to the commenter, the use of the less efficient units could result not only in higher electric prices but, also more emissions due to a higher emission rate.

d. Gas-fired generation should be omitted from the capacity factor calculation.

Comment 78: Commenter 17725 states that to encourage the use of natural gas, when available to a dual fuel fired EGU, gas-fired generation should be omitted from the capacity factor calculation.

Comment 79: Commenter 17648 states that with this exemption the EPA has provided ample protection to units that primarily fire biomass, solid waste, or other non-fossil fuel sources (or that fire natural gas, for which the EPA did not make the finding required by section 112(n)(1)), to ensure those units are not unintentionally brought under the ambit of the Toxics Rule because they occasionally co-fire coal or oil. Commenter states that in this way, the EPA has been reasonably careful to develop the rule to apply to the sources Congress intended be covered by this regulation.

Comment 80: Commenter 17689 states that excluding units that use little oil is appropriate for several reasons. The commenter states that the associated monitoring, compliance demonstrations, and associated costs for units using little oil are simply not justified. The commenter asserts that units using small amounts of oil overall are not contributing any significant portion of emissions to the national or regional inventories that is the concern of this rulemaking.

Comment 81: Commenter 17805 agrees with the exemption of peaking units firing fuel oil since emissions from these units are expected to be insignificant and the cost of controlling these emissions would not likely be economical.

Comment 82: Commenter 17820 supports the provision mentioned in the preamble for those units that are capable of firing dual fuels. According to the commenter, a 10% capacity factor for oil- or coal-

firing as a limited use category for dual-fired units should be included in the final rule. The commenter asserts that dual fuel-fired units need the flexibility to deal with supply constraints that can affect these units, and for which their dual fuel firing capability was designed. Commenter believes that a 10% exemption for oil-firing of dual fuel units is consistent with the manner in which these units operate and will provide a cost effective manner of dealing with their HAP emissions. The commenter states that tt also preserves the use of oil as a start -up (light off) fuel for natural gas or biomass units.

Comment 83: Commenters 17818 and 17843 support the EPA's proposed EGU exemptions as listed in paragraphs (a) through (c) of section 63.9983.

10% of annual heat input capacity potential.

Several Commenters (17681, 17689, 17718, 18020) state that the exemption should be based on 10% of a unit's annual heat input capacity or design capacity (potential).

Comment 84: Commenter 17681 believes the EPA should allow for an exemption for EGUs that fire less than a "percentage," e.g., 10%, of their annual heat input capacity potential, e.g., 1,000 MMBtu/hr (hourly nominal heat input) x 8,760 hrs/year (hours in a year) = 8,760,000 MMBtu/yr (annual heat input capacity potential on fuel oil or coal). According to the commenter, therefore, if a unit was allotted 10 percent of this potential to fire on fuel oil, or 876,000 MMBtu/year in this example, it would be exempt from the control equipment and recordkeeping requirements of this proposed regulation. The commenter states that this exemption would allow for units that fire only on peaking days during cold or warm days to still fire on fuel oil if needed for reliability purposes although not requiring expensive control technology installation for limited use EGUs. Commenter has fossil fuel boilers with the capacity to fire natural gas and fuel oil. In some cases, and possibly to a greater extent in the future, these units may only be called upon during peaking periods when it is either financially prudent to fire fuel oil or when there is a lack of natural gas capacity in the pipeline and fuel oil must be fired in order to generate enough capacity to meet demand on the grid.

Comment 85: Commenter 17689 also believes that the percentage oil exclusion in §63.9983 should be amended to exclude a unit if the annual oil based Btu input is 10 percent or less of the unit's Btu annual design rate. According to the commenter, the rationale for extending this exclusion is the same as the excluding units based on oil based Btu input of 10 percent or less of the unit's annual heat input. The commenter states that that is, the costs of monitoring and compliance demonstrations cannot be justified when compared to the small emissions contributed to the overall emissions inventories that are the subject of this rulemaking. The commenter asserts that additionally, oil exclusion based on the design rate criteria would give utilities needed leeway over successive years to avoid being brought in and out of the EGU HAP program.

Comment 86: Commenter 17718 states that the proposed rule adopts the definition of "oil-fired" unit contained in the Acid Rain Program in 40 CFR §72.2. According to the commenter, in the proposed rule, the definition determines whether a unit that combusts oil is an affected unit based on the percentage of oil combusted by the unit compared to its total heat input. Commenter does not believe that this is an appropriate means for differentiating between affected and non-affected oil-fired units because it is likely to subject low capacity units to regulation, regardless of whether such units have significant HAP emissions from the combustion of oil. Instead of using the Acid Rain Program's definition of oil-fired unit, the EPA should adopt a new definition -- "Oil-Affected Unit" – that differentiates between affected and non-affected units based on the total quantity of oil combusted.

Commenter 17718 states that the principal goal of the proposed rule is to reduce emissions from oil used for electric generation. According to the commenter, the most effective means for achieving these reductions is to target units that combust more than insignificant quantities of oil. The commenter asserts that the proposed rule would exclude from regulation EGUs that did not fire "oil for more than 10.0 percent of the average annual heat input during the previous three calendar years or for more than 15.0 percent of the annual heat input during any one of those calendar years." The commenter states that because the exclusion is based on a fuel combustion ratio, a unit that operates for only two days (one on oil, one on gas) could be subject to the proposed rule, and a unit that combusts the same quantity of oil as the first unit but operates for multiple days on gas to be excluded. Such an arbitrary result is possible given the current operating practices for oil and oil/gas units. According to the commenter, since the promulgation of the Acid Rain Program regulations in 1993, the operation of oil and oil/gas fired units has changed significantly. The commenter asserts that a large fraction of these units are no longer base load units, and typically operate at capacity factors well below 50 percent. The commenter states that in many cases, the capacity factor is less than 15 percent. According to the commenter, the EIA Annual Energy Outlook 2011 forecasts that the amount of liquid fuels used for electricity generation in 2015 will be approximately 60 percent lower than 2000 levels.

Commenter 17718 urges the EPA to revise the proposed rule to define an oil-affected unit (an oil-fired unit that is subject to the EGU MACT rule) as a unit that had a 3-year average oil heat input greater than 10 percent of the maximum potential annual heat input, calculated by multiplying the maximum design heat input by 8,760. The commenter states that this definition would ensure that the EGU MACT rule targets EGUs with greater HAP emissions from the combustion of oil, and address EPA's concerns regarding limited use oil-fired units, which typically operate at very low capacity factors.

Comment 87: Commenter 18020 states that oil-fired units should be exempt from the rule if a unit's annual oil-fired capacity factor is 10 percent or less of the unit's maximum potential annual capacity. According to the commenter, if the EPA decides to continue to include oil-fired units in the EGU MACT in lieu of the comments from the Class of '85 regarding why oil-fired units should not be included in the MACT, Commenter believes that there should be an exemption for units that have a 3-year average of oil-fired capacity of 10 percent or less based on the unit's maximum potential annual capacity.

Commenter 18020 states that regarding oil-fired units, the intent of the proposed rule is to reduce emissions from oil combustion used for electric generation. The commenter states that the most effective means for achieving these reductions is to target units that combust significant quantities of oil. The commenter asserts that many peaking units burn only a small amount of oil- often only for emergency reasons or due to natural gas unavailability.

Commenter 18020 states that section 63.9983(c) of the proposed rule lists exemptions to the rule for oil- and coal-fired units based on percentage of heat input. Commenter believes a problem exists in that these percentages are misleading and may impact limited-use units that combust a small quantity of oil whereas units with higher capacity factors that combust a larger quantity of oil are not impacted.

Commenter 18020 states that under the proposed exemption, a unit with a total heat input of 10 MMBtu in one year and 1.6 MMBtu is from oil, then that unit is subject to the rule. (Because it fired oil for greater than 15.0% of the annual heat input). The commenter asserts that however, if a unit has a 3-year average of annual heat input of 10,000,000 MMBtu and the average heat input from oil is 999,999 MMBtu then that unit is not subject to the rule. (Because it fired oil for less than 10.0% of the average

heat input during the previous three calendar years.) The commenter states that from this example, the unit that combusted only 1.6 MMBtu of oil is subject to possible environmental control additions, monitoring requirements, and reporting requirements of the MACT Rule and the unit that combusted a much greater quantity of oil- 999,999 MMBtu- is not.

Commenter 18020 states that requiring installation of emission controls on oil-fired units when a unit operates at a 10 percent oil-fired capacity factor or less is nonsensical and will result in little environmental benefit. The commenter states that low capacity factor units emit significantly less HAP than even well-controlled oil-fired units with much higher capacity factors. The commenter asserts that in addition, stack-testing at such units would be equally impractical and would likely require the unit to operate on oil (and emitting pollutants just for the test) when it would otherwise be off-line or operating on natural gas.

2% of annual heat input capacity potential.

Comment 88: Commenters 17725 and 18498 state that the EPA is proposing to use the oil-fired definition in section 72.2 to allow gas-fired units that burn some oil to not be subject to the rule. According to the commenters, sources that burn less than an average of 10 percent oil during any 3-year period or less than 15 percent oil during any single year would not be subject to the EGU MACT. The commenter states that however this could pose a problem for infrequently operated sources. The commenter asserts that for example, a peaking boiler might trigger EGU MACT applicability if it is operated on oil for a day or two due to gas curtailment but then not operate (or operate very little) during the rest of the year. In addition to the section 72.2 definition, Commenters recommend that a unit that normally fires natural-gas but has a oil-fired capacity factor of 2 percent during any year not be considered an oil-fired unit for applicability purposes under this rule regardless of the gas/oil percentage during that year.

Comment 89: Commenter 17803 states that in the U.S., the operation of oil and oil/gas-fired units has changed significantly over the last 10 years. According to the commenter, a large fraction of these units are no longer base load units, and typically operate at very low capacity factors. The commenter asserts that in many cases, including many of Commenter's units, the capacity factor is less than 15 percent. The commenter states that furthermore, the EIA Annual Energy Outlook 2011 forecasts that the amount of liquid fuels used for electricity generation in 2015 will be ~60 percent lower than 2000 levels.

Commenter 17803 states that in the proposed rule, the EPA requires compliance by oil-fired units and section 63.9983(c) states that an oil-fired unit that did not fire oil for more than 10 percent of the average heat input during the previous 3 years or for more than 15 percent in any one year is not subject to the rule. The commenter states that however, since the proposed MACT is designed to reduce emissions from oil used for electricity generation, the definition of an oil fired unit should be aligned with the total amount of oil burned as opposed to a ratio of oil/gas consumption.

Commenter 17803 states that in order to address the changing status of these units, including both reduced utilization and the significant reduction of oil consumption, Commenter strongly recommends that the EPA revise the rule to define an oil affected unit (an oil capable unit subject to the regulation) as a unit that had a 3-year average oil heat input greater than 10 percent of the maximum potential annual heat input. According to the commenter, the maximum annual potential heat input would be calculated by multiplying the maximum design heat input by 8760. The commenter states that this definition would

also serve to provide relief for limited use oil-fired units, units that typically operate at very low capacity factors.

Comment 90: Commenter 17696 supports establishment of an exemption for a subcategory of limited-use, low capacity factor liquid oil-fired units. If the EPA ultimately chooses not to pursue an exemption, Commenter supports adoption of a subcategory for these limited use units that would only be subject to work practice standards, e.g., biennial tune-ups. Commenter states, to qualify for this exemption or subcategory, an EGU would need to have an annual capacity factor of 10 percent or less, averaged over the preceding three calendar years. Commenter states that because the operation of such limited use oil-fired EGUs is variable, the 10 percent threshold capacity factor for defining a limited use oil-fired unit should be the average of the unit's annual capacity factor over the preceding three calendar years, and not a single year or based on operating hours.

Commenter 17696 states that without either an exemption or applicability of only work practice standards for a limited use oil-fired unit subcategory, many low capacity oil-fired EGUs that otherwise do not operate except to meet peaking demand would be required to install costly but infrequently used air pollution control technology to comply with the EGU NESHAP rule. According to the commenter, such installations would result in extremely high cost factors (i.e., dollars per pound of pollutant removed) compared to EGUs with high or moderate capacity factors thus imposing significant costs on the owners/operators of such units without any concomitant material environmental benefit. The commenter states that for many limited use oil-fired EGUs, retrofitting for MACT compliance would be prohibitively expensive. The commenter asserts that shutdown may be the only cost-effective compliance option. The commenter states that in those cases, there would no longer be units available to operate to meet peaking electrical demand thereby raising electric reliability concerns. The commenter states that moreover, because these units operate sporadically to meet peaking demand, the proposed 30-day average NESHAP emission limits offer little relief as several unit startups and shutdowns within a 30-day period potentially would make compliance infeasible given that the proposal would include startup and shutdown emissions in compliance determinations. According to the commenter, creating a limited use oil-fired category is permitted by CAA section 112(d)(l) because the operational characteristics of these units distinguishes them from baseload, steady-state EGUs as a separate "class" or "type" of unit, is well within the EPA's discretion, and is consistent with the EPA's approach in other MACT rulemakings.

Commenter 17696 concludes, in the unfortunate event the EPA does not create a limited-use liquid oil-fired unit subcategory that is exempt from proposed HAP standards, or alternatively that is only subject to work practice standards, the EPA should only require fuel analysis compliance demonstrations for limited use liquid oil-fired units when the EGU burns fuel from a new mixture or a new supplier that differs from what was burned in the initial compliance demonstration. The commenter states that monthly or bimonthly fuel analysis as is currently proposed serves no purpose if the oil-fired EGU is not operating, has operated only for a few hours and/or has not changed its fuel supply.

Comment 91: Commenter 17928 supports establishing less stringent requirements for limited use oil-fired units. According to the commenter, the EPA included similar limited-use requirements in the final ICI Boiler MACT. Commenter believes oil-fired unit generation contributes de minimis emissions and has a negligible impact on overall emissions nationally.

Comment 92: Commenters 16850 and 17887 state that the EPA should retain the limited use provision that appears to allow utilities to avoid installing costly controls on units that are rarely dispatched.

Comment 93: Commenter 17627 states that as in the final Industrial Boiler MACT rule, the EPA should implement a limited use boiler exemption for EGU's with a capacity factor below 25% and heat rate less than 12,000 Btu/kW-hr. The commenter asserts that units that run a very limited amount of time do not significantly contribute to the total HAP emissions from this source category and therefore should be exempt from the requirements of these rules. According to the commenter, the exemption should be based on a specified capacity factor of less than 25%. The commenter asserts that control of these types of units is not cost effective. According to the commenter, the EPA provided an exception for limited use boilers in the final Industrial Boiler MACT effective February 21, 2011.

e. Support for the exemption.

Comment 94: Commenters 17760 and 17803 state that the Agency should establish an exemption for gas-fired units that burn oil during emergencies, periods of gas curtailment, or when obligated by state or regional Reliability Councils or ISOs. According to the commenter, the proposed rule exempts natural gas-fired EGU s from regulation. The commenter states that nonetheless, some gas-fired units may periodically burn oil in certain situations, which could unexpectedly force them into regulation under the EGU MACT rule.The commenter asserts that at many natural gas-fired facilities, oil is used only in the event of a natural gas curtailment or for emissions control device testing or limited reliability testing. The commenter states that at these units, oil firing is often limited to less than one percent of the total fuel combusted. The commenter asserts that however, in the event of curtailments, such units may be forced to fire significantly more oil for short periods of time. The commenter states that in addition, some dual fueled gas/oil units are obligated to burn oil during periods of high electric demand to ensure system reliability in the event of a gas supply interruption. According to the commenter, in the final rule, the EPA should specify that gas-fired units forced to combust oil during emergencies, periods of curtailment or when obligated to ensure electric system reliability would not become subject to the EGU MACT.

Comment 95: Commenter 17808 recommends expanding the text to define "period of natural gas curtailment or supply interruption" as a "period of time during which the supply of natural gas to an affected facility is limited for reasons beyond the control of the facility, including when a unit is obligated to run on fossil fuel (other than natural gas) by local reliability rules. According to the commenter, this addition, as well as the language from the ICI Boiler MACT, would exclude fossil fuel consumed as a result of (1) an emergency situation when natural gas supplies are physically interrupted; (2) a contractual agreement that limits a unit's natural gas supply; and/or (3) mandated operating rules requiring a unit to limit the use of natural gas to ensure electric system reliability.

Commenter 17808 only intends this exemption to apply in a limited set of circumstances when there is a genuine threat to the reliability of the electric power system. The commenter states that for example, the New York State Reliability Council has established reliability rules and operating procedures that obligate certain units on Long Island and downstate New York to switch from natural gas to oil (regardless of economics) in order to protect the reliability of the bulk power system. The commenter asserts that reliability rules require that New York City and Long Island have detailed plans in place to maintain electricity supplies in the event that there is a loss of natural gas supplies. The commenter states that for example, on Long Island, the I-R5 reliability plan requires at least one of the Northport Generating Station units to run on oil if all the three following conditions occur: (1) the Northport-Norwalk Harbor Cable (NNC) is out of service, (2) electrical load on the island exceeds 2,751 MW, and (3) two of the Northport Generating Station units are on-line. The commenter states that these requirements may be changed in the future in response to changes in the transmission system, load

conditions and/or changes in the generation system. According to the commenter, in New York City, there are nine units that report combusting oil in response to the I-R3 reliability rules between January 1, 2009 and August 31, 2010. The commenter states that the total number of hours that they were subject to minimum oil burn requirements is fairly low although these were critical run times for the reliability of the system. According to the commenter, the average was 653 hours over these 18 months (4.5 percent).

Comment 96: Commenter 18024 states that the AGC boilers operate primarily on natural gas. Under New York State Reliability Council Rules, the AGC facility is required by the New York Independent System Operator (NYISO), for reliability purposes, to maintain the capability to burn oil and actually burn oil, from time to time, at varying load levels to help avoid or avert potential natural gas shortages in New York City. According to the commenter, the requirements to burn oil under this program are mandatory and are not within AGC's discretion. The commenter states that the reliability rules require that the AGC boilers maintain their co-firing capability to respond to unplanned, emergency scenarios by operating on oil during required minimum oil burn periods, typically 25 percent oil/75 percent natural gas. The commenter asserts that operation using oil at other times or on 100 percent oil during reliability operation periods occurs very infrequently; with natural gas expected to become more available in future years, such an operating scenario will become less likely. The commenter states that , although the reliability rules remain in place and our boilers are required to operate under his regimen, it is essential that they be able to do so.

Commenter 18024 states that because of the reliability rule's minimum oil burn requirement, the AGC boilers very likely would be subject to the EGU MACT Rule under the "unit designed to burn liquid fuel oil" subcategory as EGU's with actual average 3-year heat inputs from oil of more than 10 percent (or greater than 15 percent in any single year). According to the commenter, for units like the AGC boilers that operate at very low annual capacity factors on natural gas, limiting oil burning to 10 percent of actual heat input may not provide sufficient hours in a year to assure system reliability for New York City. The commenter states that for example, if a given unit were dispatched only 30 percent of the time during a year (3-year rolling average), only 10 percent of its actual heat input would be available to operate on oil for system reliability purposes, equal to only 11 days per year at full load. According to the commenter, this may not be acceptable under the reliability rules.

Commenter 18024 states thus, in order for the AGC boilers to meet the state's reliability rules, the amount of oil that they likely would be required to burn would subject them to the EGU MACT Rule. The commenter asserts that however, it is neither practical nor economically feasible for AGC to retrofit add-on control technology that would be necessary for the boilers to meet the EGU MACT Rule's requirements for liquid oil-fired units. The commenter states that site constraints and economics make it infeasible to control emissions to the proposed MACT. The commenter asserts that furthermore, the emissions monitoring requirements imposed on liquid oil-fired EGUs do not make sense for units that operate so infrequently on oil. The commenter states that for example, the AGC units would have to be operated with various mixes of oil and natural gas or 100 percent oil for the sole purpose of performing the required annual performance testing, although these tests would not represent normal or even frequent operating modes.

Comment 97: Commenter 18450 supports exempting a limited amount of oil firing where used as a backup fuel to natural gas. The commenter states that this would essentially exempt dual-fuel combined cycle units and conventional boilers firing natural gas except during periods of gas supply curtailment from the particulate matter control standards. The commenter asserts that requiring compliance with

HAP emission limits would have imposed significant efficiency penalties for insignificant emissions reductions.

f. Opposition to the exemption.

Comment 98: Commenter 17316 states that some Commenters have suggested that the EPA should alter or expand the definitions in the rule to exclude from regulation EGUs that fire oil rather than natural gas during periods of natural gas curtailment. Commenter states that the EPA already has amply protected sources that might only occasionally burn coal or oil from being drawn into the rule, thus ensuring that the costs of the rule will be borne by the sources that in fact are burning the fuels that prompted the Finding. Commenter says that curtailment is not a response to an emergency situation, as their comments might suggest, but the result of an economic decision. Commenter states that owners of EGUs can avoid curtailment by simply paying the natural gas pipeline supplier a sufficiently high rate to assure that their supply will not be subject to curtailment. Commenter believes that allowing an exemption from regulation for periods of natural gas curtailment would allow sources that elect to burn oil or coal because they have made business decisions not to protect their gas supplies through firm transport contracts to avoid being subject to the rule and gain an unfair competitive advantage over those who protect their supplies. Commenter states that there is no basis for the EPA to overlook the health and environmental effects associated with HAP emissions from units firing coal and oil and to treat those units any differently from others that must control their emissions under this rule.

Comment 99: Several commenters (17808, 17690, 18025, 17904, 17870) recommend limited exceptions to account for infrequent fuel switching during reliability issues. The commenters propose that the EPA revise the definition to be consistent with ICI Boiler MACT and address natural gas curtailment situations. The commenters assert that for example, inclement weather can result in curtailments of natural gas supplies to gas-fired units, and if needed to stabilize and support electric delivery, these units are likely to burn oil for as long as the curtailment lasts or until the unit is not needed for reliability purposes.

Comment 100: Several commenters (17808, 18025, 17690) suggest that the EPA define a period of natural gas curtailment or supply interruption "as a period of time during which the supply of natural gas to an affected facility is halted for reasons beyond the control of the facility. According to the commenters, the act of entering into a contractual agreement with a supplier of natural gas established for curtailment purposes does not constitute a reason that is under the control of a facility for the purposes of this definition. The commenter asserts that an increase in the cost or unit price of natural gas does not constitute a period of natural gas curtailment or supply interruption" (76 FR 15685).

Comment 101: Commenter 17904 recommends that the rule should expressly exclude such curtailment periods from the heat input averaging period by adding the following to the end of the definition of "fossil fuel-fired:" "Heat input during any period of natural gas curtailment shall be excluded from this calculation."

Comment 102: Commenter 17870 and 18025 suggest that the language specify that the exception should also include "when a unit is required to run on fossil fuel (other than natural gas) by local reliability rules." The commenters state that this addition, as well as the language from the ICI Boiler MACT, would exclude fossil fuel consumed as a result of (1) an emergency situation when natural gas supplies arc physically interrupted; (2) a contractual agreement that limits a unit's natural gas supply;

and/ or (3) mandated operating rules requiring a unit to limit the use of natural gas to ensure electric system reliability.

Comment 103: Alternatively, Commenter 17648 states that some commenters have suggested that the EPA should alter or expand the definitions in the rule to exclude from regulation EGUs that fire oil rather than natural gas during periods of natural gas curtailment. According to the commenter, the EPA already has amply protected sources that might only occasionally burn coal or oil from being drawn into the rule, thus ensuring that the costs of the rule will be borne by the sources that in fact are burning the fuels that prompted the Finding. The commenter states that curtailment is not a response to an emergency situation, as their comments might suggest, but the result of an economic decision. The commenter states that owners of EGUs can avoid curtailment by paying the natural gas pipeline supplier a sufficiently high rate to assure that their supply will not be subject to curtailment. The commenter asserts that allowing an exemption from regulation for periods of natural gas curtailment would allow sources that elect to burn oil or coal because they have made business decisions not to protect their gas supplies through firm transport contracts to avoid being subject to the rule and gain an unfair competitive advantage over those who protect their supplies. According to the commenter, that is no basis for the EPA to overlook the health and environmental effects associated with HAP emissions from units firing coal and oil and to treat those units any differently from others that must control their emissions under this rule.

Comment 104: Commenter 17690 recommends that the EPA revise the definitions of two terms in the proposed Utility MACT: "fossil fuel-fired" and "oil-fired electric utility steam generating units" (76 FR 85, page 25123) to be consistent to the 40 CFR section 72.2 "peaking unit" definition. According to the commenter, this would exclude units that have minimal air toxics impacts simply because they burn limited amounts of oil. In particular, the commenter recommends that an oil-fired unit subject to the Utility MACT be "affected" if the unit has: a 3-year average oil heat input greater than 10 percent of the maximum potential annual heat input OR an annual oil heat input in any year greater than 20 percent of the maximum potential annual heat input. According to the commenter, the proposed changes to the definitions would thereby exclude oil-fired units that run rarely but when they do run are likely to be directly supporting a reliability issue. The commenter states that the definition would also exclude gas and oil dual fueled units if the amount of oil burned meets the definition. Commenter 17690 also recommends the adoption of this language for an "affected" unit.

6. Low capacity factor units or limited use units for coal-fired units.

Comment 105: Commenters 17808 and 17870 oppose establishing an equivalent limited use subcategory for coal-fired EGUs because of their higher HAP emissions rates, higher average capacity factors, and higher average capacity size (i.e., greater potential to consume larger amounts of fuel). The commenter states that in contrast to the vast majority of coal-fired units, oil-fired EGUs in the continental U.S. tend to be used for peaking, voltage support, or to ensure fuel diversity during winter months. The commenter asserts that according to the EPA's ICR database, oil- and coal-fired EGUs report annual average capacity factors of 19 percent and 63 percent, respectively. The commenter states that oil-fired EGUs are smaller, on average, than coal-fired EGUs. The average oil-fired EGU is less than 300 MW. The commenter asserts that the average coal-fired EGU is 440 MW. The commenter states that according to EIA, oil steam generating units produced only about 17 terawatt hours of electricity in 2010. According to the commenter, in contrast, coal-fired generating units produce 1,835 terawatts hours of electricity in 2010 – more than 100 times greater.

Comment 106: Commenter 18450 agrees with the EPA's justification to not include a limited use subcategory for coal-fired units.

Response to Comments 25 - 106: : As explained in the preamble to the final rule, we are establishing a limited use liquid oil-fired EGU subcategory for sources that have an annual capacity factor of less that 8% over a 24 month block average. Liquid oil-fired EGUs subject to this subcategory would be required to conduct an annual tune-up according to manufacturer's specifications. We do not agree with commenters that suggest higher capacity factory subcategories. The subcategory we have developed is designed to address the natural gas entailment and other reliability related issues that these units address.

We are not establishing a limited-use subcategory for coal-fired EGUs as some commenters have requested. As opposed to the large number of liquid oil-fired EGUs with low capacity factors, of the 949 coal-fired EGUs for which we have 3-year average capacity factor data from the 2010 ICR, only 55 have capacity factors less than 30% (and 2 of these EGUs are new which has skewed their 3-year average low). All of the coal-fired EGUs in this group have either ESPs or fabric filters and 13 of them have either wet- or dry-FGD systems installed. Commenters also did not provide the strong justification for a limited-use subcategory for coal-fired EGUs based on required use during periods of natural gas curtailment as was provided for oil-fired EGUs. The need for limited-use oil-fired EGUs to be available during natural gas curtailments to address reliability concerns was an important factor in our determination that such a subcategory was warranted.

The EPA believes that a limited-use subcategory as requested by commenters for coal-fired EGUs is not appropriate because a significant majority of the limited use units are the older, less efficient, and minimally controlled units. We believe it would be unreasonable to exclude these units from regulation because such units can emit HAP at high levels and there would be a perverse incentive to keep these units running further beyond their useful life if we created a subcategory for them that led to less stringent standards. In addition, we have no data to suggest that the limited use coal-fired EGUs emissions are different from baseload units. We believe units run longer than the limited-use oil fired units we subcategorized such that we do not have any reason to conclude that the emissions would in fact be different as we concluded in regard to the limited-use oil-fired EGUs. For, all these reasons we do not believe it is reasonable to establish a limited-use coal-fired EGUs subcategry. Furthermore, even if we determined that the data reasonably supported such a subcategory, which it does not, we would likely decline to exercise our discretion because a standard based on minimally controlled coal-fired units would be artificially low and these units are able to install controls.

7. Boiler Size.

a. General support for further subcategorization based on boiler size.

Comment 107: Multiple commenters (8443, 17608, 17689, 17731, 17767, 17775, 17868, 18018, 18031) support further subcategorization for small units.

Comment 108: Commenter 17608 states that the EPA should have considered additional subcategorization schemes, including one on based on EGU size. According to the commenter, small entity representatives (SERs) identified a wide range of available options for subcategorization, but as with much else during the panel, Commenter believes there was insufficient information available to evaluate the relative merits of these options. The commenter states that the EPA Panel members and OMB recommended that the EPA consider these subcategories and adopt a set of standards that would

be consistent with the CAA and which would effectively reduce the burden on small entities. Commenter states that the EPA's own recommendation in the SBAR panel report was that it select a subcategorization that effectively reduces burden on small entities; Commenter questions how the EPA would accomplish that goal without a more detailed analysis of alternate subcategorization schemes.

Commenter 17608 states that the EPA's rationales for its preferred subcategorization scheme have two major flaws. The commenter states that first, the EPA adopts, without further justification, this same subcategorization scheme for new sources as well. CAA section 112(d) requires that new sources have "emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator." The commenter asserts that since the EPA sets its new source standards based on the single lowest emitting source in each HAP, a subcategorization that relies on the presence of different types of EGUs in the top 12 percent is inappropriate. The commenter states that subcategorization for new sources should consider each EGU type on its own merits.

Commenter 17608 states, second, although the statute clearly gives the EPA the discretion to subcategorize by size, the EPA asserts that size is irrelevant to a source's emissions profile, since "the size should only affect the rate at which a unit generated electricity and, with a lower electricity generation rate, there is less fuel consumption and, therefore, less emissions of fuel-borne HAP (i.e., acid gas and metal HAP)." According to the commenter, this statement assumes that all boilers operate at the same energy efficiency and that all HAP are equally extracted from fuel by boilers of all sizes. The commenter states that this statement also assumes that only HAP are relevant to this rule. The commenter asserts that however, this rule would regulate PM emissions, and PM emissions may not follow the same logic. The commenter states that it is unclear upon what other information the EPA based its rejection of size as a basis for subcategorization. For these reasons, Commenter does not see evidence that the EPA seriously considered subcategorization schemes other than its preferred scheme.

Comment 109: Commenter 17868 states that the EPA's RIA offers peculiar reference (RIA p. 10-18) to the APPA and NRECA request (verbal and written) for subcategorization. According to the commenter, neither the proposed rule nor the RIA adequately explained why more subcategorizations were not made. The commenter states that the RIA (RIA section 10-18 under "Subcategorization") specifically refers to the SER panelists who recommended units that generate for wind generation or other purposes such as combined heat and power (CHP). The commenter asserts that PerHAP most significantly the EPA declined to propose a subcategory for small or rural (geographically isolated) units. According to the commenter, this decision not to propose a small unit subcategory is bad enough but is made all the worse since the EPA offered no use of GACT controls. The commenter asserts that OMB's own comments in the RIA agree that GACT and management practices would be effective (pp. 10-21 of RIA).

Commenter 17868 points out that the EPA's RIA states that the U.S. Small Business Administration (SBA) (and presumably OMB) expressed concerns that the EPA failed to identify and offer as regulatory alternatives a number of options on the proposed EGU MACT rule before it was proposed. The commenter states that none of those recommendations for subcategories (by size, by fuel type, by generation technology type or by geographic isolation (rural)) were even proposed by the EPA in the proposed rule. According to the commenter, the EPA's proposed rule did not explain why none of these recommendations were considered. The commenter states that that explanation in the proposed rule is required under the Small Business Regulatory Enforcement and Fairness Act (SBREFA) and Unfunded Mandates Reform Act (UMRA) and both of these statutes deal with regulatory decisions for local government-owned utilities. The commenter asserts that the proposed rule did not mention any plans to

offer an additional year to these smaller entities and was dismissive of the serious reliability issues for smaller communities (especially in the midwest) where many of the retrofit or conversions to natural gas will take place.

Comment 110: Commenter 8443 also suggests that the EPA should add the size of an EGU to the list of subcategorization approaches it considers.

b. Boilers less than 100 MW.

Comment 111: Commenter 17775 encourages the Agency to consider subcategories for EGUs with capacities of 100 MW or less. Commenter notes that one of the factors that the Administrator can consider under CAA section 112(d)(1) in making subcategorization decisions is unit size. According to the commenter, analysis of ICR data by some UARG members has shown a statistical difference between EGUs with a capacity of 100 MW or less and EGUs above 100 MW. The commenter states that there are 294 units with capacities of 100 MW or less. The commenter asserts that although large in number - about 27 percent of all EGUs - these units only comprise about 5 percent of the coal-fired capacity in the U.S. The commenter states that , if different MACT limits are set for this subcategory of units, it will not have a significant impact on the health effects of HAP emissions. Commenter asserts that the EPA should evaluate subcategorization based on unit size.

Comment 112: Commenter 17767 states that small EGUs were not adequately accommodated in the creation of the rule's emissions limits, though there is sufficient data to support the creation of a small unit (<100 MW) category (affecting only 5 percent of the total utility sector). According to the commenter, emission rates from such small units are greater than those found in the large unit fleet, yet their contribution to the total EGU emissions isn't significant. The costs associated with coming into compliance with the rule via the installation of new controls would be proportionally much higher for these small units. This would surely force the retirement of generation capacity and threaten electrical reliability without appreciable benefit to the environment. It has been demonstrated by environmental consulting firm RMB Consulting & Research's analysis (as found in the August 2, 2011 American Public Power Association's (APPA's) comments on the rule) that a small unit category would have negligible impact on the >100 MW EGU fleet and no change to the overall EGU rates. Without such a category, Commenter's Dallman Units 31 and 32 would be possible candidates for retirement. Dallman Units 31 and 32 each have an SCR to reduce NO_X emissions, and an ESP for particulate control, and a common WFGD to reduce SO_2 emissions. Although these units are small (90 MW nameplate each), Commenter has invested in overall emission reductions by installing pollution controls (WFGD was operational in 2001 and the SCRs were operational in 2003) on these small units. These investments would be lost if Commenter had to retire Dallman 31 and 32, which they could argue are among the cleanest small units in Illinois.

Comment 113: Commenter 17868 states that in general, the nature of many public power facilities differs from the general population of coal-fired power plants. Public power units tend to be smaller in size, and are often space-constrained by growth in the community surrounding the generating unit since its initial construction. These limitations restrict the ability of these units to achieve the same performance levels as larger, unconstrained units, and for those units which can comply with the proposed standards, sharply increases the cost of compliance. Commenter states that the EPA did not adequately subcategorize to accommodate many small and medium sized public power utilities. In particular, the EPA did not avail itself of the opportunity to use public power electric utility subcategory, rural subcategory, and many other fuel type subcategories. Commenter endorses the establishment of a ≤

100 MW subcategory that will reduce the costs of the proposed rule significantly but only affect 5 percent of the total electric utility sector.

Commenter 17868 urges the EPA's final EGU MACT rule to contain <100 MW subcategory to minimize impacts to smaller units. Commenter points out that this recommended subcategory, primarily designed for public power utilities <100 MW would help minimize uneconomical plants from facing retirements. Further this subcategory, although still reducing mercury through GACT controls, would provide "wiggle room" during the time of transition to ensure system or regional reliability—particularly in the midwest where these <100 MW units are more common. Commenter believes that this <100 MW subcategory should also be provided for investor utilities, merchant power or electric-co-operative utilities although Commenter notes that 106 of these units are in public power communities. Although the subcategory would help a handful of investor or electric co-operative utilities, it would most benefit local governmental utilities. Of the <100 MW utilities across the U. S. the total generating capacity affected, if a subcategory is created, is only 5 percent. Thus this subcategory is not a "loophole" and should not concern the EPA or public health officials. See Table 1 of EPA-HQ-OAR-2009-0234-17868 for details.

Commenter 17868 believes that the EPA should re-propose the rule to require reasonable Hg reductions consistent with the intent of section 112 of the CAA without the extraneous control requirements on non-methyl Hg. Commenter believes that this re-proposal should include subcategories for smaller systems (≤100 MW) that have limited physical space. Those units should only have to meet GACT controls or area source controls for Hg.

Comment 114: Commenter 18447 feels there should be another subcategory -- for small EGUs, probably less than 100 megawatts. The unit cost of complying with this rule is much greater for smaller units than it is for larger ones. The economies of scale that work for the large units do not work for the small units. This places small and municipal utilities like ours at a severe disadvantage, and the rate impact upon our ratepayers will be shocking and severe. Similarly, small utilities will have a much tougher time finding suppliers, manufacturers, and installers of necessary equipment for compliance, since the suppliers historically have a natural tendency to gravitate toward the larger projects that cost more money. Commenter's electric utility regularly experiences this kind of selectivity on the part of suppliers, and we would not expect any improvement in this situation going forward. In fact, it probably will be worse in this case due to the competition for installation of equipment and services brought about by the time crunch that this rule will no doubt create.

Comment 115: Commenter 18031 states that the EPA should give more consideration to subcategorization, particularly for units < 100 MW. Commenter is concerned that the extensive experience they have had in testing and providing for Hg and other pollutant emission reductions on their units does not appear to be delivering, in all cases, reductions of Hg, non-Hg trace metals (total PM as a surrogate), or HCl in line with the ambitious MACT levels the EPA has proposed in their May 3, 2011 EGU MACT Rule. Commenter recommends that the EPA provide for a small unit subcategory, which per the analysis conducted by RMB Consulting & Research, Inc., involves delivery of HAP emissions performance with installed controls along the lines with what Commenter's units have achieved that are cost effective and also consistent with Minnesota Hg reduction targets.

Commenter 18031 states that the following are RMB's comments regarding the justification for a small unit subcategory: "The results of this investigation show that there is sufficient data within the ICR database to justify a small unit subcategory for all of the applicable HAP and HAP surrogate based on an

analysis using the top 12% best performing units of the population. The results also show statistically significant differences in emissions between small and large units for all pollutants, which suggests that there is a fundamental benefit for a small unit subcategory. The investigation also highlights the bias in EPA's selection of the best performing units for mercury emissions in the proposed rule. The EPA selected the top 12% best performing units based on the available ICR data rather than the top 12% best performing units based on the population of units, which resulted in a significantly lower proposed mercury emission standard for existing units. RMB recommends that EPA address this issue in the final rule."

Commenter 18031 is in a similar situation as the municipal utilities represented by APPA in that their small generation units were constructed to support local industry. In Commenter's case, their small units were constructed to support their unique customer base, represented by large industrial sources, such as the taconite mining industry. Each taconite mine represents a large energy load and locating smaller generation units close to where this load is makes engineering and economic sense.

Commenter 18031 has always been proactive in maintaining the lowest possible emissions at these small units. At the Laskin Energy Center (LEC) an early horizontal wet particulate scrubber was installed in the early 70's for particulate capture, with a side benefit of some incidental SO_2 removal. More recently LEC has also installed Low NO_X burners with over-fire air for NO_X reductions.

Commenter 18031 states that the Taconite Harbor Energy Center (THEC) installed on units 1 and 2 a DSI system for reduction of SO_2, and converted the hot-side precipitator to a cold-side precipitator for better particulate removal. THEC also installed a Rotating Over Fire Air (ROFA) system along with Selective Non-Catalytic Reduction (SNCR) on units 1 and 2 for NO_X reductions. THEC currently has a temporary $CaBr_2$ injection system on unit 2 for Hg, with plans for the permanent installation of Hg controls on both units 1 and 2 in the near future.

Commenter 18031 states that these retrofits have all provided substantial reductions in emissions that were cost effective for these small units. Because Commenter has been proactive in installing these cost effective emission reduction technologies on their smaller units, the incremental cost to meet the Proposed EGU MACT Rule will be much higher than for similar uncontrolled units. These small units are not significant contributors in terms of the environmental impact.

Comment 116: Commenter 18032 requests that the EPA revise the rule to reduce drastic, disproportionate burdens on small, municipally-owned utility units that are not significant sources of Hg or other HAP, by creating a subcategory for units of less than 100 MW in size owned by public power entities that have a number of unique characteristics. Commenter urges the EPA to create a subcategory for Hg, non-Hg metals and acid gases for municipally-owned electric generating units with a nameplate capacity of less than 100 MW and other unique characteristics. For this small municipal subcategory, the controls should consist of GACT and management/operational controls for area source utilities. Commenter supports APPA's technical and legal justifications with respect for the need for a <100MW subcategory, including APPA's data in Appendix A to its comments. There are many unique technical characteristics of these small municipal EGUs that justify a subcategory, including: (1) The "must-run" importance of these units that are typically the only available and/or legally usable resources within the municipal service territory, especially in load pocket areas constrained with insufficient generation and/or transmission capacity. As these Michigan (and beyond Michigan) public power communities typically own only one, or a limited number of power plants, these public entities have little ability to serve customer demand by shifting to other generation resources. (2) These municipal utilities are

required by law to serve all customers, at regulated cost-of-service rates, in specified service territories, under rates specified by state and/or local governing bodies. (3) These units in Michigan and other states are low emitting EGUs (LEEs) that contribute relatively insignificant levels of pollutants (specifically less than 22 pounds annually) and therefore are less likely to impact public health and environment. (4) These units are either physically constrained (too small) to accommodate required pollution controls or are economically constrained by the diseconomies of scale of pollution controls and the small rate base of customers to cover the costs of these controls.

Commenter 18032 states that these factors, and certainly the combination of all these factors, make public power entities unique from other types of EGU owner/operators, including investor-owned units and merchant power plants. These differences make small municipal EGUs justified for a subcategorization and more flexible control requirements under GACT and specified maintenance practices.

Commenter 18032 urges the EPA to consider APPA's comments, create a subcategory for small municipal units <100MW so that GACT and operational controls can achieve real pollution reductions, and exempt permitted units from NSPS requirements when they are not necessary because MACT has already been established for such units.

c. Boilers less than 125 MW.

Comment 117: Commenter 17689 states that the EPA should include an additional subcategory for small units 125 MW or less. Regarding small units of 125 MW or less, Commenter believes the data collected in connection with this rulemaking show differences in HAP performance as compared to the floor averages proposed for many of the MACTs. The MACT floor levels would in some cases be notably higher (less stringent) than conventionally sized EGUs. It is appropriate to develop a subcategory for units less that 125 MW based on the existing data.

d. Opposition to further subcategorization based on boiler size.

Comment 118: Commenter 17648 states that the EPA properly recognized that subcategories based on unit size would be inappropriate because the proposed emission limits are in terms of lb/MMBtu or lb/TBtu and a unit's total nameplate capacity is wholly unrelated to its ability to achieve the proposed limits. The EPA's judgment is confirmed by the fact that there are both large and small units among the EGUs in the best-performing 12 percent of sources.

Comment 119: Commenter 17402 opposes any proposal to subcategorize units below 100 MW. The proposed rule does not apply to units less than or equal to 25 MW, and this is a sufficient threshold for applicability.

e. Staged compliance for a small unit subcategory.

Comment 120: Commenter 17731 states that the EPA could establish subcategories for the purpose of temporarily exempting, for example, a subcategory of utilities that meet the definition of small entity for purposes of the rule, from the proposed rule. The temporary exemption would sunset on a date certain, e.g., 3 years from the effective date of the rule, at which point the sources in the subcategory would become subject to the rule, and a compliance timetable would start to run. This time-staged promulgation and compliance proposal would greatly increase the chance that the control measures

could be added in an orderly and efficient manner with minimal disruption to power markets and grid reliability.

Response to Comments 107 - 120: The EPA agrees with commenters that an EGU's size is unrelated to its ability to comply with the proposed limits. Commenters suggested a size cut-off for such a subcategory as high as 125 MW. The EPA examined the size of units within the respective MACT floor pools of sources and found units ranging in size from 25 to 1,320 MW in the HCl floor pool, from 25 to 869 MW in the non-Hg metallic floor pool, and from 47 to 544 MW in the Hg floor pool. Further, the EPA believes that units of all sizes are owned by both large and small entities. Thus, units of all sizes are capable of achieving the final limits and the EPA is not finalizing a subcategory based on unit size in the final rule. In addition, the EPA does not believe it has any statutory authority under CAA section 112 to alter the compliance date based on a size consideration and, thus, is not providing such distinction in the final rule.

Some commenters noted that the EPA should establish different subcategorization scenarios for new sources than for existing sources. However, commenter fails to note that new sources are not necessarily constrained by the existing conditions and an argument could be made that fewer subcategories are necessary for new sources as they may be located and controlled based on the best environmental controls rather than on existing conditions at a given facility. Other commenters have indicated that the EPA should subcategorize based on geographical isolation (e.g., rural) or the amount of space available (noting that many EGUs owned by public power companies are now surrounded by the cities they serve and, thus, have no space to add controls). The EPA does not find these arguments generally persuasive as these units have the same emissions characteristics as other EGUs. Further, rural EGUs have the same ability to install emission controls as do other EGUs and EGUs in both rural and urban locations have become surrounded by residential, commercial, and industrial developments over the years. Thus, there is no legitimate subcategorization rationale for allowing these EGUs to emit at levels other than at what has been established as the MACT level of control, particularly since as commenters note these units are often surrounded by populated areas. It defies reason to allow less contolled sources to remain among populated areas. In addition, the EPA does not believe that this rulemaking should reward either economical or uneconomical EGUs through subcategorization one way or another.

The EPA is somewhat confused by commenter's assertion that the rule should be re-proposed to "require reasonable mercury reductions...without the extraneous control requirements on non-methyl mercury." The requirement is to reduce emissions of total Hg (elemental, ionic/oxidized, and particulate). Methylmercury is not emitted in the flue gas stream; rather, it is formed through microbial activity once mercury has deposited from the atmosphere and made its way into aquatic environments.

Some commenters said that smaller plants would have a harder time getting controls on plants within the compliance time frame because they would not be able to compete with larger plants for equipment, labor, and engineering and, therefore, they need a longer compliance time frame. Small plants are not necessarily at a disadvantage. The EPA notes that smaller plants can often control very cost effectively either because they simply need less equipment and labor to retrofit and because they can often tie more than one small or midsize unit into one control device. Shared APC systems will allow the overall effort to be more manageable than otherwise, and should require relatively fewer supply chain resources. In addition, sources that need additional time to install controls can seek a fourth year consistent with CAA section 112(i)(3)(B). The EPA has also committed to working with facilities that are unable to install controls within a 4-year period.

Several commenters said that small companies need more time to comply with the regulation because they would not be able to compete with larger companies in the market for labor, equipment and engineering services to comply with this regulation. This comment presumes that there is a shortage of equipment, labor and materials to apply to compliance with this regulation. As stated elsewhere we are in an economy that is characterized by high unemployment and chronic excess capacity. Although this regulation will modestly spur demand it cannot reasonably be expected stimulate enough demand to cause shortages such that firms will have difficulty obtaining the services they need to comply. Elsewhere we note that in conversations with makers and vendors of control equipment, we have been assured that they can meet demand within the compliance timeframe laid out in the CAA. In addition, as stated above, EPA is committed to working with facilities that are unable to install controls within the allowable time frame.

8. Reliability concerns.

Comment 121: Commenter 17868 is concerned that 400 newly designated critical generation facilities will be evaluated for protection and compliance with NERC Reliability Standards at approximately the same time as the EPA final rule. Commenter believes the EPA should provide additional compliance options or a subcategory for units newly designated as critical under the NERC Reliability Standard CIP-002-4. Some of these newly designated units also may decide to shut down due to the crush of all these competing regulations, and APPA believes that the EPA should provide additional time for studies to determine the reliability impacts of these retirements.

The list of newly identified critical assets will not be available as a public document due to the assets being classified as critical and protected under FERC's CEII requirement and the DHS PCII requirement.

1. Department of Homeland Security Procedures for handling Protected Critical Infrastructure Information (PCII); Final Rule September 1, 2006: http://www.dhs.gov/xlibrary/assets/pcii_final_rule_federal_register9-1-06-2.pdf

2. FERC Critical Energy Infrastructure Information (CEII) http://www.ferc.gov/help/filing-guide/file-ceii/ceii-guidelines.asp#skipnav

Commenter 17868 would also like to note that current proposed NERC Critical Infrastructure Protection standards will create an additional cost that was not considered in the EPA's economic analysis. This cost may be significant and should have been considered as a part of the EPA's RIA.

An additional consideration is the availability of RICE units to soften the blow that the large scale scheduling of outages and retirement of plants will likely cause. Commenter has already commented on and requested reconsideration for the EPA's RICE rule. Commenter hopes that the considerations will be resolved in time to allow RICE use and that the EPA will allow emergency operation of these engines to help ease the transition pains that will be experienced by utilities as a result of this rule.

Comment 122: Commenters 17724 and 17876 state that the EPA should consider creating a specific subcategory of resources due to specific reliability concerns. This subcategory would recognize the location of units on the electric transmission grid within each independent system operating region, to ensure reliability if specific units are retired as a result of the rule. It is not always the case that a new unit can be installed at the same facility where a coal-based unit was retired, having the same design and

electric generating capacity. Several factors must be considered such as change in fuel type between the retired and new unit, the availability of new fuel, infrastructure requirements, and as important, electric transmission capacity. If new generating resources are not located in the immediate vicinity of a retired unit, new transmission investments may be required to facilitate the delivery of energy from new generating resources. The siting, permitting, design, and construction of new transmission facilities may take longer to complete than the construction timeline for generating resources. If sufficient time is not allowed for the orderly retirement of existing coal-based generating resources, reliability will be impacted if new generation resources require lengthy transmission upgrades to interconnect to the existing transmission system.

Comment 123: Commenter 17805 states that the EPA should consider creating a specific subcategory of sources in this rule due to specific reliability concerns and should work closely with FERC, NERC and regional reliability organizations to ensure that electric reliability is guaranteed.

Response to Comments 121 - 123: The EPA does not know how it would implement the commenters proposed subcategory consistent with the statutory authority to subcategorize, particularly since we are not able to identify the sources that would populate such a subcategory based on the available information. Absent our ability to identify the sources, we question how we could reasonably establish a subcategory and the attendant standards.

Additional reliability issues are addressed elsewhere in this document and the preamble to the final rule.

9. Units permitted but not yet constructed.

Comment 124: Commenter 17735 states that the EPA should establish a subcategory consisting of units that had received air construction permits but had not yet commenced construction as of the date of the EPA's proposed rule. Such a category would be justified because a substantial amount of time, money, and effort have been invested in these units. Imposing new source standards on these units for which the EPA's proposed rule had not been anticipated during their permit consideration would unreasonably and arbitrarily impose additional costs and burdens on these projects and would likely threaten the viability of many of them. The standards for this subcategory would be based on the anticipated performance of these units (as reflected by the permitted case-by-case emission levels), ensuring a reasonable and appropriate level of HAP control without unreasonably and arbitrarily upsetting the development of these units.

Response to Comment 124: CAA section 112(a)(4) defines a new source as "a stationary source the construction or reconstruction of which is commenced after the Administrator first proposes regulations under this section establishing an emission standard applicable to such source." The EPA's regulations implementing the CAA section 112 general provisions define "commenced" to mean "with respect to construction or reconstruction of an affected source, that an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or reconstruction." *See* 40 CFR 63.2.

The EPA is constrained by the definition of "new source" such that any source that "commenced" construction after the May 3, 2011, proposal date is considered a new source under the statute and the source must comply with the new source standards even if the source received a final and legally effective CAA section 112(g) permit before proposal. Even if EPA believed it could establish a

subcategory for such sources, which we do not, we would still be required to establish the standards consistent with CAA section 112(d). Further, it is unclear from the comments whether the sources identified in the comments have commenced construction as defined in the regulations; however, the identified sources are existing sources, not new sources, under the final rule if construction was commenced prior to the proposal date.

Under the final rule, new sources must comply with the standards on the date of promulgation or at startup, whichever is earlier, and existing sources have 3 years to come into compliance with the final standards. Pursuant to the EPA's regulations at 40 C.F.R. 63.44(b)(1), however, we may provide in a final section 112(d) standard a specific compliance date for those sources that obtained a final and legally effective section 112(g) case-by-case MACT standard and submitted the information required by 40 C.F.R. 63.43 to the agency before the close of the comment period. The EPA does not believe it has received such information during the comment period and we are not establishing a separate specific compliance period for sources that obtained final and legally effective section 112(g) standards prior to promulgation of the final rule. In the absence of EPA action on this issue, state Title V permitting authorities are required to "establish a compliance date in the [Title V] permit that assures that the owner or operator shall comply with the promulgated standard [ ] as expeditiously as practicable, but not longer than 8 years after such standard is promulgated . . . ." 40 C.F.R. 63.44(b)(2). Sources with final and legally effective section 112(g) standards should work with their permitting authorities to determine the appropriate compliance date consistent with the EPA regulations.

10. Ownership.

a. Support for subcategorization by ownership.

Comment 125: Commenter 17868 states that section 112(d)(4) of the CAA provides that the Administrator may distinguish among classes, types, and sizes of sources within a category or subcategory (of an industrial sector) in establishing MACT standards. Commenter acknowledges that this ability to subcategorize, which the EPA has already used to subdivide the industry sector by type of fuel and size, shall not be used under CAA section 112 (d)(1) for purposes of authorizing extensions. However, we believe that the EPA has authority to use its discretion to establish emission limits for types of sources, based on ownership and location, that it has not recognized and can address some of the unique issues that not-for-profit utilities face, including but not limited to the ownership, size of communities served, and most importantly, location. Commenter suggests that the EPA must examine these issues carefully and determine standards based on the criteria enumerated in CAA sections 112(d)(2) and (d)(3) for these sources.

Commenter 17868 states that the majority of public power generators are small entities as defined by federal law. They are all not-for-profit. Seventy percent of public power systems are located in cities with populations of 10,000 or less, and a significant percentage of these systems are located in rural locations, including Alaska, Guam, Puerto Rico and American Samoa. In cities and townships, electric generation is generally located in the center of town, bounded by railroad easements and private property. These characteristics of our members' operations have several significant consequences for public power and rural electric cooperatives that will make compliance with the proposed standards uniquely difficult: (1) Many municipal utilities are space-constrained and cannot build laterally. They must build vertically, but this makes construction of dry scrubbers, ESPs and fabric filters technically infeasible. If the EPA were to examine the group of facilities as a subcategory, it is likely that the Agency would set a different floor for this subcategory of utility. (2) Most of these facilities have only

two boilers and possibly off-site gas turbines for peaking. Quite a few also own wind and/or solar generation that provide an interruptible power supply. As a consequence of state and federal requirements these operators can take only one unit off-line at a time for refurbishment and retrofit or repowering. (3) These communities are generally not located near natural gas pipelines, except in the southwest and isolated areas in the northeast. As a consequence of their size, infrastructure is not likely to come to them so that they can avail themselves by repowering units.

Commenter 17868 submits that the EPA has ignored these significant distinctions and the level of controls that are and can be achieved by these distinct parts of the utility industry. In part, this is a result of inadequate scoping and review under UMRA and SBREFA. On this basis, Commenter urges the EPA to re-propose the MACT rule to re-examine not only the regulation of pollutants other than Hg, but to re-examine the subcategorization of the industry by ownership and location. If this examination is done properly, the MACT floor for units based on their footprint and location will be vastly different than the level of emissions control achieved for larger non-rural power plants.

b. Opposition to subcategorization by ownership.

Comment 126: Commenter 17648 states that the EPA lacks discretion to subcategorize based upon source ownership. Ownership does not constitute a distinction of class, type, or size, and has no logical connection to physical characteristics or emissions performance of units.

Response to Comments 125 - 126: The EPA does not agree that a subcategory based on ownership is reasonable for EGUs under the facts available to the agency; therefore, we need not address the comment that questions the agency's discretion to establish such a subcategory. Commenters that support a subcategory based on ownership assert that the majority of public power generators owning all or part of EGUs are small entities, but the commenters do not explain how the ownership affects the HAP emissions characteristics of the boilers. Further, commenters do not indicate how the EPA could or should distinguish situations where a public power generator owns one or more large EGUs in their entirety from situations where the public power generator owns only a minor percentage of a large EGU. The EPA does not think it is reasonable to establish a subcategory based on ownership absent data that demonstrates that the emissions characteristics are indeed distinct or information that is sufficient to evaluate the scope of the subcategory (i.e.,what small entities own what percentage of existing EGUs). Our information indicates that a number of small entities own as little as a 1 percent interest in EGUs or EGU facilities. In any case, we do question the viability of such a subcategory even if we had data that supported it. In response to a request that the EPA create a subcategory for small municipal electric utilities for the major-source Industrial Boiler NESHAP, the EPA stated that "The EPA sees no technical or legal justification for creating a separate subcategory for municipal utilities. Boilers at municipal utilities fire the same type of fuels, have the same type of combustor designs, and can use the same type of controls as other units in the large subcategory." *See* 69 FR 55,232.

11. Tire-derived fuel.

Comment 127: Commenter 17620 does not support a subcategory for sources that combust tire-derived fuels.

Response to Comment 127: The EPA is not establishing a subcategory for tire derived fuel-fired EGUs.

12. Units located on Tribal lands.

Comment 128: Commenter 17732 states that in accordance with section 112(d)(l) of the CAA, the NESHAP rule should also take into account differences among classes, types, and sizes of sources as well as differences in types/classes of fuels in determining emissions standards for existing sources, and which differ substantially on a regional and site specific basis. Based on the government-to-government relationship of the Navajo Nation and the U.S. government, and consistent with the right of sovereignty and self-determination of the Navajo Nation, it may also be appropriate to classify EGUs on tribal lands in a different subcategory from those on non-Indian lands. In any case, the EPA should not promulgate a "one size fits all" rule that fails to acknowledge the efficacy of certain technologies based on boiler type and coal qualities or the impracticability of coal blending for many plants.

Commenter 17732 states as permitted by law, the EPA should subcategorize the coal-fired EGUs based on rationally based characteristics of sources and fuels that will affect the efficacy of various compliance controls for meeting the NESHAP Rule, e.g., the quality of the coal, the boiler class, the size and range of unit capacity, etc. the EPA should then set MACT floor standards based on the 12 percent of best performing units within each respective subcategory. Such an approach would be rationally based and provide flexibility for industry to comply with the NESHAP Rule. A "one-size-fits-all" standard is inappropriate and contrary to Executive Order guidance that regulations be appropriately flexible and least burdensome on society and industry, although still meeting Agency goals.

Commenter 17732 states in accordance with the distinctive status of Indian lands, based on principles of tribal sovereignty and self-determination, our government-to-government relationship, and the flexibility of federal agencies mandated under E.O. 13175, the EPA should classify sources on tribal lands (e.g., NGS) as a unique subcategory of EGU s for which emission standards for NESHAP should be set pursuant to CAA section 112(d)(3).

Response to Comment 128: Pursuant to CAA section 112(d)(1), the EPA may subcategorize sources based on differences in class, type, or size. In the preamble to the proposed rule, the EPA further explains that any basis for subcategorizing (e.g. class) must be related to an effect on emissions, rather than some difference which does not affect emissions performance. The EPA does not believe a subcategory based solely on location in Indian country is consistent with the statutory authority to subcategorize. In addition, the EPA does not have any HAP information for NGS that demonstrates that the HAP emissions characteristics of that facility are different such that subcategorization is appropriate, nor do commenters provide any. While the agency does not believe a subcategory for NGS is warranted, the agency understands the importance of NGS to the local Tribal economies and associated water rights. The agency is committed to working with the interested parties to address any compliance related issues associated with implementation of this final rule.

13. The EPA should establish a subcategory for sources with dry scrubbers or other pollution controls and/or water resource limitations.

Comment 129: Commenter 17867 states that one important and sensible subcategory for the EPA to establish is for sources that already have state-of-the-art dry scrubber systems that face limitations on their control technology due to resource limitations – namely, water. These facilities warrant a subcategory because they already have very effective controls in place for reducing emissions of Hg, SO_2 and HCl. These dry scrubbers, however, are generally not as effective for some HAP as the wet scrubbers If the EPA treated all facilities as one category, then the wet scrubbers would dominate the top

12 percent that would determine the MACT floor for existing units. However, the dry scrubber controls are used because of insufficient water available to install and operate wet scrubbers. And even where water is available, the EPA could not want western facilities to use that limited resource given the environmental consequences of doing so. Consequently, there are very good environmental reasons for the EPA to create a subcategory for facilities that already have installed dry scrubbers.

Commenter 17867 states that the EPA has consistently and correctly asserted that it has the discretion to create subcategories based upon whether certain pollution control technology is viable. For example, the EPA said in response to comments on its Boiler MACT rulemaking: "Thus, we have discretion in determining appropriate subcategories based on classes, types, and sizes of sources. We used this discretion in developing subcategories for the industrial, commercial, and institutional boilers and process heaters source category. Through subcategorization, we are able to define subsets of similar emission sources within a source category if differences in emissions characteristics, processes, air pollution control device (APCD) viability, or opportunities for pollution prevention exist within the source category." 69 FR 55232 (vacated on other grounds). Likewise, the EPA noted early in the Boiler rulemaking process that "The Clean Air Act allows EPA to divide source categories into subcategories when differences between given types of units lead to corresponding differences in the nature of emissions and the technical feasibility of applying emission control techniques." 68 FR 1670 (Proposed Boiler MACT Rule). Finally, in response to a request that the EPA create a subcategory for small municipal electric utilities, the EPA stated that "The EPA sees no technical or legal justification for creating a separate subcategory for municipal utilities. Boilers at municipal utilities fire the same type of fuels, have the same type of combustor designs, and can use the same type of controls as other units in the large subcategory." 69 FR 55232. The EPA's reasoning suggests that if small municipal electric utilities used different types of controls, then subcategorization might have been appropriate. Thus, the existence of pollution control devices is a reasonable basis for subcategorizing a source category.

Commenter 17867 states that this approach does not conflict with the D.C. Circuit's vacatur of the EPA's Brick Kiln rulemaking in *Sierra Club*, 479 F.3d at 880. In that case, the Court took issue with the EPA's establishment of MACT floors within various subcategories of brick and ceramic kilns. See, e.g., *Sierra Club*, 479 F.3d at 881 (holding that the EPA's ranking of best-controlled sources must include all relevant sources regardless of the control technology they employed). The Court did not take issue with the EPA's subcategories.

Comment 130: Commenter 17898 recommends that the EPA provide for distinct limits considering control device capabilities (dry versus wet scrubbers).

Comment 131: Commenter 18018 states that the EPA should expand the number of subcategories to reflect air pollution controls on the effectiveness of air toxic emission reductions.

Response to Comments 129 - 131: The EPA disagrees with commenter's assertion that wet- and dry-FGD systems are not viable or that they cannot achieve the same emission limits. The EPA's MACT floor pool for HCl contains EGUs with both wet- and dry-FGD systems installed indicating an ability to achieve the MACT floor emission levels. Further, commenter's interpretation of the statement in the proposed Industrial Boiler NESHAP is incorrect. Rather than implying that a difference in controls would have provided a basis to subcategorize, the statement indicates that such units have the same generic types of controls as other units and, thus, may achieve the same emission levels.

We believe it is legally impermissible to subcategorize based on the type of air pollution control device. *See Chemicals Manufacturers Association* v. EPA, 870 F. 2d 177, 218–19 (5th Cir. 1989) modified on different grounds on rehearing 884 F. 2d 253 (5th Cir. 1989) (rejecting subcategorization based on type of control device for purposes of the technology-based standards under the Clean Water Act, which are analogous to the CAA section 112 standards). The problem with subcategorizing on the basis of pollution control device, quite simply, is that it leads to situations where floors are established based on performance of sources that are not the best performing. For example, suppose a source category consists of 100 sources using the same process and having the same emission characteristics, but that 50 sources use control device A to control HAP emissions, and 50 use control device B which is two orders of magnitude less efficient. If one subcategorized based on the type of pollution control device, the MACT floor for the 50 sources with control device B would reflect worst, rather than best performance. For these reasons, we decline to subcategorize based on controls.

14. Establish a subcategory for facilities with an enforceable closure (retirement) date.

Comment 132: Commenter 17867 states that the EPA could also establish a subcategory for facilities that are subject to an enforceable closure date. Units subject to shutdown orders should be a separate class because it would be technically and economically infeasible to install many types of control technologies given the limited number of years the facilities have left to operate. Facilities scheduled for closure have a limited operational life over which to design, install, and capitalize the installation of new pollution control equipment. For those facilities that are required to shut down anyway, installing MACT control technology deemed appropriate for all affected EGUs would be infeasible given the short remaining life of the facility.

Comment 133: Commenter 19114 states that there are numerous older boilers that are devoted to similar peaking or occasional use as they near the end of their useful lives. The limited use category could also be applied to any units 50 years or older for which a retirement date has been established based on the approved depreciation schedules on file with a public utility regulatory commission or similar binding commitment. A limited use subcategory for any older oil and coal units that are also willing to accept a limitation to a 25 percent capacity factor will help to ensure the reliability of the electrical system, as well as limiting the overall emissions of HAP associated with these units. This subcategory should be allowed to expire after six years. The inclusion of the limited use subcategory would provide ample time for replacement power to be constructed, transmission reinforcements and upgrades to be designed and put in place, or allow for other measures to be taken, as appropriate, and in coordination with the reliability organizations and regional transmission operators, and would alleviate grid reliability concerns associated with abrupt mass coal-fired generation retirements at the same time. Commenter announces plans to retire 5,900 MW of generation as an outcome of this rule and other EPA requirements. By providing flexibility with the limited use provision, the EPA would recognize the reliability issue that exists, although still guaranteeing significant emissions reductions. There is precedent for a limited use subcategory in the Industrial Boiler MACT rule, and similar justification is present within the category of utility units. The inclusion of the limited use subcategory would provide flexibility to the industry in being able to balance the retirement of units with the needs for grid reliability.

Response to Comments 132 and 133: We question the legal viability of the subcategory suggested by commenters as being consistent with the statute and we do not think the emissions characteristics of such units would be different from other EGUs. Commenters have provided no data that demonstrating a difference in emissions characteristics. Further, commenters have not identified all the units that would

fit within this subcategory so we question how we could establish the subcategory and set standards absent identified sources and data on which to base the CAA section 112(d) standards. The EPA would likely decline to exercise its discretion in this manner in any case given that the older units described in the comment are often minimally controlled even though they are able to install controls in the same manner as base-load units. In any case, the EPA could not extent the compliance date to coincide with the closures of such facilities as we are constrained by CAA sections 112(i)(3)(A) and (B).

3G - Subcategorization: Other

Commenters: 17402, 17608, 17620, 17648, 17656, 17689, 17702, 17724, 17730, 17732, 17757, 17768, 17774, 17775, 17805, 17808, 17867, 17870, 17876, 17898, 17902, 17912, 17925, 18025, 18051, 18831, 19114, 8443

1. General support for additional subcategories.

Comment 1: Multiple commenters (8443, 17608, 17656, 17687, 17689, 17702, 17730, 17732, 17757, 17867, 17876, 17805, 17898, 17912, 19114) express general support for more subcategorization on a number of bases, including boiler design, boiler size, coal rank, oil type, duty cycle, and air pollution control technology.

a. General support.

Comment 2: Commenter 8443 states that although the SBREFA SER panel did discuss subcategorization, the discussions were inadequate and overly brief. Commenter states that in the SBREFA presentation material, the EPA explained that it would evaluate a number of possible subcategorization approaches, including boiler design, coal rank, unit type, oil type, and duty cycle. Commenter agrees that all of these factors are reasonable bases for subcategorization.

Comment 3: Commenter 17702 states that the EPA should expand the number of subcategories to reflect the impact of fuel composition, air pollution controls and/or boiler types on the effectiveness of air toxics emission reductions.

b. Lack of further subcategorization is arbitrary and capricious.

Comment 4: Commenter 17805 states that the EPA's decision not to further consider subcategorization of sources is arbitrary and capricious.

Comment 5: Commenter 17876 states that the EPA's failure to subcategorize EGUs based on boiler type, pollution control technology, and type of coal is arbitrary and capricious.

Comment 6: Commenter 17732 states that in the proposed NESHAP Rule, the EPA divides the major subcategory of "coal" into only two subcategories. The commenter states that the EPA provides no justification for these proposed subcategorizations, stating merely that that the units were grouped on a reasonable basis, estimating the performance of "generally similar units," and further concluding that the selected subcategories were therefore "appropriate." According to the commenter, without further explanation based in science, the proposed subcategorizations are arbitrary and capricious. The commenter asserts that moreover, these subcategorizations contradict past such subcategorizations by the EPA for compliance standards, including boiler types, coal quality, etc.

Comment 7: Commenter 17912 states that the EPA's proposed subcategories result in arbitrary preferential treatment among EGUs. The commenter states that the limited subcategorization proposed does not acknowledge the full range of actual differences among units and fuel types. According to the commenter, the EPA must acknowledge that there are "significant design and operational differences" that warrant additional subcategorization under CAA section 112(d) (1). The commenter asserts that both the AES Hawaii Unit 1 (total particulate) and Nucla (mercury) units were apparently selected as the

best performing sources for different pollutants. The commenter states that both units have fluidized bed boilers, and neither has a wet scrubber. Commenter questions whether either plant should serve as the best controlled similar source for PC-fired boilers employing wet scrubbers and Hg controls. The EPA has not adequately explained its refusal to do so. Commenter urges the EPA to consider additional subcategories within the EGU MACT.

Response to Comments 1 - 7: The EPA has reviewed the data provided and continues to believe that the subcategories in the final rule are the only appropriate subcategories. As noted elsewhere in this document, the EPA may not subcategorize by air pollution control technology type. Further, the EPA has reviewed the other suggested subcategories and finds no basis for further subcategorization (e.g., based on boiler design, boiler size, or duty cycle) beyond what is in the final rule. The EPA has evaluated a number of subcategory options as it indicated to the SER panel that it would; however, the EPA does not believe that the data support further subcategorization.

The EPA disagrees with commenters' assertion that the subcategorization analysis was in any way arbitrary or capricious. As indicated elsewhere, the EPA evaluated a number of subcategorization approaches and, for all but those included in the final rule, found no basis in the data for additional subcategories. What the EPA may or may not have done in prior NESHAP rulemakings has no bearing on the present case other than to indicate a process. The EPA has followed that process in evaluating the data. The EPA also disagrees with commenters who state we have provided no basis for the subcategories proposed. As noted in the proposal preamble (76 FR 25037), there were no EGUs designed to low rank, virgin coal among the top performing 12 percent of sources for Hg emissions, indicating a difference in the emissions for this HAP from these types of units. Because the emissions of Hg are different between these two subcategories, we proposed to establish different Hg emission limits for the two coal-fired subcategories. The EPA acknowledges that there are differences among EGUs as commenters note. However, a review of the data did not indicate that those differences result in any difference in ability to achieve the proposed MACT floor limits as evidenced by the fact that multiple boiler types and control technologies may be found in the pool of floor sources, with the exception of Hg. As noted elsewhere in this document, the EPA has revisited its selection of the bases for the new-source MACT limits.

In any case, as noted above, subcategorization is a discretionary determination – the EPA is not required to subcategorize even where we determine we may subcategorize. We have considered many potential subcategories and we believe we have established sufficient subcategories and final standards that are achievable by all existing sources, though achievability by all sources is not required under CAA section 112. That some sources will make the business decision to retire their units instead of installing the controls necessary to comply does not make the standards invalid or unachievable. Further, the fact that we did not explain in detail why each and every suggested subcategory was rejected does not make our decision arbitrary and capricious as commenters suggest. Commenters have made assertions that different subcategories are warranted but not provided data that demonstrate a clear need for additional subcategories. In any case, the EPA can decline to subcategorize for policy reasons even if a valid subcategory is demonstrated. We believe it is reasonable to include a wide array of EGUs in the subcategories in the final rule because the data show us that all different sizes, types, and classes of EGUs are meeting and can meet the final standards such that additional subcategories, even if we could justify them under the statute, are not warranted.

c. The EPA should conduct further analyses.

Comment 8: Commenter 17608 states that in its proposal, the EPA appears to have seriously considered only the EPA-proposed subcategorization. According to the commenter, the preamble does not describe how it evaluated other alternatives nor upon what basis the EPA concluded they were rejected, citing in most cases simply that different types of units were in the top 12 percent, making further subcategorization unnecessary. The commenter states that the technical support documents available in the docket treat the EPA's preferred subcategorization as a given assumption and do not provide additional support for the EPA's decision or evaluate other subcategorization options.

Comment 9: Commenter 17689 states that as a general matter, the EPA claims to have examined closely the collected data and found no adequate justification for further subcategorization. According to the commenter, as the EPA knows, the underlying data used to construct the proposed MACT limits is as the proposal puts it, the only "available." The commenter states that in other words, if a more complete set of data were available, the EPA may have arrived at the conclusion that more subcategorization was appropriate. The commenter asserts that the EPA does know that different combustion designs and different unit demands and operations yield different emission characteristics depending on those designs and operational factors. According to the commenter, the EPA's statement that an examination of the available data shows no need for further subcategorization misses two important points. The commenter asserts that first, was the data available to discern the different emission characteristics? The commenter states that second, just because units of different designs (and presumably different operational conditions) are on the list of best performing units does not mean that all units of similar design or operation will perform the same. According to the commenter units of different design and operation do have different emission characteristics. CAA section 112(d)(1) is clear that the EPA has the discretion to subcategorize based on classes, types, and designs of sources. According to the commenter, the EPA needs to use this authority here.

Comment 10: Commenters 17656 and 17805 state that the EPA should further review the wide range of boilers, combustion unit sizes, coal-types and control technologies currently in use that result in varying levels of Hg, non-Hg metals and acid gas control. The commenters state that with the extremely high level of control proposed in the rule, it is unknown whether existing plants could comply, even if baghouses were installed for non-Hg metals and Hg controls. Commenters endorse the recommendation that the EPA conduct further analysis -- reviewing more stack test data from a wider range of units, to better understand the differences in HAP emissions within the industry -- before finalizing any related MACT standards.

Comment 11: Commenter 17730 states that the EPA's consideration of any alternative subcategorization is substantially lacking in the preamble discussion. According to the commenter, the EPA does not present data or a clear explanation to support its contentions that no other subcategorization scheme can be supported in the rule. The commenter states that the argument that all of the various emission control technologies are represented in the top 12 percent of performing sources is not an argument against subcategorization. According to the commenter, this is an argument that supports the idea that emission control technologies can be identified for all sources, but does nothing to support the idea that there is no need for further subcategorization with different emission standards. Therefore, Commenter believes that the EPA's dismissal of other options is premature.

Commenter 17730 continues, clearly, Congress provided that the EPA would assess possible subcategorization options when it developed MACT limits under CAA section 112. CAA section 112 (d)(l) provides the EPA discretion to distinguish "among classes, types, and sizes of sources within a category or subcategory in establishing standards."According to the commenter, CAA section 112(c)(l)

adds that "[t]o the extent practicable, the categories and subcategories listed under this subsection shall be consistent with the list of source categories established pursuant to section 7411 of this title and Part C of this subchapter."

Comment 12: Commenter 17757 states that section 112 of the CAA grants the EPA significant latitude to establish "categories and subcategories" to distinguish between classes, types and sizes of sources within a source category when determining MACT standards. The commenter states that this is one clear avenue Congress gave to the EPA to enable it to craft regulations that make sense for differing types of sources. The commenter asserts that for reasons that are not clear, the EPA chose to take a very limited view of sub-categorization in the proposed rule, establishing only two subcategories for coal-fired units. Commenter urges the EPA to exercise its discretion to establish additional subcategories.

Response to Comments 8 - 12: The EPA has explained elsewhere its rationale for the proposed subcategories. Commenter may be correct in stating that the EPA may have arrived at different conclusion had different data been available; however, such data were not made available to the Agency which must base its decisions on the data available to the Administrator. See, e.g., CAA section 112(d)(3) ("...for which the Administrator has emissions information..."). The EPA may not postulate or hypothesize what subcategories (or MACT floor levels) MIGHT be appropriate were other data to be available. The proposed limits are based on EGUs currently operating with available controls, indicating that the levels are achievable. Further, the EPA believes it has fulfilled the CAA section 112(c)(l) directive that "[t]o the extent practicable, the categories and subcategories listed under this subsection shall be consistent..." with those of CAA section 111.

d. Further subcategorization for least burdensome rule.

Comment 13: Commenters 17656 and 17805 state that the EPA must consider additional subcategorization of sources and that the additional subcategorization of units goes hand-in-hand with the President's Executive Order 13563, "Improving Regulation and Regulatory Review," which directs federal agencies to apply the least burdensome means to achieve regulatory compliance. According to the commenters, there is little evidence that the EPA has applied this directive to this proposed rule.

Comment 14: Commenter 17687 states that Congress intended that the EPA should "take into account factors such as industrial or commercial category, facility size, type of process and other characteristics of sources which are likely to affect the feasibility and effectiveness of air pollution control technology. The commenter asserts that cost and feasibility are factors which may be considered by the Administrator when establishing an emission limitation for a category under CAA section 112. According to the commenter, the proper definition of categories, in light of available pollution control technologies, will assure maximum protection of public health and the environment while minimizing costs imposed on the regulated community." S. Rep. No. 228, 101st Cong., 1st Sess 166.

Response to Comments 13 - 14: Commenters appear to argue that the Executive Order requires the Agency to create subcategories that will significantly diminish the level of HAP control under the final rule. We do not agree that the Executive Order requires the Agency to ignore the mandates and purpose of CAA section 112 when establishing subcategories and standards, and EPA may not use an Executive Order as justification for promulgating a rule that is inconsistent with the statute. In any case, although commenters maintain that the standards would generally be less stringent with additional subcategorization, the commenters have not provided data that demonstrate that is in fact the case. We

believe that we have established valid subcategories and promulgated standards consistent with CAA section 112 and applicable Executive Orders.

e. Further subcategorization would improve achievability of the rule.

Comment 15: Commenter 17898 believes that greater use of subcategorization, review and use of the historical CEMS data for SO_2 and Hg to set the variability limits, and the use of a single best controlled unit to set the floor will significantly improve the quality and achievability of the rule.

Response to Comment 15: The EPA does not believe that further subcategorization would enhance the achievability of the rule and still fulfill the CAA section 112 mandates regarding how the MACT floors are to be determined. In addition, we have established the new source MACT standards consistent with the statute as discussed elsewhere in this final rule.

f. Further subcategorization would improve flexibility of the rule.

Comment 16: Commenter 17867 states that subcategorization is generally appropriate for coal- and oil-fired EGUs. In developing standards under CAA section 112(d) to date, the EPA has based subcategorization on considerations such as: the size of a facility; the type of fuel used at the facility; and the plant type. According to the commenter, the EPA also may consider other relevant factors such as geographic conditions in establishing subcategories. The commenter states that once the source category is divided into subcategories, the EPA determines the "floor" for each subcategory and, in turn, the emissions standard independently for each subcategory. According to the commenter, this approach has helped build flexibility in meeting environmental objectives in the past. The commenter asserts that of course, these potential subcategories are simply the starting point for the analysis. The commenter states that there are other subcategories that the EPA likely might include in its final EGU MACT rulemaking.

Response to Comment 16: As noted elsewhere, the EPA has considered all of the factors noted by the commenter and found that no subcategories, beyond those in the final rule, are supported by the data or otherwise warranted.

Comment 17: Commenter 19114 states that the EPA also chose not to use its full available authority and discretion under the CAA in promoting flexibility within the proposed HAP regulations. The commenter asserts that by starting with an emission dataset that intentionally included only the best performing units, it ignored the potential for subcategorization amongst different boiler configurations, sizes, ages, fuel types and existing control technologies to provide compliance flexibility. The commenter states that there is extreme variability in capability and costs associated with reducing emissions in the broad category of utility boilers and thus additional flexibility through subcategorization needs to be examined and should be provided. According to the commenter, other areas where flexibility could be improved include the source averaging provisions and the requirements for monitoring and verification of compliance.

Response to Comment 17: The EPA disagrees with commenter's assertion that the EPA ignored any possible subcategorization approaches or that it has insufficient data upon which to base or evaluate various subcategories. As noted elsewhere, the EPA does not disagree with commenter that there are differences in EGUs; however, the EPA does disagree with commenter that all of those differences result in differences in emissions to the atmosphere and we do not in any case believe it is appropriate to

exercise our discretion to establish additional subcategories. As noted elsewhere in this document, the EPA has made changes to the monitoring requirements partly based on comments received.

2. General opposition to additional subcategories.

Comment 18: Commenter 17620 believes that the subcategories established by the EPA are reasonable and cautions against creating additional small subcategories, where insufficient data undermine the calculation of MACT floors.

Comment 19: Commenter 17648 supports the EPA's decision to largely limit the number of subcategories used in setting emission limitations for coal-fired and oil-fired EGUs. According to the commenter, the Agency properly has refrained from subcategorizing based upon coal rank or grade of liquid oil, which are not valid bases for distinguishing subcategories of sources to set emission limitations. The commenter states that the Agency also should not subcategorize limited use units and peaking units, or units based upon ownership type. The commenter asserts that any subcategorization must be based upon a determination that units are fundamentally different in class, size, or type, in a way that affects emissions performance and the feasibility of controls to address those emissions.

Commenter 17648 states that section 112 restricts the EPA to subcategorizing based upon size, class, or type of unit for purposes of setting emission limitations. According to the commenter, the EPA has discretion to create subcategories under CAA section 112 for purposes of setting emission standards for sources within a listed source category, but that discretion is constrained by the statutory language, which provides that the EPA may "distinguish among classes, types, and sizes of sources within a category or subcategory" in establishing emission standards. The commenter states that the process in sections 112(d)(2) and 112(d)(3) for setting MACT emission limitations also constrains the EPA's discretion to subcategorize. The commenter asserts that emission standards must be based upon what sources actually achieve, without regard to control technology. According to the commenter, , emissions control technology is not itself an appropriate basis upon which to subcategorize, because subcategorizing on that basis would effectively exclude from consideration in setting MACT floors for one subgroup sources that may be best-performing but use alternative control techniques. The commenter states that moreover, in directing that the EPA set MACT standards for sources in a listed source category, section 112(d)(2) requires that the EPA consider what standards are achievable "through application of measures, processes, methods, systems or techniques including, but not limited to, measures which: (A) reduce the volume of, or eliminate emissions of, such pollutants through process changes, substitution of materials or other modifications, (B) enclose systems or processes to eliminate emissions, (C) collect, capture or treat such pollutants when released from a process, stack, storage or fugitive emissions point . . ." According to the commenter, as the statute identifies control technologies and processes as part of the beyond-the-floor determination, control technology alone does not present a reasonable basis for distinguishing among classes, types, or sizes of EGUs. The commenter states that interpretation of the statute is consistent with Congress's intent, as evidenced by a report of the Senate Committee on Environment and Public Works: "The technologies, practices or strategies which are to be considered in setting emission standards under this subsection go beyond the traditional end-of-stack treatment or abatement system. According to the commenter, the Administrator is to give priority to technologies or strategies which reduce the amount of pollution generated through process changes or the substitution of materials less hazardous. The commenter asserts that pollution prevention is to be the preferred strategy wherever possible."

Commenter 17648 states that the EPA also lacks authority to exclude any class, type, or size of coal-fired or oil-fired EGU entirely from regulation under CAA section 112. According to the commenter, CAA section 112(n)(1)(A) directs the EPA to regulate EGUs under CAA section 112 once the Administrator has made the preliminary "appropriate and necessary" finding. The commenter states that National Lime affirms that the Agency must promulgate section 112 standards for all HAP emitted by sources in source categories regulated under CAA section 112. The commenter asserts that although the EPA enjoys some discretion to subcategorize within an EGU source category for purposes of setting emission standards under CAA section 112, the Administrator lacks discretion to elect not to promulgate section 112-compliant regulations for any particular HAP emitted by a subcategory of coal-fired and oil-fired EGUs.

Commenter 17648 states that the EPA is not obligated to create a subcategory in every instance where it has authority to do so. According to the commenter, nothing in section 112 mandates that the EPA create a subcategory in any situation, even if creating a subcategory based on distinctions in class, type, or size of sources would not be arbitrary and capricious. The commenter asserts that on the other hand, it is appropriate for the EPA to exercise its discretion to subcategorize only when a difference in class, size, or type of source within a source category has a meaningful and substantial effect on the emissions performance of sources within the respective subcategories in a way that impacts the technical feasibility of applying emission control techniques to produce a particular product. The commenter states that if sources that are different in size, class, or type can or do achieve similar emissions performance – such that, for example, one or more sources of each type are among the best performing-sources for a particular pollutant – then it would be inappropriate to exercise discretion to create different emissions limitations for those subsets of sources. According to the commenter, the emissions performance of the top-performing 12 percent of sources reflects what those sources have "achieved." The commenter asserts that Congress deemed the emission level achieved by the top-performing 12 percent of sources to be achievable for all sources. The commenter states that any distinction among sources that does not impact emissions performance is irrelevant to what is achieved by the top-performing sources and achievable by all other sources. According to the commenter, removing certain best-performing sources from the pool of best performers and placing them in a separate subcategory artificially weakens the emission levels that the remaining pool of best performers achieves. The commenter states that there is no reason to remove those sources even if there are some physical differences between those sources and the remaining pool of best performers.

Comment 20: Commenter 17402 generally supports the EPA's creation of five subcategories of EGUs in the proposed Utility MACT rule. Specifically, Commenter agrees that the distinct emissions profiles of coal-fired, oil-fired, and IGCC units provide reasonable grounds for subcategorization, since differences between various types of units can lead to corresponding differences in the nature of emissions and the technical feasibility of applying emission control technologies. Commenter further believes that the EPA's decision to subcategorize utility units according to fuel type is consistent with its broad discretion to establish subcategories under the CAA as interpreted by the D.C. Circuit and as supported by the legislative history. Although Commenter supports the subcategorization the EPA proposes in its rule, Commenter believes that any further subcategorization is unnecessary and inappropriate.

Commenter 17402 agrees that the EPA appropriately subcategorized EGUs on the basis of fuel type. Commenter agrees that fuel type affects design characteristics, which warrants treating coal-fired units differently from non-coal units. According to the commenter, the EPA's subcategories recognize these

inherent fuel-related characteristics, as well as the corresponding differences in the design and operation of feasible and effective emission control technologies.

Commenter 17402 states that the EPA has legal authority under the CAA to create the proposed subcategories. According to the commenter, section 112(c)(1) of the CAA grants the EPA broad discretion to establish "categories and subcategories" of sources to be regulated under CAA section 112 as it deems appropriate. The commenter states that the EPA's subcategorization authority is of critical importance in MACT because the best-performing sources within a particular subcategory define the floor without reference to sources outside the subcategory. The commenter asserts that setting MACT based on subcategories thus complies with the plain instructions of CAA section 112(d)(3). According to the commenter, the decision by the EPA to subcategorize EGUs on the basis of fuel type is supported by the D.C. Circuit's interpretation of CAA section 111 and by the legislative history of the CAA itself. The commenter states that the EPA's decision to create the proposed subcategories is consistent with the Agency's past practice.

Comment 21: Commenter 17808 supports the EPA's proposed subcategories for coal-fired EGUs. Commenter states that section 112 allows the EPA to subcategorize by size, class, or type, and any basis for subcategorization is generally related to an effect on emissions. According to the commenter, the Agency developed a robust database of stack emissions data from more than 300 coal units. The commenter asserts that as a result, the EPA had an extensive database on which to base its decision and we believe the proposed subcategories for coal are consistent with the requirements of the CAA.

Response to Comments 18 - 21: The EPA maintains that the subcategories contained in the final rule are reasonable and consistent with our authority under the statute as discussed elsewhere in this final rule record.

3. Data are limited for assessing subcategorization options

Comment 22: Commenters 17730 and 17775 state that the ICR data are very limited for assessing subcategorization options. Commenters state that the EPA designed the 2010 ICR for coal-fired EGUs to require stack testing by units that the EPA believed had the lowest emissions of Hg, non-Hg HAP metals, acid gas HAP, organic HAP, and dioxins. Commenters state that this focus resulted in Part III testing that was not representative of a cross section of all coal-fired EGUs for such distinguishing factors as boiler design, type of coal burned, and class of unit. Thus, according to the Commenters, the ICR limits one's ability to certain subcategorization options.

Comment 23: Commenter 17775 adds that the fact that the EPA required 50 random units to conduct HAP testing does not change this conclusion. Commenter asserts that the EPA chose the 50 units to provide information for its benefits analysis. Commenter states that the 50 units were not chosen as possible best performing units so they are unlikely to appear in any comparison of possible subcategories to see if there are statistically significant differences in the emissions of the best performing units.

Response to Comments 22 - 23: The EPA believes it has sufficient data upon which to base its subcategories. We disagree that we identified the best performing sources for Hg as explained in the ICR and response to other comments on this issue. We required testing from a broad array of EGUs and commenters have not provided any data that supports their assertions.

4. Subcategorization should be consistent with NSPS and BACT.

Comment 24: Commenters 17724 and 17876 state that section 112(c)(1) requires the EPA to identify source categories consistent with the source categories established under the NSPS section and the best available control technology (BACT) determinations made in prevention of significant deterioration sections of the CAA. According to the commenters, the Final Report delineated the HAP emissions from EGUs as well as the various types of coal combustion boilers and pollution control systems that could serve as the basis for subcategorization of EGUs based on boiler type and pollution control technologies. The commenters states that the EPA's prior findings and rulemakings established subcategories based on the type of coal burned (e.g., the subcategorization of sub-bituminous and lignite coals for Hg based on the unique chemical properties and different forms of mercury compounds in those coals).

Commenters 17724 and 17876 support the subcategorization of lignite in the proposed rule based on the BTU content of coal, but the rule does not go far enough in recognizing the different boiler types, pollution control technologies installed as BACT, and the differences in the chemistry of coals that lead to differences in NSPS and BACT. CAA section 112(c)(1) requires the EPA, "to the extent practicable," to follow existing NSPS and BACT determinations. According to the commenters, this means that the EPA can and should establish different source categories and subcategories based upon relevant evidence and reasons including NSPS and BACT. The commenters state that this is especially true when the EPA's own record in this rulemaking reveals that subcategories are justified, and the EPA has not, "to the extent practicable," followed the existing NSPS and BACT categories. Commenters encourage the EPA to amend the proposed rule to include the differences between facilities established through NSPS and BACT, and to the extent practicable, follow established NSPS and BACT categories for coal-based EGUs.

Response to Comment 24: The EPA disagrees with the commenters and believes that the subcategories fulfill the requirements of CAA section 112(c)(l) that the subcategories established for a given source category be "to the extent practicable" consistent between the CAA section 111 and 112 rulemakings. The EPA is not required by that provision to have the same subcategories under CAA section 112 and 111. We believe Congress provided flexibility given that the control of HAP and criteria pollutants varies as times such that the same subcategories may be unworkable. In this final rule, we have established subcategories that are supported by the available data.

5. Separate subcategories for coal- and oil-fired units.

Comment 25: Commenter 17402 agrees that the EPA appropriately subcategorized EGUs on the basis of fuel type. Commenter agrees that fuel type affects design characteristics, which warrants treating coal-fired units differently from non-coal units. According to the commenter, the EPA's subcategories recognize these inherent fuel-related characteristics, as well as the corresponding differences in the design and operation of feasible and effective emission control technologies. The commenter asserts that for instance, coal-fired and oil-fired utility units employ different technologies to produce electricity, and an EGU constructed to burn coal cannot burn oil without substantial design modifications. The commenter states that the principal HAP emitted by coal-fired units are Hg, acid gases and some other metals, although the principal HAP of concern emitted by oil-fired units is nickel. According to the commenter, although emission control technologies like fabric filters may prove effective for coal-fired units, such technology cannot be used to reduce HAP emissions from oil-fired EGUs.

Comment 26: Commenter 17730 states that the EPA's 1998 Utility Study and the more recent 2010 ICR data demonstrate that emissions from coal- and oil-fired EGUs are markedly different. According to the commenter, these differences result from the amount and form of trace substances in each fuel, as well as the compounds that are created during the combustion process. Commenter believes that the EPA was justified in placing oil-fired EGUs in a different category than coal-fired EGUs.

Comment 27: Commenters 17648 and 18023 agree that the EPA's decision to distinguish liquid oil-fired EGUs from the EGUs in the other four categories (solid fuel-fired units) is clearly appropriate, given the differences in levels and characteristics of the emissions generated by such units. According to the commenters, the design of solid-fueled boilers is fundamentally different from that of boilers fueled by liquid or gaseous fuels.

Comment 28: Several commenters (17808, 17870, 18025) support the EPA's decision to subcategorize between coal- and oil-fired EGUs given the different operating characteristics and emissions profiles of the two subcategories. The commenters state that oil-fired EGUs generally operate as peaking or load-following units. The commenters assert that coal-fired power plants generally operate as base load generating resources. The commenters state that according to the EPA's ICR database, oil- and coal-fired EGUs report annual average capacity factors of 19 percent and 63 percent, respectively. In structuring the final rule, Commenters encourage the EPA to better separate the compliance and monitoring requirements applicable to oil-fired EGUs from the requirements for coal-fired EGUs to ensure that the requirements for both subcategories are fully developed and clearly articulated. The commenter asserts that for example, the requirements for oil-fired LEEs are not specified in the proposal. Commenters believe that better separation of the requirements for coal- and oil-fired EGUs will reveal where these gaps may be occurring.

Response to Comments 25 - 28: The EPA appreciates commenters' support for the coal and oil subcategories. The EPA has reviewed the respective monitoring requirements and made adjustments as appropriate in the final rule.

6. The EPA has statutory authority to establish subcategories.

Comment 29: Commenter 17402 states section 112(c)(1) of the CAA grants the EPA broad discretion to establish "categories and subcategories" of sources to be regulated under CAA section 112 as it deems appropriate. According to the commenter, in other words, CAA section 112 allows the Agency to create subcategories on any reasonable basis. The commenter states that the EPA's subcategorization authority is of critical importance in MACT because CAA section 112(d)(3)(A) provides that the MACT floor for existing sources shall be based on "the average emission limitation achieved by the best performing 12 percent of the existing sources…in the category or subcategory." The commenter asserts that there is no MACT floor that exists outside of the context of categories and subcategories. According to the commenter, instead, the best performing sources within a particular subcategory define the floor without reference to sources outside the subcategory. The commenter states that setting MACT based on subcategories thus complies with the plain instructions of CAA section 112(d)(3).

Commenter 17402 states that the EPA may exercise its statutory authority to create broad subcategories based on fuel type (i.e., coal-fired, oil-fired, and IGCC units) and to subcategorize coal-fired units further based on coal heating value. The commenter states that an established principle of statutory construction requires courts to "give the words of a statute their ordinary, contemporary, common meaning, absent an indication Congress intended them to bear some different import." According to the

commenter, section 112(d)(1) of the CAA grants the EPA broad discretion to "distinguish among classes, types and sizes of sources within a category or subcategory" when establishing MACT standards. Webster's Third New International Dictionary Unabridged (1993) defines "class" as "a group, set or kind marked by common attributes or a common attribute." The commenter asserts that it also defines "type" to mean "qualities common to a number of individuals that serve to distinguish them as an identifiable class or kind." The commenter states that the use of such broad terms as "type," "kind," and "size" illustrates Congress' intent for the EPA to have broad discretion in determining which factors require distinctions to be made for the purposes of setting MACT floors and MACT standards.

Response to Comment 29: The EPA agrees with commenter that it has statutory authority to consider and establish subcategories. However, the EPA also agrees with other commenters that this authority provides the EPA with discretion; the authority is not a mandate to establish subcategories that the EPA does not believe are warranted.

7. Case law supports the establishment of subcategories.

Comment 30: Commenter 17402 states the decision by the EPA to subcategorize EGUs on the basis of fuel type is further supported by the D.C. Circuit's interpretation of CAA section 111. According to the commenter, the language of CAA section 112 that permits the Administrator "to distinguish among classes, types and sizes of sources" when establishing MACT standards is identical to language pertaining to the establishment of NSPS in CAA section 111. The commenter states that the D.C. Circuit addressed this language in the context of NSPS for power plants, holding that section 111 grants the Administrator discretion to create different emissions standards for fuel types even where the strictest standard is achievable for all fuel types. The commenter asserts that the Sierra Club Court rejected the contention that CAA section 111 was "designed to permit a non-uniform standard only in the limited circumstance where a best technological system could not achieve the national percentage on certain types of coal," holding instead that "[t]he required finding that must underlie a variable standard is much broader than a mere determination that uniformity is not achievable."

Commenter 17402 states that although the Sierra Club Court analyzed CAA section 111, the Court's holding sheds light on the authority granted by CAA section 112 because the two provisions employ the same language in granting the EPA the authority to set distinct emissions standards. The commenter states that that sections 111 and 112 use the same language is significant because the Supreme Court has held that "when administrative and judicial interpretations have settled the meaning of an existing statutory provision, repetition of the same language in a new statute indicates, as a general matter, the intent to incorporate its administrative and judicial interpretations as well." The commenter asserts that Congress borrowed the language of section 111 in drafting the new section 112 nearly ten years after the D.C. Circuit decided Sierra Club. According to the commenter, as a result, section 112 must be read to carry the meaning established by that decision, and to grant the EPA the authority to create subcategories on the basis of any reasonable ground not expressly prohibited in the statute. The commenter states that in other words, Sierra Club establishes that the EPA may promulgate different standards for different fuel types, even where a uniform standard is achievable, as long as the Agency has reasons for not treating units uniformly.

Commenter 17402 states that the Agency's decision to subcategorize utility units on the basis of fuel type when setting MACT standards is further supported by the D.C. Circuit's holding in *Northeast Maryland Waste Disposal Authority v. EPA*. According to the commenter, following the Supreme Court's instructions to read the words of a statute "in their context and with a view to their place in the

overall statutory scheme," the D.C. Circuit found express authorization in the second sentence of CAA section 129(a)(2) for the EPA to distinguish among units within a category when establishing emission standards. The commenter states that the Court rejected the petitioners' contention that the EPA cannot rely on the second sentence of section 129(a)(2) because it permits subcategorization only after MACT floors are calculated. According to the commenter, instead, the D.C. Circuit read the statute to authorize the Agency to distinguish among units "within a category" during all stages of the MACT standard-setting process described in the section. The commenter asserts that the Court reasoned that if one reads the sentences of section 129(a)(2) in order, the second sentence "appears to contemplate that EPA may first distinguish among units in a category, and then apply the resulting subcategories when setting MACT floors." Thus, according to the commenter, the Agency lawfully executed its subcategorization authority under the CAA.

Comment 31: Commenter 17867 states that another area in which the EPA retains considerable discretion is under CAA section 112(d)(1), which allows the EPA to establish subcategories. The commenter states that the use of subcategories was to recognize the cost differences between different classes, types and sizes of sources. The commenter asserts that as Judge Williams eloquently explained in a concurring opinion: CAA section 112(d)(1) authorizes the Administrator to "distinguish among classes, types and sizes of sources within a category or subcategory," and the language of subsections 112(d)(2) and (3) pervasively refers to standards for sources in each "category or subcategory." According to the commenter, the authority to generate subcategories is obviously not unqualified; at the least it must be limited by the usual ideas of reasonableness. The commenter asserts that there is not necessarily any guarantee that, even with suitable subcategorization, every source will be able to achieve standards that meet a lawful application of section 112(d)(3) to reasonably defined subcategories. *Sierra Club v. EPA*, 479 F.3d 875, 885 (D.C. Cir. 2007) (J. Williams, concurring).

Response to Comments 30 - 31: The EPA agrees with commenters that case law supports our authority to consider and establish subcategories. However, the EPA also agrees with other commenters that this authority provides the EPA with discretion; the authority is not a mandate to establish subcategories that the EPA does not believe warranted.

8. Legislative history supports the establishment of subcategories.

Comment 32: Commenter 17402 states that the legislative history of the CAA makes clear that the EPA has the authority to subcategorize types, classes, or sizes of source to account for differences in HAP emissions and the effectiveness of emission control technologies. According to the commenter, based on the legislative history, the EPA may distinguish among classes, types, and sizes of sources when differences among sources affect the (1) feasibility, (2) effectiveness or (3) costs of control technology. The commenter states that the Senate Report accompanying the CAA directs the Administrator to: "take into account factors such as industrial or commercial category, facility size, type of process and other characteristics of sources which are likely to affect the feasibility and effectiveness of air pollution control technology. The commenter asserts that cost and feasibility are factors which may be considered by the Administrator when establishing an emission limitation for a category under CAA section 112. The commenter states that the proper definition of categories, in light of available pollution control technologies, will assure maximum protection of public health and the environment although minimizing costs imposed on the regulated community. The commenter states that however, in limited circumstances where a group of sources may share the characteristics of other sources in the category, the Administrator may establish subcategories for such sources."

The commenter states that although the report cautions the Administrator to make use of subcategories only in limited circumstances, the report makes clear that the EPA must follow what is essentially the same standard for establishing categories and subcategories. The commenter asserts that the report further provides that the cost of emission controls is an appropriate basis for distinguishing among sources only so long as it is not the only basis for such a distinction.

According to the commenter, the House Report accompanying the CAA states that: "EPA may distinguish among classes, types and sizes of sources within a category or subcategory… In the determination of MACT for new and existing sources, consideration of cost should be based on an evaluation of the cost of various control options… MACT will require substantial reductions in emissions from uncontrolled levels. However, MACT is not intended to require unsafe control measures, or to drive sources to the brink of shutdown."

The commenter asserts that although the goal of the MACT program is to achieve emissions reductions, these reports demonstrate that Congress wanted the EPA to remain cognizant that distinctions among classes, types, and sizes of sources can affect the feasibility, effectiveness, and cost of a given control technology. According to the commenter, subcategorization enables the EPA to do so.

Response to Comment 32: The EPA agrees with commenter that the legislative history supports the Agency's authority to consider and establish subcategories. However, the EPA also agrees with other commenters that this authority provides the EPA with discretion; the authority is not a mandate to establish subcategories that the EPA does not believe warranted.

9. The EPA's past practice supports the establishment of subcategories.

Comment 33: Commenter 17402 states that the EPA's past practice with regard to the creation of subcategories demonstrates that the Agency's decision-making is driven by certain principles. The commenter states that first, the EPA considers subcategorization appropriate where sources use different processes and those processes either result in different types or concentrations of uncontrolled HAP or affect the applicability of control technology. The commenter asserts that the EPA also has subcategorized sources based on size where differences in size affect the performance of control technologies. Importantly, the commenter states that he Agency has created subcategories where differences among sources affect the performance of control technology and, as a result, the achievability of the MACT standard.

According to the commenter, in prior MACT standards, the EPA has created separate subcategories where differences among sources resulted in different chemical emissions. The commenter asserts that indeed, the EPA also has subcategorized power plants on the basis of fuel type. In its section 112(n)(1)(A) determination, the EPA chose to regulate only coal- and oil-fired plants under CAA section 112. According to the commenter, the Agency exempted gas-fired plants from regulation, thereby creating a clear subcategory based on fuel type. The commenter asserts that it is appropriate for the Agency to take the same approach in this context as well.

According to the commenter, in sum, the EPA's past MACT standards have created subcategories where: (1) different types, classes or sizes of sources emit different types or concentrations of uncontrolled HAP; (2) differences among types, classes or sizes of sources affect the applicability of control technology; and (3) differences among types, classes or sizes of sources affect the performance of control technology and, hence, the achievability of the MACT standard. The commenter states that

the EPA has stated its intention to follow a similar approach under this proposed rule, and the Agency's stated intentions are well within the scope of the law.

Comment 34: Commenter 18051 states that the EPA has almost completely ignored their previous work and analyses on subcategorization. According to the commenter, under CAMR, the EPA took painstaking detail in justifying subcategorization by coal rank and process type. The commenter states that a lot of time and effort was made in justifying the legal and technical basis for subcategorization, but little effort was made in this rule when the subcategories were set aside with little to no discussion. Commenter has coal reserves and mining operations in all major producing regions in the U.S. As such Commenter has a vested interest in ensuring that the EPA is not picking winners and losers by virtually eliminating subcategorization. According to the commenter, the EPA needs to take the time to justify this change.

Response to Comments 33 - 34: The EPA agrees with commenter that its past practice supports its statutory authority to consider and establish subcategories. However, again, the EPA also agrees with other commenters that this authority provides the EPA with discretion; the authority is not a mandate to establish subcategories that the EPA does not believe warranted. What may be warranted for one source category may not be for another. Further, we disagree with commenters that we did not adequately assess available subcategories. The data show that in particular coal-fired EGUs of all classes, types and size have similar emissions characteristics such that limited subcategorization was reasonable. Commenters have provided no data that compels a different conclusion and, to the extent commenters have shown there is a difference, we do not find the difference sufficient to further alter our subcategories. The EPA is not required to exercise our discretion in the manner commenters want, and commenters have provided no data that supports a conclusion that EGUs cannot comply with the standards in the final rule, only that the cost may be prohibitive for much older and less efficient EGUs. CAA section 112 is a technology forcing statute and we believe it would be unreasonable to subcategorize in a manner that would lump the least controlled sources together so that the sources can continue to avoid installing controls to limit HAP emissions.

10. Subcategories should be created only if they increase net benefits.

Comment 35: Commenter 17768 states that the proposed source subcategorizations may not represent the groupings that would lead to the most efficient regulatory program. According to the commenter, subcategorizations should be made to the extent that they increase the rule's net benefits. The commenter states that setting separate standards for multiple different subcategories incurs administrative costs: collecting separate information, setting the different standards, and monitoring and enforcing different standards. The commenter states that such costs are only warranted if different sources face sufficiently different costs or could generate sufficiently different benefits such that setting a unique standard would increase overall net benefits.

Commenter 17768 states that the EPA should justify any subcategorizations it makes along these grounds. Its current explanation for the subcategories begins to address the differing costs and benefits of regulating different existing sources. The commenter asserts that retrofitting existing plants with control devices or process changes can be costly, and plants designed for different fuel types may face different retrofit costs and may be able to achieve different levels of emissions reductions. The commenter states that the EPA should be more explicit about the costs and benefits it is weighing in making these determinations, should try to quantify the costs and benefits to the extent possible, and

should only propose subcategories for existing sources to the extent that different standards will enhance net benefits.

Commenter 17768 states that the EPA should explore the justifications for subcategorization for new sources separately. The commenter asserts that compared to existing sources, new sources do not face the same limitations on their design options. According to the commenter, the EPA must explain why for new, still-unconstructed sources, it would not be more efficient to set a single standard and let all new sources choose any fuel type and design option capable of meeting that standard—including natural gas-based designs. The commenter states that given how few new coal- or oil-fired EGUs the Agency is anticipating (essentially none over the next five years), it is not clear how much force the EPA's concerns about supply limitations and the constraints of current technology should have on setting a standard that might only be achievable by switching to natural gas.

Response to Comment 35: The EPA does not consider costs and benefits of subcategorization in the manner suggested by the commenter and the statute does not require, and arguably does not permit, such a consideration. We also maintain that it is reasonable to establish new source standards for the subcategories we have established in the final rule. We decline to establish a single subcategory and require all new units to be natural gas-fired as commenter suggests. We maintain that fuel switching is appropriately considered in evaluating whether a beyond-the-floor level of control is warranted. We address the beyond-the floor comments elsewhere.

11. The application of subcategories should apply based on the fuels actually being burned.

Comment 36: Commenter 17902 recommends that the following section be amended for both coal- and oil-fired units to read as follows "EGUs designed for or currently combusting." According to the commenter, this will remedy instances where a unit may have been designed for one type of fuel, but have been subsequently permitted to accommodate other fuels (switched completely to burning a different coal rank or fuel type) and thus is currently combusting fuel that would fall into a different subcategory. The commenter asserts that the application of subcategories and associated MACT emissions limitations for existing EGUs should apply based on the fuels actually being burned at any given point in time.

Comment 37: Commenter 17925 states that units burning fuels from different subcategories should be classified at the end of each calendar year according to the fuel processed in the greatest amount. Commenter is concerned about how to classify a combustion unit like Madison 3 that might burn two different subcategories of coal either alone or as a mix. Commenter proposes that if a combustion unit burns a mix of fuels in a given year from the two subcategories of coal, for example, subbituminous coal and lignite, the unit should be classified at the end of that year according to the fuel subcategory that contributed the greatest heat input during the year. For instance, according to the commenter, if Commenter's Madison 3 Unit burned a mix of subbituminous coal and lignite periodically during a calendar year with a heat-input ratio at year end of 70 percent subbituminous coal and 30 percent lignite, by this guideline, the unit would be classified as a processor of coal >8,300 Btu/lb.

Response to Comments 36 - 37: As discussed elsewhere, EPA has revised the definitions for the coal-fired EGUs partly based on comments received. The final definition for a "Unit designed for low rank, virgin coal" is "a unit designed to burn and is burning nonagglomerating virgin coal having a calorific value (moist, mineral matter-free basis) of less than 19,305 kJ/kg (8,300 Btu/lb) that is constructed and operates at or near the mine that produces such coal." We are not including a requirement for units to

determine a particular percentage of coal combustion annually to determine the subcategory because we believe units in this subcategory generally burn primarily low rank virgin coal. We also understand that some units blend with subbituminous coal; therefore, we intend to reevaluate this subcategory as part of the 8 year review required under CAA section 112(d)(6) to determine whether it is reasonable to revise the subcategory definition.

12. The EPA should clarify a process for units that transition between subcategories.

Comment 38: Commenter 18025 states that if the EPA elects to finalize LEE status and/or, in particular, a limited use subcategory, there may be limited circumstances where units may transition between subcategories. The commenter asserts that for example, a nuclear plant could be shut down for an extended outage and limited use units could be called on to pick up the load, with the result that units previously designated as limited use would exceed the limited use threshold for that year. The commenter states that for situations like these, we request that EPA clarify a process by which these units remain in compliance although transitioning between subcategories and their respective emission and compliance requirements, similar to that which was discussed for waste incinerators or co-generation units that become subject to the proposed rule.

Response to Comment 38: The EPA has included in the final rule provisions that discuss how EGUs transition between different NESHAP. We do not think similar provisions to address the commenters concern are warranted. Units must comply with an applicable standard on the date the unit becomes subject to this final rule. The source must maintain compliance with the applicable standard until its operations make it subject to a different standard under this final rule or another NESHAP or CAA section 129 standard, and, on that date, the source must comply with the newly applicable standard. However, we believe it is unlikely that many EGUs subject to the final rule will be switching subcategories.

13. The EPA should include a provision to all burning of small amounts of other materials.

Comment 39: Commenter 17774 states that the proposed utility MACT needs to account for situations where an affected source could be burning smaller amounts of other materials. According to the commenter, the EPA's proposed Utility MACT standards also do not address situations where a source could be burning smaller amounts of other materials (e.g., used oil, oily debris, Ethylene Diamine Triacetic Acid (EDTA), anthracite, biomass, or carbon burnout). The commenter states that in particular, the EPA should clarify which emission standards would apply in the event that a source includes small amounts of non-standard fuels in the fuel mix.

Commenter 17774 states that to handle this situation, Commenter recommends that the EPA include a provision in the final rule that would allow an affected source to continue this common practice of burning small amounts of other materials. According to the commenter, the EPA could accomplish this by adding a provision specifying that so long as an affected source is permitted by the permitting authority to burn a particular material and complies with the applicable MACT standard for the majority fuel, co-firing is allowed.

Response to Comment 39: As stated above, units combusting solid waste in any amount are solid waste incineration units subject to standards issued pursuant to CAA section 129, not EGUs subject to this final rule. The fact that sources may be authorized to burn these materials in valid operating permits issued by the permitting authority does not supersede the CAA or Court decisions. *See NRDC v. EPA*,

489 F.3d at 1257-1258. For materials that are not solid waste, the EPA believes that the definitions in the final rule clearly indicate which limits are in effect as discussed in the preamble to the final rule.

14. The EPA should clarify the ambiguity regarding flexible fuel units that can burn combinations of coal and petroleum coke.

Comment 40: Commenter 18831 states that the proposed rule has some ambiguity regarding under which subcategory flexible fuel units belong (units that can burn a wide array of combinations of coal and petroleum coke). Commenter operates two CFB boilers that are approximately 300 MW each. The units were designed to burn bituminous coal (>8,300 Btu). The commenter states that he units are also able to fire with petroleum coke. According to the commenter, current operation has them burning approximately 10 -20 percent coal and 80-90 percent petroleum coke. The commenter asserts that fuel mix varies with fuel cost and availability.

Commenter 18831 considered three separate rule references within the proposed rule to ascertain the proper subcategory designation for these CFBs. The commenter states that the first reference comes from the proposed rule's preamble, Section IV. The commenter asserts that summary of this proposed NESHAP, paragraph B, (page 250) wherein it states, "If an EGU burns coal (either as a primary fuel or as a supplementary fuel), or any combination of coal with another fuel (except as noted below), the unit is considered to be coal-fired under the proposed rule." According to the commenter, the next two references were found within the definitions of the proposed subcategories (page 288): …"an EGU is considered to be a "coal-fired unit designed for coal greater than or equal to 8,300 Btu/lb" if the EGU: 1) combusts coal; 2) meets the proposed definition for "fossil fuel fired"; and 3) burns any coal in an EGU…" . The commenter states that the last of the references (page 289) states, "We are proposing that the EGU is considered to be "solid oil-derived fuel-fired" if the EGU burns any solid oil-derived fuel (e.g., petroleum coke) and meets the definition of "fossil fuel fired."

Commenter 18831 states that the first two references cited above give clear indication that Commenter's CFBs are appropriately subcategorized as being, "coal-fired unit designed for coal greater than or equal to 8,300 Btu/lb." According to the commenter, however, an ambiguity and conflict comes from the last reference cited wherein the proposed rule designates these CFBs as "solid oil-derived fuel-fired" on the basis that they burned some amount of petroleum coke. Commenter encourages the EPA to clarify this ambiguity Although recognizing that a unit combusting coal, in combination with any other boiler fuel, will have an emissions profile vastly different from combusting the respective boiler fuel alone. Commenter supports the EPA's premise, expressed in the proposed rule's preamble, "that any unit burning any coal is a coal unit." Accordingly, Commenter suggests eliminating the conflicting and ambiguous provision by either removing the entire provision, as cited in the reference above or revise to read as follows: "We are proposing that the EGU is considered to be "solid oil-derived fuel-fired" if the EGU burns ~~any~~ solid oil-derived fuel (e.g., petroleum coke) <u>not blended with coal</u> and meets the definition of "fossil fuel fired."

Response to Comment 40: The EPA has revised several definitions in the final rule to clarify when units are considered coal-fired, oil-fired, or natural gas-fired EGUs, including changes to the definition for solid oil-fired EGUs. The definitions of "Coal-fired electric utility steam generating unit," "Integrated gasification combined cycle electric utility steam generating unit," "Oil-fired electric utility steam generating unit," and "Unit designed to burn solid oil-derived fuel subcategory" have been modified as follows to clarify applicability for units co-firing coal and petroleum coke:

Coal-fired electric utility steam generating unit means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that burns coal or coal refuse for more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year.

Integrated gasification combined cycle electric utility steam generating unit or IGCC means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that burns a synthetic gas derived from coal and/or solid oil-derived fuel more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year in a combined-cycle gas turbine. No coal or solid oil-derived fuel is directly burned in the unit during operation..

Oil-fired electric utility steam generating unit means an electric utility steam generating unit meeting the definition of "fossil fuel-fired" that is not a coal-fired electric utility steam generating unit and that burns oil more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year.

Unit designed to burn solid oil-derived fuel subcategory means any oil-fired electric utility steam generating unit that burns solid oil-derived fuel.15. The EPA should provide additional analysis and support for more lenient emission limits for "non-continental" CFBs.

Comment 41: Commenter 17620 states that the EPA proposes more lenient limits for pressurized CFBs, for units that combust waste coal and for EGUs subject to the CAA, but located outside of the continental U.S. According to the commenter, it is our understanding that CFB EGUs burning conventional coal in Puerto Rico and CFB EGUs in Pennsylvania that burn waste coal have exhibited extremely good SO_2 and Hg emission levels. The commenter states that we also suspect that the reasons for historically less stringent "non-continental" emission levels may have disappeared with the passage of time, especially for more populated and commercially developed locations. The commenter asserts that accordingly, we believe the EPA should reconsider these proposals, revise as appropriate and provide additional analysis and data in support of its final decision with respect to these proposals.

Response to Comment 41: The EPA does not believe that it has proposed "more lenient" limits for the EGUs noted by the commenter. Elsewhere in this document, the EPA has provided its rationale for not subcategorizing FBC/CFB units. We also have provided our rationale for finalizing a subcategory for non-continental liquid oil-fired EGUs but not for coal-fired EGUs located in non-continental areas elsewhere in the final rule record.

16. The EPA should clarify the applicability.

Comment 42: Commenter 17754 states that it appears that the Agency intends for coal refuse-fired EGUs to be covered by the proposed rule. According to the commenter, based on the ambiguity in the language of the relevant definitions and the apparently inconsistent language within the preamble to the proposed rule, the EPA should revise the proposed rule to expressly clarify how an EGU that combusts coal refuse with a heating value of greater than 6,000 Btu/lb on a dry basis is regulated under the proposed rule (i.e., under which of the two subcategories of coal fired EGUs would such unit fall?).

Response to Comment 42: The EPA has clarified the definitions in the final rule.

CHAPTER 4: MACT FLOOR/MACT BEYOND-THE-FLOOR/DATA

4A01 - MACT Floor Methodology: General Approach

Commenters: 16122, 16469, 16849, 17383, 17402, 17403, 17608, 17620, 17621, 17622, 17623, 17628, 17637, 17638, 17648, 17656, 17681, 17682, 17689, 17702, 17705, 17711, 17712, 17715, 17716, 17718, 17724, 17725, 17728, 17729, 17730, 17731, 17734, 17735, 17736, 17739, 17740, 17752, 17753, 17754, 17756, 17757, 17758, 17760, 17761, 17765, 17767, 17770, 17771, 17772, 17774, 17775, 17776, 17781, 17798, 17799, 17800, 17804, 17807, 17812, 17813, 17816, 17817, 17820, 17821, 17834, 17837, 17838, 17840, 17841, 17842, 17843, 17851, 17857, 17868, 17871, 17873, 17876, 17877, 17878, 17881, 17883, 17884, 17885, 17886, 17898, 17901, 17904, 17912, 17914, 17923, 17928, 17930, 17931, 17975, 18021, 18024, 18033, 18034, 18039, 18424, 18425, 18426, 18428, 18443, 18483, 18484, 18487, 18488, 18498, 18500, 18963, 19032, 19041, 19114, 19213, 8443, 19536/19537/19538, 18023

1. Pollutant-by-pollutant approach.

Comment 1: Commenter 17648 states that the agency's pollutant-by-pollutant approach to setting MACT floors, based upon emissions rather than control technology, is correct. Commenter states that the EPA rightly used emission levels achieved in practice by the best-controlled EGU sources with respect to each HAP or group of HAP and that emission limits for each HAP reflect the best performance achieved in practice for that HAP, without limiting the analysis to only particular types of controls. The commenter also states that this approach assures that existing facilities actually reduce their emissions to the level achieved in practice by the best performers regardless of the means used to achieve that level, as required by section 112, and that new sources achieve the emission reduction achieved by the best controlled similar source. The commenter states that this approach does not mandate a particular technology or set of technologies, but mandates obtaining results achieved in practice. The commenter provides an in-depth discussion in support of the EPA's approach to setting MACT floors.

Comment 2: Numerous commenters (8443, 16469, 16849, 17383, 17403, 17608, 17621, 17623, 17637, 17656, 17681, 17689, 17705, 17712, 17716, 17718, 17724, 17728, 17729, 17730, 17731, 17734, 17735, 17739, 17740, 17753, 17754, 17756, 17757, 17758, 17761, 17765, 17767, 17771, 17772, 17774, 17775, 17776, 17781, 17799, 17800, 17807, 17812, 17813, 17816, 17817, 17820, 17821, 17834, 17837, 17838, 17840, 17842, 17844, 17851, 17873, 17876, 17877, 17878, 17885, 17886, 17898, 17901, 17904, 17914, 17923, 17930,17931, 18024, 18033, 18034, 18428, 18500, 18963, 19023, 19041, 19114) disapprove of the pollutant-by-pollutant approach used in the development of the MACT floors.

Commenters state that this approach is inconsistent with the statute and will preclude the construction of new, reliable coal-fired units. According to commenters, this approach does not meet the statutory requirement to base new source standards on the "best controlled similar source" and instead results in a unit that could never be built. Also according to commenters, Congress intended "best controlled similar source" to mean that the limit should be set based on the overall emissions from an actual source and not the composite of the lowest emissions from multiple sources. Commenters state that Congress provided express limits on the EPA's authority to parse units and sources for purposes of setting standards. That limited authority does not allow the EPA to "distinguish" units and sources by individual pollutants as is proposed in this rule. As a result of the pollutant-by-pollutant approach, the top performers used to set the various new source standards are not the same and do not account for real world conditions or technology configurations. The EPA has stated [*Cement Kiln Recycling Coalition v. EPA*, 255 F.3d855,

863 n.57 (D.C. Cir. 2001)] that the MACT process should identify the best performing "objective, duplicable control" technology, which enables other sources to implement these controls and reduce their emissions. Commenters state that the approach used in the proposed rule does not identify a specific technology that is, or even technologies that are, the best performing and, therefore, does not identify the control technology that other sources can adopt to reduce emissions. According to commenters, the pollutant-by-pollutant approach will result in a large number of new coal plants not being able to meet the new source MACT. According to commenters, none of the new coal plants that have been permitted and commenced operation with advanced pollution control technologies in the past several years can meet the proposed new source MACT standards and a recent technical analysis by American Electric Power showed that of the 27 new coal-fired EGUs that have case-by-case MACT permit limits established under CAA section 112(g), not one would comply with all of the proposed new source MACT limits. These new coal-fueled units represent a variety of combustion techniques (from conventional PC, to FBC, to IGCC), have a variety of emission control systems, and burn bituminous coal, subbituminous coal, and lignite. Their permits reflect the most efficient and advanced combustion and control technologies available, yet none of them meet the EPA's proposed MACT standards for all HAP.

Comment 3: Commenter 17931 states that notwithstanding the questioned legality of the HAP-by-HAP approach, the CAA requires the EPA to identify the best performing sources for each emission standard. The EPA must also articulate how a future plant can comply with all of the proposed standards. Without disclosing such vital information, the commenter states that the EPA is proposing a beyond-the-floor fuel switching measure for new sources. Such a measure is not remotely demonstrated by the record.

Comment 4: Multiple commenters (17403, 17772, 17724, 17774, 17799, 17807, 17821, 17931, 18033, 18428) state that, for existing sources as with the new source standard-setting approach, a pollutant-by-pollutant approach does not consider what the top performing 12% achieve in practice for all pollutants and does not consider the antagonistic effects of the concurrent use of various control technologies. For example, one commenter states that 47 of the 131 sources used to calculate the existing source total PM limit only had baghouses but no scrubbers and other units also have DSI to control HCl that also emits additional PM. Commenters state also that units with DSI using sodium carbonate (Trona) as a sorbent create complications for units using ACI to control Hg and because 47 of the units only had baghouses, the units tested did not accurately account for this antagonistic impact on Hg emissions from additional controls. According to commenters, the CAA is clear that standards must be based on actual sources and not the product of a pollutant-by-pollutant determination resulting in a set of composite standards that do not necessarily reflect the overall performance of any actual source. To address these issues, the commenter recommends that the EPA use an approach that more accurately reflects what actual best performing sources achieve.

Comment 5: Commenter 18963 adds that the EPA analyzed proposed emission limits for HCl based on the lowest emission rates achieved for that pollutant from distinct affected coal-fired EGUs, without considering simultaneous emission levels of Hg and total non-Hg HAP from such sources. Therefore, although the EPA's proposed emission limits reportedly reflect emission levels achieved by the lowest emitting sources in the source category, the EPA did not identify existing sources that simultaneously achieved emission standards for all HAP that would be governed by the proposed rule. For this reason, the EPA's derivation of the emission limits proposed in the proposed rule, including, in particular, the proposed emission limit for HCl, fails to satisfy the mandates of section 112 governing HAP emission limit development. The commenter noted that consistent with this position, the National Association of Clean Air Agencies (NACAA) similarly recognized that the methodology used by the EPA to develop

emission standards under the proposed rule is inconsistent with the data collected for affected EGUs during the rulemaking process, and the directives of the CAA for establishing HAP emission limits under CAA section 112.

Comment 6: Commenter 17608 states that the plain language of section 112(d)(2) requires standards that are based on the "maximum degree of reduction in emissions of the hazardous air pollutants subject to this section . . . that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable . . . ." The commenter interprets this language as being a mandate to pursue regulations based on existing technologies. The EPA's use of the pollutant-by-pollutant approach would require overall emissions reductions across all HAP that are not yet demonstrated as achievable. In contrast, regulation of new mobile sources under CAA section 211 of the CAA mandate "standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology." In the regulation of new mobile sources, Congress explicitly allowed the Administrator to project into the future available technologies for emissions reduction. In the absence of such authority for HAP, the commenter believes the MACT floor should be based on emissions reductions achievable with currently installed technology. This requires a MACT floor based on emissions of all HAP, not pollutant-by-pollutant. The commenter does not believe that these arguments [see below] are a legal barrier to serious consideration of a facility-wide approach. Although the statute requires the EPA to consider emissions from the "best performing 12 percent of the existing sources" for standards for existing sources and the "best controlled similar source" for standards for new sources, the EPA has used the "lowest emitting" in both cases, as if the three terms are interchangeable. However, the term "best" is ambiguous, open to a wide variety of interpretations. The EPA has recognized this fact in other contexts. "The "best way for pursuing a goal is not always the one that most single-mindedly pursues that goal at all costs. Instead, the best way often depends on other considerations." The EPA could consider the "best performing" to be the technology that "best" reduces overall HAP rather than each individually. [EPA explained its reliance on the "pollutant-by-pollutant" approach in the SBAR panel report. As noted above, there are concerns with respect to the suggestion that MACT floors should be established using a facility-wide approach]. Determining floors based on a facility-wide approach would lead to least common denominator floors – that is floors reflecting mediocre or no control, rather than performance which, for existing sources, is the average of what the best performing sources have achieved. For example, if the best performing 12 percent of facilities for HAP metals did not control organics as well as a different 12 percent of facilities, the floor for organics and metals would end up not reflecting best performance. This fact pattern has come up in every rule where EPA investigated a facility-wide approach. See, e.g., 75 FR 54999 (Sept. 10, 2010). Thus, utilizing the single-facility theory proffered by the stakeholders would result in the EPA setting the standards at levels that would, for some pollutants, actually be based on emissions limitations achieved by the worst-performing unit, rather than the best-performing unit, as required by the statute. Moreover, a single-facility approach would require the EPA to make value judgments as to which pollutant reductions are most critical in working to identify the single facility that reduces emissions of HAP on an overall best-performing basis. The EPA's reluctance to make value judgments is not a reasonable argument against this approach. There are numerous metrics against which pollutants can be ranked or weighted, not least of which is the potential impact on public health. The fact that the task is difficult is not a justification for avoiding the task altogether. Congress has often required the EPA to perform difficult tasks that require balancing competing interests. Commenter therefore strongly supports a reconsideration of the EPA's current practice of setting the MACT floor on a "pollutant-by-pollutant" basis.

Comment 7: Commenter 17621 states that no coal-fired EGU tested in the ICR would likely meet the new unit MACT limits for all three regulated HAP—total PM, Hg, and HCl (or the alternative acid gas surrogate, SO_2). The new unit limits are very challenging to achieve as few EGUs have multiple ICR measurements that are consistently below the proposed new unit limits. The use of the lowest test series average introduces biases, and the EPA should use the average of all ICR data for setting the HAP standards for both new and existing EGUs.

Comment 8: Commenter 17621 also states that by selecting the lowest emissions for each HAP (or its surrogate) from an extremely large pool of data sets that are dissimilar in design, there is a significant probability that all HAP limits cannot be met simultaneously for any specific design. Consequently, the EPA should develop an alternative approach to selecting the unit and data set for new unit limits—i.e., the emissions from a "best performing" facility could be used to set all the various HAP new unit standards

Comment 9: Commenter 17739 states that the EPA declined to consider natural gas as a beyond-the-floor technology because "it would effectively prohibit new construction of coal-fired EGUs, and we do not think that is a reasonable approach." The commenter agrees with EPA that effectively prohibiting construction of new coal-fired EGUs is unreasonable. Having adopted that standard however, it becomes incumbent upon EPA to apply it throughout its MACT rule. The EPA may not rationally conclude that it is unreasonable to adopt beyond-the-floor standards that would effectively prohibit construction of new coal-fired EGUs, and then generate a MACT floor using a discretionary HAP-by-HAP approach that produces the same result. Having adopted this position (and the commenter states that it believes no other is defensible) it is now incumbent upon EPA to affirmatively ensure, on some reasonable basis, that the MACT floor limits for new sources are not so stringent so as to "effectively prohibit new construction of coal-fired EGUs ." In fact, there is substantial data that indicates that no new unit would plausibly be capable of meeting the new unit MACT limits. In the face of that data, which we do not believe EPA can rebut, there being no operating or permitted and under construction unit that has shown the capability of meeting all the new source MACT limits, it is incumbent upon EPA to revise its new source standards, and abandon its pollutant-by-pollutant approach for new source MACT.

Comment 10: Commenter 17740 states that the EPA must establish MACT floors based on the overall performance of existing units. The EPA is proposing to establish MACT standards for new and existing EGUs using a methodology that is inconsistent with the text of the CAA because it results in MACT standards that are neither feasible nor representative of the HAP emission limits being achieved by existing sources. Accordingly, the commenter urges the EPA to revise the proposed standards so that they reflect the actual, overall performance of existing sources.

Comment 11: Commenter 17756 states that setting a MACT limit at the average emissions level achieved by the best performing 12 percent means that as few as 6% of all units can meet the limit without some change in their control equipment. The EPA's decision to employ a pollutant-by-pollutant approach in setting MACT limits greatly reduces the number of units that can comply.

Comment 12: Commenter 17931 states that even if the EPA does have the discretion to set MACT standards in this manner, the agency still has not met the requirements of the CAA. The commenter's review of the record reveals a glaring need by the Agency to provide an assessment of how many existing EGUs will be able to meet all of the proposed standards without installing any new control technology-i.e., the EPA has not demonstrated that the proposed standards reflect the performance of any actual operating EGUs. Commenters17931 and 18033 state that the AES Hawaiian plant and the

Dunkirk plant are not representative of the operational profile for new coal units. The RIA forecasts the type of control equipment needed to comply with the proposed standards-acid gas emissions (including SO_2) can be reduced with FGD or with DSI. An alternative to wet and dry scrubber technology is DSI, which injects an alkaline powdered material (post combustion) to react with acid gases. The reacted product is removed by PM control devices. DSI technology is most efficient with a baghouse downstream but can function with an ESP downstream as well. Regardless of whether the EPA's assessment of DSI is correct, a new plant will not exist with just a fabric filter. Therefore, selection of a plant that does not have this control technology will not exist in reality, and accordingly, its selection as the best performing source is contrary to the plain language of the CAA.

Comment 13: Commenter 18500 states that the proposed existing-unit MACT standards for individual HAP or surrogates are set inconsistently with the requirement to use the best performing 12 percent of existing actual sources. The EPA has proposed MACT standards for existing units based on a pollutant-by-pollutant evaluation of best performing existing units. However, test data clearly show that there is a different set of existing units comprising the best 12% for each HAP. The CAA does not direct the EPA to establish limits for each HAP in the manner the EPA has used. Rather, it directs the EPA to look to best the performing 12% of sources (plants or units), and to set the standards based on that set of existing units. As a result, the proposed limits are more stringent than required by section 112(d). Notwithstanding our other comments, if the EPA proceeds with regulating multiple HAP emissions from existing units, it should evaluate an appropriate way to identify a single set of units representing the best performing 12%, and proceed to develop appropriate HAP emission limits or surrogate limits based on emissions testing from that particular 12% of existing units.

Comment 14: Commenter 17772 states that the HAP-by-HAP problem is particularly acute when looking at the "best performing coal-fired units" and how they perform against all of the individual standards. There are 15 different HAP measured, including the 10 individual non-Hg metals, Hg, HCl, and the proxy standards of "PM total," "total metal" and SO_2. Each HAP has two standards for existing units based on lb/MMBtu or lb/GWh and a single standard for new units based on lb/GWh. For each of these 15 standards, the EPA has identified the single best existing performer to use in setting the new facility standard. A few of these "best performers" were best for more than one HAP standard. All told, there were 13 "best performing units." Significantly, however, the vast majority of even these best performers will fail one or more of the standards that were set by some other unit.

For example, 12 of these 13 best performing coal-fired units were measured for antimony. Of these 12, ten failed the individual antimony standard for new units. Thus, only the best performer for antimony (AES Hawaii Unit 2) and one other best performing unit meet the new facility standard. All other best performing units would have failed if they were built after these standards become effective. Such a result raises serious doubts as to whether the new facility standards, as a whole, can be found to be in compliance with the statutory mandate. If there is not a single EGU in the country that can comply with all of the standards, then the new facility standards cannot be found as a whole to have been achieved in practice by the best controlled similar source.

The proposed antimony standard is obviously defective if coal-fired units with state-of-the-art pollution control equipment installed such that they are best performers for other HAP standards cannot meet the standard. Although the antimony standard is the most egregious example, several other standards are similarly and patently defective: 9 out of 12 best performers do not meet the new facility arsenic standard; 9 out of 12 best performers do not meet the new facility lead standard; 8 out of 12 best performers do not meet the new facility nickel standard.

Comment 15: Commenter 17878 states that the pollutant-by-pollutant approach is exacerbated by the fact that HAP emission rates are directly related to the elemental composition of the fuel burned at a particular unit. For example, the average bituminous coal contains about 30 ppm arsenic, whereas the average subbituminous coal contains about 5 ppm. Similarly, the average bituminous coal has nine times the average chlorine content, as the average subbituminous coal. On the other hand, subbituminous coals tend to have much higher concentrations of manganese. Variability is even greater within coal ranks, with the maximum content reported for arsenic and manganese in bituminous coal reported to be over 70 times greater than their average contents for that coal rank. Moreover, the dependence of capture efficiency on flue gas chemistry means that a decrease in one HAP related coal constituent, like chlorine, can lead to an increase in emissions of another HAP such as Hg.

Comment 16: Commenter 17781 states that their test results were used in the existing unit floor calculations for PM, and individual metals Cr, Co, and Ni. The commenter does not understand how EPA can choose to use only certain metal results from a given test series to set the individual metal limits. This cherry picking exercise could potentially allow a specific plant, with a certain coal blend, to meet several of the individual metal limits although being out of compliance with others. No facility can optimize a coal blend to meet the individual metal limits. The proposed floor calculation is basically designed with this inherent flaw.

Comment 17: Commenter 17820 agrees with other commenters that the proposed approach does not produce emission limits that reflect the performance of actual sources. For example, the source with the best performing unit for two individual metallic HAP emission limits is nowhere near the best performing unit for other metals and ranks 104th for total metal emissions. The best performing source for total PM has HCI emissions that are 66 times the proposed new source HCl limit. Similarly, the source serving as the basis for the new unit Hg emissions limit had a total PM measurement during the ICR testing that is almost an order of magnitude above the proposed new unit total PM limit.

Comment 18: Commenter 17772 recommends the following as a solution to the HAP-by-HAP approach: 1) For existing standards, the EPA should look for the top 12 percent performing units based on the emissions for all of the HAP collectively: total metals, HCl, and Hg. By no means should specific pollutant limits be set that cannot be achieved by the units determined to represent the average of the top 12%. For example, if 120 units make up the overall top 12% based on emissions and/or technology employed, approximately 60 of those units should be able to meet all of the emission limits. 2) Similarly, for new facility standards, the EPA should identify at least one unit that achieves in practice the "best" level of HAP emissions as a whole. This unit should be able to meet all of the emission limits - under all normal operating conditions. 3) If emissions during start-up, shut-down and malfunction are to be included in the emissions limits, all of the limits should include data gathered during start-up and shutdown, or, as a minimum should include an extended averaging time to ensure that a unit can maintain compliance although including emissions during start-up, shut-down or periods of malfunction which are expected operating conditions for EGUs.

Comment 19: Several commenters (17820, 17821, 18428) recommend an approach whereby the EPA would develop a weighting approach for identifying the best-performing units in MACT rulemakings where the sources in the category emit multiple HAP in lieu of the pollutant-by-pollutant approach with shifting groups of best-performing units that the EPA used in this proposal.

Comment 20: Commenters17931 and 18033 state that the CAA grants the EPA considerable discretion to establish alternative forms of emissions control narrowly tailored to substantially reduce the burden of

regulation although still achieving the desired health results. At each opportunity throughout the proposed rule, the EPA declined to exercise this discretion primarily to preserve the benefits attributable to regulating criteria pollutants. This rationale is not permitted by the CAA. Accordingly, the commenter requests the Agency to reevaluate its single-minded commitment to the pollutant-by-pollutant approach to regulating HAP emissions from EGUs.

Comment 21: Several commenters (18014, 18498, 18023) believe the proposed rule violates the CAA by selecting the best performing units for each individual HAP and creating emission limits not achievable by any actual source. Commenters explain that some control technologies are incompatible, so the hypothetical plant suggested by the proposed emissions limits are unlikely to be possible. The HAP-by-HAP approach used to identify the top-performing units led to the identification of only 5 units which were "top performers" in all HAP categories, which is well under 12 percent at around 4%. Commenter 18023 goes on to explain that the EPA has compounded this problem by rewriting the statute to set the "MACT floor" at the rate achieved by the top 6 percent of units. Instead of the average rate *achieved by all* of the 12% of the top performing sources, the EPA sets the floor at the *average of the rates* achieved by the top 12% of such limits. Commenter 18023 states that because the EPA has neither identified a single new source plant that achieved all of the limits, nor identified that the top performing 12% of existing sources actually achieved all the limits, the current approach is inappropriate and should be abandoned in the final Utility MACT.

Comment 22: Commenter 17725 believes that the EPA has misinterpreted the statutory language regarding achievability of emissions limits because the proposed limits for new sources are based on the best controlled sources for specific pollutants rather than the best controlled source for all regulated HAP taken in aggregate. This resulted in a set of emissions standards for new sources that cannot be achieved in practice by any one source.

According to the commenter, the EPA applied the same approach in their development of the proposed standards for both new and existing sources, however, the misinterpretation of the statute (although we believe it also applies to existing units) is easier to demonstrate for new sources based on the plain language in section 112(d)(3): "the maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source." It is important to note that the statute refers to a single source – not multiple sources. The EPA's approach suggests that the "best controlled similar source" is actually an aggregate of the best-controlled sources for each HAP, which is clearly not consistent with the plain language of the statute.

Comment 23: Commenter 17734 states that the EPA should reconsider its "best of all possible plants" approach in setting the individual toxics limits. It also appears that the proposed rule as proposed may be unfairly biased against coal fired units and that the EPA may have significantly underestimated the generation that is likely to be shuttered as a result of the regulation. Some well-supported analyses have estimated that as much as 60 GW of capacity rather than the EPA's 10 GW (approximate) is at risk.

Comment 24: Commenter 17739 states that the policy basis for the EPA's pollutant-by-pollutant approach does not meaningfully apply in the case of new source standards for coal-fired utility units. In the Boiler MACT, the EPA's primary concern with using a source and not a pollutant-by-pollutant approach was that a source approach ensured "that the floor level of control must be limited by the performance of devices that only control some of these pollutants" which "effectively 'guts the standards' by including worse performers in the averaging process..." 76 FR 15622. That concern is not

present for coal-fired EGUs. The EPA has ample data on units permitted under stringent new source standards that control all of the relevant HAP or surrogates. As a consequence, a source-based approach for the new unit floor would not plausibly "gut the standards."In fact, the mass-based differences in emissions between the set of well-controlled units that would be candidates for the new source floor is essentially trivial from any real world perspective on human health or environmental impacts. In other words, all of these candidates emit at such low levels for all pollutants that there is no meaningful human health or environmental difference if one is selected over another. Indeed, although the EPA makes much of its desire not to have to "make some type of value judgment as to which pollutant reductions are most critical to decide which sources are best controlled," 76 FR 15622, the EPA sets up a false dilemma because these differences are trivial among sources that could set the new sources floor. The EPA is expert in making exactly these types of decisions, and indeed it is the EPA's job to do so, and, Congress has specifically directed the EPA to select the source that would provide "the most environmental protection." 76 FR 15622.

Comment 25: Commenter 17761 states that CAA language was the basis for the holding in the March 2007, D.C. Circuit Court decision in *Sierra Club v. EPA* which vacated the previously established Brick MACT.17 In this case, the court concluded that the CAA limits the EPA to establishing MACT limits "based on the emission level actually achieved by the best performers". The court also stated that "the Clean Air Act provides express limits on the EPA's authority to parse units and sources for purposes of setting standards under CAA section 112 and that express authority does not allow the Agency to distinguish units and sources by individual pollutant". The decision in this Brick MACT litigation resulted in the subsequent vacature of the original Boiler MACT. As such, the EPA should follow and not ignore this key holding. Section 112 of the CAA also does not speak in terms of the best performing source or sources for each individually listed pollutant or group of pollutants. Instead, the focus is on the best existing source/s for all pollutants. If the EPA was required to establish separate MACT floors for each different pollutant than section 112(d)(3) would have been written to refer to the best performing sources for "each individual pollutant" or "for each separate group of pollutants." The pollutant-by-pollutant emissions limits proposed under this MACT are in violation of this congressional intent and are impermissible. Commenter requests the EPA to follow the plain statutory language of section 112(d) of the CAA and establish a MACT floor for all pollutants that is no less stringent than the "average emission limitation achieved by the best performing 12% of existing sources."

Commenter 17807 asserts that establishing utility MACT standards based on the best performing sources of each pollutant without regard to the total performance of those units is inconsistent with the CAA, which required the EPA to set the standards on real, not hypothetical sources.

Commenter 18424 considers the EPA estimates for control technologies to be suspect since they may not be appropriate for use by many power plants, depending on the coal burned and the impacts DSI will have on PM and mercury emissions. The commenter questions the method of developing emission rules for each pollutant independently without considering how one control device may impact the control of other pollutants.

Commenter 17682 considers the EPA estimate of compliance technologies to be suspect because of the proposal of adopting an untested compliance technology to reduce sulfur emissions, and which may impact PM and mercury emissions. The commenter asks that the EPA refrain from developing emission rules for each pollutant independently without considering how one compliance measure may impact the control of other units. The commenter believes this approach leads to cost estimates that do not

adequately reflect the cost for other sources of energy that may be required to make up for lost coal-fired generation. The commenter would like to see cost estimates that adequately reflect the ultimate cost increases that individual home owners will need to pay.

Commenter 17638 states that the EPA's basis for the proposed emission limits is flawed. MACT standards must be set based on the level of performance achieved by actual sources, not hypothetical composite ones. The EPA's approach in its proposal, to the contrary, selected the best performing units for each individual HAP, resulting in a suite of limits that match the emissions profile of only a hypothetical, ideal unit.

Response to Comments 1-25: The EPA disagrees with the commenters who believe MACT floors cannot be set on a pollutant-by pollutant basis. Contrary to the commenters' suggestion, CAA section 112(d)(3) does not mandate a total facility approach. A reasonable interpretation of CAA section 112(d)(3) is that MACT floors may be established on a HAP-by-HAP basis, so that there can be different pools of best performers for each HAP. Indeed, as illustrated below, the total facility approach not only is not compelled by the statutory language but can lead to results so arbitrary that the approach may simply not be legally permissible.

CAA section 112(d)(3) is ambiguous as to whether the MACT floor is to be based on the performance of an entire source or on the performance achieved in controlling particular HAP. Congress specified in CAA section 112(d)(3) the minimum level of emission reduction that could satisfy the requirement to adopt MACT. For new sources, this floor level is to be "the emission control that is achieved in practice by the best controlled similar source." For existing sources, the floor level is to be "the average emission limitation achieved by the best performing 12 percent of the existing sources" for categories and subcategories with 30 or more sources, or "the average emission limitation achieved by the best performing 5 sources" for categories and subcategories with fewer than 30 sources. Commenters point to the statute's reference to the best performing "sources," and claim that Congress would have specifically referred to the best performing sources "for each pollutant" if it intended for the EPA to establish MACT floors separately for each HAP. The EPA disagrees. The language of the CAA does not address whether floor levels can be established HAP-by-HAP or by any other means. The reference to "sources" does not lead to the assumption commenters make that the best performing sources can only be the best-performing sources for the entire suite of regulated HAP. Instead, the language can be reasonably interpreted as referring to the source as a whole or to performance as to a particular HAP. Similarly, the reference in the new source MACT floor provision to "emission control achieved by the best controlled similar source" can mean emission control as to a particular HAP or emission control achieved by a source as a whole.

Industry commenters also stressed that CAA section 112(d) requires that floors be based on actual performance from real facilities, pointing to such language as "existing source," "best performing," and "achieved in practice." The EPA agrees that this language refers to sources' actual operations, but again the language says nothing about whether it is referring to performance as to individual HAP or to single facility's performance for all HAP. Industry commenters also said that Congress could have mandated a HAP-by-HAP result by using the phrase "for each HAP" at appropriate points in CAA section 112(d). The fact that Congress did not do so does not compel any inference that Congress was *sub-silentio* mandating a different result when it left the provision ambiguous on this issue. The argument that MACT floors set HAP-by-HAP are based on the performance of a hypothetical facility, so that the limitations are not based on those achieved in practice, just re-begs the question of whether CAA section 112(d)(3) refers to whole facilities or individual HAP. All of the limitations in the floors in this rule of

course reflect sources' actual performance and were achieved in practice. Finally, there are a number of existing EGUs that meet all of the final existing-source emission limits and at least one EGU that meets all of the final new-source emission limits. There is no requirement as some commenters suggest that a standard is only valid if 6 percent of the sources in the category meet all of the existing source limits. That said, based on the data available we estimate approximately 69 coal-fired EGUs are currently meeting all of the existing source standards and that number of sources is approximately 6 percent of the coal-fired EGU source category.

Commenters also point to EPA's subcategorization authority, and claim that because Congress authorized the EPA to distinguish among classes, types, and sizes of units, the EPA cannot distinguish units by individual pollutant, as they allege the EPA did in the proposed rule. However, that statutory language addresses the EPA's authority to subcategorize sources within a source category prior to setting standards, which the EPA has done for EGUs. The EPA is not distinguishing within each subcategory based on HAP emitted. Rather, it is establishing emissions standards based on the emissions limits achieved by units in each subcategory. Therefore, the EPA's subcategorization authority is irrelevant to the question of how the EPA establishes MACT floor standards once it has made the decision to distinguish among sources and create subcategories.

The EPA's long-standing interpretation of the CAA is that the existing and new source MACT floors are to be established on a HAP-by-HAP basis. One reason for this interpretation is that a whole plant approach could yield least common denominator floors – that is floors reflecting mediocre or no control, rather than performance which is the average of what best performers have achieved. *See* 61 FR 173687 (April 19, 1996); 62 FR 48363-64 (September 15, 1997) (same approach adopted under the very similar language of CAA section 129 (a)(2)). Such an approach would allow the performance of sources that are outside of the best-performing 12 percent for certain pollutants to be included in the floor calculations for those same pollutants, and it is even conceivable that the worst performing source for a pollutant could be considered a best performer overall, a result Congress could not have intended. Inclusion of units that are outside of the best performing 12 percent for particular pollutants would lead to emission limits that do not meet the requirements of the statute.

For example, if the best performing 12 percent of facilities for HAP metals were also the worst performing units for acid gas HAP , the floor for acid gases or metals would end up not reflecting best performance. In such a situation, the EPA would have to make some type of value judgment as to which pollutant reductions are most critical to decide which sources are best controlled.[220] Such value judgments are antithetical to the direction of the statute at the MACT floor-setting stage. Commenters suggested that a multi-pollutant approach could be implemented by weighting pollutants according to relative toxicity and calculating weighted emissions totals to use as a basis for identifying and ranking best performers. This suggested approach would require the EPA to essentially prioritize the regulated HAP based on relative risk to human health of each pollutant, where risk is a criterion that has no place in the establishment of MACT floors, which are required by statute to be based on technology.

The central purpose of the amended air toxics provisions was to apply strict technology-based emission controls on HAP. *See*, e.g., H. Rep. No. 952, 101st Cong. 2d sess. 338. The floor's specific purpose was to assure that consideration of economic and other impacts not be used to "gut the standards. Although

[220] See Petitioners Brief in *Medical Waste Institute et al. v. EPA*, No. 09-1297 (D.C. Cir.) pointing out, in this context, that "the best performers for some pollutants are the worst performers for others" (p. 34) and "[s]ome of the best performers for certain pollutants are among the worst performers for others."

costs are by no means irrelevant, they should by no means be the determining factors. There needs to be a minimum degree of control in relation to the control technologies that have already been attained by the best existing sources." A Legislative History of the Clean Air Act, *Vol. II* at 2897 (statement of Rep. Collins). An interpretation that the floor level of control must be limited by the performance of devices that only control some of these pollutants effectively "guts the standards" by including worse performers in the averaging process, whereas the EPA's interpretation promotes the evident Congressional objective of having the floor reflect the average performance of best performing sources. Because Congress has not spoken to the precise question at issue and the Agency's interpretation effectuates statutory goals and policies in a reasonable manner, its interpretation must be upheld. *See Chevron v. NRDC*, 467 U.S. 837 (1984).[221]

The EPA notes, however, that if optimized performance for different HAP is not technologically possible due to mutually inconsistent control technologies (for example, if metals performance decreased if organics reduction is optimized), then this would have to be taken into account by the EPA in establishing a floor (or floors). The Senate Report indicates that if certain types of otherwise needed controls are mutually exclusive, the EPA is to optimize the part of the standard providing the most environmental protection. S. Rep. No. 228, 101st Cong. 1st sess. 168 (although, as noted, the bill accompanying this Report contained no floor provisions). It should be emphasized, however, that "the fact that no plant has been shown to be able to meet all of the limitations does not demonstrate that all the limitations are not achievable." *Chemical Manufacturers Association v. EPA*, 885 F. 2d at 264 (upholding technology-based standards based on best performance for each pollutant by different plants, where at least one plant met each of the limitations but no single plant met all of them).

All available data for EGUs indicate that there is no technical problem achieving the floor levels contained in this final rule for each HAP simultaneously, using the MACT floor technology. Data demonstrating a technical conflict in meeting all of the limits have not been provided, and, in addition, there are a number of EGUs that, based on the data available to the agency, meet all of the final existing-source emission limits and at least one EGU that meets all of the final new-source emission limits.

Similarly, the EPA does not believe that the CAA requires the EPA to articulate how a future plant can comply with all of the proposed standards. Without disclosing such vital information, commenters believe that the EPA is proposing a beyond-the-floor fuel switching measure for new sources. Such a measure is not remotely demonstrated by the record. We disagree. As noted above, the statute specifies an approach to establishing the emission limits based on what is achieved in practice with no mention of any requirement for articulating how future EGUs could, or should, meet the limits.

We also disagree with commenters that indicate the individual non-mercury metal HAP limits were set improperly. These limits were established in the same manner as all of the other limits. Companies have the option of meeting the filterable PM limit or either of the alternative equivalent standards for individual non-mercury metal HAP or the total non-Hg metal HAP.

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[221] Because industry commenters argued that the statute can only be read to allow floors to be determined on a single source basis, commenters offered no view of why their reading could be viewed as reasonable in light of the statute's goals and objectives. It is not evident how any statutory goal is promoted by an interpretation that allows floors to be determined in a manner likely to result in floors reflecting emissions from worst or mediocre performers.

Comment 26: Commenter 17608 believes that the requirement for an "appropriate and necessary" finding should be interpreted to require that the EPA consider each HAP individually before regulating EGUs for that HAP under CAA section 112. The commenter also believes that this reading of the statute avoids the undesirable result of the CAA requiring substantial resources be devoted to the reduction of non-Hg HAP air emissions without any demonstrable benefit to public health or the environment. This interpretation is also more consistent with the EPA's current practice of setting MACT floors under CAA section 112(d) on a "pollutant-by-pollutant" basis. The commenter strongly disagrees with the pollutant-by-pollutant approach. However, given the EPA's position on setting MACT floors, The commenter believes that the pollutant-by-pollutant approach is permitted under the CAA if each emission standard under CAA section 112(d) is considered a separate regulation. Each MACT floor is set in isolation and without consideration of the feasibility of achieving the MACT floor simultaneously with other MACT floors. On that basis, it is reasonable to read section 112(n)(1)(A) to allow the EPA to regulate EGU emissions of each HAP separately as the EPA makes an "appropriate and necessary" finding for each HAP separately.

Response to Comment 26: The EPA does not agree with the commenter for the reasons set forth in response to comments on the legal interpretation of section 112(n)(1) and above in response to comments objecting to the pollutant by pollutant approach to setting MACT standards.

2. Existing source MACT.

Comment 27: Commenter 17403 recommends that the EPA revise its MACT floor limits for existing sources to reflect that affected sources will have to use multiple add-on emission controls to comply with the standards.

Response to Comment 27: The EPA believes that the approach recommended by commenter is the approach the EPA followed in that the EGUs making up the MACT floor pool are currently using multiple add-on emission controls.

Comment 28: Commenter 17620 states that states have years of experience with technology-based limits for Hg and other HAP, including limits that are more stringent for many sources than the EPA's proposed limits. (The commenter provides an attachment with state's Hg/toxic programs for utilities.) The EPA's primary obligation under CAA section 112 is to establish limits based on the application of the MACT. The EPA must assure that those MACT limits are no less stringent than the MACT floor. The EPA has focused nearly all of its analysis on calculations of the MACT floor and has not put forth a serious analysis addressing its obligation to propose and adopt technology-based MACT limits as required by section 112 of the CAA. From the plain language of the CAA, it would seem reasonable to expect that standards based on the MACT be no less stringent than those based on the BACT.

Comment 29: Commenter 17620 recommends that the EPA establish standards based on the application of MACT technology, rather than merely calculating MACT floors, and suggests that MACT should be no less stringent than BACT. Finally, NACAA recommends that the EPA address organic HAP emissions, including dioxins, furan and products of incomplete combustion. The EPA should calculate MACT floors and evaluate MACT technologies for these pollutants in the EGU sector, just as it has done for other sectors. Work practice standards, if employed, should be designed to achieve the same level of emission performance as would be achieved by implementation of an emission limitation.

Response to Comments 28 - 29: Elsewhere in this document the EPA has addressed comments related to the use of control technologies, rather than emissions data, to establish the MACT floors as well as the use of work practices for the organic HAP. Although they have certain common principles, BACT is necessarily an evolving standard that accounts for changing technology and performance over time, wheras MACT is a single nationally-applicable standard that evolves only as the result of periodic 8-year technology reviews.

Comment 30: Several commenters (17705, 17712, 18443) state that the MACT floor for existing sources should be based on the best performing 12% of existing sources for all HAP. In determining the EGU MACT limits, the EPA derived the MACT floor by aggregating all 1091 coal-fired EGU's regardless of type of boiler or fuel and establishing the best performing 12% for each HAP category from the 1091. CAA section 112(d) requires that the EPA set this MACT floor using the best performing 12% for each category or subcategory of units with 30 or more sources. If the EPA followed the statute in setting the EGU MACT floors, 130 sources should be able to comply with all the proposed standards as they operate today. This is not the case. Currently, no coal-fired unit tested in the ICR will meet the limits that the EPA is proposing. The EPA has misinterpreted the CAA by proposing a MACT floor that is based on the best performing 12% of all coal-fired EGUs for each HAP, rather than the best performing 12% coal-fired EGUs in each subcategory for all regulated HAP. The EPA should redefine the EGU fleet and propose standards achieved on average by the 12% best performing sources for all HAP in each category.

Response to Comment 30: We address the comments opposed to the pollutant-by-pollutant approach above and in the preamble to the final rule. Further, the EPA disagrees with commenter's assertion that a plain reading of the statute would indicate that 12% of the population should be meeting the limits. In fact, the statute does not require that the existing source standard be achievable for any source in the category. In any case, however, the commenter is incorrect because the average of the best 12% would not be 12% but instead would be 6%. In this rule, based on the data available, we have identified approximately 69 coal-fired units meeting all the standards and that accounts for approximately 6% of the coal-fired EGU population.

Comment 31: Commenter 18487 states that the EPA's limits are well in excess – in many cases more than 10 to 50 times above – the average test emissions data of the best-performing sources. That inflation is the result of a series of statistical and mathematical manipulations, the sum effect of which is to establish standards that substantially diverge from the statutory standard. First, with the exception of PM, the EPA has used inconsistent measures of plants' "actual" emissions to assess the floor. For example, when selecting its best-performing sources, the EPA defines their emissions according to their lowest test, but when establishing the floor, the EPA defines plants' emissions as the variability-adjusted average of all of the EPA's data for that plant (even where the data reflect a different test method).

Response to Comment 31: The commenter appears to take issue with EPA's consideration of emissions variability in establishing MACT standards. In the 2010 ICR, EPA required EGUs to provide both data that was available to them as well as required certain EGUs to conduct new testing. The EPA has used the lowest emissions for a given EGU in establishing the "average of the top performing 12 percent" and then has used additional data available to it for the top performing 12% of sources for any given HAP to assess the variability. The EPA believes it is appropriate to consider variability in establishing standards that apply at all time, and we believe our approach for establishing MACT floors is reasonable as explained in the proposed rule. *See Mossville Environmental Action Now v. EPA*, 370 F.3d 1232, 1242 (D.C. Cir. 2004) (holding that MACT floors may legitimately account for variability because "each

[source] must meet the [specified] standard every day and under all operating conditions."). We disagree that our analysis constitutes "a series of statistical and mathematical manipulations" but, rather, is consistent with past practice and Court interpretations of the statute.

Comment 32: Commenter 17402 states that they support the EPA's identification of the MACT floor pool for both metallic and acid gas HAP. The EPA properly identified the best performing 12% of sources for which it had emissions information for non-Hg metallic HAP, Hg-metallic HAP and acid gas HAP, and the EPA then calculated the average emission limitations achieved by this pool. This is consistent with the statutory requirements for MACT floor determinations and with the case law interpreting section 112.

Response to Comment 32: The EPA appreciates the commenter's support.

Comment 33: Commenter 17402 states that the EPA established MACT floors for non-Hg metallic HAP and acid gas HAP based on sources representing the top 12% of performers in the subcategory. For instance, there were 1,091 sources in the coal-fired unit subcategories, so the number of units in the MACT floor pool for those HAP were 131 or 12%. Here, the EPA has emissions information for all units from other information collection activities; the EPA specifically collected recent emissions testing information from all units; and the EPA carefully crafted its supplemental emissions testing requirements to ensure that it had the most detailed emissions information from the units it identified as the best performing 12% of sources in the subcategory based on the other information.

On July 2, 2009, the EPA published a Federal Register notice of its submission of an ICR to the OMB for review and approval. The purpose of the ICR was to obtain information needed to establish HAP emission limits for coal-fired and oil-fired EGUs under CAA section 112(d). There were two main data requests in this ICR. According to the EPA, the purpose of the first data collection requirement, which was applicable to all EGUs, was "to confirm the population of potentially affected [EGUs], and update existing emission test data and fuel analysis information" that is available to "address variability" in developing the NESHAP for coal- and oil-fired electric utility steam generating units. This information request required that all coal- and oil-fired units submit emissions test data for all tests conducted since January 1, 2005.

In contrast to the general data request, the EPA's second ICR required stack testing for emissions of certain HAP surrogates and targeted a select group of EGUs that the EPA had determined to be the best performing units. The EPA explained that the purpose of the second requirement was "[t]o further define the emission level being achieved by the average of the top performing 12 percent of similar sources for the existing population"—the emission floor required under CAA section 112(d)(3)(A) of the statute. The EPA's approach for stack testing of three HAP groups (Hg and non-Hg metallic HAP, acid gas HAP, and non-dioxin/furan organic HAP) at coal-fired EGUs was to identify the best performing EGUs based upon a variety of factors and information currently available to the Agency. Thus, the EPA targeted the best performing 15 percent of all coal-fired EGUs for these HAP groups based upon information available to the Agency. The EPA reasoned that "[b]y targeting the best performing 15 percent of coal-fired EGUs for testing, we believe this will ensure that we have emissions data on the best performing 12 percent of all existing coal-fired EGUs." In response to comments, the EPA reassessed its approach regarding the top 15% and "will now base its selection solely on units believed to represent the top performing units and we intend to use all of the data (up to the number of units representing the 12th percentile of the entire coal-fired population)." This approach is entirely appropriate and consistent with the statute.

Comment 34: Commenter 17821 states that in the proposal, the EPA used emissions from 131 units – 12% of the 1091 coal-fired EGUs -- to calculate the MACT floor HCl and total PM. Because the EPA intentionally selected what it thought were the best performing units, the commenter strongly agrees with the EPA's use of 131 units to calculate the MACT floors for these HAP.

First, the EPA has emissions information from all coal-fired EGUs that would be needed to determine the MACT floor pool for non-Hg metallic HAP and acid gas HAP. For acid gas HAP, the EPA already has SO_2 emissions information for all sources through its Acid Rain program. The EPA has proposed that SO_2 is a potential surrogate for emissions of the acid gas HAP. The EPA therefore has relevant emissions information from all coal-fired EGUs for the acid gas HAP. Similarly, the EPA has concluded that non-Hg metallic HAP tend to be well controlled by the same control devices that control PM. The EPA first established PM NAAQS in 1971, and sources have controlled for PM for decades. Under state and EPA permit programs, sources must test for PM and report to the EPA. Thus, the EPA has relevant emissions information from all coal-fired EGUs for the non-Hg metallic HAP.

Second, after years of research and study on the efficacy of various control technologies, the EPA knows which controls are the most effective in limiting each category of emissions (i.e.,acid gases, metals, Hg). Therefore, in identifying the best performing units for the acid gas HAP MACT floor pool, the EPA, again, considered SO_2 as a surrogate for acid gases because the same controls limit both pollutants. The EPA identified new FGD controls as the best control technology for SO_2, and also for removing acid gas HAP. Therefore, the EPA selected the units with the newest FGD controls for stack testing and to constitute the MACT floor pool for acid gas HAP. Similarly, non-Hg metallic HAP tend to absorb to the particles in EGU flue gas, and thus tend to be well controlled by the same control devices that control PM. The EPA therefore identified the units with the newest PM controls installed for stack testing and for the MACT floor pool for non-Hg metallic HAP. Thus, the EPA collected more detailed data from what represents the top performing 12 percent of existing sources and the EPA appropriately used that data to establish emission standards under CAA section 112(d), but the EPA had emissions information for all coal-fired EGUs.

Response to Comment 33 - 34: The EPA agrees that it identified the EGUs it determined to be the best performing units for non-Hg metal HAP, acid gas HAP, and organic HAP and required the best performing 15 percent of those units to test so that we would be able to establish the MACT floors for those pollutant groups based on 12% of the category instead of 12% of the available data. The EPA was unable to determine the best performing 15% for Hg so we required the sources selected for testing non-Hg metallic HAP to test for Hg as well because the test methods are similar.

Comment 35: Commenter 17402 states that any competing interpretation of the MACT floor pool would be contrary to law despite the EPA's MACT floor pool methodology, which based the MACT floor on the best performing 12% of sources for which the Administrator had emissions information, as required by the statute. The commenter understands that some have argued for a competing methodology—that the MACT floor should be set based upon the average emission limitation of top performing 12% for which the EPA required additional stack testing after its identification of the top performing 12% of all coal-fired EGUs (hereinafter "Narrow Interpretation"). However, any attempt to go beyond the best performing 12% of units and set a MACT floor based upon the average performance of a smaller percentage of units would be contrary to law, where, as here, the EPA has emissions information on all sources. If the EPA were to adopt the Narrow Interpretation, it would be establishing the MACT floor as the average emission limitation achieved by the top performing 12% of units within the top performing 12% of coal-fired units the EPA identified for stack testing–thus, establishing the

MACT floor based upon the average performance of the top performing 1.4% of all coal-fired units for which the Administrator has information. This is clearly contrary to the plain language of the statute– nothing in the statute gives the EPA discretion to choose a different percentage in establishing the MACT floor for existing sources.

Even though the EPA chose to require stack testing data from only those sources that the EPA deemed to be the best performing sources in a subcategory, this does not mean that the EPA may limit its MACT floor calculation as suggested by the Narrow Interpretation. As noted above, the EPA selected these units for stack testing based upon the ample information before it including the results of all emissions tests conducted since January 1, 2005 for all existing coal-fired EGUs and other emissions information that the EPA had collected previously. Thus, although the statute qualifies that the calculation of the MACT floor for existing units should be the "average emission limitation achieved by the best performing 12% of the existing sources (for which the Administrator has emissions information)," the Administrator has emissions information for all of the sources as a result of the 2010 ICR and other databases and analyses. The EPA simply has more detailed information for the best performing 12% of existing sources. The plain language of the statute does not permit the EPA to restrict its MACT floor calculation to the top 1.4% of existing sources simply because the agency collected more detailed information for certain sources. On the contrary, the EPA actually used the data it had for all sources to identify the best performing sources from which to require more detailed testing.

Therefore, the Narrow Interpretation would fail the first step of the Chevron test. Under Chevron, a court will look to whether Congress has "directly spoken to the precise question at issue," and if it has, the court (and agency) "must give effect to the unambiguously expressed intent of Congress."In this case, Congress directly spoke to the percentage of sources the EPA must consider to establish the MACT floor and unambiguously required the EPA to set the MACT floor for existing sources as the average emission limitation achieved by the best performing 12% of sources for which the Administrator has emissions information–not any lesser percentage. Thus, the Narrow Interpretation would fail even under the deferential standard for agency action.

Comment 36: Commenter 17402 states that the EPA's MACT floor pool is consistent with case law interpreting section 112. Although the EPA had additional emissions information on the best performing 12% of sources because these sources were required to do stack testing specifically for this rulemaking, the fact that the EPA had any emissions information for other sources will suffice under the law. The case law suggests that the EPA has broad discretion in determining the information on which it will rely.

For example, in *National Lime Association v. EPA*, the Court pointed out that "[s]ection7412's additional phrase [for which the Administrator has emissions information] says nothing about what data the Agency should use to calculate emission standards. "The court rejected the Sierra Club's argument that the "additional limitation [for which the Administrator has emissions information] implies that EPA must directly calculate the average of the best twelve percent from the data it has. . . ." The Court found the EPA's use of data it had from other sources that used the same technology as the best performing 12 percent to estimate the actual performance of the best performing 12 percent was "not unambiguously forbidden by the statute," but "to comply with the statute, the EPA's method of setting emission floors must reasonably estimate the performance of the relevant best performing plants."

Furthermore, in *Mossville Environmental Action Now v. EPA*, the Court upheld the EPA's use of part 61 NESHAP standards to estimate the performance of the best performing sources. Additionally, in Cement Kiln Recycling Coalition, the Court approved the EPA's use of RCRA test results for emission

information noting the "wide latitude" the EPA is permitted in data gathering and use of scientific information. Thus, courts have confirmed the EPA's broad discretion in this regard. Here, the EPA was entirely within its discretion and acted within the bounds of the statute where it had emissions information from several sources for all coal-fired EGUs and appropriately set the MACT floor based on 131 (12%) of those EGUs.

Response to Comments 35 - 36: The EPA believes it has reasonably justified its use of data from 12 percent of the sources in the category for establishing the acid gas HAP and non-Hg metal HAP MACT floors, but not for the reason commenter asserts. The EPA does not generally interpet the CAA section 112(d)(3)(A) requirement to base the standards on the top 12% of sources "for which the Administrator has emissions information" as being satisfied unless the emissions information is for the HAP or HAP surrogate for which the agency is establishing the standard. We believe such an interpretation would be unreasonable unless the agency could determine the best performing sources based on the available non-HAP emissions information and be able to establish the standards based on the non-HAP emissions data. A contrary interpretation would allow the agency to target for HAP testing the worst performing units and base the standards on those units as long as the agency required all units in the category to provide available non-HAP emissions data.

In this case, however, we determined we could identify the best performing 12% of sources in the category for non-Hg metallic HAP and acid gas HAP such that if we required those units to test we would be able to set the standards based on 12% of the sources in the category, notwithstanding the fact that we would not have HAP emissions information for all the sources in the category. We could not identify the best performing 12% of sources for mercury and that is why we established the MACT floor for that standard based on 12% of the sources for which we have Hg emission data.

Further, we do not agree that a standard based on 12% of the data would be per se illegal even if we required units we determined to be the best performers to test. The EPA must have data to establish standards and must establish standards based on the data in hand consistent with section 112(d)(3)(A). The regulated industry may supply additional data if they believe the data available to the Administrator disproportionately includes best performing units. Finally, we note that one commenter cites two cases to support EPA's use of data from 12% of the sources in the category. We believe those cases generally support EPA discretion in establishing MACT standards, but they are not directly on point. In *National Lime*, for instance, the Court did not actually opine on the reasonableness of EPA's approach, instead the Court rejected Sierra Club's challenge because it was not raised in its brief to the Court. *See National Lime Association v. EPA*, 233 F.3d 625, 633 (D.C. Cir. 2000). In *Cement Kiln Recycling Coalition v. EPA*, the Court agreed that EPA may account for variability in establishing MACT floor standards, but it rejected EPA's approach in that instance. 255 F.3d 855 (D.C. Cir. 2001).

3. New source MACT.

Comment 37: Commenter 17754 states that the Utility MACT standards should provide for emission limitations that are consistent with the mandates of section 112. Although the EPA's approach toward emission limit setting under the proposed rule is extremely stringent for virtually all parameters, Commenter does not oppose all such limitations, and believes that the EPA can finalize a regulation that is generally consistent with the proposed rule by addressing the comments made on the rule. Also, Commenter believes that all such limits should be simultaneously achievable by regulated sources.

Response to Comment 37: The EPA appreciates the commenter's support.

Comment 38: Commenters 17715 and 17757 add that the EPA should have followed the language of the CAA section 112(d)(3) for setting new source MACT limits. This language directs the EPA to use a single "source" in its analysis to set the MACT limits. The commenters ask the EPA to reevaluate the emissions data for HAP in their entirety to develop emission limits that can be met by the best performing units in accordance with the CAA language. When the EPA undertakes this reevaluation, the commenters also ask that the MACT limits not be set based on data obtained during full load steady-state testing taken at a single point in time. Instead, the limits should be based on what is achievable by the sources under a full range of operating conditions including changes in operating variables (i.e., pulverizers, taken out of service, fuel variability causing changes in control equipment operations, etc.) that a unit experiences as a normal course of operation. Commenters assert this is a more logical and rational approach to take into account the variability that a unit experiences in operation and emissions when establishing an emissions rate limit based on a "best performing" unit.

Response to Comment 38: The EPA disagrees with commenters that we have not followed the statute in developing the new-source MACT limits. The EPA has used the best performing similar source in establishing all of the MACT floors (our comments on the pollutant-by-pollutant approach are found elsewhere in this document). Further, commenters seem to be asking that the EPA require all EGUs to install CEMS for all HAP and then operate those CEMS for an extended period of time before the EPA establishes the MACT floors. Although that may be a reasonable way to obtain the data, the statute requires EPA to establish standards based on the information available to the agency. The EPA may not defer setting standards for new sources to conduct the type of data collection suggested by the commenter.

Comment 39: Commenter 17730 believes that the proposed rules for the EGU MACT are not reasonable, are not based on sound practices of data quality, and are not readily achievable using generally available emission control technologies, especially for new units. The commenter also believes that the EPA should consider the benefits of other emission reduction programs set forth in the CAA before it determines the benefits of the EGU MACT, and the necessity of each of the elements of the proposed rule to provide appropriate public health protections.

Commenter 17771 states that the proposed MACT emissions limits appear to be unachievable given currently available emissions control technologies and it is likely that existing units will not be able to meet the proposed limits. The commenter believes that any emission limits should be achievable based on current existing emission technologies available to new and existing units.

Response to Comment 39: As discussed elsewhere in this document, the EPA believes the final emission limits to be achievable with currently available emission control technologies and new EGUs will be able to comply with the limits. We also maintain we have established standards consistent with the statute. We discuss the comments related to whether the final rule is appropriate and necessary elsewhere in this document.

Comment 40: Commenter 17735 states that they urge the EPA to revise the MACT standards by adopting the most stringent case-by-case MACT determination recently made by the various state permitting authorities. These MACT determinations were conducted in strict compliance with a most rigorous procedure set forth in regulation by the EPA, subjected to public review and comment, and in many cases have undergone administrative and judicial review. The commenter recommends the following emission standards for new EGU facilities, all of which were established as MACT for Wolverine Clean Energy Venture (the surrogate metric strategy as proposed by the EPA is followed

here, with the exception that filterable PM_{10} rather than PM total is the appropriate metric selected in each of the case-by-case MACT analyses):

TABLE 1 – COMPARISON OF ACHIEVABLE VS. The EPA PROPOSED MACT LIMITATIONS

	Permit MACT Analysis (Case-by- case)	EPA-proposed MACT for "new units"	EPA-proposed MACT for "existing units"
PM10(filterable)	0.010 lb/MMBtu	0.0056 lb/MMBtu	0.030 lb/MMBtu[1]
HCl (bituminous)	0.0011 lb/MMBtu	0.000323 lb/MMBtu	0.0020 lb/MMBtu
Hg (non- Lignite)[2]	0.0077 lb/GWh	0.0002 lb/GWh	0.008 lb/GWh

1 Limitation indicated is for Total PM_{10}. The EPA has not proposed a limit for filterable PM_{10}.
2 Commenter does not recommend a specific limitation for lignite coal as we do not intend to use lignite as a fuel. However, the EPA should retain a sub-category for lignite in the final rule.

The commenter notes that the proposed emission limitations, although less severe than those proposed by the EPA for new units, are also more stringent than those proposed by the EPA for existing units. The commenter reminds the EPA that even their recommended limits, with the exception of PM_{10}, have not yet received either vendor or EPC guarantees, nor have they been established by contract(s). Plant Washington's limits were not established by the case-by-case determination as they were established following the proposal date of the EPA's EGU MACT. In this situation the permitting authority simply imposed the EPA's own proposed rule as permit conditions.

Response to Comment 40: The EPA must establish MACT standards consistent with the requirements of sections 112(d)(2) and (3). Under those provisions, the EPA must set standards base on the level of HAP control achieved in practice by existing sources. For this reason, the commenters proposed approach is not viable.

Comment 41: Commenter 16849 states that the limits set for new units do not represent the best performing unit. The commenter states that the EPA has chosen the strictest limit irrespective of the unit and that limits for new units should be achievable. According to the commenter, no existing unit is currently meeting these limits, which will result in a moratorium on the construction of new coal-fired units. The commenter states that this regulation goes beyond protecting public health and will impact the country's choice of fuel for energy production. Commenter 17383 states that another result of the EPA's flawed approach is that the proposed standards for new units are so low that adequate test methodologies to demonstrate compliance do not exist. Without accurate testing methodologies, contractors will not guarantee that potential emission control technologies will meet the proposed standards. Without accurate test methodologies and vendor guarantees, financing of new facilities will be virtually impossible to secure. And this in turn will effectively preclude the construction of any new coal-based units. Commenter 17873 also states that the new source MACT limits have not been achieved in practice at any single unit.

Comment 42: Commenter 18033 states that because no existing units can comply with all of the new-unit standards, there is no basis to conclude that a new unit can likewise comply. Adopting standards effectively banning new coal units amounts to a momentous change in national energy policy without discussion or analysis and far exceeds the EPA's authority.

Comment 43: Commenter 19114 adds that the proposed new source MACT standards do not represent rates that have been achieved in practice and are orders of magnitude lower than any of the 112(g) case-

by-case MACT limits established for the most advanced units in the U.S. coal fleet after review of the 112(g) limits established by multiple state agencies. Commenter 19114 states that the new source Hg MACT standard is 1 to 4 orders-of-magnitude lower than all of the 112(g) limits identified for Hg. - Commenters 17715 and 19114 also add that a majority of the 112(g) Hg limits are based on 12-month averages (and which is consistent with prior EPA proposals), not a 30-day average as proposed by the EPA. The commenter also states that none of the 112(g) limits reviewed can meet the proposed new source HCl standard as it is 1 to 3 orders-of-magnitude lower than all of the 112(g) limits identified for HCl. Also, none of the 112(g) limits reviewed can meet the proposed new source SO_2standard as the new source SO_2 MACT is 40 to 50 percent lower than all of the 112(g) limits identified for SO_2 as a surrogate for certain HAP. Also, none of the 112(g) limits reviewed can meet the proposed new source total PM standard. The new source total PM MACT standard is an order-of-magnitude lower than all of the 112(g) limits identified for total PM as a surrogate for certain HAP. Also, a majority of the 112(g) permit reviewed did not contain limits for individual metals, but instead relied upon PM as a surrogate.

Comment 44: Commenter 17756 states that the MACT standards for new units are more stringent than MACT for existing units by one to three orders of magnitude and that their new unit, which commenced operation in 2010, would be challenged to meet all the proposed new source limits.

Comment 45: Commenters17884 and 17886 state the new-unit standards are so stringent that they create deep concern as to whether any new coal-based EGU can comply. Thus, in addition to forcing large-scale retirements of existing coal power, the rule may prevent the construction of any new coal units as well.

Comment 46: Commenter 17931 states that with the proposed standards, uncertainties exist surrounding the construction of a new coal-fired plant. The EPA states that, although multiple coal-fired EGUs have recently commenced operation and several are currently under construction, no new coal-fired EGUs have commenced construction in either 2009 or 2010 and forecasts do not project any new coal-fired EGUs being constructed in the short term. This is an indication that, in the near term, few new coal-fired EGUs will be subject to NSPS amendments. Adding the EPA's new source standards will ensure this trend becomes a self-fulfilling prophesy.

Comment 47: According to commenter 17724, the proposed limits for new sources, based on single-unit observations, are so stringent that only a handful of units in the ICR database could meet the proposed new source limits.

Comment 48: Commenters (17383, 17724, 17876) urge the EPA to provide a suite of HAP limits reflecting differences in coal chemistry among bituminous, subbituminous and lignite coals, and the types of emission controls typically needed to comply with NSPS and BACT requirements for criteria air pollutants. As an alternative, commenters suggest that the EPA could set individual new source HAP based on coal input characteristics, using several different coal types representative of the U.S. coal reserve base, coupled with recent BACT permitting decisions, to help ensure that all types of coal can be used in well-controlled new units.

Comment 49: According to several commenters (17724, 17735, 17876, 19032), data provided by the EPA shows no unit in the EPA's sample of more than 200 coal-based EGUs meeting the combined new source emission standards for Hg, acid gases and PM.

Comment 50: Several commenters (16849, 17383, 17735, 17775, 17817) state that the limits resulting from this approach are so low that vendors will not guarantee performance of their control equipment at those levels. Commenter 17734 adds that this conclusion has been reinforced repeatedly in their discussions with vendors; no vendor has offered a guarantee that they can meet the emission limitations proposed in the EGU MACT. The largest air pollution control technology company in the world has stated to the EPA representatives at a meeting on June 30, 2011 that they could not guarantee these standards as proposed. Further, Bechtel, the largest utility plant constructor in the U.S., has confirmed that they will not make any guarantee that is not first offered by a vendor and that has not been adequately demonstrated in practice. Commenter 16849 states that to their knowledge, no single unit in operation in this country can meet the combination of the proposed limits.

Comment 51: Commenter 18488 states that the EPA choice of best performing units used to establish the proposed rule is a fatal flaw in the proposed rule. The commenter is advised that the Coal Utilization Research Council (CURC) is providing numerous comments criticizing the EPA's choice of best performing units that underpin the EGU MACT. The CURC concludes that "[a]s proposed, the Utility MACT, independently and especially in combination with other pending rules for the industry, will drive a significant number of existing coal units to be prematurely retired, thereby no longer using this domestic, affordable source of energy, and will effectively prohibit any new coal-based electric generation from being developed."

In addition, comments on the proposed rule submitted by Unions for Jobs and the Environment (UJAE) on July 8, 2011, note that data in the ICR database compiled by the EPA purportedly for use in developing the proposed emissions standards demonstrate that not a single existing coal-fired unit in the database can meet the total filterable proposed MACT floor for HCl, PM, and Hg emissions. Importantly, CAA section 112(d) defines MACT as "The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator.

Emission standards promulgated under this subsection for existing sources in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than - (A) the average emission limitation achieved by the best performing 12 percent of the existing sources(for which the Administrator has emissions information), excluding those sources that have, within 18 months before the emission standard is proposed or within 30 months before such standard is promulgated, whichever is later, first achieved a level of emission rate or emission reduction which complies, or would comply if the source is not subject to such standard, with the lowest achievable emission rate (as defined by section 7501 of this title) applicable to the source category and prevailing at the time, in the category or subcategory for categories and subcategories with 30 or more sources, or..." (emphasis supplied)

It is clear from the CAA that Congress intended MACT standards to be based on actual performance of existing units. The commenter suggests that, in light of the CURC analysis and the EPA ICR data cited in the UJAE comments, setting the EGU MACT standard at the proposed level will not comply with the CAA and is inappropriate as a MACT standard.

Comment 52: Commenter 18034 states that no new coal-fired EGUs will be built in the country if the proposed rule is adopted, and many existing units will shut down due to the unrealistic compliance

burden placed on these units, including the need in Texas to reduce SO_2 emissions by almost 50 percent in less than a year. These shutdowns may lead to reliability issues.

Comment 53: Several commenters (17682, 18033, 18484) state that no new coal-fired plants will be constructed because no power plant was identified that could achieve all the MACT requirements. The commenters suspect that no plant is able to achieve all the compliance requirements at the same time and questions the wisdom of trying to do so at a great cost for little benefit.

Comment 54: Commenters 17735 and 17817 criticize the proposed rule because it doesn't acknowledge the possibility that new coal unit construction may have been foreclosed because the plant could not meet new limits.

Comment 55: Several commenters (17765, 17840, 17931, 18033, 19114) believe the proposed rule, coupled with the overall operational and risk profile associated with new coal-fired EGU construction will be a barrier to building new coal plants. The first four commenters expect the closing of coal-fired EGUs without allowing new ones to be constructed to increase the cost of electricity and impact the economy. The commenters point out that comparing the levelized cost of electricity for solar generation finds that it is 6 times the cost of coal-based electricity, although wind power is 60% more expensive and even natural gas is problematic since 70 percent of the cost is based on volatile fuel costs and associated with environmental issues from hydrofracking and methane emissions.

Comment 56: Several commenters (17840, 17931, 18033) believe the EPA's position contradicts Secretary of Energy's assessment that "prosperity depends on reliable, affordable access to energy. Coal…is likely to be a major growing source of electricity generation for the foreseeable future." The EPA claims the inability to construct new coal-fired EGUs is a product of stack testing and the proposed new-source limit is a reflection of the data. Commenter 17840 disagrees, mentioning that the agency admitted to a substantial error in calculating the emissions standard for Hg and did not provide evidence to show that a coal-fired EGU can meet all of the new source emissions standards. This commenter references the Hg floor analysis for coal, showing that on average, the newest existing units do not achieve the existing source standards, let alone the new source emission standards for Hg.

Comment 57: Commenter 17883 discusses a newly permitted coal-fired unit in Texas that has not yet begun construction. The facility has not been able to find a manufacturer willing to guarantee the emission limits set for mercury, hydrogen chloride or particulate matter. Under these circumstances, financing cannot be obtained without vendor guarantees, making it impossible to build new coal units under the proposed rule.

Comment 58: Commenter 18483 states that they have an interest in this matter as it is currently developing the following two coal-fueled facilities that would potentially be subject to the proposed rule: (1) Trailblazer Energy Center - 900 MW, pulverized coal boiler with post-combustion carbon capture, near Sweetwater, Texas (2) Taylorville Energy Center - 716 MW, IGCC with carbon capture, near Taylorville, Illinois. The commenter states that they struggle to comprehend, in reference to new unit Hg and PM limits, how any new unit subject to the proposed Utility NESHAP will be able to continuously meet several of the proposed limits under all operating conditions for the life of the unit. The PSD construction permit for the Trailblazer Energy Center was recently issued on December 29, 2010 after a rigorous review process which included a contested case hearing. Emission limits for criteria pollutants were established according to BACT and for HAP according to case-by-case (i.e., 112(g)) MACT. Despite the BACT and MACT permit limits being very recent determinations, the

proposed NESHAP limit for PM is almost five times lower than the limit established as BACT in the Trailblazer permit (a PM limit was established in the permit as MACT for non-Hg HAP metals). With regard to Hg, the proposed NESHAP limit is 80 times lower than MACT limit contained in the Trailblazer permit. Further, Commenter 18483's EPC contractor for the project has stated they would be unable to obtain guarantees for the proposed NESHAP PM total and Hg limits from equipment suppliers. In Commenter 18483's experience, lenders require such guarantees and, without such guarantees, the Trailblazer project may not be financeable.

Comment 59: Commenter 18424 disagrees with the EPA's analysis predicting an increase in bituminous coal production in response to the proposed rule. The commenter's view is that the proposed rule, along with other pending regulations will cause retirements of coal-fired units and since the proposed rule requirements are so stringent, no utility company will be willing to risk investing in a new coal-fired EGU which may not be able to meet the required emission limits. The commenter cites a study of 40 recently permitted coal-fired EGU projects representing the most stringent technology limits currently applicable, which shows that none of the new facilities are able to meet all the proposed new source standards under their new permits. The commenter expects these technological, operational and financial challenges to deter investors, which will shrink the Indiana coal industry market, increase prices and jeopardize the country's electricity reliability.

Comment 60: Commenters 18424 and 18425 consider the proposed emission limits for new coal-fired plants to be a defacto ban on construction of new plants, which will shrink the Indiana coal industry market, increase prices and jeopardize the country's electricity reliability.

Comment 61: Commenter 18024 states that MACT Floors should not be based on data from uncontrolled sources. Uncontrolled units in many cases represent the lowest HAP emitters in the EPA's database, but also represent some of the highest emitters. By setting MACT Floor limits for certain HAP based on a subset of oil-fired boilers that reported low emissions during a one-time stack test but that do not employ any control technology for HAP, and by using a different subset of boilers with ESPs for others, the EPA has created MACT Floor limits that are not achievable by other similar sources since there is no control technology identified that is demonstrated to achieve compliance for all oil-fired boilers. The commenter requests that the EPA select the top 12% best controlled similar boilers (i.e., No.6 oil-fired EGUs that employ ESPs) and then set the MACT Floor for the entire source category based on the available test data for all HAP from this single group. By establishing the MACT Floor in this way, the EPA could actually demonstrate that the top 6 percent of boilers tested can actually meet the limits established as the MACT Floor.

Comment 62: Commenter 17729 states that the EPA is required to set the MACT limits based on emission values achieved by actual best performing units. The EPA has not used any 30-day rolling average data to determine the emission rates proposed in the rule but instead has used short term stack test data performed under steady state full load conditions. The EPA should reevaluate the PM limits and base them on data representative of actual 30-day rolling average emissions.

Response to Comments 41 - 62: These comments assert that the new source limits, as proposed, will result in a de facto moratorium on construction of new coal-fired power plants since, according to commenters, the limits are unachievable and that no existing source is meeting all of the new source limits.

The EPA disagrees with commenters' statements that no existing unit is currently meeting the proposed new-source limits because the new-source limits are based on data from existing EGUs. As a result of comments received on the full body of data, the EPA has reviewed the new-source limits and has made revisions where appropriate. The EPA agrees with commenters that the new source basis for particulate matter (PM) should employ a full suite of emission controls because any new EGU will also need to comply with the NSPS and the Cross-State Air Pollution Rule (CSAPR), among others. Thus, such EGUs will have controls that could add to the PM loading. Of those units which supplied total particulate emissions using a filterable particulate test method (Method 5, Method 29 or Method 26A) and condensable particulate using OTM-28, several units meeting this criteria also had emissions lower than the proposed total particulate matter emissions limit. Units having a combination of acid gas controls and post combustion NO_x controls included MPU Power Plant - Manitowoc, WI; Northside Stations - Jacksonville, FL and Springerville Generating Station - Springerville, AZ. The basis for the new-source limit in the final rule is a unit meeting this criteria (i.e., it is a unit with SCR, dry FGD, and FF). The EPA has also taken into account the ability of the various test methods to accurately measure emissions at the levels being demonstrated by the EGUs in the top performing 12 percent in establishing the final limits. Further, based on the data available, there is at least one EGU meeting all of the final new-source limits (Logan Generating Station, NJ); thus, EPA does not believe that it is adopting standards that "ban" new coal-fired generation as indicated by the commenters.

4. Feasibility of compliance.

Comment 63: Commenter 17775 states that the EPA's rulemaking proposal relies heavily on the use of DSI to reduce the cost of compliance with the proposed rule and to minimize the time needed to comply with the rule. The EPA never mentions nor acknowledges that DSI can impede Hg removal if ACI is used. The injection of Trona in an EGU generates NO_2, which degrades activated carbon. This degraded performance was seen during a demonstration test at the Presque Isle Station unit equipped with a Toxecon system.

Yet another area where a given control technology can have a negative impact on other emissions involves NO_X controls. If a unit uses low NO_X burners to minimize NO_X emissions, CO emissions will rise. Although the EPA chose not to set CO limits as a surrogate for organic HAP emissions as it has done in other rulemakings, this antagonistic effect supports the EPA's decision to impose work practice standards instead.

Response to Comment 63: The EPA is aware of the results from the Presque Isle testing which seemed to indicate a negative effect of trona injection on Hg control – presumably due to an effect of NO_2 competition. However, we are also aware that in other tests, the injection of trona has enhanced Hg control with PAC injection. Trona-based DSI is a technology that has been specifically recommended for facilities that have experienced ACI performance degradation due to competition with SO_3. It is known that injection of trona under certain conditions can promote the oxidation of NO to NO_2. This reaction can be minimized by optimizing the location of trona injection and by minimizing the amount added.

Comment 64: Commenter 17739 states that the EPA acknowledges "that if optimized performance for different HAP is not technologically possible due to mutually inconsistent control technologies (for example, metals performance decreases if organics reduction is optimized) . . , then this would have to be taken into account by the EPA in establishing a floor (or floors)." That circumstance exists with respect to control of acid gases, which require scrubbers or other SO_2 controls that add particulate to the

flue gas stream, and that must be removed by PM control devices, as well as units that need to install ACI for Hg control. Since particulate devices provide a fixed percent reduction of particulate, it is mathematically certain that "PM performance decreases if acid gas control or mercury reduction is optimized," since both optimizations techniques would add additional particulate matter to the flue gas stream which would in turn decrease "PM performance" on the relevant mass metric.

Commenter 17739 adds that the EPA specifically recognizes this issue in its discussion of the revised NSPS. There, the EPA observes that "addition of sorbent (to control acid gases in a DSI system) adds filterable PM to the system and could conceivably increase filterable PM emissions." 76 FR 25059. The EPA further observes: "when using a wet FGD, some small amount of scrubber solids (gypsum, limestone) can be entrained in the exiting gas, resulting in an increase in filterable PM emissions." Id. The EPA concludes the "increase in filterable PM may challenge the ability of the owner/operator of the affected facility to meet a similarly stringent filterable PM standard." Id. at 25061. Consequently, the EPA is on record as recognizing that control of certain HAP that require sorbents for control (acid gases and Hg) will increase loadings of PM, and thereby impact sources ability to meet the proposed total PM MACT standard. As a consequence, there is no assurance that sources can meet the EPA's "cherry-picked" floors for acid gases and for Hg by "optimizing" these systems to meet the performance of the floor units because to do so would impact their ability to meet the EPA's similarly cherry-picked total PM floor standard ("if optimized performance for different HAP is not technologically possible due to mutually inconsistent control technologies (for example, metals performance decreases if organics reduction is optimized) . . , then this would have to be taken into account by the EPA in establishing a floor (or floors)".

Comment 65: Commenter 17931 states that the EPA's approach has no basis in the reality facing the proponent of a new coal-fired plant - namely, wet/dry scrubbing technology, SCRs and baghouses. For example, although it is difficult to positively discern which actual plant the EPA selected to represent the best performing source for PM, both plants nonetheless do not reflect the type of coal and/or control technology expected in the operational profile of a new coal plant. In fact, both likely candidates suffer from the same basic flaw-which is, they both use a baghouse without a scrubber.

Comment 66: Commenter 17772 states that one of the most widely recognized antagonistic effect involves the use of SCR systems that are effective in controlling NO_X and assist with the removal of Hg but also tend to increase emissions of condensable PM. By establishing a standard for one HAP based on one EGU that has a certain set of control equipment and another standard for a different HAP based on another EGU with a different set of control equipment, the proposed rule creates a set of standards that may be impossible for any single facility to meet irrespective of its control equipment.

Response to Comments 64 - 66: The EPA is aware that the performance of one control technology can affect the performance of other in-stream control technologies. Injection of powdered sorbents – alkaline sorbents for acid gas control (e.g., DSI) or activated carbon for mercury control – can increase the particulate loading to the PM control device. Use of a dry FGD scrubber can do the same. Use of a downstream wet FGD scrubber can increase PM loading (via entrained limestone or gypsum particles) after the primary PM control device. However, the EPA believes that these situations have been accounted for in the ICR data that was used to set the emission limits. The EPA has examined the ICR data and notes that units with SCR, SNCR, wet and dry FGD scrubbers, dry sorbent injection, and activated carbon injection are among the best performing PM units – i.e., those units that were used to set the existing source filterable PM emission limit.

As noted elsewhere in this document, the EPA agrees with commenters that the existing unit that is used to develop the new-source limit for PM should employ a full suite of emission controls because any new EGU will also need to comply with the NSPS and CSAPR, among others. Thus, such EGUs will have controls that could add to the PM loading. The basis for the new-source limit in the final rule is a unit meeting this criteria (i.e., it is a unit with SCR, dry FGD, and FF). We have identified an existing unit that meets all of the new sources standards. In addition, we decline to subcategorize new units as commenters suggest because we believe a new unit can be constructed in a manner that ensures compliance with the standards based on all types of coal use.

Comment 67: Commenters 17931 and 18033 state that the feasibility of meeting the new Hg standards is questionable. The plant selected as the best performing for Hg, the 20-year-old Nucla plant, is a CFB plant that burns a coal that has a significant amount of inertinites compared to most other U.S. coals. This factor increases the amount of unburned carbon in the fly ash and promotes better Hg capture. Given this difference in feedstock, the EPA should have selected a more representative plant for the best performing source. Furthermore, this plant's total PM measurement during ICR stack testing is almost an order of magnitude above the proposed new unit total PM limit.

Comment 68: Several commenters (17761, 17765, 17840) state that about 30 existing sources could meet all of these proposed emissions limits. These 30 existing facilities constitute less than three percent of all existing facilities – far less than the best performing 12 percent of existing sources required in section 112(d). According to commenter 17765, this estimate overstates the number of compliant units because measuring below the limit once does not guarantee compliance on a continuous basis. According to the commenter, the EPA has selected the best performers in setting each emission limit and created hypothetical sources rather than sources that exist.

Comment 69: Commenter 17757 states that they have installed state-of-the-art SCR technology and will be installing state-of-the-art FGD control technology, which are recognized by the EPA as achieving the greatest level of emissions reductions achievable by coal-fired EGUs. The commenter urges the EPA to determine that high-performing control systems such as wet FGD-SCR combination systems constitute MACT if properly maintained and operated. As proposed, the commenter has no confidence they can comply with the limits on an ongoing basis.

Comment 70: Commenter 17767 states that components from top performing units selected in the EPA HAP-by-HAP approach cannot be isolated and placed into an existing plant and be expected to perform at the same levels. There are many variables that come into play in making pollution control equipment perform to these extraordinary levels. The design of the boiler, type of fuel, design of each pollution control equipment, and how these systems affect each other are just a few of these variables. The industry expertise in this area is limited when approaching these high performance levels of pollution control.

Comment 71: Commenter 17772 states that the limits for non-Hg HAP metals are unachievable by the best controlled sources and strongly urges the EPA to remove the non-Hg HAP metals from the proposed rule until such time as it can perform a valid and thorough study within the meaning of section 112(n) of the CAA. The commenter would further submit that based on the current information available to it, such a study would verify that no HAP standards are necessary with respect to non-Hg metals.

As noted above, even for a specific HAP where an EGU is the "best performer," that performance level is at ideal, full-load conditions. Thus, even the best performer is unlikely to be able to achieve that

performance level over a 30-day rolling average if emissions during startups, shut-downs, and malfunctions are included.

Comment 72: Commenter 18023 believes the proposed rule violates the CAA by selecting the best performing units for each individual HAP and creating emission limits not achievable by any actual source. Commenter explains that some control technologies are incompatible, so the hypothetical plant suggested by the proposed emissions limits are unlikely to be possible.

Comment 73: Commenter 18023 states that the EPA must ensure that any MACT standards proposed can be achieved by actual units and existing technologies, not just a hypothetical unit or set of controls that does not exist in the real world.

Comment 74: Commenter 17878 compares the proposed limits to limits placed on newly constructed units. Citing the EIA-860 report, the commenter states that over the past decade at least 40 new coal-based generation units have been built or are actively under construction. Of these 40 recently permitted units, only five were assigned HAP emission limits as stringent as the EPA is proposing for existing units. None has been permitted at a level equal to the proposed limits for new units. Of the 40 units, 18 have commenced operation and reported data to the EPA for Hg emissions. For these units, the coal averaged 6.7 lb Hg/TBtu. Their emission tests averaged 1.8 lb Hg/TBtu (these averages do not reflect the variability considerations necessary to establishing MACT limits). Only two units reported tests below 0.2 lb Hg/TBtu, and the lowest test value was 0.07 lb Hg/TBtu(several times greater than the limit proposed for a new source, approximately 0.018 lb Hg/TBtu).

Commenter 19114 describes 40 new coal-generation units that have been built in recent years with the most efficient and advanced combustion controls available, non of which can meet all the proposed new source MACT standards and 35 of them cannot meet the proposed existing source MACT standards. The commenter states that units must operate well beyond manufacturer performance guarantees, accept emission limits that are so low that numerous unknown and uncontrollable variable would influence compliance and utilize compliance testing methods with suspect accuracy. These low emission limits are also expected to limit operating flexibility and limit or eliminate development of new advanced coal-based generation projects.

Comment 75: Commenter 17883 requests that the EPA consider reassessing whether or not emissions from a sufficient number of coal-fired units were evaluated to yield proposed emission limits that can be achieved by existing plants without rendering such plants economically unviable.

Comment 76: Commenter 17739 states that the EPA must revise the PM MACT floor limit because it fails to account for mutually exclusive control technologies that result from the HAP-by-HAP approach adopted by the Agency. According to the commenter, that is the case with the PM limit because, as the EPA has recognized, optimization of Hg controls and acid gas controls will increase loadings of PM, and limit sources ability to meet the PM floor. Since PM performance will necessarily be impacted by optimization of Hg and acid gas control, it is incumbent upon the EPA, in accordance with its own policy for using HAP-by-HAP floors, to account for this issue in setting the floors.

Comment 77: Commenters 17758 and 17840 state the EPA failed to address cumulative effects of using multiple pollution control devices in determining MACT levels applicable to PM levels. In proposing total PM as a surrogate, the EPA also fails to consider or address the antagonistic effects that adding multiple different pollution control devices can have on an EGU's HAP emissions. This is particularly

relevant with the PM limit. To illustrate, the 131 best-performing units from the EPA ICR database for total PM include 47 units that have a fabric filter installed, but no scrubber. These existing units would not be able to comply with this proposed rule without adding a scrubber or some type of sorbent injection to control HCl emissions. Adding these HCl control technologies will increase the total PM emissions of these units. Because a fabric filter-alone configuration would not meet all MACT limits (since the EPA has relied on PM emissions data that could not exist under its suite of HAP limits), these units may not be the best performing units. Accordingly, the EPA should establish a single, category-wide filterable PM emissions standard.

Comment 78: Commenters 16469 and 17739 state that for each new source emission limit, the EPA selected the best performing unit from its information collection request database, regardless of the type of coal burned, pollution control train, or boiler type. Although the commenter states that they believe the pollutant-by-pollutant approach is unlawful, they also believe that even if the EPA has discretion with respect to this approach, it is unreasonable to apply it when setting the MACT floor for new units for these reasons. First, unlike the case with other MACT standards issued for other source categories, the EPA has clear and convincing evidence that new units simply cannot meet all of the new source MACT emission standards no matter what they do. Second, the EPA's proposed floor units for the new MACT standards are based on mutually inconsistent control technologies of a type that the EPA has already concluded are impermissible. The EPA's new source floor units are based on mutually exclusive control technologies because, of the floor units for Hg, total PM and HCl, two are FBC units and one is a wall-fired plant with a different control train. The Hg floor unit is the Nucla CFB which has no ACI system, but rather achieves its Hg control from the CFB itself plus a fabric filter. The PM floor unit is Dunkirk Unit 1, which is a tangentially-fired boiler with a fabric filter. Since the EPA has long maintained that FBCs are a type of boiler that produces emission reductions for several HAP that are inherent to the boiler design and operation itself, one could never optimize an FBC and a wall-fired boiler to replicate the "Franken-floor" simply because the building of one precludes the building of the other. Indeed, for the EPA's PM and Hg floor units not to be mutually exclusive, one would have to be able to optimize the performance of an atmospheric FBC+ fabric filter with that of a tangentially-fired boiler + fabric filter. In short, a floor based on an FBC and a wall-fired boiler is a floor that is based on "mutually inconsistent control technologies," and therefore is impermissible. Whatever may be the case where emission reductions may be attributed to add-on control technologies, there is a very certain increment of emissions control that is inherent to, and stems from a CFB, that clearly cannot be "optimized" with a wall-fired boiler with add on control technology to meet the pollutant-by-pollutant floor. Since the EPA has no data to determine what emissions control characteristics stem from an FBC plus control train and a wall-fired boiler plus control train, and has no data that either an FBC or a wall-fired boiler can meet all the floor limits, the only way for the EPA to take this inconsistency "into account" is to set a floor based on one type of boiler or the other (or establish different subcategories).

Several Commenters (17689, 17702, 19213) agree and add that the EPA improperly considered how a component of a plant might achieve emission reductions, rather than the results of such components operating simultaneously, resulting in unrealistic standards (dubbed "The Franken Plant approach").

Comment 79: Commenter 17975 states that the proposed standard for non-Hg metals would require EGUs to meet one of three alternative limits: a limit for filterable PM of 0.03 lb/MMBtu, a total non-Hg metals limit of 0.00004 lb/MMBtu, or specific limits for ten of those metals. As a matter of law, limits for HAP must, at a minimum, be based on emission rates achieved in practice by the best 12 percent of the sources within a specific industrial category.

Comment 80: Commenter 17837 states that, as proposed, the new source emission limits for Hg, PM and acid gases could not be met by any power plant in operation today, regardless of its coal supply or emission control technologies. The proposed rule needs to be revised to provide a set of new source emission standards that reflect achievable limits based on the performance of actual permitted plants employing BACT and using a variety of different coal types.

Comment 81: Commenter 17817 states that the proposed MACT, through its stringent limits, would effectively preclude the construction of any new coal-based EGU. According to the commenter, only Congress, not an administrative Agency, can establish such a far-reaching policy.

Response to Comments 67 - 81: As a result of comments received on the full body of data, the EPA has reassessed the new-source limits and has made revisions where appropriate and believes that the analyses are consistent with the statutory mandate and with Court decisions on the matter. The EPA agrees with commenters that, particularly with regard to PM, the basis for the new-source limit should be an EGU that is configured with such controls as to ensure compliance not only with the final rule, but also with other rules applicable to new sources. Thus, such EGUs will have controls that could add to the PM loading. The basis for the new-source limit in the final rule is a unit meeting this criteria (i.e., it is a unit with SCR, dry FGD, and fabric filter). The EPA has also taken into account the ability of the various test methods to accurately measure emissions at the levels being demonstrated by the EGUs in the top performing 12 percent in establishing the final limits.

Further, although the EPA does not concede that it is a statutory requirement, based on the data available, we believe that there is at least one existing EGU meeting all of the new-source limits in the final rule (Logan Generating Station, NJ). Thus, the EPA does not believe that we are adopting standards that preclude new coal-fired generation. In addition, although the EPA does not concede that it is a statutory requirement, based on the data available, we believe that there are approximately 69 existing coal-fired EGUs that can meet all of the final existing-source limits. Although not a requirement of the CAA, we note that 69 units is approximately 6 percent of existing coal-fired EGUs and the average of the top performing 12 percent is the top 6 percent. A greater number of units are complying with one or two of the final rule standards. Thus, the standards appear reasonable on the face of the statute.

In addition, the EPA does not believe that the statute requires that the EPA articulate how a future EGU could comply with the final limits in any MACT standard; rather, those emission limits must be based on the emission levels achieved in practice by existing sources in the category or subcategory. The EPA believes it has fulfilled this mandate.

Further, the EPA may not base the MACT standards on the existence of any given control technology but, rather, on the performance of those technologies and any non-technology factors that affect HAP emissions.

The EPA believes that commenters are misinterpreting the use of the alternate individual non-Hg metallic HAP values. EGUs are provided the choice of complying with the filterable PM standard or one of two alternate equivalent emission limits – total non-Hg metallic HAP or individual non-Hg metallic HAP. The EPA has established the final limits in accordance with the statute. For the individual non-Hg metallic HAP limits, the EPA sorted the data for each individual metallic HAP and selected the top performing 12 percent for each. For the total non-Hg metallic HAP limit, the EPA summed the individual metals for a given EGU and then sorted on the total and selected the top performing 12

percent. The basis for establishing emission limits for the non-Hg metallic HAP may be found elsewhere in this document and in the preamble to the final rule.

The EPA's responses to the use of short-term stack test data to establish a 30-day rolling average, to the establishment of additional subcategories, and to comments related to oil-fired EGUs are discussed elsewhere in this document. The EPA believes that its MACT floor analysis is consistent with the statutory requirements and those of recent interpretations of the statute by the Court.

Comment 82: Commenter 17736 finds the proposed emissions limits to be unreasonable because they have spent nearly $1 billion to install SCR technology and are in the process of adding FGD equipment to all coal-fired units, yet they are not confident that these controls will be adequate to meet the proposed limits. The commenter therefore asks that the EPA consider revising the proposed rule to avoid negative impact on a large portion of the EGU industry unable to achieve the standards.

Response to Comment 82: The EPA disagrees that the standards are not achievable by a large portion (or any portion) of the industry and the commenter does not provide data to support its claim or demonstrate that its own units will be unable to comply with the final standards, instead questioning its ability to comply.

5. Beyond-the-floor standards.

Comment 83: Commenter 17718 suggests, to the extent that the EPA proposes emission standards that are above the MACT floor, the agency is required to conduct a cost-benefit analysis to demonstrate the appropriateness of such standards. In the present instance, the EPA's cost-benefit analysis dramatically underestimates the cost of compliance. For example, PPL's indirect subsidiaries, Louisville Gas and Electric Company and Kentucky Utilities Company made filings with the Kentucky Public Service Commission on June 1, 2011, to obtain approval to undertake over $1.7 billion in retrofits to comply with the MACT Rule.[2] These and other capital expenditures for environmental compliance facilities and their associated ongoing operations and maintenance costs (projected to be $90 million in 2016) will result in a 12.2 percent rate increase for KU customers and a 19.2 percent rate increase for LG&E customers by 2016. Those increases do not take into account the costs associated with retiring generating units with a current book value of over $100 million—units the MACT rule will make uneconomical to run beginning in 2016—nor do they account for the additional cost of replacing the retired units. With cost impacts of this magnitude for a combined utility system with less than 8,000 MW of coal-fired capacity, it is apparent that the EPA's cost-benefit analysis (estimating a nation-wide cost impact in 2016 of less than $11 billion) has failed to account for significant costs of compliance.

Moreover, for states like Kentucky, one of whose competitive advantages has been low-cost electricity, rate increases of these magnitudes could have serious economic consequences other than the immediate cost of increased rates. Kentucky is home to a number of high electricity-use industrial facilities, including Ford, Toyota and General Electric. The electricity cost increases resulting from implementation of the MACT rule could drive such employers out of the state, or at least cause them to consider expanding their operations elsewhere (and perhaps overseas rather than elsewhere in the U.S.). It is not clear that the EPA has attempted to account for such costs in its analysis.

Response to Comment 83: The EPA did not propose beyond-the-floor standards other than for the existing-source low rank, virgin coal subcategory and new-source IGCC units, which are discussed elsewhere in this document. The EPA did not propose beyond-the-floor fuel switching for any

subcategory. Further, the EPA believes it has adequately accounted for costs in its analyses as reflected in the technical support documents supporting the beyond-the-floor standards.

Comment 84: Commenter 17904 states that the EPA is using only the lowest measured value from the ICR test runs to establish the "average emissions" for each category. As an initial matter, where a unit has conducted multiple tests for emissions of a given HAP under different operating conditions, the average value of those tests should be used to establish the mean of the data. Instead, the EPA uses only the lowest measured value. This overstates the level of control actually achieved by the best performing units. The EPA's standards represent (at best) limitations achieved by the top 0.5% of existing sources—in direct contravention of section 112(d)(3). Such a standard would be considered "beyond the floor" and required to satisfy the criteria of section 112(d)(2).

Response to Comment 84: The EPA has used the average of the lowest emission values for the MACT floor pool of EGUs to establish the "average of the top performing 12 percent" and then included any other data from those EGUs in assessing variability. The EPA does not believe this to be a beyond-the-floor approach as asserted by commenter.

Comment 85: Commenter 17728 states that the EPA's proposed approach also renders the beyond-the-floor analysis of section 112(d)(2) pointless. In this section, the EPA is instructed to set MACT limits that require the maximum degree of reduction in emissions of HAP determined "achievable," taking into account cost and any non-air quality health and environmental impacts or energy requirements. For existing units, the MACT floor is to be set at the average emission limitation achieved by the best performing 12 percent of existing sources. The EPA's proposal ignores this two-step process; instead of choosing the best performing units for each HAP on the basis of what they actually achieve, the Agency attempts to define what is hypothetically achievable, whose basis is a theoretical unit unfettered by the factors (such as cost) in section 112(d)(2) that the EPA is required to consider. The EPA's approach is contrary to section 112(d).

Response to Comment 85: Commenter appears to take issue with EPA's pollutant-by-pollutant approach to setting standards and we respond to that comment above and in the preamble to the final rule. To the extent the commenter asserts that EPA should consider costs in establishing the MACT floors, we believe the statute is clear that costs are not considered in establishing the minimum stringency MACT floor levels.

Comment 86: Commenter 17851 states that it is impermissible for the EPA to set standards that result in the best performers having to install controls in what amounts to a beyond-the-floor standard without consideration of the beyond the floor factors. The EPA cannot demonstrate that all standards are achievable as required by section 112(d)(3). Consequently, the EPA is proposing standards that are in excess of its authority. If the EPA cannot demonstrate that at least 12 percent can simultaneously meet all standards, the commenter believes that in effect, the EPA has improperly gone around the CAA section 112(d)(2) beyond-the-floor process because the floor standards would force industry-wide technological changes without consideration of the factors (cost and energy in particular) which Congress mandated for consideration when establishing beyond-the-floor standards. The commenter believes that the EPA needs to develop a method that selects facilities that do the best job under the worst conditions.

Response to Comment 86: The EPA disagrees with the commenter that EPA must demonstrate that any unit can simultaneously meet all of the established limits, let alone 12 percent, as discussed above.

Further, the EPA disagrees with commenter that its process essentially results in a beyond-the-floor standard being established. CAA section 112 is a technology forcing statute and contemplates that the vast majority of sources in the category will be required to install some controls. It is unreasonable for commenter to assume otherwise given the MACT floors must be based on the emissions limitations achieved by the best performing 12 percent of sources. Further, commenter appears also to take issue with EPA's consideration of variability in establishing MACT standards. We maintain we have adequately accounted for variability as discussed in the proposed rule and response to comments.

Comment 87: Commenter 17904 states that the EPA's proposed beyond-the-floor standard for low rank fuel boilers is not achievable. Use of data from the top performing unit in the subcategory is not a reasonable or sufficient analysis to justify the EPA's proposal. As an initial matter, data from a single unit cannot establish what is achievable for all existing units under the most adverse circumstances which can be reasonably expected to recur. The unit the EPA relies upon to establish the beyond the floor limits is owned and operated by the commenter and the commenter asserts that the proposed beyond the floor limit is not achievable consistently at this unit, which only became commercially operational in 2009. The commenter cites several reasons that removal efficiencies for lignite boiler are limited:

• higher exhaust temperatures that reduce Hg removal with carbon injection;

• low chloride levels in lignite increase the ratio of elemental Hg;

• low levels of unburned carbon causing low natural removal of Hg;

• higher sulfur creates SO_3 reducing Hg removal by carbon injection;

• Hg content of lignite fuel is higher and more variable than other fuels making it more difficult to remove.

The commenter has CEMS data showing that the proposed 30-day limit is too stringent. According to the commenter, increases in ACI feed rate will not result in the capture of any additional Hg. The commenter believes the EPA's beyond the floor analysis was done incorrectly. Their analysis established a beyond the floor level at 8.4 lb/TBtu.

Response to Comment 87: The EPA has reviewed its analyses and continues to believe that the beyond-the-floor analysis for such EGUs is appropriate and that the limits are achievable. The EPA believes that the data used to conduct the beyond-the-floor analysis are consistent with results achieved in U.S. DOE Hg control technology demonstration projects. The DOE's National Energy Technology Laboratory (NETL) sponsored a project entitled "Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD."[222] In this project, URS Group evaluated sorbent injection for Hg control in an 85/15 blend Texas lignite/PRB-derived flue gas. The authors of the final project report noted that, in short term parametric tests, three different brominated sorbents performed similarly with results indicating that 90 percent reduction of Hg was attainable at injection rates of 2-3 lb/Macf and greater than 90 percent at higher rates. This is also shown in Figure 3-7 of the final report. In longer-term (60-

[222] "*Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD,*" Final Project Report, Report Number: 42779R16, Prepared by K. Dombrowski, URS Group, Austin, TX (March 2010).

day) testing using a brominated sorbent, Hg removal averaged 80 percent at a modest injection rate of 2 lb/Macf. This compares favorably to the results of 70 to 90 percent achieved in the short-term testing at the same injection rates. Figure 3-12, however, predicts that greater than 90 percent could have been achieved at injection rates of 3 to 5 lb/Macf. Note that all of these results are for control across a cold side ESP. Control across a fabric filter is normally expected to exceed that measured through an ESP.

6. Use of test data.

Comment 88: Commenters 17758 and 17820 state that under CAA section 112(d)(3)(A), MACT standards are applicable to categories or subcategories of sources and must be determined by the EPA based on its assessment of the average of the best-performing 12 percent of the existing sources for which the EPA has information. Accordingly, MACT standards cannot be unit-specific and set by a single test. Even assuming for the sake of argument that the EPA is not bound by the statutory language and has discretion to set MACT standards in a different way, it should adopt a more flexible approach than unit-specific operating limits in accordance with the flexibility precepts of the President's recent executive order.

Commenter 17798 states that source-specific operating requirements that require performance better than the emissions limits are beyond the scope of the CAA NESHAP.

Response to Comment 88: The EPA believes it has complied with the statutory mandate and recent Court decisions on the issue. Based on the statutory language, emission limits for new-sources are required to be based on the performance of the best performing similar source. Absent additional data from that best performing similar source, the EPA is constrained to use the single data point in establishing the new-source limits. For new sources, the EPA used the individual run data in order to provide additional data for variability analyses. In addition, as noted elsewhere in this document, the EPA has revised the monitoring requirements in the final rule. The EPA does not believe that these monitoring requirements require performance better than the final emission limits.

Comment 89: Commenters 17725 and 18498 suggest that Part II data should only be used in limited circumstances in the floor analysis. The EPA used the test data that was collected by sources that were required to perform stack testing specifically under Part III of the Agency's ICR for this rule and historic stack test data that was collected under Part II of that same ICR. The EPA has inappropriately treated both sets of data equally. The Part III data were collected and reported following the specific instructions that the EPA provided in the ICR, which included requirements for much longer sampling times and greater sampling volume than sources have typically employed. The Part III testing requirements were designed to allow the EPA to obtain more accurate information for this rulemaking process than sources normally would have collected. In contrast, the Part II data was collected using differing sample volumes or times and, perhaps, following different procedures or conditions, which suggest that the Part II is likely to have a higher degree of data accuracy or data quality issues.

The commenters appreciate the value of including Part II data when determining the new unit floor or even when establishing the floor for existing units when the number of units or test data in the category is small. In these cases, including the Part II data can provide valuable information about the variability of the source(s) in question. However, the Part II is not necessary for evaluating the emission floors for existing coal-fired units because the volume of Part Ill data is adequate for its purpose. The top 12% analysis will include data from a large number of sources (131 units) so adding additional Part II test data for these sources would not be expected to help better address any of the variability concerns

expressed in these comments. Using the Part II data here would seem to contradict the Agency's purpose in establishing more stringent requirements for the tests conducted under the ICR.

Commenter 17621 states that the EPA chose to use the lowest 40 units to calculate the MACT floor based, in part, on an erroneous conclusion that the Part II data were significantly lower than Part III data. The Part III data are generally lower than the corrected Part II data and thus likely to represent the best performing units for Hg. Thus, 127 EGUs is the appropriate number of EGUs for setting the MACT floor for Hg.

Response to Comment 89: The EPA believes that all data submitted should be used in the analyses. Absent use of all of the data, the EPA would have no basis for addressing variability; other commenters have stated that the EPA has not adequately addressed this point even with use of all of the data. The EPA has addressed the number of data points to use in the MACT floor analyses elsewhere in this document.

In reviewing 2010 ICR data from Part II and Part III, the agency assessed the limitations that existed in using the data for selecting the best performing source or the best performing 12% of the sources and for calculating the numerical limits associated with these two categories. The agency used some existing procedures for accommodating data limitations based upon the development of other NSPS, NESHAP, and MACT emissions standards. Where there were situations where existing procedures were not sufficient or acceptable, the agency made adjustments to the existing procedures, developed alternate procedures, or excluded the data. The agency is confident that we have properly assessed the limitations that exist in the data supplied to us by the utility industry, developed procedures which address the limitations, and have used the data to establish emissions limitations that are representative of the best performing source and the average of the best performing 12% of the sources.

Comment 90: Commenter 17620 states that the EPA's approach also comes perilously close to its earlier approach of defining the "best performers" by the technology that a unit employs rather than its emissions – an approach that was rejected by the U.S. Court of Appeals. It is not entirely clear, but it appears that the EPA did not include any results from its section 114 request or from the set of 50 "poor performers" in its determination of the "best performing units." At this point in time it is too late for the EPA to fully address the issue. The commenter recommends that the EPA: (1) set out in far greater detail the basis for its conclusion that the units ordered to conduct testing are in fact the best 15 percent performers and (2) continue to assume that the 131 units are the best performers, but substitute any units where other testing, including the responses to the CAA section 114 request and the results of its 50 unit random testing, identifies better performing units.

Response to Comment 90: The EPA ranked all the available data and selected the best performing units for each HAP or HAP grouping when establishing the MACT floors. For non-Hg metallic HAP and acid gas HAP we used data from sources representing 12 percent of sources in the category or subcategory for the reasons set forth in the supporting statement for the EGU ICR. For Hg, we establish the MACT floor based on 12 percent of the data because as we indicated in the supporting statement for the EGU ICR, we could not identify the best performing sources for Hg.

Comment 91: Commenter 19114 states that state agencies have established final 112(g) MACT limits based on the use of subcategories with respect to combustion technologies and coal type. State agencies have established final 112(g) MACT determinations based on coal type subcategories in order to address the substantial differences in emission characteristics and heating value for the various coal ranks on the

emission reductions that can be achieved in practice. (Commenter provided several quotes from state air agencies regarding subcategorization based on coal rank and boiler type.) State agencies have performed section 112(g) case-by-case MACT determinations and concluded that "achieved in practice" represents the best performance that is achievable based on range of reasonably expected operating scenarios that might occur over the life of a unit. These agencies determined that data from a single stack test or from a limited number of stack tests that occurred under the same operating conditions is not sufficient to determine achieved in practice. (Commenter provided statements form state air agencies.)

Response to Comment 91: The EPA has addressed comments on other subcategorization approaches and use of single stack test data elsewhere in this document.

7. Variability.

Comment 92: Commenter 16122 states that the "arbitrary variability analysis" used in the proposed rule results in a much higher MACT standard than the CAA prescribes, violating the CAA and the EPA's Trust Responsibility. According to commenter, the EPA must reasonably estimate the performance of the best performing sources. Commenter states that the only support the EPA provides for its variability methodology is that this approach was used in other recent promulgated rules which has not been subjected to judicial review. The commenter adds that with this unnecessary variability analysis the EPA is disregarding its Trust Responsibility, the tenets of the Environmental Justice Doctrine, and causing tribal trust resources (and more importantly tribal members) to be exposed to Hg emissions that are up to 100 times greater than appropriate and legally required. Commenter requests the EPA remove the variability analysis.

Comment 93: Commenter 16122 states that the EPA failed to demonstrate that the UPL approach accurately reflects the actual performance of different sources and did not properly justified the achieved results. According to the commenter, the EPA didn't provide any evidence that Hg controls operating under normal conditions would experience the extreme variation reflected in the UPL MACT floor. Commenter adds that the UPL does not represent the average emissions of top 12 percent performers.

However, Commenter 17402 states that, overall, the EPA's proposed approach to adjusting the MACT floor for variability satisfies the statutory requirements of CAA section 112(d) and is consistent with the D.C. Circuit's interpretations of permissible variability calculation methods. The commenter agrees with the EPA that its MACT floor adjustments for operational and fuel variability are needed to achieve a meaningful estimate of the average emissions levels of the top 12 percent best performing units, which fulfills statutory requirements and makes practical sense. The commenter has not completed an analysis of the data quality or variability analysis, but the commenter recommends the EPA include methodologies that include the maximum flexibility for fuel and operating variability above the UPL as required.

Comment 94: Commenter 16122 states that using the 99% UPL resulted in a MACT floor exceeding the average performer of the top 12% performers. The commenter reminds the EPA that the CAA specifically states that the MACT standard cannot be less stringent than "the average emission limitation achieved by the best performing 12% of the existing sources". The proposed ruling will result in a MACT floor that is lower than the emissions of some of the worst performers in the top 12%. For example, the 99% UPL for the EGUs burning non-lignite coal results in a MACT floor that is 25 times higher than the worst performer in the top 12% is given.

Response to Comments 92 - 94: The EPA believes that its approach complies with the statutory mandate and recent Court decisions and is reasonable. The fact that the approach has not been subjected to judicial review does not make the approach invalid or not appropriate for use in this rulemaking. The EPA believes its approach appropriately addresses the issue of variability.

Comment 95: Commenter 17623 states that the EPA properly chose to consider variability in its setting of the MACT floor but did not consider all the sources of variability that could be reflected in the standards. The commenter adds that the EPA should consider adjusting the floors by adding normal changes in operations and fuel in addition to the sample runs' test variability in order to account for the actual operating conditions of the units, and thus the worst reasonably foreseeable circumstances. Commenter 17623 adds that the MACT floors do not reflect operational variability because they vary greatly and mentions that examples of the variability affecting emissions that Congress intended the EPA to incorporate are differences of chemical composition of coal, changes in combustion conditions as electric load fluctuates, and variability in the inert fraction of limestone supplied to scrubbers.

Response to Comment 95: The EPA recognizes that although it has much data for this rulemaking, as noted by other commenters, it cannot have sufficient data to account for all conditions that may occur. Thus, the EPA believes its variability analysis is an appropriate method of addressing the concern that these standards must be met at all times and the data available provide a snapshot of the sources performance. The EPA believes its approach is reasonable to establish standards that may be met at all times.

Comment 96: Several commenters (19536, 19537, 19538) states in setting its utility standards for Hg and HCl (but not PM), the EPA has failed to consistently follow that command [to establish source standards based on what the best performing sources actually achieve]; it has used one measure of sources 'actual performance' to select its best performing plants, and an entirely different measure of actual performance to set standards that reflect those plants' emissions.

Response to Comment 96: The EPA has used the average of the lowest emission data from the top performing 12 percent of sources in calculating the MACT floors. The EPA has then incorporated variability in developing the final MACT floor limits in the final rule. As noted elsewhere, the EPA has conducted traditional outlier analyses to remove from the data set any data determined to be statistical outlier data. The EPA believes that the data incorporated in the MACT floor pool represent the variability present at the various EGUs.

Comment 97: Commenter 17621 states that the EPA's rationale for using the UPL is to account for variability in evaluating compliance for future measurements. However, according to compliance requirements for EGUs set in section 63.9991of the proposal, the EGUs must meet not the MACT limit, but a site-specific operating limit based on initial performance. This limit, adds the commenter, is based on a test that is performed once every five years, and it doesn't include variability. The commenter concludes that the EPA can't make any statements about the probability of compliance with these site-specific operating limits until the performance test is completed.

Response to Comment 97: Partly based on comments received, the EPA has modified its monitoring requirements as noted elsewhere in this document.

Comment 98: Several commenters (17715, 17843, 19536, 19537, 19538) state the EPA's Hg limits should be strengthened. A long-term averaging time with compliance determined by Hg CEMS can

effectively account for variability in emissions. Such an approach would be preferable to the 99th percentile UPL analysis, which goes well beyond predicting the worst reasonably foreseeable conditions. An adjusted averaging time will adequately account for the worst reasonably foreseeable circumstances although at the same time more accurately reflecting the average Hg emission rate of the lowest emitting EGU in the <8300 Btu/lb subcategory. In addition, by requiring use of Hg CEMS and imposing a long averaging time, EGU owners will be more vigilant about the EGU's Hg emissions on a day in-day out basis to make sure the Hg controls are being operated in a manner to ensure continuous compliance with the MACT limits.

Commenters 17715 and 17757 request that the EPA provide a mechanism in the final rule for a mass-based emissions average at individual facilities, including adjacent facilities under common control. The proposed emission rate-averaging plan does not provide much flexibility because the emission rate limits are so low. In order for a source to take advantage of these provisions, at least one unit would need to achieve a rate substantially lower than the MACT limit. There is no evidence that such rates are achievable for any existing units. A mass-based plan that applies the final MACT emission rate limits to the design heat input for all sources present at a facility on the date that the rule is finalized would achieve the EPA's mission to reduce HAP emissions although also providing units a much greater level of flexibility and also allow for more economic reductions. The mass-based plan would provide each facility a total annual mass emission limit for HCl, PM, and Hg that could then provide flexibility for the source to operate its units in the most economical way to meet that facility-wide limit. By utilizing a mass approach, it becomes possible to "bank" the total mass that a source is under the limit on an hourly basis in order to provide more flexibility for a unit that will run at a very low capacity factor and would not be economically viable to retrofit. The HAP of concern are regulated due to their ability to accumulate in the natural environment; thus, the issue is not the rate that the pollutants enter the environment, rather the total mass that is emitted.

Response to Comment 98: The EPA did not have sufficient Hg CEMS data to conduct the analyses indicated by commenter. The EPA believes that the Hg limits in the final rule are supported by the data and that the analyses are consistent with the statutory mandate and the Court decisions

Comment 99: Commenter 18498 states that, with the exception of some of the SO_2 data and Hg data reported by a handful sources, the floor analysis was based on reference method data whereas on-going compliance is proposed to be determined continuously using CEMS for PM, Hg and HCl (or SO_2). There is a significant disconnect between the two that has not been addressed in the proposed limits. In one of its response to comments for the Portland Cement MACT Rule, the EPA stated that it "believes that it has a reasoned technical basis for not combining CEMS data with non-CEM data, since this would be a classic apples-to-oranges comparison due to the difference in measuring times and methods."[38] The EPA should address the additional variability introduced by the CEMS within the rule. The "apples-to-oranges" contrast of the CEMS versus reference method data (particularly given the current state of PM, HCl and Hg CEMS) provides additional .support for the call to use the CEMS data as indicators of performance rather than direct measures of compliance. Since neither the CEMS measurement variability or the plant operational variability that will be an inherent part of the CEMS data will not be reflected in the reference method-based UPL, a separate multiplier should be applied to the UPL (or applied as an additional multiplier to the FVF adjusted floor average) to address for the CEMS/operating variability issue. Commenter understands that the UARG intends to provide comments based on an evaluation of the variability of EGU PM CEMS and Hg CEMS data and encourages the EPA to use this information to address the issue.[38] 75 FR 55002, September 9, 2010.

Response to Comment 99: The agency disagrees with the commenter's assertions that this rule inappropriately used both stack test data and CEMS data in establishing emissions limits and that this rule has not accounted for differences between stack testing and use of CEMS in establishing emissions limits. The commenter misunderstands the 'apples to oranges' analogy given the the preamble to the Portland Cement MACT rule. In that case, the agency rejected combining other data of unknown quality collected over differing durations using inconsistent measurement methods (the 'apples') with CEMS data collected using instruments meeting a consistent set of performance specifications and quality assurance procedures (the 'oranges'); this kind of assessment was peformed for this rule by reviewing the ICR Part II data before including those data that met acceptablility criteria with the ICR Part III data. As mentioned elsewhere, variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of this rule's proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that the agency has promulgated. In general terms, the UPL procedure addresses variability from stack tests, while the 30-boiler operating day rolling average provides an additional allowance of variability for CEMS use and accounts for regular process and fuel variability over the averaging period.

8. Use of permit information.

Comment 100: Commenter 19114 suggests that the EPA should refine their standard setting methodology so that the final rule contains standards provide the maximum level of control and that are practical and achievable. This would include a review of air permits and associated technical support documents so that proper consideration is given to the range of unit operations and the capabilities of emission control equipment and compliance demonstration methods. Commenter provides in its Appendix D the air permit documents considered in AEP's analysis of emission limits in Appendices B and C.

Response to Comment 100: Where emissions data are available, the EPA believes that it is generally inappropriate to use permit information. Permit limits for existing sources demonstrate at best the minimum level of stringency (i.e., allowable emissions), but emissions data represent actual emissions data. We decline to adopt the commenter's suggested approach for this reason, though we note that we may use permit data if we believe it represents a reasonable estimate of the top performing 12 percent of sources in the category or subcategory. *See Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 953 (D.C. Cir. 2004).

Comment 101: Commenters 17739 and 19114 state that the most recently developed new coal-based generation units (those constructed over the past decade) represent the state-of-the-art in terms of the emissions profile that can be achieved by the most advanced technologies available. The EPA should consider the air permits for these units so that the final rule contains standards that are practical and achievable by even the most advanced technologies. Since 2001, 40 coal-based EGUs have been commissioned or, at present, are undergoing active construction. These units represent the most efficient and lowest emitting coal-based EGU's ever to have been built. Further, the expanding scope and complexity of regulatory requirements, the maturation of emission control technologies, and increased input from external groups have resulted in these units being subject to the most stringent air permit limits ever established. In developing the air permits for these units, state agencies considered vendor information, fuel data, variable operating conditions, as well as the performance and air permit limits of other operating units. This in-depth evaluation by state agencies has enabled practical, achievable air permits to be established that protect public health and that accommodate the range of operating

scenarios expected over the life of the unit. Although these 40 units comprise approximately 4 percent of the existing coal fleet in the U.S., they establish an expected baseline of performance for future units. If any group of units could be expected to be able to meet the proposed MACT standards, it would be this group of 40, which represent the newest and best-performing units. However, based on a review of air permits, 35 of 40 cannot meet the proposed existing source MACT standards, and none can meet the proposed new source standards. In part, this reflects the difference between a state Agency permitting a unit on a project-specific basis with consideration all operating conditions and a broad-brush regulatory approach for all units based on snap-shot-in-time stack test data for a limited number of units.

The data indicating that no new unit could plausibly be expected to meet the new source MACT limits comes from information about 40 new recently permitted coal units. As detailed in the comments of American Electric Power Corporation, in the past several years, 40 new coal units have been permitted and are either built or under construction. Based on either permit limits or performance data, none of those units can meet all the proposed new source MACT standards.

Commenter 17739 states that these data are highly relevant because each of these units underwent stringent pollutant-by-pollutant new source permitting (generally under either NSR BACT or case-by-case MACT permitting criteria, both of which apply pertinently identical stringent permitting criteria) for each pollutant or relevant surrogate in the new source MACT floor, and therefore made specific technology and emission rate determinations for new units employing the most advanced combination of technologies and processes. In addition, with respect to the group of new coal units specifically permitted under CAA section 112(g) case-by-case MACT, none can meet the Hg, HCl, SO_X, or total PM standards, let alone all of them in combination. Nor, in the face of this hard data, can the EPA rationally waive its hand in the air and suggest that new units can achieve these if only they would "optimize" controls, as it suggested in the Portland Cement MACT. 75 FR 54,999. There is no evidence that some ethereal "optimization" would even be sufficient to overcome the large compliance gaps between the unit capability information about the 40 new units, and the EPA's proposed new source MACT limits, since the EPA's proposed limits are typically substantially below the emission rates those 40 units would be expected to achieve.

Comment 102: Commenter 17770 states that the EPA should reconsider all of the proposed new unit emission limits. They are unachievable with technology that is presently available, even for new units that have state-of-the-art controls and very efficient steam cycles. The commenter's expansion units provide a good example of why the EPA's proposed new unit limits are unachievable. These units are two of the best controlled and newest coal fired units in the country. These two 615-MW coal-fired supercritical pulverized coal units are equipped with a full suite of emission controls including SCR, fabric filters, wet FGD, and wet ESP. Unit 1 began commercial operation on February 2, 2010, and Unit 2 began commercial operation on January 12, 2011. Due to their start-up dates, these relatively new units are actually classified as existing units under the proposed rule. They must therefore comply with the existing unit requirements, and are well equipped to meet those emission limits. The new units employ an advanced combustion technology that increases efficiency by operating at higher pressures and temperatures, resulting in fewer emissions. The air quality control systems on the new units reduce/capture more than 85% of NO_X, 99% of PM, 97% of SO_2, more than 90% of Hg, and more than 94% of sulfuric acid mist, aerosols, and fine PM. In addition, these units produce valuable by products and avoid landfilling of coal combustion products. The EPA's method of setting new unit limits must be based on actual operating data for the best performing new units, not on a hypothetical ideal unit that has never been designed, constructed, or operated. We Energies Oak Creek expansion units provide a real-

world example of the point being made by EEI and UARG and others that the EPA should revise the new unit limits based on actual emission levels achieved in practice by the best performing new units.

Comment 103: Commenter 17912 does not believe using a limited amount of stack test data is sufficient to develop long-term MACT emission limits that meet the "achieved in practice" requirement, nor does the EPA's approach for setting MACT emission limits account for the operational variability that can and will occur throughout the life of an EGU. The courts have said that the EPA must consider such factors. The Agency has said that taking a short-term test and defining the long-term compliance period to be a 30- day average will account for such factors. The EPA fails to provide any actual data or cogent explanation to support this important, but unsubstantiated, conclusion.

Commenter 17912 states that the EPA has established Hg limits based on three short-term test runs from one facility during maximum load and normal operating conditions, which do not provide enough statistical sampling to project with a 99 percent confidence level that the Hg emission limit established by the EPA can be achieved on a continuous basis, including startup and shut down. The commenter questions the EPA's decision to use Part II data. They also question the QA that was done on the Part II data. This raises questions about the scientific underpinnings of the proposed rule. The commenter believes that additional subcategories are needed to differentiate between fundamentally different types of EGUs.

Response to Comments 101 - 103: Commenters appear to assert that the EPA's new and existing source standards are flawed based on its conclusion that the 40 newest coal-fired EGUs are not meeting the existing or new source standards. Commenters suggest that the EPA should not establish the standards based on the ICR data obtained from the industry in 2010 and instead base the standards on permit limits contained in the permits for the 40 newest coal fired EGUs, particularly since some have undergone "rigorous" case-by-case MACT reviews. As a preliminary matter, we estimate that approximately 6 percent of coal-fired EGUs are meeting the existing source standards in the final rule and at least one coal-fired EGU is meeting the new source standard. It is not entirely clear from the comment but it seems that one commenter is asserting that none of the 40 units can meet the new-source limits, but the commenter does not actually state that none can meet the existing-source limits (commenters provided no data to support their claims). We think it quite likely that some of the 40 newest units referenced by the commenters are currently achieving the existing source standards for coal-fired EGUs. Even if not correct, EPA established the standards based on the available data consistent with the statutory requirement as discussed elsewhere.

We also question commenters' assertions that the permit data are a better reflection of the performance of the existing sources as those assertions are not supported by available data and commenters have not demonstrated that they are in fact a better representation. The EPA may use permit information only if the permit information allows EPA to make a reasonable estimate of emissions. *See Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 953 (D.C. Cir. 2004). We do not believe at this time that the permit information provide a reasonable estimate of emissions as they represent allowable emissions, and we have actual HAP emissions data on which to establish the standards.

As stated above, EPA has revised the HAP emissions data based on industry corrections to data they submitted in response to the CAA section 114 information collection request and based on other comments. Based on the corrections, EPA has revised the new source limits in the final rule. We have identified at least one source that is able to meet all the new source limits.

We also disagree with the commenter's assertion that the agency's variability analysis and 30-day averaging period are not sufficient to establish standards based on stack tests and also require monitoring based on CEMS. As mentioned elsewhere, variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of this rule's proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that the agency has promulgated. In general terms, the UPL procedure addresses variability from stack tests, while the 30-boiler operating day rolling average provides an additional allowance of variability for CEMS use and accounts for regular process and fuel variability over the averaging period. The commenter also claims that the EPA should not use the Part II ICR test data, in part because they question the QA of the data.Also, as mentioned elsewhere, the agency reviewed ICR Part II data before including those data that met acceptablility criteria with the ICR Part III data. The EPA further disagrees with the general assertion that the scientific underpinnings of the rule are in question and the commenter provided nothing more than a general statement to support its assertions. Pursuant to the CAA section 114 2010 ICR, industry was required to provide accurate data and quality assured data. The EPA relied on industry to comply with its legal obligation to submit accurate data and used the data that were provided. The EPA has made the corrections to the data identified by industry and others during the comment period and incorporated revised, new, and corrected data into the standards included in the final rule.

The EPA declines to further subcategorize for all the reasons discussed above.

9. Calculation of standards – rounding.

Comment 104: Commenters 17620 and 17975 state that the EPA's rounding of emissions has led to some confusion. Commenter 17620 states that rounding and truncating issues should not be allowed to have a significant impact on the determination of a MACT floor, but the EPA has permitted these matters to significantly affect the proposed emission levels. The EPA's approach to rounding introduces an inappropriate upward bias to the calculation of MACT floors. It should be revised to reflect technically correct rounding procedures and the requirements of the statute. For example, the mean of the top 12 percent of the Subcategory 1 units for arsenic is given as 0.41029 lb/TBtu. The EPA then multiplies this figure by approximately 2.5 to account for variability and calculates an UPL of 1.0816 2988 lb/TBtu. Expressed to three significant digits, this result would ordinarily be set out as 1.08 lb/TBtu. The EPA's desire to ensure that no source be at risk of a 1-percent false positive result would cause it to raise this figure to 1.09, which could easily be argued is not a significant increase. Expressed to two significant digits this figure would round up to 1.1 lb/TBtu; again, this would represent an increase of no great import. However, the EPA nearly doubles the limit by "rounding" to 2.0 lb/TBtu. Table 2 sets out a number of the more significant impacts of rounding and truncating choices on proposed MACT floor calculations.

Commenter 17620 states that in its initial Subcategory 1 Hg MACT floor calculation, the EPA had determined that the MACT floor was slightly less than 0.9 lb/TBtu, which it then rounded to 1.0 lb/TBtu. After a calculation error was identified by industry, the EPA revised its UPL calculation to 1.18121634. In this instance, rather than rounding to 2 or 2.0 lb/TBtu, the EPA has only rounded up to 1.2. Although commendable, the EPA's disparate treatment of this standard will likely lead to a claim that the Hg limit should be raised to 2 or 2.0 lb/TBtu.

In most engineering calculations, rounding protocols provide for rounding down as well as up. The EPA justifies its decision to only round up by asserting that to do otherwise would deprive sources of the "variability" cushion to which they were otherwise entitled. This position is unbalanced in that it wholly ignores the public interest in reducing emissions of HAP, as well as normal engineering protocols. It would also seem to be contrary to writtenEPA policy concerning rounding for NSPS compliance purposes. This policy, which has not been revised to our knowledge, adopts ASTM standard rounding protocols – carry at least five significant digits throughout all intermediate calculations, and employ ASTM Procedure E 380 (round down if less than 5; round up if equal to greater than 5) for the final calculation. Where a MACT floor would otherwise be calculated at 1.082, it would seem that rounding a final standard to 2.0 rather than 1.08, 1.09 or 1.1 would be technically unjustifiable and would not comply with the requirement of section 112 that the MACT standard be not less stringent than the average of the top 12 percent.

Rounding also ordinarily includes truncating the number of significant digits only at the end of the calculation process. In the EGU MACT floor memo, the EPA truncates many of its calculations to one significant digit and then expresses the resulting value in two significant digits in the proposal – an unheard of and completely unjustifiable approach. The limit for arsenic provides a fair example of the process. The 99th percentile UPL calculated by the EPA for arsenic is 1.0816. The EPA truncates this result to one significant digit and rounds up to obtain a value of 2, which it then expands back to two significant digits and proposes a limit of 2.0 lb/TBtu. Properly done, this calculation yields a limit of 1.08 (to three significant digits), or 1.1 lb/TBtu (to two significant digits).

Having calculated the UPL, the EPA's rounding and truncating approach guarantees that the standard will be less stringent than the average performance of the top 12 percent in the category by substantial amounts and is likely unlawful. The EPA should employ technically sound rounding protocols, including those that require rounding down at the final step. Should it decide that it must always round up, the EPA should promulgate all MACT standards to three significant digits to minimize the adverse environmental impact of rounding up its final UPL calculation when setting a standard.

Comment 105: Commenter 18039 agrees with NACAA's extensive comments on the flaws in the EPA's use of rounding, truncating and significant figures in calculating the proposed MACT standards. In several instances, the EPA rounded various values inappropriately, in most cases leading to less stringent standards. When rounding, the EPA should apply consistent rounding procedures that conform to scientific norms, rounding values ending in 5 or more to the next higher value and values below 5 to the next lowest value. The use of only one or two significant figures when more are justified by the data being analyzed also effectively weakens emission limits. For example, with a limit of 1, measured emission values of up to 1.499… would be in compliance, whereas with a limit of 1.0, measured emission values only up to 1.0499… would be in compliance. The EPA should use at least three significant figures because the emissions data that the MACT standards are based on typically are reported to at least three significant figures.

Response to Comment 104-105: The EPA does not believe it is appropriate to round down in establishing the MACT floor standards because the standards are required to reflect what is actually achieved by the best performing unit or units and must be complied with at all times. Rounding the final MACT floor emissions number down would equate to establishing a MACT floor that is less than what we have determined is achieved by the best performing existing units, and we think that approach would be inconsistent with CAA section 112(d)(3).

The EPA disagrees with commenter regarding the number of significant figures that should be used in the final emission limits. We believe that we have been consistent with the rounding approach used in the Portland Cement NESHAP in that we have consistently rounded up to one significant figure if the limit was less than zero at the highest level of detail format used (e.g., lb/TBtu or lb/GWh). In addition, to partially address commenter's concern, we have added a zero following the single significant digit. For limits greater than zero, we have rounded up to two significant figures. We do not believe that use of conventional rounding is appropriate in this instance because of the generally low numbers involved, the general nearness to the MDL in many cases, and the fact that we are requiring continuous compliance with the HAP limits.

Comment 106: Commenter 18500 suggests that if the EPA chooses to regulate non-Hg metals or PM as a surrogate, the number of significant figures for the total non-Hg metals limit and PM limit should match the number of significant figures in the floor value analysis. There is a disparity between the number of significant figures in the proposed metals and PM emission limits for existing coal-fired units, and the floor value analysis. The number of significant figures in the rule text (e.g., Table 2 in the proposed rule) should be revised to match the number of significant figures in the floor value analysis (e.g., to 0.00004 lb/MMBtu for total metals and 0.03 lb/MMBtu for PM based on the values in the proposed rule).

Adding a significant figure to the rule limits, as proposed, arbitrarily makes the limits more stringent than called for in the floor value analysis, which clearly sets floor values to one significant figure. The importance of the number of significant figures can be exemplified by examining the 1997 eight-hour ozone NAAQS, that was set at 0.08 ppm (not 0.080 ppm). As the NAAQS limit was set, a measured ozone level of 0.084 ppm (84 ppb) would not exceed the NAAQS; if, however, the NAAQS had been set at 0.080 ppm, a measured ozone level of 0.084 ppm would exceed the NAAQS.

Response to Comment 106: The EPA has reviewed its analyses partly based on comments received and believes the limits are now consistent in the final rule. The emissions limits in the rule now contain two significant figures.

10. Hg floor.

Comment 107: Several commenters (19536, 19537, 19538) state that the EPA's Hg MACT floor limit in units of lb/MW-hr is flawed. The EPA determined a Hg MACT floor limit in terms of lb/MW-hr as well as lb/TBtu. The EPA has not specified how it determined the lb/MW-hr MACT floor limit.

It appears that the EPA first converted Hg emissions in terms of lb/MMBtu to lb/MW-hr for each coal-fired EGU based on a unit specific heat rate. The EPA then calculated the unit-specific heat rate by dividing the total generating capacity of the unit in MW by the total maximum heat input in MMBtu/hr. If so, the EPA has failed to accurately determine the necessary heat rates. With respect to the total maximum heat input data, many companies may be reporting the maximum possible heat rate of the boiler rather than typical maximum heat input need to achieve MW capacity. For example, for Seward Unit 1, the EPA indicated the total maximum heat input was 6,200 MMBtu/hr, whereas the EPA's Clean Air Markets Division (CAMD) data base identifies the maximum heat input to this boiler as 3,180 MMBtu/hr. For Valley Units 1, 2 and 3, the EPA indicated that the total maximum heat input for each unit was 1,736 MMBtu/hr whereas the CAMD data base identifies the maximum heat input to these boilers to be 1000, 959, and 1192 MMBtu/hr, respectively. Many of the calculated unit heat rates given in the EPA's spreadsheet for the Hg MACT floor analysis are entirely implausible – such as unit heat

rates as low as 4.65 MMBtu/MWh or as high as 13.07 MMBtu/MWh. Further, even if the data the EPA was using was accurate and reflective of maximum heat input at maximum generating capacity, the EPA's approach to determining heat rate fails to reflect the heat rate the unit operates at during lower loads or differences during the summer or winter.

Regardless, the alternative lbMW-hr MACT is intended to encourage efficiency. Instead of determining a Hg MACT floor limit based on the EPA's calculations of lb/MW-hr emission rates, the EPA should simply convert the average Hg emission rate in lb/MMBtu to lb/MWh (or lb/GW-hr) based on a reasonable heat rate (at a minimum, improved heat rates should be required as a "beyond the floor" method of reducing emissions). The alternative lb/MW-hr limits for both total PM and HCl reflect an assumed heat rate of 10,000 Btu/kW-hr. This reflects approximately 34 percent thermal efficiency. However, a comparison of the EPA's existing source Hg MACT floor determinations in lb/MMBtu to lb/GW-hr shows that the lb/GWhr limit reflects a heat rate of 10,438 Btu/kW-hr or 32.7 percent thermal efficiency. Not only is this heat rate higher than the assumed heat rate for the conversions of the HCl and total PM MACT limits to units of lb/MW-hr, this heat rate is even higher than the average heat rate of the coal-fired EGU fleet of 10,400 Btu/kW-hr. According to data compiled by the Center for Integrative Environmental Research at the University of Maryland, the top 50 performing EGUs in 1998 had average heat rates of 9,854 Btu/kW-hr based on data from the U.S. Energy Information Administration. This reflects an efficiency being achieved at the most efficient EGUs of 34.6 percent, and it was being achieved over ten years ago. Lower heat rates have been achieved in recent years through boiler, turbine and other plant modifications.

The EPA should not assume a heat rate any higher than 9,854 Btu/kW-hr in developing a Hg MACT limit in terms of lb/GWH-hr to comply with the goal of rewarding energy efficiency. Converting the EPA's 99th percentile UPL value of 1.2 lb Hg/TBtu heat input, a more appropriate Hg floor emission limit in terms of lb/GW-hr would be 0.0118 lb/GW-hr. Or, if the EPA were to adopt a Hg MACT floor of 2.125 x 10-2 lb/TBtu applicable over a rolling 12 month average as we recommend above (rather than determining the 99th percentile UPL), an appropriate alternative limit would be 0.0002 lb/GW-hr. This would much more accurately reflect the actual average Hg emissions achieved by the 12 percent best performing EGUs and the alternative limit would much more likely encourage energy efficiency.

Response to Comment 107: With the exception of the calculations for the output-based Hg MACT floor standard, the EPA converted a unit's reported emission rates from a lb/MMBtu basis to a lb/MW basis using unit-specific heat rates to convert between the input- (lb/MMBtu) and output- (lb/MWh) based emission factors. Each unit's heat rate was calculated by dividing their maximum heat input by the gross summer generating capacity.

In response to public comments the EPA completed output-based Hg MACT floor calculations using a different methodology. The EPA received comments on the proposed rule that the output based Hg standard should reflect the heat rates of the most efficient units. One commenter stated that the "EPA should not assume a heat rate any higher than 9,854 Btu/kW-hr in developing a Hg MACT limit in terms of lb/GWH-hr to comply with the goal of rewarding energy efficiency." Commenters had also stated that "... the EPA should simply convert the average Hg emission rate in lb/MMBtu to lb/MWh (or lb/GW-hr) based on a reasonable heat rate."

The EPA agrees with the commenters that Hg calculations should be completed using a different methodology because of the antagonistic relationship between low Hg emissions and high thermal efficiency in coal combustion that is evident at the lowest emitters in Subcategory 1. This antagonistic

relationship is attributable to the high carbon content (i.e., high loss on ignition (LOI)) typical of inefficient combustion units and the affinity of this high-carbon flue gas stream for Hg. For example the units achieving the lowest level of Hg emissions in Subcategory 1 were largely stoker-fired units and fluidized bed combustors (FBCs). Many of the stoker-fired units and some of the FBCs had approximately 25 to 30 percent lower efficiencies than the most efficient pulverized coal-fired units in the floor pool. The best performing unit on a lb/MMBtu basis was a stoker unit with an emission factor half the value of the lowest emitting pulverized coal source. This disparity between thermal efficiency and Hg removal efficiency increases the intra-unit variability predicted by the UPL calculation.

For the conversion of the Hg emission rates for the best performing (lowest emitting) sources in Subcategory 1, EPA utilized the average heat rate for the sources in the input based floor pool (i.e., the 47 sources used to set the lbs Hg/MMBtu standard) and maintained the same units and their rankings between the input and output based standards. The numerical value of this average heat rate is 11.18 MMBtu/MWh.

In order to eliminate the mercury-specific statistical artifact resulting from the disparity between thermal efficiency and Hg removal efficiency exhibited in the lowest emitters in Subcategory 1, prior to completing the UPL calculation to set the lb/MWhr alternative emission standard, EPA converted the lb/MMBtu emission rates for the lowest emitters to lb/MWhr by multiplying by the average heat rate (11.18 MMBtu/MWh) for the sources in the input based floor pool (i.e., the 47 sources used to set the lbs Hg/MMBtu standard) and maintained the same units and their rankings between the input and output based standards.

Comment 108: Several commenters (19536, 19537, 19538) state that many states have adopted more stringent numerical Hg emission limits for existing coal-fired EGUs, typically applicable to those EGUs >25 MW in size (commenter provided examples). Those state requirements, and the plants meeting them, demonstrate the achievability of additional Hg reductions. The EPA is obligated to evaluate these lower Hg emission limits as part of its national MACT rulemaking to ensure that its proposed emission limits reflect the maximum degree of emission reductions that can be achieved, taking into account costs of control and any non-air quality, environmental, and energy impacts.

Response to Comment 108: The EPA has included all available data in the MACT floor analysis, including data from EGUs in the states noted by commenter. The EPA established the new and existing source MACT limits on actual data provided by EGUs and we believe the final MACT standards reflect what is achieved in practice, or achievable to the extent we established beyond-the-floor standards. The EPA may not, as commenter appears to suggest, establish the nationally applicable mercury standard based on state limits, particularly when we have data from actual EGUs that suggests a different level of HAP emissions reduction is achieved. We also do not know how the state limits were derived, but we cannot presume that the limits were established consistent with section 112(d) or that the state limits are a reasonable estimate of the performance of the top 12 percent of existing sources. *See Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 953 (D.C. Cir. 2004).

Comment 109: Commenters 19032 and 18023 state that the proposed Hg limits for new and existing sources must be revised before issuing the final Utility MACT. First, as stated elsewhere, the EPA should calculate the Hg MACT floor for existing units using the average rate achieved by the top 12 percent from all the sources in the category or subcategory rather than the average performance of the top 12 percent from the ICR data. As the standard for Hg now stands, it represents the best of the best performers – i.e., only the top 4 percent. The CAA requires the EPA to make certain findings if

standards are to be set more stringent than the average performance achieved by the top 12 percent unless the EPA determines the standards are "achievable" and takes "into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements." 42 U.S.C. 7412(d)(2) (CAA section 112(d)(2)). The EPA has not done such an analysis, nor has it justified why it is changing its intended approach when issuing the ICR. The EPA must expand the Hg MACT floor to include the average performance of the top 12 percent of the entire category or source category (i.e., approximately 130 units).

Response to Comment 109: The EPA explained in the proposal preamble its rationale for use of 12 percent of the data available for Hg versus 12 percent of the population for acid gases and non-Hg metallic HAP. The EPA did not believe that it had identified the best performing 12 percent of units for Hg. The EPA also does not have Hg emission data on all EGUs so we may not, as commenter suggests, establish the mercury standard based on units representing 12 percent of the category or subcategory. See section 112(d)(3)(A) (requiring the agency to establish existing source MACT floors based on emissions limitations achieved by existing sources "for which the Administrator has emissions information."). In addition, the commenter flatly asserts without any support that EPA is establishing the standards based on the best performing 4% of EGUs. Commenters have not provided Hg data for all EGU and we do not have such data in our possession so we do not believe it would be reasonable to establish the standards based on sources representing 12% of the category or subcategory.

Comment 110: Commenter 18024 states that the ICR data show that for certain liquid oil-fired boilers, an apparent 99 percent reduction in Hg emissions is being achieved, even though no control technology is present. In other cases, more Hg is reported coming out of the stack than was present in the fuel. This makes much of the data set highly suspect, and the EPA should provide an explanation for why the data set is so variable. If this apparent Hg reduction cannot be explained, then the EPA should not simply rely on the lowest ICR reported numbers when evaluating the best controlled 12 percent of similar sources. One alternative is the addition of a statistical error to the MACT Floor limits such that real-world sources would have assurance of being able to maintain compliance using the same suite of emission controls employed by the best controlled 6 percent of similar units for which the EPA has data.

Response to Comment 110: The EPA recognizes that the levels of mercury in liquid oil are often near the detection limit. This contributed to our rationale behind including mercury in the total metal HAP emission limit for liquid oil-fired EGUs and for dropping the fuel analyses from the final rule. However, we believe it appropriate to maintain an alternate mercury emission limit in the final rule for those EGUs that wish to take advantage of it.

Comment 111: Commenter 18428 states that limits are in many cases lower than justified as a result of faulty analysis by EPA. The EPA's determination of MACT floors and ultimate limits are technically very flawed and perpetuate excessive errors in the baseline ICR data because the data were not adequately quality assured by the EPA and its contractors. Data interpretation and statistical methods are flawed resulting, in many cases, in far lower emission limits and cannot be justified by corrected ICR data nor the accepted MACT development procedures. Refer to EPRI's detailed technical analyses of these issues. PM limits are in some cases less than any known vendor guarantees for control equipment. The EPA has also used inappropriate data treatment for tests that are below the MDL and used flawed methodology on emissions variability. Finally, the EPA's proposed limits do not account for fuel variability and in particular chlorine content, and are based in most cases on snapshot or "single point in time" testing. The EPA must develop MACT limits that meet "every day and all operating conditions"

of the top performing units by using all available quality controlled data and appropriate statistical methods and assumptions.

Response to Comment 111: We address the data errors noted by commenter elsewhere in this document. We, however, disagree that the analyes themselves are faulty or flawed. As noted elsewhere, under the CAA section 112 2010 ICR, companies were to submit accurate data. Use of the MDL is addressed elsewhere in this document.

11. HCl floor.

Comment 112: Several commenters (19536, 19537, 19538) states the EPA did not include HCl emissions data for all of the lowest emitting coal-fired EGUs. The EPA has HCl emissions data for 256 EGUs, which only reflect the emissions of 23 percent of the total number of coal-fired EGUs in the U.S. EPA assumed that this data captured all of the lowest emitting units, and on that basis selected data from the lowest emitting 131 units (51 percent of the units for which the EPA collected emissions data) to represent the best performing 12 percent of all coal-fired EGUs in the U.S. The statute requires the EPA to establish existing source standards no higher than the "average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)." 42 U.S.C. 7412(d)(3)(A). The agency has, instead, based its standard on the assumed emissions of sources for which it has no information and the record does not support the EPA's reliance on that assumption. Prior to proposing EGU MACT standards, the EPA collected emissions data on numerous coal-fired EGUs via an ICR. The EPA selected EGUs to be tested that it believed were the "best performing sources for the HAP groups for which they will be required to test." The EPA targeted 15% of all EGUs and assumed that would ensure the agency had the emissions data for the top 12 % of all EGUs (commenter provides more discussion).

The EPA assumed that those units with the most recently installed SO_2 scrubbers would have to comply with most stringent SO_2 emission limits, and achieve the greatest SO_2 removal efficiency. The EPA has not, however, presented data on the SO_2 emission limits, or on SO_2 removal efficiencies of the EGUs tested to verify that the SO_2 controls at these units are operated to achieve the most stringent SO_2 emission rates. The EPA's assumption that only the more recently installed scrubbers would have the highest removal efficiency was a flawed assumption (commenter provides examples). Most importantly, the data in the record does not support the EPA's claimed relationship between SO_2 emissions and acid gas emissions. Aside from chlorine content of the coal and SO_2 removal efficiency of the SO_2 controls, HCl removal is affected by process conditions and by competing reactions between the slurry and the acid gases (including SO_2). A comparison of the lowest 131 HCl-emitting EGUs to the lowest 131 HF-emitting EGUs seems to indicate such competing reactions. Based on all of the acid gas data presented in the EPA's HCl MACT floor spreadsheet, commenter sorted the EGUs based on HF emission rates. The table below ([in commenter's document) shows that the lowest 131 HCl-emitting EGUs have an average HF emission rate than is five times higher than the average HF emission rate of the lowest 131 HF-emitting EGUs.

Similarly, the lowest 131 HF-emitting EGUs have an average HCl emission rate that is an order of magnitude higher than the average HCl emission rate of the lowest 131 HCl-emitting EGUs. The EPA has indicated that HCl and HF would be absorbed more readily than SO_2 in a scrubber, but such acid gas removal does not appear to occur at the same levels for each acid gas emitted by an EGU – as set forth above, and this suggests the need for separate HF limits. In addition, the low chlorine dataset also included some EGUs with PC boilers that had absolutely no SO_2 controls. Chlorine in the coal accounts

for some of these low HCl values, but there is data to show some level of HCl removal is occurring at these units. For example, Joliet 9 Unit 5 is a cyclone boiler, burns subbituminous coal, and is equipped with ACI and an ESP; it is achieving approximately 55 percent HCl reduction. As the data for this unit shows, there can be other factors that come into play that affect HCl removal. That the EPA's 131 lowest HCl-emitting EGUs data set includes EGUs with no SO_2 controls also suggests that the EPA's data set does not capture all of the lowest HCl-emitting EGUs in the U.S. The SO_2 removal efficiency of the SO_2 controls is not the only factor impacting HCl emissions. Chlorine content of the coal has an impact. The EPA's ICR did not seek out EGUs with the most effective SO_2 controls that also were burning lower chlorine coal, and we have identified several such units that the EPA should have included in its data set but did not. In addition, there likely are other factors that affect the removal of HCl that go beyond the SO_2 removal efficiency of the scrubber, such as competing reactions between the slurry, HCl and other acid gases. Further, there could be other factors in the design and/or operation of the scrubber that optimize a scrubber for HCl removal. For all of these reasons, it is unlikely that the EPA's target data set includes the 131 lowest HCl-emitting EGUs out of all the 1,091 coal-fired EGUs in the U.S. Commenter suggests that the EPA truncate the dataset it uses to determine MACT floor to better ensure that it only reflects the HCl emissions of the top 12% performing units, to reflect the fact that some of the best performers lie outside its data set.

In contrast, the EPA collected Hg emissions data for 328 EGUs in the>8300 Btu/lb subcategory, but treated that data as representative of the fleet as a whole. Accordingly, it based its Hg standard on 12% of its dataset - or 40 EGUs. Similarly, For the <8300 Btu/lb subcategory, the EPA assumed that 12% of that dataset of 11 EGUs - or 2 EGUs - reflected the top 12% of the EGUs in the nation in the <8300 Btu/lb subcategory. The record suggests that SO_2 control efficiencies correlates with HCl control efficiencies. Nonetheless, the EPA should not use SO_2 limits as a surrogate for direct limits on HCl and other acid gas HAP. Actual HCl emissions remain significantly dependent on the chlorine level in the fuel. Net SO_2 emissions, similarly, depend on the sulfur content of the burned coal. The uncontrolled SO_2 emissions based on sulfur in the coal can vary from 0.6 lb/MMBtu to in excess of 6 lb/MMBtu. See August 2010 Documentation for EPA Base Case v.4.10 Using the Integrated Planning Model, Table 9-5 (at 108-109) (Docket no. The EPA-HQ-OAR-2009-0234-3049). Thus, a unit burning coal with an uncontrolled SO_2 rate of 6 lb/MMBtu would be achieving 95% SO_2 removal if its SO_2 emission rate was 0.30 lb/MMBtu. However, if a unit was burning coal with an uncontrolled SO_2 rate of 1 lb/MMBtu, an SO_2 emission rate of 0.3 lb/MMBtu would only reflect 70% control. Accordingly, a unit with a low-performing scrubber (but low sulfur coal) could have low SO_2 emissions. The record suggests no correlation between sulfur content and chlorine content in coal; that same unit would, therefore, have high HCl emissions.

Response to Comment 112: As explained in the proposal preamble and Supporting Statement for the 2010 ICR, the EPA selected for testing for acid-gas HAP those 175 EGUs with the newest FGD control devices installed, both wet and dry. This selection was based on the premise that effective control of SO_2 would also provide effective control of acid gas HAP and "...these units represent those units having to comply with the most recent, and, therefore, likely most stringent, emission limits for SO_2" and that "...efforts by units to comply with stringent SO_2 limits will likely represent the top performers with regard to acid gas HAP emissions." As we reasonably identified and selected the "best performing" units for acid gas HAP from among the entire coal-fired EGU population for testing, the EPA used 12 percent of the entire population as the pool of units from which the MACT floor was derived. A similar approach was used for filterable PM. The EPA has also explained that the best performing units for Hg could not be identified for ICR testing and, thus, the smaller data set was used to set the Hg emission limit.

Comment 113: Several commenters (19536, 19537, 19538, 18023) state that, in reference to the determination of HCl MACT Floor for new sources, at least some of the three test results at the Logan Generating Plant were measured below the detection limit of the testing method. Several commenters (19536, 19537, 19538) adds that, in spite of this, the EPA assumed that the test results were measured at the detection limit. Although the precise emissions are not known when a test does not detect a pollutant, it is known that the emissions are less than the detection limit. See previous discussion on better approaches for data substitution when non-detect data are present. So, the EPA overestimated the average HCl emission rate being achieved at the best performing source. The EPA compounded this issue by applying a 99th percentile UPL factor and then rounding up to the nearest tenth of a lb/GW-hr. Further, by rounding up to 0.3 lb/GW-hr, the EPA's proposed new source MACT standard assumes a very poor heat rate and thermal efficiency for new units. Specifically, the proposed 0.3 lb/GW-hr limit includes an assumption that the heat rate is 10,000 Btu/kW-hr and that the unit thermal efficiency is 34% when converted from the EPA's 99th percentile MACT floor value of 0.000030 lb/MMBtu. A heat rate of 10,000 Btu/kW-hr is higher than the annual average heat rate of 9,854 Btu/kW-hr of the existing coal-fired EGU fleet. New coal-fired EGUs are typically supercritical or ultra-supercritical boilers that are designed to be more efficient with lower heat rates than typical existing coal-fired EGUs. The EPA should not assume a heat rate of new coal-fired EGUs higher than 9,000 Btu/kW-hr (or approximately 38% thermal efficiency) in setting its new source MACT floor limit. Based on the EPA's floor emission rate of 0.000030 lb/MMBtu, that means the EPA's proposed new source MACT floor limit should not be any higher than 0.27 lb/GW-hr. For all of these reasons, the EPA's proposed HCl MACT floor limit for new units is too high and does not reflect the emissions achieved at the best controlled similar source under the worst reasonably foreseeable circumstances.

Response to Comment 113: The EPA has addressed elsewhere in this document the comments related to its use of the MDL. The EPA did not set the lb/GWh limit by converting from the lb/MMBtu emission limit (using an assumed heat rate value). Both the lb/MMBtu and the lb/GWh emission limits were from actual data submitted from the units tested in the 2010 ICR.

Comment 114: Several commenters (19536, 19537, 19538) states that the EPA's proposed HCl limits for existing units are in excess of the statutory floor. The EPA has made an unsupported assumption that it captured the 131 lowest HCl emitting units in its ICR for HCl emissions. The EPA has also improperly assumed those units with HCl test results below test method detection limits were actually emitting at the detection limit. And the EPA has impermissibly rounded up its UPL-adjusted rate such that it is now 1.6 times the 99th percentile UPL of the plants' actual emissions. Finally, compounding all of this, the EPA has set the floor based on 3 times the MDL– without proper justification. The EPA should, for these reasons, revise the HCl MACT floor to realistically reflect the actual emissions of the best performers.

Comment 115: According to several commenters (19536, 19537, 19538) not only did EPA determine the 99th percentile UPL emission rate for Nucla Unit 1, the EPA then rounded up that value in coming up with a new source MACT floor emission limit. Specifically, the EPA determined the average lb/MW-hr emission rate of the best controlled similar source to be 5.0036 x 10-8 lb/MWhr, and then the EPA determined the 99th percentile UPL of that source's data to be 1.7324 x 10-7 lb/MW-hr. The EPA then rounded up this value to the nearest 10 to arrive at a floor value of 2 x 10-7 lb/MW-hr or 0.0002 lb/GW-hr. The commenter claims that the EPA has not provided adequate justification for going beyond the 99th percentile UPL in its determination of the MACT floor emission rate for Hg. In fact, there is no technical justification for rounding up any of the floor limits.

Response to Comments 114 - 115: The EPA maintains that the limits in the final rule are supported by the available data. The EPA has addressed comments related to use of the minimum detection level, selection of best performing units for acid gas HAP, and the statistical analysis elsewhere in this document.

12. SO_2 floor.

Comment 116: Several commenters (19536, 19537, 19538) states that in determining the SO_2 MACT floor, the EPA re-ranked the data collected for the 256 EGUs not by HCl emissions but by SO_2 emissions. See EPA spreadsheet titled "floor_analysis_coal_HCl_31611.xls"(Docket no. The EPA-HQ-OAR-2009-0234-3036). The top ranked units in the HCl ranking is the Logan Generating Plant Unit 1, whereas the top ranked unit in the SO_2 ranking is Stanton Unit 10 – a unit which does not even show up in the EPA's lowest 131 HCl emitters. The 2nd ranked unit for SO_2 is Stockton Unit 1, which is also not included in the EPA's lowest 131 HCl emitters. In fact, eleven of the top 20 units ranked by lowest SO_2 emissions are not in the EPA's lowest 131 HCl emitters (this, of itself, should cast doubt on the notion of using SO_2 as a surrogate for HCl or any other acid gas). The average SO_2 rate of the 131 lowest HCl emitting units with a flue gas desulfurization system (i.e., wet or dry scrubber) is 0.14 lb/MMBtu, as compared to the average SO_2 rate of the 131 lowest SO_2 emitting units which the EPA has calculated to be 0.0740 lb/MMBtu.

Commenter 17621 also notes that the EPA's chosen approach does not consider whether a single facility is capable of meeting the other proposed standards. The commenter's Table 2-2 compares the proposed MACT limits for new coal EGUs with the lowest test series average for the four sites that were used by the EPA to produce the new unit standards. None of the four EGUs had emissions below all three limits; some did not test for all of the parameters. Values shaded in orange exceed the proposed new unit limit. "NA" indicates that measurements are not available in the Part II or III data series for that HAP in the current EPA MACT Floor spreadsheets.

As shown in the commenter's Table 2-2 Logan Unit 1 (the site used for the HCl limit) would not meet the limits for total PM or the SO_2 surrogate. Dunkirk Unit 1 (the site used for the total PM limit) would not meet the HCl or SO_2 limits and was not measured for Hg. NuclaUnit 1 (the site used for the Hg limit) would not meet the total PM limit and was not measured for HCl or SO_2. Port of Stockton, i.e., POSDEF Unit 1, (the site used for the SO_2 limit) has no other HAP measurements.

Response to Comment 116: In setting emission limits for HCl (and for SO_2 which is an alternative emission limit available to those units with operational flue gas desulfurization controls), the EPA ranked the top performing units for HCl emissions using the available data from the 2010 ICR. Similarly, the EPA set the alternative emission limit for SO_2 using the same approach. In some cases, the EPA had emission data available for SO_2 emissions but not for HCl emissions (and visa versa). This is the case for both Stanton Unit 10 and Stockton Unit 1. The EPA continues to believe that HCl and HF, due to their chemical and physical properties, will be controlled at least as well, and likely much better than, SO_2 using flue gas desulfurization technologies. We address the remainder of the comment elsewhere in this document.

Comment 117: Several commenters (19536, 19537, 19538) states that operators of EGUs routinely use SO_2 CEMS data to guide adjustments to the SO_2 control equipment. This is especially so when the unit has a strict SO_2 limit to meet. For example, if a unit operator sees SO_2 emissions spiking, the concentration of lime or limestone in the scrubber slurry can be increased which in turn increases the

removal efficacy of the scrubber. Plant operators use such methods on a daily basis. The EPA's analysis suggests that the SO_2 removal efficiency of the SO_2 controls has an impact on HCl emission rates. Yet, the EPA, in applying the 99th percentile UPL to the average SO_2 emissions rate, has come up with an SO_2 emission rate that will not encourage the best operation of the scrubber, and thus will not ensure removal of HCl (or other acid gases). A long term averaging time provides sufficient flexibility to EGU owners/operators to deal with spikes in SO_2 emissions, and thus no adjustments to the SO_2 emission rate considered to be reflective of the lowest HCl emitting units is warranted. Further, an SO_2 MACT limit that is based on an appropriate subset of the lowest HCl emitting units will ensure that the SO_2 controls at each EGU are operated to maximize SO_2 removal and also maximize removal of HCl.

Response to Comment 117: The EPA believes that its analysis results in establishing an emission limit that is appropriate for the averaging period selected.

13. PM floor.

Comment 118: Several commenters (19536, 19537, 19538) states that the EPA's PM floor analysis does not reflect the performance of the best performing sources. First, in setting the new floor limit, the EPA did not use the unit with the lowest emissions (i.e., the best performing unit), which was the Bonanza Power Plant, Unit 1-1. Instead, citing unspecified data issues, the EPA set the floor using the second lowest emitting unit, the Dunkirk Generating Plant, Unit 1. The total particulate emissions from Bonanza were 8.6E-06 lb/MMBtu although the emissions from Dunkirk were 2.82E-03 lb/MMBtu. Absent an explained technical basis for disregarding them, the EPA should have based the new source floor on the Bonanza plant. Further, the data questions which prevented the EPA from selecting the Bonanza plant as its best performer did not prevent the EPA from retaining the Bonanza emissions in the variability analysis used to set the existing source floor.

Response to Comment 118: The EPA has corrected data errors that were brought to its attention and reanalyzed the PM MACT floor limits in the final rule.

Comment 119: Several commenters (19536, 19537, 19538) states that the EPA's PM floor analysis does not reflect the performance of the best performing sources. Second, in setting the existing source floor, the EPA used the top 12% or 131 units based on the total number of plants and not the units for which the EPA has data (approximately 245 units). The EPA thereby assumed that it had captured, in its data, the entirety of the "best performing" units. Since the best performing set includes units that have both ESPs and fabric filters of various designs, with and without various scrubbers, it is difficult to see how the EPA can justify this assumption. Third, we note that even with the best performing set, the emissions of the 131 units (Dale Station, Unit 3) is 2.58 E-02 lb/MMBtu, which is approximately 9.1 times the emissions of the second best source (i.e., Dunkirk Unit 1) or close to 3000 times the emissions of the best performing unit (i.e., Bonanza). The EPA assumes – without support – that all of this variability is emissions variability. For example, a portion of this variability could be due to different test methods, and other factors unrelated to variability in the plants' actual emissions. Or (as discussed above) the Dale unit is not amongst the best performing sources.

Response to Comment 119: As noted elsewhere, the EPA has corrected data errors in the PM data set and reanalyzed the PM MACT floor limits in the final rule. The EPA discussed in the proposed rule and the supporting statements for the ICR its justification for establishing the non-Hg metal HAP on sources representing 12 percent of the population instead of 12 percent of the data. The EPA identified and required testing from the best performing 15 percent of units for non-Hg metal HAP and it is reasonable

to establish the standards based on 12 percent of the sources in the category instead of 12 percent of the data.

Comment 120: Commenter 16469 notes that, in reference to the proposed PM limit for existing sources based on an analysis of the EPA's sample group of 131 units, when we removed units that do not employ scrubbers or sorbent injection (precisely the kinds of technologies that will be required to meet the proposed existing source limits for Hg, acid gases and PM) the resulting PM emission rate of the sampled units is more than twice the EPA's estimate (the commenter gives details of this). The downward bias of the EPA's sample group should be corrected.

Response to Comment 120: We do not agree, as commenter appears to suggest, that we should exclude data from best performing units. We do not think such an approach is consistent with the statute or otherwise warranted. In addition, if the EPA did not include all the best performing units in the MACT floor analysis for PM, we would not be able to justify using sources representing 12 percent of the population of coal-fired EGUs because we would no longer be using data on all of the best performing sources. Instead, we would have to base the standard on 12 percent of the data.

Comment 121: Commenter 17628 requests that the EPA modify the standard as currently proposed and adopt a total particulate emission standard in the final EGU MACT that is no more stringent than 0.16 lb/MWh. Such a limit would be appropriate based upon the test results in the ICR data base from pulverized coal-fired units that are equipped with both baghouses and wet scrubbers, and would ensure that the final standard is achievable under the "worst reasonably foreseeable circumstances" that are likely to occur in actual operation, as the MACT standard requires.

Response to Comment 121: As noted elsewhere in this document, the EPA is finalizing a filterable PM alternate to the total non-mercury metallic HAP limit.

Comment 122: Commenter 17975 states that the EPA only gathered total PM data for 245 units and not 131, or 12% of the universe. In other words, the EPA's standard is based on emission rates already achieved in practice by more than half of the units for which it collected data. The EPA appears to have assumed that only the 131 plants included in its sample are capable of meeting the standards it has proposed. That is not a reasonable assumption, give that many facilities not included in the EPA's analysis already have baghouses, which are very effective at removing both filterable PM and non-Hg metals. Had the EPA considered the 12% of units for which had data (i.e., 12% of 245 = 30 units) as the top performing data set, and followed its statistical methodology for inclusion of variability, the 99 percentile UPL value for total PM would be much lower at 0.0084 lb/MMBtu. Rounding this result is not necessary with current monitoring methods. Thus, the PM surrogate limit for non-Hg metal should be no greater than 0.0084 lb/MMBtu, 30-day average, with compliance to be demonstrated using PM CEMS, as the EPA has proposed. The commenter also evaluated the sensitivity of control technology on the floor for existing coal units in the EPA's list of "best performing" units regardless of other variables (i.e., unit type, coal burned, etc.). It is well known that ESPs alone cannot achieve consistent, high levels of capture of PM given numerous shortcomings such as difficulty of charging particles of all size ranges, achieving proper exhaust gas resistivity, avoiding re-entrainment during rapping, gas flow channeling, maintaining proper geometry and field strength, etc.

Response to Comment 122: The EPA believes that its MACT floor analysis is consistent with the statutory requirements of CAA section 112 and with Court interpretations of those requirements,

including the ability to address variability. We address the remainder of this comment above and in the preamble to the final rule.

14. Filterable PM floor.

Comment 123: Commenter 17715 states that the ICR database is comprised of filterable PM tests that were performed utilizing a variety of methods. Methods 5 and 29 were conducted at different units and used in the same floor analysis. They compared Method 29 filterable PM data against historical Method 5 compliance data and noticed that the Method 29 data was an order of magnitude lower than the Method 5 data. The commenter performed subsequent side-by-side testing utilizing both methods simultaneously and again saw the order of magnitude disparity in the methods. The results of the side-by-side testing of the methods were summarized in a white paper by EPRI that was attached to the commenter's comment package.

The commenter requests that the EPA conduct an analysis for the filterable PM MACT floor using either the Method 5 or the Method 29 data. It is inappropriate to mix data from the two methods as they are not equivalent methods. The PM limit is set by the lower data obtained using the Method 29; however, compliance will be determined solely by Method 5 for the filterable PM option, which tends to yield higher results. The EPA is setting a standard that will make an already difficult limit to achieve even more difficult to meet due to the variability observed in PM data as a result of collecting the data using a different set of procedures under differing methodologies. The EPA is also proposing to further complicate compliance by adding back half condensable PM via Method 202 into the equation despite the fact that this is a brand new method and there is no historical data available over a period of time and operating conditions in the industry to fairly assess whether compliance is achievable. Given the above, we ask that the EPA recalculate a PM limit based only on the filterable Method 5 test data and re-propose the rule.

Response to Comment 123: Although the EPA is concerned over the potential that filters used for Method 5 and 17 filterable particulate analyses may include sulfate artifacts, we do not believe that these artifacts significantly impact the calculations of the standards. By ordering of the test data from lowest to highest prior to selecting the best performing 12%, we believe that we are limiting the number of tests having a significant positive bias. We also recognize that other test criteria may influence the amount of particulate measured and we specified alternative filter temperatures for Method 29 and 26A for greater consistency with previous emissions tests. We do not agree that it is inappropriate to mix data from two methods as long as the critical components which potentially cause differences are controlled to the same criteria. For example, by revising the Method 29 filter temperature from 250 ºF to 320 ºF we have avoided the differences that may exist compared to the particulate measured at utilities with Method 5. We do not believe that the addition of the December 2010 revision of Method 202 introduces additional method variability. Although the 1990 version of Method 202 has a high degree of variability due to the inconsistencies between different testers selection of the allowed alternatives and the additional variations which they believe were appropriate, the December 2010 version has eliminated all the variations to make a single set of standardized and improved procedures which improve the precision and consistency among and between testers.

15. Organic HAP floors.

Comment 124: Commenter 17620 suggests the EPA address organic HAP emissions, including dioxins, furans and products of incomplete combustion, and calculate MACT floors and evaluate MACT technologies for these pollutants in the EGU sector, just as it has done for other sectors.

Response to Comment 124: The EPA has explained its rationale for the use of work practice standards for the organic HAP in the proposal preamble. Further, the EPA believes that, although the approach in this rule in not consistent with the approach taken in all other NESHAP rules, each source category and its data are unique and must be handled as such.

Comment 125: Commenter 17620 states that the EPA has not explained why it is infeasible to set a MACT limit or MACT floor using the CO data in its possession. The EPA's Multi-pollutant Control Research Facility pilot-scale testing provides useful information as discussed in the proposal's preamble, but only describes the emission performance of units that presumably would comply with the CO MACT floor of less than 100 ppm that the EPA would otherwise have calculated (if the agency had done such a calculation). This testing is cited by the EPA as demonstrating that at low CO levels there is not a strong correlation between CO and organic HAP emissions. However, these data provide no reason to believe that reducing CO emissions to 100 ppm from much higher levels would not lead to meaningful reductions in organic HAP from units currently emitting CO at much higher levels. Thus, this issue requires additional study. The commenter agrees that, if upon examination, there is no correlation between organic HAP levels and elevated CO emissions, CO should not be used as a surrogate. In this event, however, the EPA would be obliged to set a MACT floor and MACT limits for each of the individual organic HAP of concern. This approach has successfully been employed by states issuing new source MACT permits.

Response to Comment 125: The EPA has explained its rationale for the use of work practice standards for the organic HAP in the proposal preamble and this final rule. The EPA does not have to justify not setting a surrogate CO standard for organic HAP as the commenter suggests. For the same reasons we do not believe it is practicable to measure organic HAP emission, we do not believe we can establish a reasonable CO surrogate standard.

Comment 126: Commenter 17620 states that the EPA makes an argument with respect to dioxins and furans, that, in some instances, not all congeners of dioxins have been found to be above detection limits in some samples. We do not understand the relevance of this argument. Dioxins are extremely hazardous chemicals and, although some congeners are more hazardous than others, the risk posed by dioxins is not dependent on all possible congeners being present.

Response to Comment 126: The commenter appears to suggest that EPA established work practice standards for organic HAP based on the identified factor alone. The EPA explained in the proposed rule its justification for establishing a work practice standard for organic HAP emissions from EGUs, including dioxins and furans. We maintain that the extent of the non-detects warrants use of the work practice standards.

Comment 127: Commenter 17812 supports the EPA's findings and approach to CO and THC in the Utility MACT rule. Setting no standard for CO and THC is correct given the data provided, and there is no justification for not taking the same precautions in setting standards for ICI Boilers, even if only for coal and liquid units.

Response to Comment 127: The EPA did establish work practice standards for organic HAP emissions from EGUs, however the approach taken for EGUs should not be viewed as precedent for other source categories (such as ICI boilers) as the commenter suggests. The EPA believes that, although the approach in this rule in not consistent with the approach taken in all other NESHAP rules, each source category and its data are unique and must be handled as such.

16. Acid gas HAP floors.

Comment 128: Commenter 17620 asks if, as the EPA assumes, the MACT floor for acid gas emissions will result in 290 MW of capacity having some form of acid gas scrubbing, what is the rationale for not establishing these technologies as MACT? The EPA has not explained why it has not chosen these technologies as MACT and has not discussed the adverse environmental impacts of failing to do so. As proposed, installed control capacity would not have to be fully utilized unless needed to meet the MACT floor-based limit. The EPA's model assumes installation of controls whenever an existing unit currently exceeds the proposed limit, but operation only to the extent needed to meet the applicable limit. Establishing these technologies as MACT would have the effect of requiring installed capacity to be fully utilized and of requiring that the remaining 10 GW install these technologies. Since requiring full utilization of installed control devices is a highly cost effective means of reducing pollution, the EPA should set forth a clear rationale for any final decision it makes on this issue and, at a minimum, require operators to reasonably minimize HAP emissions by fully utilizing the capabilities of MACT control systems after installation.

Response to Comment 128: The EPA does not require a particular control mechanism under MACT. Instead, the EPA evaluates the data of the best performing sources and establishes a numeric emission standard that sources must meet at all times. See section 112(d)(2) and (3). Sources are required to comply with the standard in any way possible, and sources will have to employ varying levels of control to comply with the standards. The final standards are not invalid simply because not all sources will have to employ a certain control technology to comply. The EPA could if we had sufficient data on the costs and non-air quality health and environmental impacts and energy requirements consider such an approach as a beyond-the-floor level of control. We do not have sufficient data and commenter has not provided it. Furthermore, given the current level of control required in the final rule, we believe it is unlikely the additional HAP emissions reductions would be achieved in a cost effective manner. And, in any case, the EPA believes that the emission limits in the final rule will result in the proper operation of emission control technology that will generally yield maximized HAP emission reductions.

Comment 129: Commenter 17843 supports proposed acid gas HAP MACT standards that have the potential of reducing acid gas emissions from EGUs by over 90 percent, with the caveat that the EPA should follow conventional rounding rules to establish the standards. The commenter also supports using HCl as the surrogate indicator for acid gas HAP in a technology-based MACT standard.

Response to Comment 129: The EPA appreciates the support of the commenter. We address the rounding issue in response to other comments.

17. HAP metals floors.

Comment 130: Commenter 17621 notes two discrepancies between the EPA's description of the procedure used to derive MACT floor limits and the implementation of that procedure. The EGUs used as the basis for new unit limits for chromium and selenium are not the lowest emitting units. No

explanation is offered for why those EGUs were selected. This discrepancy is present both in the coal MACT PM workbook (EPAHQ-OAR-2009-0234-3038) and in the revised MACT floor memo (EPA-HQ-OAR-2009-0234-9858.)

Response to Comment 130: The data have been reassessed and the new source emission limits for both Cr and Se have been revised accordingly.

18. Floors for oil-fired units.

Comment 131: Commenter 17711 states that the EPA should base MACT floor calculations on EGUs that are commercially operated on a regular basis (the four distillate fired EGUs in the EPA's dataset are not routinely operated).

Response to Comment 131: The EPA has considered all the available HAP emissions data from units in the different subcategories consistent with the statute. See CAA section 112(d)(3)(A). The limited-use liquid oil-fired EGU subcategory is addressed in the preamble to the final rule.

Comment 132: Commenter 17760 recommends that the EPA reset the MACT floor for existing oil-fired units so that they include data from co-fired units, adjusted to exclude the contribution from gas-firing. Owners and operators of co-fired units incurred significant costs to conduct the testing required by the 2010 ICR with the understanding that the EPA would adjust the data so that it reflects operation on oil only and use that data in setting the standards. The EPA opted to completely disregard this data in establishing the proposed standards, as well as in its determination of how many units should make up the MACT floor. By ignoring this data, the EPA set the floor based on fewer sources than it should have. The EPA should have adjusted and used such data to develop the proposed standards and the EPA has not offered any justification for its failure to do so.

Response to Comment 132: Upon receipt of the data noted by commenter, the EPA determined that there was no feasible method to adjust the HAP emissions data for the amount of natural gas fired, particularly given the amounts of gas that were fired in some cases. Prior to their stack testing efforts, the EPA was contacted by several companies that had oil-fired EGUs that co-fired natural gas and oil. These companies explained that, due to contracts, they could not stop co-firing to perform 100 percent fuel oil-fired stack testing. The EPA agreed to let those companies test under their "normal operation" even if that operation included co-firing oil with natural gas. We also indicated that the EPA would try to utilize the data if possible. However, the EPA did not realize that the percent natural gas fraction would be as large as it was in some cases and after reviewing the test data we concluded that it is not possible to utilize most of these data. As to the commenter's suggestion to exclude the contributions from natural gas firing, EPA believes it is not possible to separate post-combustion HAP emissions and attribute them to separate fuels (i.e., apportion the data to the oil fraction versus the natural gas fraction). The EPA believes that including such co-firing data in the MACT floor analyses would result in a skewed emission limit that oil-fired EGUs without access to natural gas would be unable to meet. Therefore, the EPA had to disregard these selected co-fired derived data from EGUs exceeding the 10 percent threshold mentioned above from the data used to analyze HAP floor emissions and to develop the final oil-fired EGU limits.

Comment 133: Commenters 17711 and 17804 believe it is inappropriate to use the data from four boilers designed to burn distillate oil as the basis for setting the MACT floor for the population of boilers that burn residual oil. Distillate is no longer used in EGUs because of its high cost (typically

costing 50 percent more than residual oil according to U.S. Department of Energy's Energy Information Administration). As a practical matter, use of distillate oil to define the MACT floor will effectively eliminate the use of residual oil in many existing boilers.

Response to Comment 133: The EPA does not agree with the commenter. Our data show that residual oil EGUs with ESPs achieve the comparable level of performance as uncontrolled distillate-fired EGUs. Sources can choose to install controls or switch to distillate oil to comply with the final rule.

19. Additional subcategories.

Comment 134: Commenter 17730 states that the EPA has inappropriately used the ICR test data to categorize the top performing existing units and consequently created a bias toward lower emitting units in the top performing 12 percent of sources. Both the ICR reference units and the top 125 performing units are characterized by a high fraction of fluidized bed boilers, fabric filter particulate controls, and sorbent injection for Hg control. These characteristics of boilers and fabric filters promote Hg control. Both the fluidized bed boilers and the stoker boilers generate ash or solid byproducts with relatively high inherent carbon content. These units thus effectively generate their own "inherent" carbon-based sorbent. Almost without exception, these units employ a fabric filter to control PM. As a result, the inherent Hg control for this combination of boiler type and particulate collector is extremely high, due to the extended residence-time of carbon-containing particles trapped on the filter media. The over-representation of fabric filter-equipped fluidized bed boilers in the database biases the analysis. The commenter believes that the fluidized bed boilers should be carved out of the ICR test data and used to create a separate subcategory of boilers. If the EPA were to create a separate fluidized bed subcategory, the Hg emission limit for existing conventional PC-fired boilers would more appropriately be set at a higher value.

Comment 135: Commenters 17817 and 17931 believe that more subcategories are needed. They state that the proposed existing unit MACT standards are not achieved by the best performing 12 percent of existing sources, rather the EPA has, in most situations, aggregated all sources, including widely disparate fuel-burning technologies, fuel sources, and air pollution control technologies into a single category. This is not practicable in the regulatory process and it ultimately leads to much uncertainty on the part of sources. The EPA has selected the source with the lowest emission rates for each particular HAP without regard to the performance of those same sources for other HAP.

Comment 136: Commenter 17885 states that the EPA needs to subcategorize for purposes of issuing realistic new unit MACT standards. For example, the proposed new unit PM limit is based on a one unit with a CFB design having no FGD. The limit is many times more stringent than the existing unit MACT limit. The EPA is well aware that because PC units with FGDs emit small amounts of PM as compared to a CFB, no new PC unit requiring FGD installation can achieve the proposed new unit PM MACT. The configuration and designs of CFB units would allow them to achieve low levels of PM emissions that PC unit with an FGD cannot. Considering the combination of new unit MACT proposals, the unit required to meet the proposed MACT limits would have to have a dry FGD, a wet FGD, an ESP, and finally a fabric filter, as well as be a CFB and a PC utilizing all coal ranks at once. Presently there is not and cannot ever be a unit designed with this required configuration. IGCC technology cannot achieve the proposed new unit MACT levels. A new MACT standard must be based on the best controlled similar source. And yet, no one source exists or can exist that has the combination of technologies and combustion designs required to achieve all the proposed MACT standards. The EPA must therefore proposed new MACT standards based on subcategorization as required to comport with reality.

Commenter 17901 states that the EPA narrowed the data set for the establishment of the high heat content coal (greater than 8,300 Btu/lb) Hg limit from the 131 units evaluated for HCl and PM to 40 units, most of which controlled Hg using ACI. By limiting the data set, the EPA completely ignored the class of units utilizing bituminous coals, eastern coal boiler designs with wet scrubbing, SCR and ESP technologies. As recent section 112(g) analyses for new eastern coal projects have demonstrated, this eastern coal boiler design and control equipment configuration is very effective at controlling Hg emissions. However, the EPA has unreasonably overlooked this data when selecting a subcategory of units for consideration.

Response to Comments 134 - 136: The EPA has responded to comments on other subcategorization approaches elsewhere in this document.

20. MACT-on-MACT.

Comment 137: Commenter 18498 asks the EPA to consider the development of MACT standards considering recent case law in *Medical Waste Institute*, No. 09-1297, 2011 WL 2507842 (D.C. Cir. June 24, 2011), the D.C. Circuit heard a challenge to the EPA's October 2009 MACT standard for new and existing hospital/medical/infectious waste incinerators ("HMIWI"). The D.C. Circuit had previously heard a challenge to the EPA's 1997 HMIWI MACT standard. *Sierra Club v. EPA*, 167 F.3d658 (D.C. Cir. 1999). Although the court found the rule "hopelessly irrational," it chose not to vacate the rule, instead leaving the rule in place rather than allowing the industry to be unregulated and remanded the rule to the EPA for reconsideration. After the Court's decision, 94 percent of the HMIWI shutdown and an additional 3 percent obtained waivers from the 1997 HMIWI MACT rule's requirements.

When the EPA proposed a new HMIWI MACT standard in December 2008, the EPA based its MACT floor on data from the 57 HMIWI remaining in operation, rather than the original 1997 data set. In *Medical Waste Institute*, the petitioners sought review of the revised HMIWI MACT rule in the D.C. Circuit, arguing that the EPA improperly relied on post-compliance emissions data to set the MACT floor and that its pollutant-by-pollutant approach was impermissible under the CAA. The petitioners argued that the EPA had artificially ratcheted the MACT floor downward because the EPA considered data from the best performing 12 percent of sources, which were already regulated under the 1997 HMIWI MACT, rather than basing its MACT floor on data from unregulated sources. Further, the petitioners argued the EPA did not identify a top-performing unit that is best controlled overall but rather identified the top-performing unit for each pollutant. The petitioners argued that the EPA had set its floors with reference to a hypothetical Franken-plant that attains maximum emissions control for every pollutant, and that the EPA had violated the CAA in so doing because the floors have never been achieved in practice by any single unit. The Court held that the EPA properly relied on post-compliance emissions data because the EPA was setting an initial MACT floor and because it was the most reliable data set the EPA had available. In light of the *Medical Waste Institute* decision, Commenter makes the following comments on the EPA's proposed EGU MACT rule.

In the current rule, the EPA improperly considered emissions data from major sources of HAP, such as Commenter's Spurlock Unit 3, that have implemented case by case MACT determinations under CAA section 112(g) due to the lack of an applicable MACT standard at the time of construction of those sources. The EPA's approach can be termed MACT-on-MACT because the EPA set an initial MACT standard using data from sources already operating MACT controls. This approach has resulted in the EPA setting a lower MACT floor than it would have been able to if it had used data from unregulated sources. Commenter suggests that the EPA modify the data set it used to set the MACT floor to exclude

data from sources that have implemented case-by-case MACT determinations under CAA section 112(g). Excluding such data from the EPA's review of the best performing 12 percent of sources would provide a much more accurate MACT floor.

Commenters 18498 and 19114 also believe that the EPA should exclude sources that have implemented case-by-case MACT determinations under CAA section 112(g) from the EGU MACT. These sources already operate under stringent HAP limits.

Response to Comment 137: The commenter has provided no legal basis for its assertion that units with case-by-case MACT limits should be excluded from the pool of best performing units, and we do not believe such a prohibition exists. In fact, we believe it would be unreasonable to exclude such units from the MACT floor pool. CAA section 112(d)(3)(B) contains a specific exclusion on the use of data from "those sources that have, within 18 months before the emission standard is proposed or within 30 months before such standard is promulgated, whichever is later, first achieved a level of emission rate or emission reduction which complies, or would comply if the source is not subject to such standard, with the lowest achievable emission rate (as defined by section 7501 of [the CAA]) applicable to the source category and prevailing at the time." We interpret the inclusion of this exclusion as evidence that Congress understands how to limit the agency's consideration of data in setting MACT floors. The absence of a similar exclusion for sources subject to section 112(g) standards leads us to conclude that we are not prohibited from considering such data, and instead that we must consider the information we have from such units at the time we establish the standards.

The EPA also disagrees that sources subject to section 112(g) standards should exempt from this final rule. We find no basis for such an exclusion under the statute and commenters have not provided one.

21. IGCC units.

Comment 138: Commenter 19114 states that the IGCC processes should be exempted from the proposed NESHAP for coal- and oil-based EGUs. IGCC processes are inherently different from other methods of coal-based electric generation and more similar to natural gas combined cycle units in terms of design and emissions. In fact, several coal-based gasification projects are being developed to produce synthetic natural gas that will compete with natural gas suppliers in marketing to combustion turbine generators and other industries. Combustion turbines for IGCC units are typically designed to fire natural gas or syngas, and are typically equipped with the same dry low NO_X burners and water injection emission controls used for natural gas units. The IGCC heat recovery steam generator is typically designed with duct burners that utilize natural gas. Because of the similarities of natural gas combined cycle and IGCC units, both are currently subject to the same NESHAP listed under 40 CFR part 63 subpart YYYY, (Commenter cited section 63.6080. What is the purpose of subpart YYYY? and section 63.6085. Am I subject to this subpart?) Therefore, because of the similarities to natural gas combined cycle units and the applicability of subpart YYYY, the EPA should exempt IGCC processes from the final rule.

Response to Comment 138: Because IGCC units fire a "fossil fuel" derived from coal and/or solid oil-derived fuel, the EPA believes that they meet the statutory definition of an EGU under CAA section 112(a)(8) and, thus, must be regulated under this action. The combustion turbine NESHAP (40 CFR part 63, subpart YYYY) was finalized prior to the 40 CFR part 60, subpart Da, amendments that brought IGCC under the utility boiler rules and it does currently cover the turbine engine at an IGCC facility. However, the majority of the combustion turbine NESHAP is currently stayed until the formaldehyde

risk is redone. When the NESHAP (40 CFR Part 63, subpart YYYY) is reopened the EPA will address any potential double coverage that may exist.

Comment 139: Commenter 19114 states that the EPA's use of data from the only two IGCC units operating in the U.S. misrepresents the design and potential performance of future IGCC units. A suite of IGCC design options are being developed for a variety of coal types and operating scenarios. To date, commercial-scale IGCC technology has been demonstrated at only two units in the U.S. The design of these two units represents only a small fraction of the IGCC technologies and coal types that could be used in the future. Further, most of the syngas cleanup technologies presented have yet to be utilized on a coal-based IGCC process, such that their performance and their ability to meet the proposed MACT standards is unknown. In developing the final rule, the EPA should consider the wide-range of IGCC design options and the many unknowns with respect to unit performance and the capabilities of syngas cleanup systems.

Comment 140: Commenter 19114 states that future IGCC units will represent first-of-a-kind technologies that pose inherent performance risks. Although the use of IGCC in the U.S. has been very limited, research and development related to commercial-scale IGCC processes has been extensive. The design of future IGCC units will utilize first-, second-, and nth generation of technologies and process integrations that create inherent uncertainties with respect to equipment performance and reliability. It also creates uncertainty with respect to the emissions profile for these future units, especially with respect to the emission of compounds present in trace concentrations. In developing the final rule, the EPA should consider the risks associated with the use of first-of-a-kind technologies at future IGCC units.

Comment 141: Commenter 19114 states that the IGCC processes are inherently different from other methods of coal-based electric generation and more similar to natural gas combined cycle units in terms of design and emissions. If IGCC units are not exempted in the final rule, then the standards should be revised to address the unique characteristics of IGCC processes. Issues that would need to be addressed include:

- operating scenarios when coal-based syngasis not consumed by the combustion turbines, but by other process systems, such as a flare, thermal oxidizer, etc.
- operating scenarios when the combustion turbines are firing only natural gas or co-firing natural gas and coal-based syngas.
- operating scenarios when the combustion turbines are consuming coal-based syngas and natural gas is combusted in duct burners in the heat recovery steam generator.
- operating scenarios when coal and other carbonaceous compounds (petcoke, biomass, municipal solid waste, etc.) are simultaneously being gasified to produce a syngas.
- combustion turbines that use synthetic natural gas (coal-based syngas) that is produced offsite by another facility.

Comment 142: Commenter 19114 states that if IGCC units are not exempt from the final rule, the applicability work practice standards, which as proposed are designed to address the unique design and operating characteristics of IGCC processes.

Response to Comments 139 - 142: Because IGCC units fire a "fossil fuel" derived from coal and/or solid oil-derived fuel and generate electricity with steam, the EPA believes that they meet the statutory definition of an EGU under CAA section 112(a)(8) and, thus, must be regulated under this action.

However, the EPA does acknowledge their uniqueness and is finalizing that they should be subcategorized from conventional coal-fired EGUs. The EPA appreciates that the two existing IGCC EGUs may not be representative of IGCC EGUs that may be built in the future. However, absent any data from these "future" IGCCs, the EPA must use the data from the two existing units upon which to base the existing-source MACT floors. However, the EPA also recognizes that it was incorrect in proposing beyond-the-floor emission limits for new IGCC EGUs based on new pulverized coal-fired EGUs because it had no data from new IGCC designs and installations. Therefore, partly based on comments received and as noted elsewhere in this document, the EPA is finalizing emission limits for new IGCC EGUs based on permit information for filterable PM and Hg, on projected SO_2 levels from DOE information, and on typical new-source analyses for the non-Hg metallic HAP. The EPA has also modified tune-up and work practice language to be applicable to these units.

22. Floor should be based on a minimum of five sources.

Comment 143: Several commenters (17711, 17904, 17914, 17930) state that it is appropriate to always use at least five sources to set MACT floor limits in order to ensure that variability is fully considered and that the MACT floor sources adequately represent the subcategory. The use of a minimum of five sources to set MACT floors can be justified under the "absurd results" doctrine. Congress clearly expected enough emissions information to be available for larger source categories to generally cause more than five sources to constitute the top 12 percent. It makes no sense for Congress to specify a minimum number of sources for source categories with few sources, but then to create a rule that would allow for standards to be set using data from fewer than five sources in larger source categories. Using no less than five sources would give effect to the clear intention of Congress. Commenter 17930 states that it is not pragmatic to use just two units in setting a floor.

Response to Comment 143: We disagree with commenters for the reasons explained in response to comments in the preamble to the final rule.

Comment 144: Commenter 17725 states that the EPA has misinterpreted the statute for establishing the emissions floor for existing units for subcategories with less than 30 sources. Commenter believes that the EPA has misinterpreted the intent of the statutory requirement for calculating the emissions floors for existing units for subcategories containing less than 30 sources. According to section 112(d)(3): Emission standards promulgated under this subsection for existing sources in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than— (A) the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information), excluding those sources that have, within 18 months before the emission standard is proposed or within 30 months before such standard is promulgated, whichever is later, first achieved a level of emission rate or emission reduction which complies, or would comply if the source is not subject to such standard, with the lowest achievable emission rate (as defined by section 171) applicable to the source category and prevailing at the time, in the category or subcategory for categories and subcategories with 30 or more sources, or (B) the average emission limitation achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory for categories or subcategories with fewer than 30 sources."

It is clear that a subcategorization for lignite sources (referred to within the proposed rule as "Units designed for coal < 8,300 Btu/lb") is needed for Hg as the EPA proposed. Likewise, it is clear that Congress' intent was to specify a specific minimum of five emissions sources from which data would be

required in order to establish meaningful emission floor values. However, the EPA appears to have calculated the emissions floor values for existing lignite sources using only data from two sources. The EPA must base its analysis upon data that the "Administrator has or could reasonably obtain" from at least five sources. It is clear that the Agency has Hg emissions data for more than five lignite sources in the ICR database so it should conduct the floor analysis using data from five sources.

Commenter 17813 also believes that the EPA should have used a minimum of at least five sources.

In response to a similar comment made during the Portland Cement MACT rulemaking the Agency stated that: EPA does not agree that section 112 (d)(3) mandates a minimum of 5 sources in all instances, notwithstanding the incongruity of having less data to establish floors for larger source categories than is mandated for smaller ones. The literal language of the provision appears to compel this result. Unfortunately, the Agency's response here is unclear. It is also unclear whether the EPA believed that section 112(d)(3)(A) or section 112(d)(3)(B) of the CAA applied since the subcategory is presented as having 30 members in Table 12 of the preamble but "includes fewer than 30 sources" in the floor analysis memo in the docket.

Commenter would agree that the EPA would be able to use fewer than five sources in some cases, but only where there are fewer than five sources in the class or the EPA could not reasonably be expected to obtain emissions data for at least five sources. Otherwise, Congress' intention seems clear that a minimum of five sources should be used. The EPA would seem to be expressing that the CAA section 112 literally allows you to have fewer sources for a larger source category. However, it is more logical to assume that Congress' intent was to set a minimum threshold of data of five sources for larger categories as well. It is only logical that the emission floor values for subcategories with more than 30 sources should be based on data from at least as many sources as are required for subcategories with less than 30 sources. It should not be considered a "loophole" for the EPA to avoid a more thorough analysis.

Response to Comment 144: We disagree with commenters for the reasons explained in response to comments in the preamble to the final rule.

23. Consideration of costs.

Comment 145: Commenter 17840 states that the proposed rule runs counter to the House Report on section 112. For example, "In the determination of MACT for new and existing sources, consideration of cost should be based on an evaluation of the cost of various control options. The Committee expects MACT to be meaningful, so that MACT will require substantial reductions in emissions from uncontrolled levels. However, MACT is not intended to require unsafe control measure, or to drive sources to the brink of shutdown." House Rep. 101-490, Part 1, at 328.

Response to Comment 145: The EPA may not consider costs when establishing the MACT floor consistent with section 112(d)(3). Before EPA may establish standards based on limits beyond the MACT floor, EPA must consider costs and non-air quality health and environmental impacts consistent with CAA section 112(d)(2).

Comment 146: Commenter 17768 states that there are three reasons supporting an interpretation that allows consideration of cost. First, in *Entergy v. Riverkeeper*, the Supreme Court affirmed that just because a statute does not require analysis of costs or benefits does not necessarily mean an Agency cannot perform cost-benefit analysis. Second, section 112(d) explicitly allows consideration of benefits

when defining "achievable" in certain contexts and that given the broad statutory language, the lack of a prohibition, and the overall purpose of the statute, EPA likely has authority to interpret section 112(d) to allow the consideration of costs and benefits. Third, consideration of costs and benefits under CAA section 112(d) will not disrupt the structural distinctions found by the Court in *Sierra Club*. CAA section 112(f) remains a public health and risk-based provision that almost certainly excludes consideration of costs. *See Whitman v American Trucking Association*. The interpretation described above would maintain a four-part structure when applying section 112(d) and section 112(f) together. CAA section 112(d)(3) mandates a technology-based floor. CAA section 112(d)(2) gives EPA discretion to go beyond this floor, to achieve the "maximum degree of reduction . . . achievable" in light of costs and benefits. CAA section 112(f)(2)(A) then has two parts: first, a health-based standard where EPA is prohibited from considering costs; and second, an environmental risk-based standard where EPA must consider costs to determine whether to go beyond the health-based standard. This interpretation preserves *Sierra Club*'s distinction between the two stages of the standard-setting process.

Response to Comment 146: The EPA may not consider costs when establishing the MACT floor consistent with CAA section 112(d)(3). Before EPA may establish standards based on limits beyond the MACT floor, EPA must consider costs and non-air quality health and environmental impacts consistent with CAA section 112(d)(2). We need not address the comments concerning CAA section 112(f) as we are not establishing standards pursuant to that provision. As the trilogy of cases, *National Lime*, *Cement Kiln Recycling*, and *Sierra Club* (brick), clarify, CAA section 112 establishes a 2-step process: the first is to set a minimum level of stringency based on the best-performing sources, regardless of whether all sources in the category can achieve it, and then to consider further emission controls based on cost and the other statutory factors. Thus, commenter's assertions are in conflict with the governing caselaw.

24. Other.

Comment 147: Commenter 17637 requests more flexibility in the stated abatement measures because they are uncertain that listed control options are capable of achieving the proposed emission limits. For example, at the commenter's Merrimack Station, wet scrubber technology is being installed in preference to dry scrubber technology to achieve greater emission reductions. Although each generating unit has different boilers and fuel sourcing requirements, and many can be grouped together due to some fundamental design similarities; still there are many differences. For example, two of the commenter's units are wet bottom, cyclone fired coal units that are much different than pulverized coal-fired boilers. These boilers also require only coals with specific ash characteristics among other things. Boiler type, coal type and unit size all contribute to differences that must be considered in any broad rule making.

Response to Comment 147: We believe that we have considered the appropriate factors noted by commenter in our analysis. Further, we believe that there are available emission control technologies for the varying conditions noted such that the EGUs can achieve compliance with the final standards.

Comment 148: Commenter 18500 states that the EPA failed to provide analysis and discussion of alternative control strategies to MACT regulation of EGUs. The inclusion of a provision directing the EPA to examine alternative control strategies to MACT indicates that Congress intended the EPA to consider alternatives to MACT regulation that might not be required once the EPA had taken into account all of the reductions required elsewhere under the CAA.

Response to Comment 148: The EPA disagrees with the commenter. The EPA has explained its regulatory approach in the proposed rule and in response to comments in the record for the final rule.

Comment 149: Commenter 17736 states that the Agency's haste in developing a rule as complex, and of such magnitude, as the proposed Utility MACT is problematic in itself. The EPA's ability to determine reasonable, feasible MACT standards was further blurred by several factors, including the Agency's reliance on insufficient and inaccurate data, inclusion of startup, shutdown and malfunction periods in the MACT standards, and a failure to recognize the need for additional subcategories, as provided for under the CAA. Each of these major deficiencies is further compounded by, and partially the result of, the EPA's emphasis on micro-economic analyses and faulty assumptions. As a result, the compliance and implementation requirements proposed in the Utility MACT Rule are unreasonable and, in many cases, will be impossible to achieve. Substantial reconsideration of the requirements under the proposed rule is necessary- even if doing so will require the EPA to delay final promulgation of the Utility MACT.

Response to Comment 149: The EPA disagrees with the commenter. The EPA has explained its regulatory approach and responded to similar comments in the proposed rule and in response to comments in the record for the final rule. The EPA does not understand the commenter's reference to micro-economic analyses and faulty assumptions, but we based the final rule on the proper considerations. As the commenter has not indicated which assumptions it believes are faulty, we need not reply. We have revised in the final rule the compliance assurance requirements partly based on comments received.

Comment 150: Commenter 17752 notes that the controls that would have been necessary to comply with CAIR were substantial, but, unlike the proposed MACT regulations, these requirements were not going to be enforced on a unit-by-unit basis. Each affected state was given an allowance budget, which it allocated to individual units. If the controls installed at a particular unit did not achieve the reductions mandated by the final rule, the utility was allowed to go to the market and purchase any allowances needed to cover emissions above the standards. Consequently, the risk from acting early was low. Indeed, there was a financial incentive to act early if controls achieved additional reductions, because the accumulated allowances could be sold in the market.

Response to Comment 150: We are not sure how this comment relates to this final rule. Commenter is correct that EPA did not establish a trading program in this final rule, and we question whether CAA section 112(d) authorizes such an approach, at least in the MACT floor setting process.

Comment 151: Commenter 17775 states that complying with the rule is greatly complicated by the unprecedented scope of the rule and the HAP-by-HAP approach that will require most EGUs to add or modify existing control equipment. Utilities will be forced to compete with one another for equipment suppliers, engineering firms, construction firms, skilled trade workers and heavy construction equipment such as cranes. The competition for these services will be even greater considering that two other very significant CAA regulations will require compliance on similar time frames – the CSAPR and the IB MACT rule.

Response to Comment 151: EPA has established the standards in the final rule consistent with the statute. We address these comments elsewhere in response to other comments in the final rule record.

Comment 152: Commenter 17841 states that the term "control" should not be construed as relating only to the installation of so-called "back-end" or "add-on" controls to an existing unit. The term should be construed to encompass "measures, processes, methods, systems, or techniques" including the

installation of a replacement unit which would embody new or refined "processes, methods, systems or techniques".

Comment 153: Commenter 17805 recommends that the EPA take into account other methods for Hg control. For example, co-feeding limited amounts of tire-derived fuel with coal could be a viable control option as opposed to ACI. Injection of an oxidizing agent, such as calcium chloride, may also assist in achieving compliance with Hg emission limits, or possibly represent a singular control method, at a facility. Similarly, oxidizing agents coupled with a wet scrubber or ESP for particulate control may also provide some control of non-Hg metals without the need for a baghouse.

Response to Comments 152 - 153: The EPA believes that all measures noted by the commenters are included in the database to the extent they were used during the emission tests that provided the HAP data to EPA. The EPA is aware, for example, of at least one EGU that was spraying a halide on its coal prior to combustion. We also know that some in the industry employ coal washing prior to combustion, which reduces certain fuel borne HAP (e.g., metal HAP). We would note, however, that co-firing a solid waste would subject the EGU to standards issued pursuant to CAA section 129 (e.g., the final CISWI rule).

Comment 154: Commenter 17857 recommends a subcategorization by fuel-type, along with the emission unit basis approach (instead of pollutant basis), for MACT standard setting. Such a method should address the EPA's objective for providing a meaningful standard that is also technically achievable.

Response to Comment 154: The EPA has addressed comments related to subcategorization by fuel type and establishing MACT standards on a pollutant-by-pollutant basis in response to other comments in the final rule record.

Comment 155: Commenter 18021 requests that the EPA take into account the other requirements that apply to the utility industry. These include maintaining generating capacity sufficient to meet demand through improving energy efficiency of its operating systems, which also contributes to minimizing emissions. Waste disposal practices will be impacted. Where we presently reuse materials, changes to meet new standards will make reuse impractical and incur a new cost not taken into account.

Response to Comment 155: The EPA established the MACT standards for EGUs consistent with statute. We question how we could legally consider the factors identified by the commenter in establishing standards, and the commenter has not explained their rationale for including such considerations, particularly in the MACT floor setting process. Commenter has also not explained how these factors would affect the performance of units in a manner we could quantify.

Comment 156: Commenter 18034 states that the EPA's use of multiple approaches to selecting data for the MACT floor analyses are inconsistent and arbitrary. Emission limits should not be based on single test runs. In some MACT floor analyses, the EPA uses the average of three test runs from the unit selected for the new unit MACT floor, and in other analyses, the EPA uses the lowest run of three test runs. In at least one case, the EPA MACT floor analyses spreadsheet indicates that the mean of multiple runs is used when in reality the cell formula for the mean uses the average of a single cell representing the lowest test run with no explanation given. The EPA should be using a consistent approach to selecting the data for establishing the MACT floors and provide a detailed explanation of their approach. Any deviation from the process must be justified and explained clearly so the public has the opportunity

to comment. In addition, relying on isolated test runs to establish regulatory emission limits when additional data is available is questionable and technically unsound. The EPA should be making maximum use of the data available rather than arbitrarily excluding valid test data.

Response to Comment 156: The EPA has reviewed its analysis and confirmed consistency in the equations. We must establish the CAA section 112 emission limits based on the data that we have available to us; in this case, that is primarily manual testing consisting of sets of three runs. For the existing-source limits, we used the average of the three runs. For the new-source limits, to be able to be able to account for any variability, we used the individual emission test runs in developing the limits. We believe that we are using a consistent approach in our analysis of the data and making maximum use of the data available.

Comment 157: Commenter 18039 is very supportive of the draft regulations overall, but notes that some elements of the MACT assessment could be improved upon which would likely lead to more stringent limits that are both achievable and would result in greater reductions of emissions. Towards this end, Commenter encourages the EPA to carefully reanalyze its development of the MACT standards to more accurately reflect the actual observed emissions of the best performing 12 percent of facilities.

Commenter supports the EPA addressing additional HAP beyond the two pollutants (nickel and Hg) addressed in the vacated CAMR. Other metals such as arsenic, and other toxics such as HCl, are also emitted from utility boilers. The EPA's inclusion of multiple HAP in the proposed rule is appropriate as it will be more cost effective for power plants to address toxic emissions together rather than piecemeal.

Response to Comment 157: The EPA agrees that the regulation in the final rule should address all HAP from EGUs. We maintain that we have carefully considered the available data and established standards consistent with the statute.

Comment 158: Commenter 18426 has completed three 112(g) case-by-case MACT determinations for solid fuel-fired EGUs, and one major NSR determination on an existing coal-fired power plant with four solid fuel-fired EGUs. The general approach taken for the 112(g) determination was to obtain information on units permitted since 1999 using the assumption that newer units would be the best performing. A summary of the information, which includes data from permits, permit reviews, and compliance testing for comparison to the MACT emission limit standards assessed for the proposed rule, was included in the commenter's submittal. The existing units as permitted could have problems meeting the proposed standards in subpart UUUUU for HCI and Hg. For Hg, since the units do fuel switch and are designed for a higher heat input coal, Hg-specific control could be added to meet the standard.

A new unit, as designed and permitted, will not be able to meet the proposed standards in subpart UUUUU with the possible exception of Hg since the unit will likely be designed for a lower heat input coal, and organic HAP, since no standard is proposed. The standards for new units appear unachievable with the control options available now, and in the foreseeable future. And, conversely the standards for existing units appear too generous for those pollutants whose emissions can be accurately predicted if the unit is well controlled.

Response to Comment 158: We are unclear whether the commenter's point concerning the EGUs with CAA section 112(g) MACT limits is that they will be unable to meet the existing or the new-source MACT limits. Some CAA section 112(g) sources will be existing sources under the final rule and since

the commenter states that the existing source standards are reasonable we assume the commenter is referring to the ability of the EGUs to comply with the new source limit. We respond to another comment in which we explain how EGUs (including those that are new sources under the final rule) with valid CAA section 112(g) limits may be provided additional time to comply with the final rule consistent with EPA regulations. Also, EPA does not agree that the new source standards in the final rule are not achievable and we have identified at least one existing source that is currently complying with all of the final new source limits.

Comment 159: Commenter 17904 states the EPA's proposed MACT floor standards are not achievable. To satisfy this requirement, the standards proposed by the EPA for existing sources must, at the very least, have been "achieved by the best performing 12 percent" of sources. The EPA has proposed limits that do not meet this standard. Additionally, the EPA's calculation of the MACT floor for Hg for lignite boilers contains errors. Finally, the EPA should properly account for variability in order to ensure sources are able to achieve the proposed standards.

Response to Comment 159: We believe that the emission limits in the final rule are achievable. The EPA believes it has adequately supported the beyond-the-floor Hg limit for low rank virgin coal units as explained in the proposed rule, supporting TSDs, and this final action. We address the compliance deadline issues elsewhere in this document.

4A02 - MACT Floor Methodology: Statistical Analysis

Commenters: 16122, 17383, 17402, 17620, 17621, 17627, 17638, 17648, 17689, 17712, 17716, 17725, 17728, 17729, 17730, 17739, 17775, 17796, 17800, 17817, 17820, 17821, 17843, 17845, 17846, 17877, 17878, 17885, 17886, 17898, 17902, 17912, 17929, 17975, 18014, 18021, 18039, 18421, 18447, 18449, 18487, 18498, 18644, 8443, 19536/19537/19538, 18023

Comment 1: Commenter 17739 states that the UPL calculation for Hg and HCl used the mean calculated from these minimum values, but used additional data from Part II and Part III to calculate the variability and, therefore, the mean and variance belong to two different and distinct data populations, and cannot be used together in the UPL calculation. The EPA should use the mean of all data and the variance of all data for the UPL calculation to be legitimately employed.

Response to Comment 1: When calculating a cut-off or prediction value to evaluate compliance of future observations using statistical approaches one must assume that future observations come from the same distribution as current and past data used in the development of the cut-off value. This same assumption was used to estimate the parameters that determine the UPL. More data usually results in better and more reliable estimates of a parameter (e.g., average or standard deviation (variability estimator)). The use of Part II and Part III data available from the top 12% performers to estimate the variability used in the UPL equation follows this approach. The Part II and Part III data used in the calculations of the UPL are data from the same sources that are in the top 12% of performers.

Comment 2: Commenter 16122 states that the EPA didn't provide in the ruling any reason for considering the 99 percent UPL for the MACT floor calculations. The commenter mentions the lack of explanation regarding selecting the significance level (why 99% UPL over the 97.5% UPL (as it did for the CAMR) or the 50% UPL). The commenter mentions that the selection of the confidence level is relevant given that an increase in the confidence level will dramatically increase the MACT floor.

Comment 3: Commenter 17620 states that the EPA does not clarify the selection of the confidence level (e.g., 99^{th} against 90^{th} confidence level). The commenter adds that the EPA has used the 90^{th} percentile in earlier Hg rulemaking and in setting the procedure for compliance by means of fuel sampling. Lower confidence levels, the commenter adds, were also used for complying options for reduced monitoring. The commenter says that the selection of the confidence level will have an impact on public health and the environment.

Response to Comments 2 - 3: The level of confidence represents the level of protection afforded to sources whose emissions are in line with the best performers, and hence it is not arbitrary. A 99% level of confidence means that a source whose emissions are in line with the best performers has 1 chance in 100 of exceeding the floor. Several confidence limits (e.g., 99, 99.9, and 95%) have been used in past rulemakings. The use of 99.9% to estimate individual units' variability was questioned in a past rulemakings, arguing that such a high confidence level was a departure from the EPA's approach in other rulemakings, which used lower confidence levels, such as 99, 95, or 90%. It was suggested that using 99.9% overcompensates for variability.

Later rulemakings (Portland Cement, HMIWI, and Boiler MACT, except for CO) have used 99%. Based on analyses at various percentiles, the 99% values are more in line with the highest test runs for the MACT floor units than the other percentiles, seldom falling below (like the 90 and 95%) but also not substantially exceeding (like the 99.9%). This finding suggested that the 99% provides a more

reasonable compensation for variability than the other percentiles, resulting in standards more representative of the level of emission reduction that sources are actually achieving on a daily basis.

In the case of the Boiler MACT limit for CO 99.9% was used. The reason is that CO emissions appear to exhibit much higher variability than emissions of other pollutants. Choosing 99.9% appeared to provide a more reasonable compensation for variability than 99%. This demonstrates that you have to always look at the actual data and the resulting limits and determine if they appear to capture variability adequately. We believe that we have done that in this case and that the 99% UPL is appropriate.

Comment 4: Commenter 16122 states that the EPA's proposed MACT floor overestimates the variability of the top performers, and that the proposed variability is really inter-source variability. Commenter states that in the preamble the EPA stated that the MACT floors were calculated considering the operational variability of the top 12% for each subcategory. Furthermore, the commenter claims that the variability considered in the equation involves more than operational variability. The commenter adds that the range of emission levels achieved by different EGUs are not similar to the day-to-day variability within an individual EGUs and for this reason the UPL overestimates the emission. The inter-variability, the commenter adds, summarizes the wide differences between the individual EGUs and not operational variability within an individual EGU.

Comment 5: Commenter 16122 states that according to the courts, the EPA can include variability when calculating MACT floors. However, the commenter adds, nowhere have courts found that EPA can account for inter-source variability other than averaging the emissions achieved by the top 12% performers. Moreover, the range of emission levels between sources with different designs, operations, and control technologies is likely much greater than the range of emission levels experienced within a source. The wide range of emission levels between different EGUs unjustifiably inflates the UPL because this range is largely caused by differences in unit design and available control technologies, not variability. Thus EPA's methodology violates the CAA by calculating a MACT floor that incorrectly accounts for differences between sources and bears no relationship to the average emission levels actually achieved by units in the top 12% performers.

Comment 6: Commenter 17402 considers that the EPA's approach is consistent with the case law interpreting section 112 and recommends that other sources of variability should be considered. Commenter recommends incorporating boiler variability and associated effects on emission controls. Boiler variability is not incorporated because test data used in the analysis was conducted at normal, full-load conditions.

Comment 7: Commenter 17402 states that the D.C. Circuit's interpretation of the CAA requires the EPA to adjust the MACT floor for variability. According to the D.C. Circuit interpretation of sections 112(d)(2) and (d)(3) the MACT floor has to be achievable by the best performing sources "under most adverse circumstances which can reasonably be expected to recur." The commenter adds that when developing MACT floors, the EPA must consider the factors that cause variability to ensure that the emissions limitations have indeed been achieved in practice by best performing units. Among the factors that may cause HAP emissions variability are operational variability of boiler and pollution control equipment, fuel variability, and test method variability. The commenter concludes that the EPA has a statutory mandate to base the MACT floor not on raw test data alone, but to take into account the reasonably anticipated worst-case emissions from the best performing sources.

Comment 8: Commenter 17402 agrees with the EPA in that variability is an element of facility performance and that it is reasonable to assess emissions of the best performers over a period of time in order to obtain a more accurate measurement of achieved emission levels. The commenter adds that HAP emissions data from best performers are based on the average of stack tests taken under uniform, steady-state and generally ideal operating conditions, however in reality this is not the case. The commenter agrees with the EPA adjusting the MACT floors for variability, because otherwise even the best performers could exceed the floor emission levels over a longer period of time when compliance is required.

Comment 9: Commenters 17739 and 18014 state that data used to establish the MACT floor only represents a snapshot in time and do not represent what a source achieves on a continuous basis. The commenters add that since the data used to calculate the UPL does not capture all operating conditions, all fuel conditions and other sources of variability, the results of the UPL are not valid because it does not ensure that the average performance of the top 12% of sources in the MACT floor would achieve the emission standards every day under all operating conditions. The commenter cites the Boiler MACT floor calculations where the EPA used a fuel variability factor.

Comment 10: Commenter 17775 states that the EPA did not make any attempt to assess the long-term variability in EGU MACT emissions. The commenter adds that the 2 or 3 days of stack sampling available were conducted under ideal plant conditions and do not reflect the long-term variability observed in the facility. The commenter adds that for coal fired EGUs, HAP emissions vary greatly because of large variations in trace element concentrations in the coal, even from coals mined from the same seam.

Comment 11: Commenter 17775 states that when the available data fails to capture long-term emissions variability attributable to varying concentrations of trace elements in coal, then the UPL would not be available to account for emissions variability. The commenter states that CEMS data from several performing units cannot comply with the MACT floor all of the time. This is the result, the commenter says, for not including variability accounting for factors such as fuel variability. The commenter criticizes the use of the UPL for new sources, when only three data points were used to calculate the MACT floor, resulting in a small variability adjustment for a single new unit compared to that used for existing units.

Comment 12: Commenter 8443 states that according with court resolutions (D.C. Circuit in *National Lime Ass'n v. EPA*) the standard floors must be achievable under most adverse circumstances which can reasonably be expected to occur. The commenter adds that to ensure that the emission limits is set at a level that the best performing sources will not violate, the EPA must assess the variability in the best performers and incorporate them in the calculations of the limit. For example, the commenter adds, the EPA must include the variability of control equipment as well as non-technology factors that may influence the best performing units. It is an incorrect statement that no sources among the best performers would ever exceed the floor limit.

Comment 13: Commenter 18023 states that when calculating the emission limits for the HAP the EPA uses short term stack testing data, which was collected under ideal steady-state plant operating conditions using a particular fuel, and do not account for the full range of emission control, load, and fuel conditions experience during normal conditions. The commenter adds that the EPA claims to have accounted for emissions variability when setting the HAP emission limits. The commenter cites the D.C. Circuit *Sierra Club v. EPA* resolution that the standard must be achievable under the most adverse

conditions, and that if the standard is as stringent as the emissions control that is achieved in practice by a particular unit, then that particular unit will not violate the standard.

Comment 14: Commenter 17621 states that because the ICR did not require units to test over the full range of operating conditions, these data do not capture all range of emissions variability. According to the commenter, new measurements are needed to characterize the variability of HAP and surrogate emissions during normal plant operations. The commenter adds that other sources of variability not included are fuels burned, startup and shutdown conditions, partial load operation, and other reasonably foreseeable changes to operating conditions.

Comment 15: Commenter 18023 states that the UPL for new sources have some flaws: the use of two or three data points from a single plant and the fact that those data points do not capture the emission variability that a new plant would endure. The commenter adds that the EPA must modify the approach to make sure that the best performing units would not exceed the standard.

Comment 16: Commenter 17621 states that another issue affecting the UPL is the capture of relevant sources of emissions variability. The commenter adds that if the data from best performers do not capture temporal variability, then it will not capture the variability present in a 30-day rolling average, which is proposed by the EPA for evaluating compliance. The commenter adds that the EPA needs to recognize the full range of within-unit variability and properly incorporate it to the UPL for compliance monitoring protocols.

Comment 17: Commenter 17725 agrees with the EPA's UPL-based floor analysis approach but requests that the EPA address fuel and operating variability issues, especially when considering small datasets (e.g., new unit limit)

Comment 18: According to Commenter 17725 the UPL is good in theory because the result depends on the assumption that the best performers data capture all forms of variability including measurement variability, boiler or emission control equipment related operating variability and fuel variability.

Comment 19: According to Commenter 17621, the new unit limits adopted by the EPA do not account for emissions variability due to changes in operating conditions that can be expected over the life of a unit. New unit limits should not be based on flue gas measurements that are below the detection limit, as those values do not account for measurement imprecision.

Comment 20: According to Commenters 17725 and 18014, the UPL needs to be adjusted to account for the snapshot nature of the ICR test results used in the analysis. Commenters add that given the control conditions under which the tests were taken, these test results do not reflect operation, control and fuel variability. These test results, the commenters add, only exhibit a fraction of the potential reference measurement variability because these variability (e.g., ambient conditions, stack tester factors, etc) are fixed during each test.

Comment 21: According to Commenter 17728, the EPA variability does not fully account for the HAP emissions variability of the best performers. Stack data do not provide meaningful insight that a unit can achieve over longer periods of time, different fuels, and varying loads and operating conditions. The commenter adds that Hg limits do not properly account for the variability in Hg emissions, and that CEMS data show that even well-controlled units have large variability in Hg emissions (daily or 30-day averages), and will not consistently meet the MACT floor limit under normal operating conditions.

Comment 22: Commenter 17729 states that the MACT floors do not represent the emissions achieved by actual best performing units and that the EPA is basing the floor on pollutant standards that only few sources can achieve. The commenter adds that the EPA's method does not account for all emissions variability caused by numerous operating factors.

Comment 23: Commenter 17739 states that even though the EPA acknowledges that the floor standard should address emissions variability, it ignores a key source of variability when using the lowest measurement instead of the average of measurements for each source. The commenter adds that the EPA has addressed fuel variability in other rulemakings such as the Boiler MACT, and that this effort was not made in this rulemaking. In the PM floor, the commenter notes, the EPA did not include more data in the variability calculation as was done for Hg and HCI. The commenter further notes that the EPA said that this non-inclusion of the data implicitly ignores temporal variability in the PM floor calculation. Finally, the commenter adds that regarding filterable particulate the EPA ignored some of the data in the MACT spreadsheet and did not mention that the total particulate values represent actual simultaneous emissions for the filterable and condensable components.

Comment 24: Commenter 17775 states that the data used by the EPA, 1-hour tests of full load operations, are not representative of the emissions achieved by the best performers under all operating conditions. According to the commenter, this denotes an incorrect perception of performance by the EPA because coal-based power plants are complex systems that do not function under steady state conditions. The commenter adds that it is unreasonable to establish emission standards based on few hours and expect to achieve this value over many years of varying conditions.

Comment 25: Commenters 17817 and 17912 state that the EPA makes several incorrect assumptions that result in MACT limits that are not attainable even by the top performers each day under all operating conditions. The commenters state that three separate runs are inadequate to establish the MACT floor or to establish a permit condition, and cannot capture day to day operating variability. The commenters add that fuel variability cannot be capture with such small data, in particular if unit train fuel deliveries come from a variety of mines.

Comment 26: According to commenter 17820, after recognizing the limitations of the short term ICR test data, the EPA uses the UPL to adjust for emissions variability. The commenter commends the adjustment of the average performance but claims that this approach does not fully account for all emissions variability because the underlying data do not reflect long-term emissions variability.

Comment 27: Several commenters (17877, 17886, 17902) state that the EPA's statistical analysis is reasonable; unfortunately the EPA lacks sufficient data to perform a meaningful UPL calculation because its data do not reflect all operating conditions. The EPA computes the within-source variability using short-term test that cannot capture the level performance of the units under the most adverse conditions. Furthermore, the commenter adds, the ICR test runs were performed hours apart under identical operating conditions. Then, the commenters add that the EPA wrongly assumes a normal distribution for the data, and the data do not account for variability of control equipment and operation conditions, nor the data accounts for load variability and upper ramp up/down conditions. The commenters conclude that if the EPA fails to obtain a complete picture of operating conditions of the best performing units over a sufficiently extended period of time, it cannot hope to develop an accurate assessment of the level of performance those plants will achieve under the worst reasonably foreseeable circumstances.

Comment 28: According to commenter 17878, the EPA's UPL analysis does not account for the full range of operational, fuel, and monitoring variability. The data used to establish the MACT floors only represents a snapshot in time and does not represent what a source actually achieved on a consistent basis. A separate variability issue is associated with the EPA's treatment of units sharing a common stack. In general, the EPA treated each unit as a separate data point, even though all units sharing a common stack by definition have the same measured emission rate.

Comment 29: Commenter 17716 states that the EPA recognizes that the short term data used for SO_2 standards do not capture the vast operating conditions under which a facility can operates. It also does not take into account control equipment variability and degradations. The commenter adds that this consideration is not extended to other aspects of the EGU MACT standard. Because performance tests were conducted at normal, full load conditions rather than a variety of conditions, the extent of boiler variability and its effects are ignored in the proposed standard.

Response to Comments 4 - 29: The EPA understands the need to capture all sources of variability and incorporate them in the calculations of the floor standard. It is impossible sometimes to separate the different sources of variability given the data available. However, the EPA believes that the range of sources and the available data capture the necessary variability of well performing sources used to establish the MACT floor. The EPA considers that the data used to calculate the UPL covers all mentioned sources of variability. Sources of variability can be summarized as inter-source and between-source. Examples of between-source variability included in the data are different boiler designs, operations, and control technologies. Similarly, intra-source (also referred as within-source) variability captures the day-to-day variability, a both "process" variation and measurement-error variation. The commenter suggests the consideration of other sources of variability. However, separating out the different types of variability from the available data may not be a trivial exercise, and may require a different protocol for data collection. We maintain the approach we have is reasonable in light of the available data and the commenter has not provided an alternative approach for us to consider.

The EPA disagrees with any commenter's assertions that we have violated either the statutory language or court decisions related to the variability analyses. We interpret the court's decisions as allowing us to consider both intra- and inter-source variability as long as we confine the analyses to EGUs in the MACT floor pool (e.g., top performing 12 percent). The UPL approach is a confidence interval for an average of future tests, and it is based on the average of emissions of the top 12 percent performers. Because the HAP emissions might change from time-to-time (e.g., year-to-year), a variability term is added to the average to account for this "sampling variability" so that the proposed MACT floor can be considered valid through time. Large differences between the emissions from the top performers will not only affect the variance but the average itself. As a matter of fact, the average is mostly affected by the between-source variability. For this reason, the variance includes within- and between-source variability.

The EPA considers that it has included any boiler variability contained in the available data. We believe that consideration of inter-source variability and use of the 2010 ICR Part II data address boiler and emission control technology variability. The operating conditions under which emissions measurements are taken from a source will directly affect those measurements. For example, emissions obtained from a source that is operating poorly will almost certainly be higher than when operating properly. Therefore, a source that is operating poorly will be less likely to be included in the pool of best performers than if it were operating properly. Similarly, if a source is being tested for compliance, it would be less likely to demonstrate compliance if operating poorly than if operating properly. The commenters believe that floors must be set at the average emission level achieved by the best performers when they are operating

under a worst-case scenario. This approach ignores the variability in the data, and, therefore, goes against established statistical theory and practice, and it also goes against the intention of the statute.

The EPA has calculated the MACT floor using all available data. The diversity of sources and range of the data suggests that the variability sources mentioned above are being considered when calculating the MACT floors. The use of MDL data is addressed elsewhere in this document. The EPA has included a confidence level to the calculation of the standard along with a 30-day average format; in this way, the EPA is also addressing the variability noted by commenters.

Comment 30: Commenter 17648 states that the calculations of the MACT floor are based on a significant pool of sources, accounting for variability in performance of the best performers that resulted in emissions limitations providing ample degree of protection from outliers. Commenter 17648 adds that the EPA took measures to ensure data quality and took measures to resolve issues of data reported under method detection limit (MDL).

Comment 31: Commenter 17739 states that the D.C. Circuit Court has held that the standards must be achievable under the most adverse conditions which can reasonably be expected to occur. The commenter adds that the DC Circuit has concluded that the EPA may consider emissions variability in the calculation and the standard, and may set the floor at a level that best-performing sources can expect to meet every day under all operating conditions.

Response to Comments 30 - 31: The EPA appreciates the commenters' support.

Comment 32: Commenter 16122 states that U.S. Government Accountability Office (GAO), states and even EGUs have made clear that because the EPA uses long-term standards (e.g., 30-day compliance period under the EGU MACT Rule), no variability analysis is needed (reference is October 2009 GAO report entitled "Mercury Control Technologies at Coal fired Power Plants…"). Commenter adds that EGUs concluded that this long-term averaging approach takes into account dramatic swings in Hg emissions from coal and allows them to meet stringent state Hg standards. The commenter further states that if the EPA is concerned that EGUs will have difficulty meeting the proposed 30-day standard then the EPA should lengthen the compliance time period (e.g., to one year).

Comment 33: Commenter 17845 states that several institutions (e.g., GAO) and states have concluded that no variability analysis is needed because when longer-term data are used (e.g., 30-day compliance period), the average of the data takes into account any variability in Hg emissions allowing units to meet stringent state Hg standards.

Comment 34: According to commenter 17846, the use of the UPL dramatically over-estimates the emissions achieved by the top 12 percent performers. The commenter adds that the proposed MACT floor standard allows Hg emissions that are 100 times the average of the top 12 percent performers for EGUs burning non-lignite coal and 11 times the average of the top 12 percent burning lignite coal. The commenter adds that the EPA must show that its variability analysis provides an accurate picture of the relevant sources performance. The commenter adds that there is no reason for incorporating variability analyses into the EGU MACT Rule because the EPA is already using a longer-term compliance standard. The commenter adds that if the EPA is truly concerned that EGUs will have difficulty meeting the 30-day standard it is proposing, the EPA should lengthen the compliance time period (e.g., to one year).

Response to Comment 32-34: Emissions data have different sources of variability; therefore, incorporating uncertainty analysis into the MACT floor accounts for sources of variation present in the data. Because a single number (e.g., average) may not capture the variability observed under different designs, operations and control technologies, a confidence type statistic like the UPL, along with a 30-day average format, is used to ensure that different sources of variability are considered and that the proposed MACT floor remains valid under different scenarios. As mentioned elsewhere, we believe that a 30-day boiler operating day period provides flexibility sufficient for sources to operate processes and control devices to assure ongoing compliance and that the 30-day period provides for the level of environmental protection intended for this rule. The 30-day rolling average requires that the operator review and act on measurement data on at least a daily basis consistent with the enforcement and compliance provisions of the CAA (e.g., CAA section 113(d)). A rolling 12-month average would reduce that frequency to once per month. Variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of the proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that the EPA has promulgated.

Comment 35: Commenter 17402 states that the EPA's proposed rule using a statistical formula meets legal requirements set forth in D.C. Circuit case law. The commenter states that the current formula does not contain flaws of the process presented in *Sierra II*, *Northeast Maryland Waste Disposal*, or *Cement Kiln*, because it is based on emissions from the best performing units, and that the EPA has provided evidence that the statistical formula estimates variability for the best performers as required by statute.

Response to Comment 35: The EPA agrees with the commenter that the approach to variability in the final rule it consistent with the statute and applicable case law.

Comment 36: Commenters 17402 and 18014 state that in the preamble the EPA stated that it used the Bhaumik and Gibbons Central Limit Theorem (CLT) approach to calculate the UPL when the data were log-normal distributed. Commenter adds that from the Agency's floor analysis spreadsheets it is not clear whether and how the EPA actually used the Bhaumik and Gibbons approach. The commenter requests further clarification in the final rule. Commenter 17402 has observed that in the case of pretroleum coke sources the EPA seemed to have used the standard UPL approach instead of the Bhaumik and Gibbons approach. The commenter requests further clarification.

Commenter 17725 states that the EPA indicated that it had used the Bhaumik and Gibbons log-normal approach for this rule when the skewness and/or kurtosis tests failed. However, the commenter adds, not evidence was found in the floor spreadsheets. The commenter requests the EPA to revise and be consistent with the description provided.

Response to Comment 36: The commenter is correct regarding the use of the standard UPL approach for most of the calculations of the MACT floors. This was possible because under the Central Limit Theorem, for moderate to large sample size (>20) the distribution of the average of emissions is approximated normal, rendering valid estimates for upper prediction limit for the average of future measurements.

Comment 37: Commenter 17620 states that the current UPL calculations use a number of discretionary choices with respect to data management. Because of the impact of these choices in the rulemaking, the commenter adds that the EPA must ensure that these choices are rational and supported by available

information. The commenter adds that the UPL calculations seem to produce reasonable results in some cases, and odd results that contradict available credible information in others. The commenter urges the EPA to resolve this issue by examination and analysis of available information.

Response to Comment 37: The EPA has carefully reviewed the data management process, and has reconciled any discrepancies.

Comment 38: Commenter 17621 states that the UPL is an upper limit for future values of the same nature (coming from the same distribution) as those used in the calculation of the UPL. The Central Limit theorem (CLT) provides a setting to calculate the UPL for a dataset regardless of the distribution of the data. Note that the CLT does not change the definition of UPL, therefore the UPL can be used to evaluate if one future value or an average of future values that come from the same distribution as those used in the calculation of the UPL.

Response to Comment 38: The UPL is an upper limit for future values of the same nature (coming from the same distribution) as those used in the calculation of the UPL. The Central Limit theorem (CLT) provides a setting to calculate the UPL for a dataset regardless of the distribution of the data. Note that the CLT does not change the definition of UPL, therefore the UPL can be used to evaluate if one future value or an average of future values that come from the same distribution as those used in the calculation of the UPL falls under a certain cutoff with some level of confidence.

Comment 39: Commenters 17716 and 18014 state that for the UPL to perform as expected the data should represent the larger population. The commenters add that if the full potential variability is included in the UPL then the MACT floor is a limit that well control units will meet in most situations. If the full variability is not incorporated, then even the most controlled units will meet the UPL by chance. One of the flaws of the EPA's approach is that it assumes a normal distribution. This assumption, the commenters add , does not agree with previous documents (e.g., the Industrial Boiler (IB) MACT Rule) and the EPA's own guidance (e.g., Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9, Report EPA/240/B-06/003 (Feb. 2006)) where log-normality was assumed. The commenters add that because the sample of best performers is not a random sample then the central limit theorem is not applicable. The commenters add that the EPA said that skewness and kurtosis tests were performed to evaluate the distribution of the data, but that revising the spreadsheets provides no indication of these tests were found. The commenters recommend to perform these tests instead of relying on the central limit theorem and to use the log-normal approach (Bhaumik and Gibbons approach for log-normal data). The commenters add that the EPA's statement that it used the Bhaumik and Gibbons approach to test compliance for log-normal could not be verified. The commenters add that they studied the distribution of 131 nickel emissions used by the EPA in its floor analysis and concluded that the data are log-normal. The commenters conclude that the EPA should keep performing the skewness and kurtosis tests, and revise its analysis to include the approach for log-normal data.

Commenter 17820 states that the EPA assumed a normal distribution of the ICR data and used an arithmetic mean instead of a geometric mean in determining emission factors (and emission rates) for units that were not sampled. This significant technical issue raises serious question about whether HAP emissions from coal-fired power plants pose risks.

Response to Comment 39: The UPL is the value below which a single test observation (or average of several test observations) from the source-to-be-tested is expected to fall with a stated level of confidence (e.g., 99 percent). By law the MACT floor limit should be based on the best performers;

therefore the collection of best performers is not a representative sample of the population of sources. The calculation of the UPL does not require a random sample of elements of a population; it requires only a sample of observations. The EPA believes that all sources of variability affecting the emissions are captured in the data used to calculate the MACT floor since those data comprise a wide array of sources using different fuels. The EPA agrees with the commenter that the skewness and kurtosis testing should be performed in all excel spreadsheets for evaluating the distribution assumptions of the data. However, the EPA clarifies to the commenter that when the sample size is large, the average of the emission factors from the best performers and not the emission factors per se, follow the normal distribution. The Central Limit allows the calculation of the UPL assuming a normal distribution because the sample size used to calculate the average is large enough, this is valid regardless of the parent distribution of the data. This property of the Central Limit Theorem for moderate to large sample size allows the application of the standard UPL without the need to check for the distribution of the data.

Comment 40: Commenters 17716 and 18014 state that the assumption of the Central Limit Theorem is to calculate the UPL does not hold. Commenters provide the example of the 131 nickel emission test results which are not normally distributed. The commenters add that if the EPA had used the approach applied in the IB MACT which tested the skewness, the EPA would have concluded that the data are log-normal distributed and not normal.

Response to Comment 40: When the data used to calculate the UPL has moderate to large size (n>15) the EPA has used the Central Limit Theorem to support the use of the standard form of the UPL to calculate the MACT floor. By doing this, the EPA is not concluding that the data are normal; the conclusion is that the average of the data has a distribution which is approximately normal, allowing the use of the equation of standard UPL.

Comment 41: Commenter 17775 states that UPL calculations assume that the stack data test results are independently and randomly distributed, which is not the case for emissions data. The commenter adds that they examined long-term CEMS Hg and PM data from the best performers to evaluate if temporal correlations and infrequent operating conditions significantly affect the emissions levels. This examination showed that long-term average emissions are higher than one would expect based on stack test alone. The commenter recommends to use ratios calculated as the 99^{th} percentile historic 30-day averages and the stack data to adjust the UPL for temporal correlation and infrequent events.

Response to Comment 41: The EPA understands that emissions data are usually non-normally distributed; for this reason when applying the UPL, the EPA is not relying on the normal distribution of the data, but in the distribution of the average. This is possible based on the Central Limit Theorem, which ensures that for a sample of moderate and large size, the distribution of the average tends to normal regardless of the parent distribution of the data.

Comment 42: Commenter 18023 states that an additional flaw in the EPA's approach is the assumption of the normal distribution. The commenter adds that in the Boiler MACT ruling the EPA suggested that environmental data tend to be log-normally distributed. The commenter adds that the EPA should determine the distribution of the data prior to the calculation of the UPL. The commenter adds that the assumption of normality results in underestimated variability for the top performing units. The commenter adds that they analyzed the data and concluded that the short-term stack data are not independent or normally distributed; as a result erroneously low emission limits were obtained. The selection of the data, the commenter adds, was also biased since the EPA selected the lowest value when

several data points were available for a given source, resulting in low emission limits. The EPA should first determine the properties of the underlying distributions before computing UPLs.

Response to Comment 42: It is correct that environmental data tend to have a skewed distribution that follows distributions such as the log-normal or the Weibull distribution. The EPA also agrees that testing the distribution of the data is a procedure that needs to be included to validate the assumptions of the statistic approaches use in any analysis. The EPA did not assume that the data were normally distributed. The EPA used the Central Limit Theorem to justify the assumption of normality for the average of emission values for medium to large sample size. Data from different sources are assumed independent, and data from the same source but different time points will be independent because there shouldn't be correlation between data collected days or months apart. We selected the lowest emissions data for each EGU so as to be able to determine the best performing sources; additional data from EGUs among the MACT floor pool (i.e., best performing 12 percent) were then used in the variability analyses.

Comment 43: Commenter 18023 states that short-term stack data do not represent long-term emissions variability. Using CEMS HAP data, commenter created synthetic stack test data and proceed to calculate the 99th UPL and the 99 percentile assuming normal distribution of the data. Commenter concluded that emissions distributions have extended periods of relatively high emissions, which do not follow a normal distribution. The commenter adds that they compared the UPL with the 99th percentile which were actually larger than the UPL. The commenter reminds the EPA that directions provided by the D.C. Circuit requires that limits should be achievable by the very units used to develop those limits. The current data, the commenter adds, may represent the variability of the data collected and not the variability of the performing sources.

Commenter 17775 examined Hg and PM CEMS data from top performing units to determine historical long-term emission averages, and to assess whether temporal correlations and infrequent operating conditions significantly affect emission limits attainable by these units. To evaluate the performance of the UPL with the CEMS data, the commenter created synthetic stack data and proceeded to calculate synthetic-based UPL and the ratio of 99th percentile historical 30-day emission averages to synthetic data-based t-statistics UPLs. The commenter found that those ratios were 3.89 for the PM CEMS data which included startup and averaged 1.80 for Hg CEMS data. The commenter recommends to apply these ratios to the UPL to compensate for correlated emissions and emissions from infrequent events.

Response to Comment 43: The EPA agrees that environmental data tend to have a skewed distribution that follows distributions such as the log-normal or the Weibull distribution. The EPA did not assume that the data were normally distributed. The EPA used the Central Limit Theorem to justify the assumption of normality for the average of emission values for medium to large sample size. The UPL and the 99th percentile are not directly comparable in the sense that one would not expect the UPL to contain the 99th percentile. In most datasets, in particular in large datasets, one would expect the 99th percentile to be larger than the UPL. Only data from the MACT floor pool were used in the variability analyses; therefore, the data represent the variability of the best performers.

Comment 44: Commenter 17338 states that the EPA makes erroneous assumptions in unit emissions variability that led to MACT limits likely not attainable by the top performing units during every day operation and under all operating conditions. Issues mentioned by the commenter are: use of the average of three separate runs to determine MACT UPL, assume that the sample mean has a normal distribution which is not supported by the data, not incorporating efficiencies of emissions control equipment over expected and varied operation conditions. The commenter adds that the EPA must develop MACT limits

that meet every day and all operating conditions of the top performing units. This, the commenter adds, will require more data and better statistical assumptions.

Comment 45: According to several commenters (17689, 17712, 17885, 18014), the EPA's assumptions about the emissions variability resulted in MACT limits likely not attainable by the top performing units during every day and under all operating conditions. Commenters add that the assumptions questioned are: the UPL is based on only three separate runs, the assumption of normality, and not accounting for the variability due to emissions control equipment over expected and varied operation conditions, whether at a constant but unusual load or under ramp up or down conditions. Commenters add that the EPA must develop MACT limits that meet "every day and all operating conditions" of the top performing units. The commenters suggest that the EPA must develop MACTs that utilize more data and better statistical assumptions.

Comment 46: Commenter 17800 states that the ICR data are based on three runs varying in time from 1 to 8 hrs. These tests are a snapshot of actual emissions and do not capture different sources of variability such as fuel and operational variability, operation of boiler and balance of plant requirements. The commenter adds that the UPL equation assumes a normal distribution of the data and this assumption cannot be validated. The commenter further adds that the EPA should retract the regulation and better substantiate the method with longer term data.

Response to Comments 44 - 46: The average of three emission test runs is typically used as the basis for determining compliance with an emission limit. The EPA considers that data utilized for calculating the UPL combines a wide range of units that incorporate all sources of variability. As noted elsewhere, we believe we have adequately incorporated variability in the analyses. The EPA did not assume that the data were normally distributed. The EPA used the Central Limit Theorem to justify the assumption of normality for the average of emission values for medium to large sample size. This assumption is valid regardless of the parent distribution of the data.

Comment 47: According to commenter 17621 the UPL does not provide an estimate of the 99th percentile, which commenter asserts is the main purpose of the UPL. The commenter adds that the use of the Central Limit Theorem (CLT) is inappropriate, because of the small sample size of future tests (m=1 or m=3) required to assess compliance. Because of the small sample, the commenter adds, the data are required to have a normal distribution, which is not true when dealing with emissions data. Furthermore, the commenter adds, the tests utilize to assess normality are not valid and have no enough power when the sample size is very small. According to the commenter, the UPL is irrelevant to the exceedance rate, regardless of the sample size used to calculate it.

Comment 48: According to commenter 18487, the EPA does not explain the claimed variation is captured in the 99th confidence UPL. The EPA also does not justify the assumption of normal distribution.

Response to Comments 47 - 48: The commenter is correct that the UPL does not provide an estimate for the 99th percentile because this is not the objective when using the UPL. The UPL is a confidence interval for an average of future tests, and does not try to provide an upper bound for a given percent of the sample or try to estimate the 99th population percentile as suggested by the commenter. One key assumption is that the future observation being predicted will come from the same distribution (e.g., will be in line with) of the best performers. The next sentences briefly describe the basis of the proposed UPL approach. A prediction interval for future value incorporates the variability around the process

(e.g., fuel, controls, etc) and uncertainty about the population average. This population average is unknown. An average of future measures will also incorporate the same sources of variability. A future observation or the average of future observations can be considered as a random deviation of the average, ie. Y_future = mean + random_error. In order to produce a prediction interval for the Y_future, an estimate for Y_future is needed. The best estimate for Y_future is the average of the current values (e.g., average of the best performers). The variance of Y_future is equal to sigma^2*(1/n + 1/m) where n is the number of terms used to calculate the average, and m is the number of future observations. This information in conjunction with the Central Limit Theorem is used to calculate the upper prediction limit for the future observation or average of future observations. The above reasoning shows that the validity of the UPL depends on the sample size of the baseline sample (i.e., the number of best performers) and not on the number of future observations. The power of the test will be affected by the sample size or number of best performer data (the larger the sample size the larger the power), significance level and the assumption that the future observations will be in line with the best performers. The sample size being used to calculate the UPL is moderate to large. Finally, the exceedance rate mentioned by the commenter is related with the significance level, in this case associated with the UPL. The interpretation of the confidence level in a prediction interval is quite different from the interpretation of confidence level in a confidence interval. In a prediction interval, the confidence level represents the probability that the future observation is below the UPL, therefore it is relevant to the exceedance rate. It is granted that when the sample size is very small, then the confidence level underestimate the intended 99%.

Regarding normality distribution, see response below.

Comment 49: Commenter 17725 states that the EPA needs to address the flaws in the UPL calculation and resolve the variability issues. The first flaw mentioned by the commenter is the assumption of normality for all datasets with 15 or more tests. The commenter reminds the EPA that in its own guidance the EPA suggests that environmental data are log-normally distributed. Furthermore, the commenter adds the application of the central limit theorem is not correct given that the data are not independent. The commenter requests the EPA to include in the floor analysis spreadsheets tests for the kurtosis and skewness to better conclude about the distribution of the data. The commenter adds that in preamble the EPA said that those tests were performed but there were not found in the spreadsheets.

Comment 50: Commenters 17820 and 18014 state that the UPL approach assumes normally distributed data, and that is not the case for emissions data. The commenters add that no evidence that the ICR data were evaluated for normality. The commenters suggest that in the absence of normality, the EPA should consider other approaches such as the ones used in IB MACT ruling.

Response to Comments 49 - 50: In this rulemaking, the EPA is not assuming that environmental data are normal; by using the Central Limit Theorem, the EPA is concluding that the Mean statistic converges to a normal distribution regardless of the parent distribution or the independent of the measurements [see Fuller, W. A. Introduction to Statistical Time Series, New York, 1996. 2ndedition. John Wiley and Sons for an example of applications of the central limit theorem to dependent data]. When the sample size prohibits the use of the CLT, the EPA use the results from the skewness and kurtosis tests to justify the use of the log-normal based UPL [Bhaumik and Gibbons approach]. The EPA has added the skewness and kurtosis tests to the floor analysis spreadsheets. As mentioned before, the CLT can be adapted to consider not independent data. The EPA emphasizes that data from different sources are independent, although data from the same sources come from different time intervals therefore they might be considered independent.

Comment 51: Commenter 17621 states that the EPA's practice of assigning emissions from one boiler to all other boilers at the same facility when no test data were available adds a source of bias to the UPL calculations and is technically incorrect. This approach results in having multiple units with zero variability in the calculations of the UPL. The commenter adds that the facilities included in the MACT floor have up to 6 replicated emission values, increasing their impact on the calculations of the UPL.

Response to Comment 51: The EPA does not fully understand the comment. The only analysis for which emissions were assigned to un-tested units was for the nationwide emissions estimate used in the modeling analyses; the UPL analysis was not used in this instance. For the MACT floor emissions limit analyses, only emission test data were used.

Comment 52: Commenter 17621 states that the EPA wants to estimate the 99^{th} percentile; for this reason, Commenter 17621 suggests that the tolerance limits will better address this need.

Response to Comment 52: The UPL is the value below which a single test observation (or average of several test observations) from the source to be tested for compliance is expected to fall with a stated level of confidence (e.g., 99%). The Upper Tolerance Limit (UTL) is the value below which a specified proportion (e.g., 99%) of the population is expected to lie with a stated level of confidence. In other words, the UTL is the value below which the population percentile corresponding to that proportion (e.g., 99^{th} percentile) is expected to lie with a stated level of confidence. Operationally, the sample percentile derived from the test runs (e.g., the 99^{th} sample percentile for small data sets is the largest observation) must be smaller than the UTL to be in compliance. The problem with this method is that for small data sets and proportions close to 100%, the sample percentile typically underestimates the corresponding population percentile. Therefore, the UTL is ordinarily used for large data sets (i.e., data sets much larger than those that we have for EGUs) and will not be appropriate for determining compliance from a small sample of test runs such as the size of the sample currently used to determine compliance.

Comment 53: Commenter 17621 states that in calculating the UPL the data are assumed to be independent measurements, but these data exhibit intra-unit correlations resulting from heterogeneity of the selected units. Furthermore, the UPL calculation does not account for temporal autocorrelation in the time series nature of the data.

Response to Comment 53: Values used for calculating the UPL are from different units or from the same unit but collected in different time points (even different years). In the case of values coming from different units the assumption of independence is valid. In the case of values coming from the same unit but different datasets (Part I and Part II), the time elapsed between the different measurements makes them essentially independent. Values could be considered correlated if they are consecutive values (taken minutes or hours apart).

Comment 54: Commenter 17621 states that when calculating MACT limits for existing units for some HAP, the EPA uses the lowest test series average for each EGU to calculate the pooled mean. This approach, the commenter adds, would be justified only if the same selection of lowest values from a series were used for the compliance tests. However, that is not the way the proposal is written—it calculates the probability of a single three-run test series average exceeding the UPL.

Response to Comment 54: The EPA used the average to rank the sources and select the best performers. Then the average for the UPL is based on the data from those selected best performers.

Comment 55: Commenter 17621 states that an EGU with more test series will contribute proportionally more to the variability than an EGU with only one test series. To avoid giving more weight to some units than to other units in the data pool, it is necessary to properly apply data weighting to eliminate this bias.

Comment 56: Commenter 17739 states that the data used to calculate the variability in the UPL is not representative of the sources used to calculate the average in the UPL. The commenter adds that the EPA didn't use all the data available because some sources only had a single point, even though sources report at least six measurements. The calculation of variability, the commenter emphasizes, uses data that are not representative of the temporal or process variability for the lowest emitting units. Also, the commenter adds, the number of data points from each source used in the variability calculation ranges from 1 to 8. Fifty percent of the sources, the commenter states, have one data point although a single source accounts for 10 percent of the data used for variability. The commenter concludes that the EPA must find and correct error that may bias the results. The commenter reminds the EPA that having lots of data is not the same as having good data.

Response to Comments 55 - 56: It is true that EGUs with more data provide more information to calculate the variance used in the UPL equation, however having more data from some EGUs does not necessarily imply that bias was introduced in the calculations of the UPL. If the data available can be considered a representative sample of the expected emissions of the top performers, then it is expected that the current variance estimator would have resulted in reliable results. Having more values from different EGUs adds more information and produces a better estimate of the variance. The weighting scheme suggested by commenter will result in smaller values for the EGUs with more observations without affecting those with 1 observation, the resulting variance estimator in such a scenario would have unknown properties and may be upward or downward biased (always producing estimates below or above the true unknown population variance). The EPA has used all available data in the analyses and does not believe that any bias has resulted.

Comment 57: Commenter 17716 states that floor values cannot be based on non-quantifiable data, and asks the EPA to re-evaluate the UPL approach for small datasets and to make sure that data reflects unit performance and not uncertainty and variability, and properly reflect operating and fuel variability. The commenter stresses that these types of variability can have a big impact in the results. The commenter adds that the UPL approach creates its own outliers, particularly in the case of large datasets where large differences can be observed, in particular if some of the smallest values are near the detection limits. The commenter suggests adding a factor to ensure some degree of confidence around the results. The commenter adds that the underlying variability cannot be assessed with such limited datasets, and recommends assessing it using comparable groups of top performing sources or formulating another way to assess variability.

Response to Comment 57: The EPA considers that the UPL includes all variability captured in the data available. When available, the EPA has even included data from Part I and Part II to get a better estimate of underlying variability such as control, design, etc. When a small dataset is the only source of information available to determine the floor value, it is almost impossible to separate the different sources of variability. In the case of non-detects the EPA has applied a procedure that compensates for the non-detects as discussed elsewhere in this document. The UPL incorporates an uncertainty measure (the standard error of the estimate) in its calculation to compensate for any variability observed in the data. The UPL results are more robust if the datasets are large, and the level of confidence used in its calculation represents the level of protection afforded to sources whose emissions are in line with the

best performers, furthermore, since the UPL incorporates in its calculation the standard error and a confidence level, it takes into account the variability due to the use of one single dataset, and provides assurance that 99 percent of the times the future value will be below the UPL. This is the same as saying that if the UPL is calculated 100 times using comparable best performance, 99 percent of the resulting UPLs will be larger than the average of future observations.

Comment 58: Commenters 17716 and 18014 state that the approach to select the best performers (using the lowest reported emissions value for all Part II and Part III ICR data and then ranking the sources) does not result in a random sample. This is aggravated, the commenters add, when a small number of sources are assigned unusually low emissions, resulting in the selection of those sources into the best performing group. These low emissions, the commenters say, tend to be outliers and are directly affecting the selection of the best performers and the MACT floor. The commenters recommend to average all available test data, and to use this average to characterize source performance. The commenters add that for non-Hg metals and particulate matter, the EPA used only the lowest values to assess variability. For the other floor analysis, the EPA included the results of multiple tests in the variability assessment, when available. The commenters point out the example of the HCl floor analysis and the Logan Unit 1, where the EPA selected this source as the best performing unit based on the lowest single average. The commenters suggest that a better approach would have been to take the average. Finally, the commenters suggest that in the case of multiple units with emissions below the detection limit, the EPA does not have criteria to determine the best performer.

Comment 59: Commenter 17739 states that the EPA's calculation of the UPL has a flaw in the selection of the MACT floor sources. The commenter adds that the EPA selects the lowest emission value from all emissions available for that source (Part I and Part II) and uses the lowest value to rank all the sources. The commenter adds that a better approach is to use the average. The commenter adds that a better approach would have been to take the average of the values. The commenter adds that by ranking the sources using the lowest value instead of the average, the EPA is not complying with the statue that requires the MACT floor to be based on the lowest emitting sources not the lowest value of all sources. The commenter adds that the EPA does not have data that represents operations at different loads, fuels and monitoring conditions and therefore these variability sources are not incorporated in the analysis. The commenter reminds the EPA that the EPA acknowledged that the HAP emissions would vary over time, and that not incorporating this variability could potentially result in the best performers exceeding the MACT floor. The commenter states that not having these data results in a UPL that does not account properly for the variability across time. The commenter adds that if a best performer source has more than one emission value (e.g., Part II and Part III) EPA needs to use all the data since these represent operation variability.

Comment 60: Commenter 17725 states that all available test runs should be used to assess variability and unit ranking the EPA has exasperated this phenomenon by selecting the lowest available test average to represent each source in the floor analysis for new and existing units. This practice is not statistically justifiable. By using the lowest test average, the agency is relying on a value that will tend to be an outlier. In addition to bias it introduces, the practice also affects the rank order of the units, which determines which units are included in the existing unit floor analysis and the "best performer" for each pollutant. The EPA should instead use the average of all available test data when trying to characterize a unit's performance, especially since the statute requires the limit to reflect the average performance of the sources included in the analysis.

For example, in the HCl floor analysis for existing coal-fired units, six test results were identified and used for Logan Unit 1. Logan Unit 1 was selected as the "best performing unit" based on the lowest single test average and the new unit limit was based on the results of that lowest test even though other tests for that unit were more than an order of magnitude higher. According to the commenter, this illustrates that the EPA's approach of using the lowest reported test result to represent the best performing unit does not meet the statutory requirements for identifying "achievable" emissions levels; the practice of intentionally selecting only the lowest test value suggests gerrymandering and is wholly inconsistent with the objective of determining the average performance specified in section 112 of the CAA.

Comment 61: Commenter 17725 states that the EPA should base the floor standards on quantifiable data. If a measurement is below the MDL it should be substituted with an approximation of the MDL. The commenter adds that the EPA needs to revise the data used to select the best performers because low values such as the MDL may affect the selection of the best performers. Commenter states that low values are affected by measurement uncertainty, especially those taken near the detection, so trying to quantify difference between test results for ranking purposes are futile. The commenter adds that those measurements should be steeped up by an uncertainty factor.

Commenters 17627 and 18014 recommend the EPA to conduct the UPL calculations using only data above the MDL. The commenter agrees with the EPA in that truncating the value will underestimate the UPL but insists that the UPL must be based on quantifiable data. The commenter also questions the effect of selecting the best performers. The commenter adds that this process creates outliers in the data. The commenter adds that uncertainty is playing a big role in ranking the data, and because the EPA is not controlling this uncertainty the ranking of units is based on data with lots of uncertainty because some of those measurements are near the detection limit.

Comment 62: According to commenter 17620, the EPA had used BDL and DLL flagged data to calculate the UPL. These low measurements will affect the measurement variability.

Response to Comments 58 - 62: The EPA does not believe that the statute requires or contemplates a random sample. Rather, use of data from the best performing sources is specified for developing the MACT floor limits. We did not assign "unusually low emissions" to any unit; the data available to the Agency came from emissions tests on the respective EGUs. We conducted outlier analyses and do not believe that the data in the resultant MACT floor pool data sets are outlier data. The EPA has used all available data in the analyses. For the non-mercury metal HAP and PM data at proposal, we had only one data set for each EGU because there were no total PM data available other than the Part III required testing data and no non-mercury metal HAP data. For the final rule, we are using filterable PM and there are additional data available. We discuss comments related to the minimum detection level issue elsewhere in this document.

The EPA believes that the lowest emission value available from a given source represents the best performance of the source and under this premise, it is appropriate to use the lowest emission value to rank the different facilities and to select the best performing sources. The average is affected by extreme values, both large and small, and won't represent the best performance of the source. The EPA uses all the emission data available from all best performing sources to estimate the variability in the UPL, accounting for within and between source variability.

Comment 63: Commenter 17739 states that the EPA fails to follow the same procedure employed for the HAP when calculating the MACT floor for PM. Specifically, the commenter says that the EPA did not use Part II and Part III data for the calculation of the floor for PM. The commenter states that for PM the EPA used only the minimum values in the UPL calculation. For this reason, the commenter concludes, the current floor for PM does not account for temporal variability.

Response to Comment 63: The EPA has used all available data in the analyses. For the non-mercury metal HAP and PM data at proposal, we had only one data set for each EGU because there were no total PM data available other than the Part III required testing data and no non-mercury metal HAP data. For the final rule, we are using filterable PM and there are additional data available, which we belive incorporates temporal variability. We discuss comments related to the minimum detection level issue elsewhere in this document.

Comment 64: Commenter 17775 states that the UPL approach defines the 99th percentile of data if the underlying data are random in nature and representative of the objective being studied. The commenter adds that in the case of HAP emissions the EPA should have used the average of emissions from different operating conditions to calculate the UPL instead of the lowest emissions. The commenter adds that the resulting UPL is biased downward and over-sates the level of control achieved in practice by the best performing units. The commenter questions the integrity of the data, adding that those low values are prompt to having quality issues.

Response to Comment 64: To calculate the UPL the sample does not necessitate the assumption of being a random sample and representative of the population. The random constraint is usually used as a surrogate for "independent" measurements, and the independence assumption determines if in the calculation of the variance of the UPL one needs to account for correlated observations or not. The representativeness of the sample is not a requirement to calculate the UPL, what is a requirement is that the future observations that are going to be evaluated for compliance come from the same "universe" of possible emissions from which the data were taken. The EPA uses the lowest emissions to rank the sources and to select the best performers. We have discussed the use of the data elsewhere and do not believe that the low values represent outliers or have quality issues.

Comment 65: Commenter 17775 states that the EPA required Hg testing at 175 units thought to have the lowest Hg emissions based on the control technologies, and for this reason the EPA should use the average of those emissions as the MACT floor. The commenter adds that if the EPA wants to use the UPL a better approach would be to use the average to rank the best performers and use those averages to calculate the mean and variance used in the UPL. This approach results in a slightly higher MACT floor compared to that produced by the EPA. Another option suggested by the commenter is to adjust the UPL by a factor that compensates for the unaccounted variability found in the long-term Hg CEMS data that is not accounted for in the stack data.

Response to Comment 65: The EPA believes that the performance shown by the facility at the moment compliance is evaluated should be maintained on a continuing basis and not only for the compliance tests. Under this reasoning, it makes sense that the lowest emission value available from a given source represents the best performance of the source and under this premise, it is appropriate to use the lowest emission value to rank the different facilities and to select the best performing sources. The EPA has recently evaluated the association between CEMS and stack data for several sources and industries. Results led to the conclusion that both sets of data would have led to similar results for the MACT floor.

Comment 66: Commenter 18023 interprets the UPL saying that one would expect that the average performance of the top 12 percent would meet the standard 99 percent of the time, and that this is not the case. The commenter adds that it is false that the data used in the UPL calculations represent all operating conditions. The commenter adds that the resulting standard is unrealistic, and that units will not typically meet the standard. The commenter adds that because the EPA uses stack data at controlled loads on a single day, those data do not represent typical variability at all operating conditions, and the UPL approach falls short to ensure that the units that established the floor would not violate the standard.

Response to Comment 66: It is an incorrect statement that no sources among the best performers would ever exceed the floor limit at a given moment in time, which is one reason we have incorporated a 30-day averaging period to account for that potential. It is easy to demonstrate this mathematically or by counter-example. The UPL was calculated using data collected for the best performers.

Comment 67: Commenter 17620 states that in defining the test conditions that the sources must meet for compliance, the EPA directs sources to employ the 90^{th} percentile "worst case" fuels, not the 99^{th} percentile worst case fuels.

Response to Comment 67: The EPA has removed fuel analysis requirements from the final rule.

Comment 68: Commenter 17620 says that the EPA is not free to select the UPL probability factors without support in the administrative records for this decision. By "probability factor" the commenter seems to refer to the confidence level. The commenter is opposed to have confidence levels that could led to having all the sources passing the MACT floor. The commenter is questioning why the EPA selected 99^{th} in this case, and previously selected 95 and 97.5 percent confidence levels.

Comment 69: According to commenter 17621 there is an issue with the interpretation of the UPL because some of the best performing themselves might exceed the UPL becoming non-compliant.

Response to Comment 68 - 69: It is an incorrect statement that no sources would ever exceed the floor limit at a given moment in time, which is one reason we have incorporated a 30-day averaging period to account for that potential. The level of confidence represents the level of protection afforded to sources whose emissions are in line with the best performers, and hence it is not arbitrary. A 99 percent level of confidence means that a source whose emissions are in line with the best performers has 1 chance in 100 of exceeding the floor.

Comment 70: Commenter 17620 states that the EPA's use of the "99^{th} percentile UPL" results in unrealistic estimates for Hg MACT floor for conventional EGUs combusting lignite and Subcategory 1 EGUs.

Response to Comment 70: The EPA clarifies that the proposed rule is based on the UPL with 99% confidence level, and it is not based on a 99^{th} percentile. We disagree that the analysis results in unrealistic estimates as claimed by the commenter.

Comment 71: Commenter 17620 suggests that in establishing the variability factors to be applied to the information in its data set, the EPA should consider: 1) public health impacts of the available options; 2) Congressional intent that some relatively large percentage of sources reduce HAP emissions as the result of MACT standards; 3) the full range of available options in performing a variability analysis; 4) the

time frame of the standard and the testing data used to set the standard, compared to the data specified to determine compliance – variations in short term test performance will be less if EPA adopts standards averaged over longer periods of time; 5) the sensitivity of the process to "outliers;" 6) the assumptions employed in developing the set of measures by which compliance with the numerical limit will be determined; 7) the variability in test results for similar pollutants (e.g., SO_2 as a surrogate for acid gas HAP and PM as a surrogate for HAP metals) exhibited by regulated sources over the years; 8) for subcategories with few units, the variability demonstrated by units in other subcategories; 9) that sources were, for the most part, under no obligation to minimize HAP emissions during testing; 10) that EPA has limited information concerning plant operating conditions during testing; 11) that, for the most recent round of testing, sources understood the purpose of the testing, and 12) that, for future testing, sources will know in advance the date of the test and can control the operating parameters of the facility based on earlier tests.

Response to Comment 71: The EPA believes that the approach taken on this final rule is consistent with that taken on other NESHAP rulemakings and the intent of the statute. Therefore, we believe we have addressed the concerns noted by the commenter.

Comment 72: Commenter 17620 states that if for a given unit one test is significantly different from the other tests available, it should be excluded from the analysis because its outlier status. Tests will be considered valid if the EPA can justify its high value; for example the EPA would need to confirm that the control devices were functioning properly during the test and that the plant operating conditions were within the reasonable worst-case operating parameters for that facility.

Response to Comment 72: It is normal practice to use the average of three emission test runs in determining compliance with an emission standard or to set emission limits. This practice allows for some measure of normal variability to be included in the results. The EPA has conducted standard statistical outlier analyses and believes that the results are consistent with the intent of the statute.

Comment 73: Commenter 17620 states that in proposal the EPA explained that some data points were removed from the analysis because they were considered outliers. The commenter states that removing data points that were two orders of magnitude greater than other data is a common practice. However, for Subcategory 1 Hg variability analysis, three tests, one for unit that satisfied the previous outlier criteria were kept in the datasets.

Comment 74: Commenter 17620 states that elimination of outliers will reduce the 99^{th} UPL from 1.18 to 0.444 and the 90^{th} UPL from .653 to 0.251. The commenter concludes that this demonstrates the effect of data treatment on the EPA decisions and that the method used by the EPA is overly sensitive to very high test results submitted by the industry.

Response to Comment 73 and 74: Outlier detection is a very important part of data preparation for analysis and it should be consistent across all datasets. The EPA has used standard outlier criteria in the MACT floor analyses and does not believe that the results are overly sensitive to high test data. The data sets for the final rule have been reviewed and a consistent approach has been taken with all of the data sets.

Comment 75: Commenter 17620 states that when explaining the selection of the confidence level the EPA refers to the level of protection afforded to the facilities (e.g., 1 chance out of 100 of failing the test), however, the EPA never discusses the level of protection afforded to the public.

Comment 76: Commenter 17620 recommends using the 90th percentile. The commenter adds that the EPA should evaluate the impact of the confidence level on public health and avoiding stack test failures at well controlled operated units.

Response to Comment 75 and 76: The EPA does not recommend the use of percentiles for calculating the floor standards. For small data sets and even a sample size smaller than 100, the sample percentile typically underestimates the corresponding population percentile, resulting in erroneous conclusions regarding the compliance of the units being evaluated. The lower the confidence level the lower the MACT floor, then the greater the potential for satisfying compliance.

Comment 77: According to commenter 17620, the EPA's claim that if the limit was based only on the average performance then the sources will exceed the limit half the time or more is true if the emissions are random in nature. The commenter adds that few state regulations result in a reduction of HAP emissions making the emissions data semi-random in nature. The commenter states that the proposed standard is not the same as that obtained using variability from sources without direct regulation. According to the commenter, if the MACT floor were based on the 50th percentile, then EGUs at the bottom half of the top performers would have to make some improvement to satisfy the limit, which he adds was the intention of Congress.

Response to Comment 77: The floor limit is based on the average of best performers plus variability. This average is different from, and smaller than, the average of the emissions of all sources. So, the chances of exceeding the limit increase as the sources performance deviates from the performance of the best sources. The sources utilized to calculate the floor limit constitute a subset of all available sources, with the restriction that they are the best performers. It may be possible that sources within the best performers are located in states without regulations. The variability used for calculating the UPL will depend on the magnitude of the emissions and the deviations between the inter- and intra-data sources.

Comment 78: Commenter 17620 states that he calculated the 90th and 99th UPLs for Hg content of the coal Subcategory 1. The large variability observed between the variability factors (t-statistic*Standard deviation) and the average and minimum values of the data suggests that certain data points were outliers. The commenter concludes that multipliers in excess of 10 or 20 that are used in other emissions to account for variability are unrealistic.

Response to Comment 78: The EPA agrees with the commenter regarding the effect of outliers on the statistic measures (mean and standard deviation are very sensitive to outliers) used in the calculation of the UPL. The EPA analyzed the data looking for inconsistencies before proceeding with the analysis. The EPA looked at both ends of the dataset looking for outliers (high and low values). The EPA removed data that failed the statistical outlier test.

Comment 79: Commenter 17620 notes that in the absence of controlled testing of individual units the EPA has utilized the variability between individual test runs to estimate the variability in the UPL for pollutants other than Hg. The commenter adds that following the same procedure they were able to obtain the same multipliers except for HCl.

Response to Comment 79: The EPA used the same approach for all HAP in each of the MACT floor analyses.

Comment 80: According to commenter 17620, year-to-year test results of well controlled and operated units shouldn't vary by more than an order of magnitude, especially under the compliance conditions of the proposed rule. The commenter adds that variability multipliers over 20 are unrealistic, and the EPA should use them with caution when assessing the variability of compliance units.

Response to Comment 80: The UPL utilizes emissions data from the top 12% performers. Because the top 12% might change from time-to-time (e.g., year-to-year) and it is possible that new controls and other factors add some variability to the data. Given the range of sources and controls represented in the data, it is not impossible to observe large variability in the data. The EPA had evaluated the data utilized in those calculations and decided those are valid data points obtained when the sources were under normal operation conditions. As a result, the EPA has included those data points in the calculations of the UPL.

Comment 81: According to commenter 17621, the EPA needs to revise some calculation inconsistencies. For example in Appendix A for coal mercury ≥ 8,300 Btu/lb the calculation of the mean used all test series, but in other tabs of the excel file only the lowest test series per unit were used. A similar inconsistency, the commenter adds, was observed with the calculation of the variance. For existing coal ≥ 8,300 TBtu/lb, the variance used all data (from Part II and III series), but for total PM and metals the variance was calculated using the lowest test series for each EGU.

Comment 82: Commenter 17621 noted some inconsistencies in the application of the calculation of the UPL across all parameters and EGU categories. The commenter states that in some cases, the mean emission was calculated from the lowest test series reported for each unit, although in others it was calculated from all test series reported across all of the units in the MACT pool. For total PM and metals for coal-fired EGUs, the commenter adds, the EPA did not include all Part II and III data as it was done for Hg. Instead, the commenter adds, the EPA used only the lowest test series for each EGU, which resulted in a lower MACT floor.

Response to Comments 81 - 82: Partly based on comments received, we have reviewed all of the MACT floor analyses and believe they are now consistent.

Comment 83: Commenter 17621 states that the EPA sorting of the EGUs produced inconsistent results in lb/MMBtu and lb/MWh units. According to the proposal, the commenter adds, to determine the best performers the data was sorted on the "lb/MMBtu" formatted data and the same pool of EGUs was used for the 'lb/MWh' analysis. According to the commenter, it is not stated that this list was sorted by lb/MWh values before selecting the best performers for the new EGU limit. The commenter adds that this inconsistency is observed in the coal PM MACT spreadsheet, where two different sorting orders for the MACT pool results if one sorts by (lb/MMBtu) and lb/MWh.

Response to Comment 83: Partly based on comments received, we have reviewed all of the MACT floor analyses and believe they are now consistent.

Comment 84: Commenter 17621 states that by combining or pooling all data from selected best performing sources they are treated as though they comprise independent identically distributed measurements from a conceptual baseline population, ignoring in this way inter-unit heterogeneity, intra-unit and temporal correlation.

Response to Comment 84: Data utilized for calculating the UPL are from different EGUs or from the same EGU but collected in different time points (even different years). In the case of values coming from different units the assumption of independence is valid. In the case of values coming from the same unit but different datasets (Part II and Part III), the time elapsed between the different measurements makes them essentially independent. Values could be considered correlated if they are consecutive values (taken minutes or hours apart), which is not the case for the current data available. The variance used in the UPL accounts for inter-unit and intra-unit variability but it does not account for temporal correlation because it was assumed that data points from the same EGU but at different time points are independent.

Comment 85: Commenter 17621 states that baseline data (which is the data used to calculate the UPL) should be compatible with the data used for compliance. The commenter is concerned that the EPA is planning on using MACT floors based on stack data and require 30-day-averages for compliance. The commenter reminds the EPA that those two types of data (stack and 30-day averages) are not compatible.

Commenter 17975 notes that emission limits for non-Hg metals are based on a 30-day rolling average that would include startups, shutdowns and maintenance events. Commenter 17975 goes on to state that the stack tests upon which the agency's PM standard is based do not reflect emission rates that can be achieved over a 30-day period because stack testing is usually designed to assure compliance with PM limits that must be met over a three-hour period. The commenter asserts that the Agency's 2009 "Clean Air Act National Stack Testing Guidance," which applies to both MACT and NSPS, makes clear that stack testing to determine compliance with these short term limits should be conducted under conditions that "are most likely to challenge the emission control measures of the facility with regard to meeting the applicable emission standards." The guidance further explains that stack testing should be conducted when boilers are operating at peak capacity, and using the dirtiest fuel that it can legally burn because stack testing under these conditions is designed to measure the maximum emissions that will occur within any three-hour period over the course of a year or more. The commenter believes that actual emissions averaged over 30-days during periods when units are operating at lower capacity with cleaner fuels – are likely to be much lower.

Comment 86: According to commenter 17638, data used by the EPA to establish floor standard does not account for emissions variability resulting from startup, shutdown, soot blowing, and malfunction. Commenter adds that the EPA needs to either propose a separate work practice standard or exempt any operational mode not included in the MACT floor for compliance with the PM limit.

Comment 87: Commenter 17716 suggests that data used in MACT floor do not account for startup and shutdown effects. According to the commenter this creates serious problems for units that are required to demonstrate continuous compliance with the PM limit using a PM CEMS since part 63 no longer includes exemptions for SSM periods. The commenter adds that even with the relatively long averaging periods (30-day rolling averages) proposed under this rule, the emissions during these non-representative periods could significantly affect the averages, especially for peaking units or other units that come on- and off-line frequently.

Comment 88: Commenter 17716 adds that it is questionable whether representative measurements could even be obtained during boiler startup/shutdown due to the dynamic flue gas conditions and technical limitations associated with the measurement technology. For instance, changes in particle size

distribution or unburned fuel levels during startup affect PM CEMS measurement accuracy, particularly those using light scattering or other optically-based technologies.

Response to Comments 85 - 88: The EPA understands that stack data and 30-day averages don't seem to be compatible. However, we have used an approach consistent with other NESHAP rulemaking efforts with similar data constraints in developing the 30-day rolling average emission limits.

Comments related to startup and shutdown issues are addressed elsewhere in this document.

Comment 89: According to commenter 16721, the statement found in proposal "only 1% of monitored emissions for a compliant EGU should exceed the UPL" indicates that the 99 percentile would be a simpler estimate of the UPL, and for this reason if enough data are available, one could compare future measurements with the 99 percentile. The commenter proceeds to describe the problems of estimating the 99 percentile, and mentions that there are approaches to estimate the 99 percentiles ranging from parametric and non-parametric ones. The commenter continues describing the issues related to estimating the 99 percentile using small sample size and the uncertainty incorporated when small sample sizes are available.

Response to Comment 89: The commenter has confused the 99 confidence level UPL with the 99 percentile. Both have different interpretation and serve different purposes. The EPA intends to calculate the UPL. The UPL is the value below which a single test observation (or average of several test observations) from the source to be tested for compliance is expected to fall with a stated level of confidence (e.g., 99 percent). The 99 percentile of a sample or population is the value such that 99 percent of the measurements are no greater than this value, and 1 percent of the values are no less than this value. A data point is below or above the 99 percentile, although a data point is below or above the UPL with some confidence level.

Comment 90: According to commenter 17621, data selection affects the calculations of the UPL. An example mentioned by the commenter is the effect in the UPL of sorting the data and selecting the smallest of the measurements from a measurement run for calculating the mean of the UPL. The commenter adds that these data selection process is justified if similar data selection would be used for compliance.

Response to Comment 90: The EPA sorts the data to identify the best performers. We selected the smallest average of three runs, rather than the smallest run of the three as is implied by commenter.

Comment 91: According to commenter 17621, the EPA needs to weight the data used in the UPL equal to the inverse of the number of baseline measurements (i.e., measurements available from each best performer). This procedure, the commenter adds, will provide each unit in the pool with the same weight.

Response to Comment 91: The EPA uses one measurement from each best performer to calculate the average of the UPL, and uses all data available from Part II and III to calculate the variability estimator.

The driving force of the variability term is not the number of measurements from each best performer but the range of the measurements. Therefore, if one would like to determine a more robust and less biased estimator, one should have more measurements for those sites with larger variability or larger range. There are approaches, like the one proposed by the commenter, that result in weighted estimators.

The use of the weighted estimator is to improve the estimation of the parameter. In this case the commenter would like to improve the estimator of the variance of the mean. Weighting down the measurements for those sources with more than one measurement will change the variance estimator and may introduce some bias to the UPL. An approach like this will have unknown results in the variance that would have to be investigated and, thus, was not used.

Comment 92: Commenters 17621 and 18014 state that instead of evaluating if the data are normal or lognormal distributed the EPA should model the tail of the distribution rather than the distribution of the measurements itself. The commenters add that the small sample size reduces the power of the test utilized to assess normality or log-normality, and because the distribution assumed dictates the approach to calculate the UPL, the EPA needs to use sufficient data to increase the probability of correctly detecting the distribution of the measurements.

Response to Comment 92: The EPA evaluated the distribution of the measurements from the best performers for the sole purpose of determining the best approach for calculating the UPL. The UPL equation varies if the distribution is normal or lognormal. The EPA modeled the tail of the distribution of the emissions because it used only data from the best performers. The EPA used the normal or log-normal approach because there are UPL equations developed for such distributions. There are currently several approaches that model extremes in a distribution (e.g., tail of the distributions), however there are no simpler approaches developed to calculate the UPL from such distributions. The EPA is aware that for sample sizes of 10 or lower, tests for assessing normality or log-normality will have a reduced power (probability of rejecting the null hypothesis that the data are normal or lognormal when it is false). For this reason, the EPA looks at other assessment tools such as kurtosis, skewness and histograms.

Comment 93: According to commenter 17621, the EPA appears to have used actual Part III emission test data to develop the actual annual emissions estimate used in their case study risk evaluation. The commenter adds that if the unit was not tested in the ICR, the EPA used data from a similar tested sister unit or an average for units tested in the ICR. These averages, the commenter adds, do not appear to have taken coal rank into account. The commenter adds that those data were not properly described using summary statistics. For example, average values were used when the data are skewed, and outlier analysis was not performed when extreme measurements suggest they might be outliers.

Response to Comment 93: The agency disagrees with the commenter. Please see response to comment 7 in section 1G for a discussion of the coal rank issue and response to comment 2 in section 1G for a discussion of the statistical methods used.

Comment 94: Commenter 17621 comments that because most of the data have a skewed distribution, the arithmetic average is not an appropriate statistics for estimating the bin mean value and that the geometric mean is more appropriate for developing emission factors. The commenter adds that nickel and chromium have possible outliers but those data points were left in the analysis.

Response to Comment 94: For skewed distributions, the median is a better statistic to determine central tendency. The geometric mean is equivalent to the arithmetic mean when analyzing log-transformed data. Prediction intervals calculated using the arithmetic mean after log-transforming the data result in intervals for the geometric mean. The arithmetic mean is the naïve estimator for the mean of the log-normal distribution, however, it is very inefficient when the coefficient of variation (CV=SD/average) is large and this is true even for large samples [Reference: Shen, L, Brown L. D. and Zhi, H. 2006.

Efficient estimation of log-normal means with application to pharmacokinetic data. Statistics in Medicine. 25:3023-3038]. This result makes the arithmetic mean very unreliable even for large sample size, which is why we declined to use it.

Comment 95: According to Commenters 17725 and 18014, the UPL approach addresses the issue of small sample size, reflecting the greater uncertainty in the results. The commenters state that in the case of the new unit limit, the unit with lowest test results was not selected at random and its tests are not typical because they are the results of random measurements affected by calculation or reporting errors.

Response to Comment 95: The EPA understands the issues surrounding the MDL and ND measurements and applies a procedure to account for this issue. Comments related to the use of MDL data are responded to elsewhere in this document. We do not understand commenters' comment relating to the EGU serving as the basis for the new-source limit not being selected at random and, thus, its results are not typical. The basis for the new-source limit was among the data available to the Agency through the 2010 ICR; we believe that any calculation and reporting errors have been corrected.

Comment 96: Commenter 17730 states that in the preamble the EPA expressed the position to account for measurement imprecision when calculating the MACT floor. However, the commenter adds, the EPA did not undertake such adjustment because it stated "it did not know how to do it" which suggests that the UPL approach is inappropriate. The commenter recommends that the EPA consider the quality of the data used and how it impacts its ability to account for different sources of variability.

Response to Comment 96: In the proposed rule, the EPA requested comment on approaches suitable to account for measurement variability in establishing the floor emissions limit when based on measurements at or near the MDL. We received a number of comments on the issue and respond to them elsewhere in this document. Also, elsewhere in this document we address the changes made in our approach to the use of MDL data in the final rule.

Comment 97: Commenter 17739 states that when calculating the UPL for Hg and HCl, the EPA used the minimum values to calculate the average and additional data from Part II and Part III to calculate variability. The commenter states that these two different datasets represent distinct populations. The commenter states that the EPA should use all data to calculate the variance and variability of the UPL.

Response to Comment 97: The floor standard is based on the best performers' data. It is not uncommon to use different sources of data to obtain better estimates of the average and the variance. A better estimate of the latter was obtained with the incorporation of Part II and Part III data. These data contain different sources of variability mentioned by several commenters.

Comment 98: According to commenter 17796, the use of pre-regulation test data to calculate variability will likely overstate the post-regulation variability to some degree. The commenter recommends that the EPA seek appropriate sources and performance tests for this variability approach. The commenter adds that in the subcategory "Existing Sources >8300 Btu/lb," there are four tests that look like outliers and without them the UPL for Hg reduces from 1.2 lb/TBtu to 0.44 lb/TBtu.

Comment 99: Commenter 17843 states that they agree with the EPA's approach. However, the commenter adds that the EPA should use pre-regulation data with caution because these data reflect emissions variability when emissions are unconstrained resulting in an UPL that will overstate the post-

regulation variability. The commenter adds that some pre-regulation sources included in EPA's analysis may not realistically reflect expect variability.

Response to Comment 98 - 99: As noted elsewhere in this document, the EPA conducted standard statistical outlier analyses and did not use data that failed. Also, as discussed elsewhere in this document, we continue to believe that use of the Part II and Part III data are appropriate.

Comment 100: Commenter 17817 recommends that the EPA review 5-year data for the top 12 performing units for both SO_2 and NO_X. The commenter adds that these inspections will clearly indicate the occasional absence of normal distribution in the data. The commenter states that so much the more must be expected for occasional measurement of for PM CEMs for which sufficient data are not yet available.

Response to Comment 100: The EPA understands that emissions data are usually non-normally distributed; for this reason when applying the UPL, the EPA is not relying on the normal distribution of the data, but in the distribution of the average. This is possible based on the Central Limit Theorem, which ensures that for a sample of moderate and large size, the distribution of the average tends to normal regardless of the parent distribution of the data.

Comment 101: Commenter 17817 recommends that the EPA use mean and standard deviation of the UPL using all stack test data for all units in each subcategory equipped with similar control technology. The commenter adds that the EPA has the data and just needs to make proper use of it. The commenter adds that they have prepared some analyses that can be made available to the EPA. The commenter adds that the EPA must establish MACT limits using data from the top performing units and account for all reasonable variability so that sources could be expected to perform every day and in all operating conditions.

Response to Comment 101: We discuss elsewhere in this document comments related to subcategorization by control device which appears to be what commenter is suggesting. The EPA believes it has made proper use of the data available to it and has established emission limits, and accounted for variability, based on the performance of the top performing 12 percent as required by the statute.

Comment 102: According to commenter 17820, the use of ICR data results in MACT limits that are low and overstates the level of control achieved by the best performing units. The EPA should set a limit based on filterable PM based on a calculation of variability using all test series, not just the lowest test series.

Response to Comment 102: The EPA disagrees that use of the available data results in MACT limits that are low or that overstate the level of control achieved by the best performing units. As noted elsewhere in this document, we have established a filterable PM limit in the final rule using the same approach as used for the other limits.

Comment 103: According to commenter 17820, the 99^{th} percentile UPL approach is questionable in the case of new source MACT limits, because it is based on only three measurements collected under identical operating conditions. These measurements obviously cannot provide information about the distribution of the data, and as a result, the variability for new sources results in a small adjustment when compared to the variability of existing sources. The commenter questions the use of the lowest value

instead of the average of each source, which according to the commenter results in an UPL biased low which overstates the level of control achieved in practice by the best performers.

Response to Comment 103: The EPA is constrained by the statute to using data available to it and basing the new-source limit on the best performing similar source. Absent other available data for the best performing unit, we used the three individual runs so as to be able to incorporate variability. As noted elsewhere, we do not believe that our UPL approach results in limits that are biased low.

Comment 104: Several commenters (17821, 17898, 17912, 18021) state that the UPL would work if the EPA uses the correct data. The current data do not capture long-term emissions variability attributable to varying concentration of trace elements in coal for example. The commenters added that they have analyzed long-term CEMS measurements for Hg and PM for some of the best performing units in some HAP groups and found that long-term average emissions are higher than those expected from stack tests alone. The commenters suggest the EPA collect more data to describe all phases of operation, in particular CEMS data. The commenters recommend that the PM standard be based on filterable PM only and not consider condensable PM. The commenters also add that the filterable PM standard should omit startup and shut down periods. Commenters 17898 and 17912 recommend the EPA use its Acid Rain database as a better means of determining what level of variability actually is associated with the most adverse conditions that reasonably recur, especially since use of the Acid Rain data will help account for startup and shutdown emissions which, as the standard is currently written, are part of the compliance demonstration. Commenter 18021 states that representative data are critical, and need to reflect the entire source category and the variability of performance within the source category when considering the need for continuous compliance and related monitoring.

Comment 105: Several commenters (17898, 19536, 19537, 19538) state that although the EPA doesn't have the same data set for consideration of Hg variability as it does for SO_2, there are several units that have Hg CEMS that would have to be considered in determining the true Hg variability. The commenters add that the EPA's present method of calculating variability just based on a short stack test and an arbitrary variability factor is insufficient to properly address variability. Commenters add that if the EPA wants compliance to be determined based on CEMS data, it should then set the variability based on CEMS data rather than trying to extrapolate from single stack tests to CEMS data. In addition, by requiring use of Hg CEMS and imposing a long averaging time, EGU owners will be more vigilant about the EGU's Hg emissions on a day in-day out basis to make sure the Hg controls are being operated in a manner to ensure continuous compliance with the MACT limits.

Response to Comments 104 - 105: We believe that we have used the "correct" data. We did not have CEM data for units comprising the MACT floor pool and, thus, could not use CEM data in assessing variability. As noted elsewhere in this document, we are finalizing a filterable PM limit in the final rule. Startup and shutdown are also addressed elsewhere in this document.

Comment 106: Commenter 17843 states that although the UPL is a reasonable way to establish the MACT floor, the EPA must evaluate the process to select the best performers. The commenter adds that in the Hg MACT analysis they noted that 4 performance tests out of 80 are driving a significant portion of the "variability." Therefore, the commenter requests that the EPA review and reconsider whether these sources are appropriate for inclusion in an analysis of expected variability by post-regulated sources.

Response to Comment 106: As noted elsewhere in this document, the EPA has reviewed its analysis and conducted standard statistical outlier tests and we believe that the data in the MACT floor pools represent the best performing sources.

Comment 107: Commenters 17929 and 18644 state that the EPA needs to revise the UPL practical effect. For example, the average of top 12 percent of most coal-fired units (0.01 lb/TBtu) is transformed into an UPL of 1.0 lb/TBtu, or one-hundred times higher.

Response to Comment 107: The EPA believes its analysis, including the assessment of variability, is appropriate.

Comment 108: According to commenter 17975, the EPA needs to evaluate the data used in the UPL calculations. The UPL is sensitive to outliers and selection of the best performers. The commenter recommends that best performers selection should be done very carefully after a thorough review of all data including operating conditions during tests when the data were collected.

Response to Comment 108: The EPA has reevaluated its analyses and conducted standard statistical outlier tests and believes its analyses to be appropriate.

Comment 109: According to commenter 18014, the individual run data should be used in the floor analysis for both existing as well as new unit limits. Therefore, the UPL analysis should be conducted using individual run data so the assessment includes the run-to-run reference method variability.

Comment 110: Commenter 17725 states that individual run data should be used for each floor analysis. The spreadsheets provided in the docket reveal that the EPA did not use the data from the individual runs in the floor analysis for existing unit limits. The individual run data should be used in the floor analysis for both existing as well as new unit limits. The UPL analysis is supposed to evaluate the potential for a unit with the desired performance to pass a future 3-run compliance test. Therefore, the UPL analysis should be conducted using individual run data so the assessment includes the run-to-run reference method variability.

Response to Comment 109 - 110: The EPA disagrees that individual run data should be used for both new- and existing-source MACT floor analyses. If a company chooses to use manual testing for its compliance, it will be the average of a 3-run test that will determine compliance. Therefore, we have used this same average of 3-run tests in developing the MACT floor limits. We would use the same approach for new sources were sufficient data available for all HAP.

Comment 111: Commenter 18014 agrees on the need to use alternative data to get better estimates of variance. Commenter adds that Part III data and not Part II should be used to evaluate variability when establishing the floor for existing units when the number of units or test data is small.

Response to Comment 111: The EPA disagrees that the Part II data should not be used to assess variability, particularly given that we only have one set of data for each of the EGUs required to test under Part III of the 2010 ICR.

Comment 112: According to commenter 18447, the EPA biased the results first by sampling a subset of power plants from which to obtain data instead of selecting all the power plants in the category. Then it selected the top 12% of plants based on the results of each individual pollutant. By skewing the results

in this way, it is possible that no power plant in the country can achieve compliance for all pollutants that the EPA is attempting to regulate with this rule. The EPA should have sampled all the power plants and then selected the best performing 12% plants.

Response to Comment 112: The EPA does not believe that it has biased the results. In the Supporting Statement for the 2010 ICR, we outlined our approach to selecting the EGUs to be tested for acid gas and non-mercury metallic HAP so as to be able to use the largest number of data points in the MACT floor pool for those HAP. We do not believe that this is biasing the results. We address comments on the pollutant-by-pollutant approach elsewhere in this document.

Comment 113: According to several commenters (19536, 19537, 19538), the statute provides the EPA some discretion in defining the facility's actual performance; it does not, however, allow the Agency to use two inconsistent definitions of that term. If a plant's actual emissions are best approximated by averaging all of that plant's test data and then statistically adjusting that data to address possible variability, then the "best performing plants" are those with the lowest emissions according to that measurement. If, on the other hand, a plant's actual emissions are best approximated by its single lowest test result, then the MACT floor must be defined using the single lowest test results of the best performing plant (or plants). For example, the EPA's Hg standard for existing units burning coal of less than 8300 BTU/lb is based upon 40 "best performing" units selected on the basis of those units' lowest three-run average Hg data (in lb/MMBtu). If the EPA had used the average to determine the "best performing" units, many of the EPA's claimed "best performers" would not qualify as such. Instead, the EPA used the lowest test result to select its best performers, but included all available tests for these "best performers" and further adjusted for variability, in order to determine the floor.

Response to Comment 113: The EPA disagrees with commenter's suggested approach and believes the approach taken by the agency is appropriate and was consistently applied for all of the MACT floor analyses.

Comment 114: Commenter 17620 provides the results of a sensitivity analysis performed by the commenter to examine the impact of a range of choices available to the EPA in evaluating the Hg data for Subcategory 1 sources. It presents what the MACT floor would be, using different choices as to the "percentile" UPL to employ, as well as several different choices available to the EPA in data selection and utilization. Table 1 also sets out the "multipliers" of the arithmetic average of the best performing 12% of these sources that are associated with each of the options analyzed. These results represent but a few of a larger number of choices available to the EPA in calculating the MACT floor.

Response to Comment 114: The EPA has analyzed the results presented by the commenter and agrees with the commenter that including and excluding outliers as well as changing the confidence level of the UPL results in a wide range of UPL values. The EPA carefully analyzed the data available and concluded that all measurements were valid measurements that represent emission values obtained under regular conditions in some of the best performers. As pointed out by the commenter, the confidence level (e.g., selection of 99% confidence level instead of 80% confidence level) is another factor that determines the final value of the UPL. If the level of confidence is 99%, then future data collected for compliance from a source that performs at the level of the best performers will have 1% probability of a false positive (i.e., non-compliant) result. This provides a high level of protection to sources whose emissions are in line with the best performer(s). If the confidence level is lowered, then the probability of a Type I error (false positive) is correspondingly increased, which means that the level of protection provided to sources in line with the best performer(s) is correspondingly reduced. But on the other hand,

the probability of a Type II error (i.e., false negative or compliant result when the future data come from a source with higher emissions than the top performer(s)) will be reduced, which means that higher emitting sources will be exposed more easily. The commenter's table also refers to the calculation of the uncertainty as a factor that affects the UPL. The EPA agrees that there are different options for calculating the variance, and each one is based on different assumptions. The formula to calculate the variance proposed by the commenter is based on the average of unit variances. Further study is needed to determine the properties of such uncertainty estimator (e.g., unbiased) and the effect of the sample size on it. The one selected by the EPA is the standard unbiased estimator.

Finally, the commenter proposed the average of the unit UPLs as the final UPL. Although this is an interesting approach, the purpose of the UPL is to provide a limit below which a future observation (or mean of several future observations) is expected to fall with a stated level of confidence. Source-specific UPLs will have multipliers that are determined by the number of measurements in each source, these result in larger multipliers for high confidence levels. Another aspect to consider in the proposed approach discussed by the commenter is the interpretation of the average UPL. The average UPL represents an average value below which a future observation or the mean of future observations is expected to fall. The confidence level of the average UPL would have to be investigated because it may not be equal to the individual UPL's confidence level.

Comment 115: Commenter 17620 states that, in the Hg floor for coal-fired units, the EPA initially selects the units based on the single lowest test results of the units in the subcategory and designates the units in the top 12% of this group as best performing units. It then includes other test results for those units in determining the UPL for purposes of assigning a variability factor. Because of this, the EPA's results include units with highly variable performance, and one low test result, rather than units with consistently good performance. In other MACT rulemakings, the commenter has commented that the EPA's approach is inconsistent and leads to higher MACT floors than are appropriate. The EPA should define "best performing units" after consideration of appropriate variability allowances. Available data concerning units in the top 12% that exhibit large variations in test results should be evaluated to determine the reason for the variation in performance.

Response to Comment 115: Based on an evaluation of the relevant factors and available data, the EPA determines the level of emissions control that has been achieved by the best performing sources considering these sources' operating variability. By examination of the available data, the EPA ranks the sources and selects those whose data will be used to calculate the UPL. A source that is operating poorly will be less likely to be included in the pool of best performers than if it were operating properly. We believe that use of the outlier analyses precludes the "highly variable performance" noted by commenter from biasing the results.

Comment 116: Commenter 17620 understands the need to incorporate some calculation of the variability in performance that is expected with modern pollution control devices in the determination of a MACT floor. The commenter believes that the arithmetic average of the performance achieved by the best performing 12% of existing units for which the EPA has data should be adjusted to reflect the repeatability of performance of complying units, so that an operator of a unit with a designed adequate compliance margin has a reasonable expectation that the unit will pass a compliance test. As we have commented in the ICI Boiler MACT data acquisition and rulemaking process, this is best accomplished by repeat controlled testing of complying units. The EPA has chosen not to do so, but has based its proposed assignment of variability on a calculation method that includes the difference in performance between all units in the top 12%. The use of inter-unit variability as a surrogate for unit repeatability can

lead to an inappropriate calculation of the MACT floor. Congress has specified how to address the inter-unit variability in the performance of the best performing 12% of the units in a subcategory – average the results.

Response to Comment 116: The EPA has incorporated all data available to calculate the UPL. The EPA believes that when a source has several measurements they could be considered a sample of intra-unit (within unit) repeatability because even though data were not collected consecutively in time, data available were collected under the unit "regular conditions." The EPA has followed Congress's guidelines and incorporated variability into the calculations of the MACT floor using data provided by the industry. Using these data, the EPA calculated an UPL that includes intra (within unit) and inter (between unit) variability.

Comment 117: Commenter 17621 states that they found discrepancies between the EPA's description of the procedure used to derive MACT floor limits and the implementation of that procedure. The EPA stated that the MACT floor for new or reconstructed EGUs is based on the lowest emitting unit for which test run data were available. However, that procedure was not followed consistently, and no explanation is provided for some of the discrepancies. The procedures used to calculate the UPL is not consistent across all parameters and EGU categories. No explanation is provided for these discrepancies.

Response to Comment 117: Where 2010 ICR Part II emissions test data were available, the EPA chose to utilize them in the MACT floors as minimum emission averages or as data showing different emission averages for the same pollutant over time. This was only possible for Hg, HCl, and HF for coal-fired boilers in the proposed rule as those were the only units with these pollutants tested, where, the extra emission test data where provided on a comprehensive basis. Because of the number of units in the industry in the solid oil (petroleum coke) and IGCC subcategories, the EPA chose to assess their UPLs (floors) using available run-by-run test data, although coal- and oil-fired unit's floors were assessed using emission averages. Commenter did not specify the discrepancies alleged; we have reviewed our analyses and believe that to the extent there were any discrepancies in the analyses for the proposed rule they have been corrected.

4A03 - MACT Floor Methodology: Treatment of Non-Detect Values

Commenters: 17620, 17621, 17627, 17690, 17711, 17716, 17725, 17730, 17739, 17775, 17795, 17812, 17820, 17851, 17877, 17878, 17886, 17912, 17914, 18014, 18021, 18443, 18449, 18498, 6637, 8443, 19536/19537/19538, 18023

Comment 1: Commenter 17620 notes that the EPA argues that emissions of a number of individual organic HAP, such as benzene, were frequently below the detection limit ("BDL") at the very best performing units and therefore it is infeasible to establish or enforce an emission limitation. However, the EPA has established procedures for addressing BDL values in calculating MACT floors and for other purposes. Moreover, the relevant factual issue is whether the emissions from the group at large are below detection limits, not just those of the very best performers.

Commenter 17725 states that in cases where multiple units have reported emissions results that are at or below the detection limit, one cannot definitively establish a single "best performer" since the results represent values that are inherently indistinguishable from one another. Although one source that reported a BDL value may have reported a slightly lower detection limit than another source due to individual test calibration, sample volume, or equipment differences, it would be arbitrary to suggest that the unit's performance is better than the other's for that reason.

We determined the RDL for each pollutant using data from tests of all the best performers for all of the final regulatory subcategories (i.e., pooled test data). We applied the same pollutant-specific RDL and emissions limit adjustment procedure to all subcategories for which we established emissions limits. We believe that emissions limits adjusted in this manner better ensure measurement variability is adequately addressed relative to compliance determinations than did the procedure applied for the proposal that may have been based on limited data sets. By accounting for measurement uncertainty in this manner, we also believe that the emissions testing procedures and technologies available are adequate to provide the measurement certainty sufficient for sources to demonstrate compliance at the levels of the revised emissions limits.

Response to Comment 1: The EPA agrees with many of the comments related to treatment of data reported as detection limit values in the development of MACT floors and emissions limits. The probability procedures applied in calculating the floor or an emissions limit inherently and reasonably account for emissions data variability including measurement imprecision when the database represents multiple tests from multiple emissions units for which all of the data are measured above the method detection level. That is less true when the database includes emissions occurring below method detection capabilities regardless of how those data are reported. The EPA's guidance to respondents for reporting pollutant emissions used to support the data collection specified the criteria for determining test-specific method detection levels.

Those criteria insure that there is only about a 1 percent probability of an error in deciding that the pollutant measured at the method detection level is present when in fact it was absent.[223] Such a probability is also called a false positive or the alpha, Type I, error. This means specifically that for a normally distributed set of measurement data, 99 out of 100 single measurements will fall within ±2.54 σ of the true concentration. The anticipated range for the average of repeated measurements comes

[223] (ReMAP): PHASE 1, Precision of Manual Stack Emission Measurements; American Society of Mechanical Engineers, Research Committee on Industrial and Municipal Waste, February 2001.

progressively closer to the true concentration. More precisely, the anticipated range varies inversely with the square root of the number of measurements. Thus, if σ is the standard deviation of anticipated single measurements, the anticipated range for 99 out of 100 future triplicate measurements will fall within ± 2.54 σ/√3 of the true concentration. This relationship translates to an expected measurement imprecision for an emissions value occurring at or near the method detection level of about 40 to 50 percent.[224]

By assuming a similar distribution of measurements across a range of values and increasing the mean value to a representative higher value (e.g., 3 times minimum detection level), we can estimate measurement imprecision at other levels. For an assumed 3xMDL, the estimated measurement imprecision for a three test run average value would be on the order 10 to 20 percent. This is about the same measurement imprecision as found for Methods 23 and 29 indicated in the ASME Precision of Manual Stack Emissions Measurements[225] for the sample volumes prescribed in the final rule (e.g., 4 to 6 dscm) for multiple tests.

Analytical laboratories often report a value above the method detection limit that represents the laboratory's perceived confidence in the quality of the value. This arbitrarily adjusted value is expressed differently by various laboratories and is called limit of quantitation, practical quantitation limit, or reporting limit. In many cases, the LOQ, PQL, or RL is simply a multiplication of the method detection limit. Multipliers range from 3 to 10. Consistent with findings expressed in reports of emissions measurement imprecision and the practices of analytical laboratories, we believe that using a measurement value of 3 times a method's detection limit established in a manner that assures 99 percent confidence of a measurement above zero will produce a representative method reporting limit suitable for establishing regulatory floor values.

On the other hand, we agree with commenters that an emissions limit set determined from a small subset of data or data from a single source may be significantly different than the actual method detection levels achieved by the best performing units in practice. This fact, combined with the low levels of emissions measured from many of the best performing units, led the EPA to review and revise the procedure intended to account for the contribution of measurement imprecision to data variability in establishing effective emissions limits. In response to the comments and internal concerns about the quality of measurements at very low emissions limits especially for new sources, we revised the procedure for identifying a representative method detection level (RDL). We did not revise the manner in which we calculate the UPL for the MACT floors.

The revised procedure for determining an RDL starts with identifying all of the available reported pollutant specific method detection levels for the best performing units regardless of any subcategory (e.g., existing or new, fuel type, etc.). From that combined pool of data, we calculate the arithmetic mean value. By limiting the data set to those tests used to establish the floor or emissions limit (i.e., best performers), we believe that the result is representative of the best performing testing companies and laboratories using the most sensitive analytical procedures. We believe that the outcome should minimize the effect of a test(s) with an inordinately high method detection level (e.g., the sample volume was too small, the laboratory technique was insufficiently sensitive, or the procedure for determining the minimum value for reporting was other than the detection level). We then call the resulting mean of the method detection levels as the representative detection level (RDL) as characteristic of accepted source emissions measurement performance. The second step in the process is

[224] Ibid.
[225] Ibid.

to calculate three times the RDL to compare with the calculated floor or emissions limit. This step is similar to what we have used before including for the Portland cement MACT determination. We use the multiplication factor of three to approximate reduce the imprecision of the analytical method until the imprecision in the field sampling reflects the relative method precision as estimated by the ASME study that also indicates that such relative imprecision, from 10 to 20 percent, remains constant over the range of the method.es. For comparing to the floor, if three times the RDL were less than the calculated floor or emissions limit (e.g., calculated from the UPL), we would conclude that measurement variability was adequately addressed. The calculated floor or emissions limit would need no adjustment. If, on the other hand, the value equal to three times the RDL were greater than the UPL, we would conclude that the calculated floor or emissions limit does not account entirely for measurement variability. If indicated, we substituted the value equal to three times the RDL for the calculated floor or emissions limit which results in a concentration where the method would produce measurement accuracy on the order of 10 to 20 percent similar to other EPA test methods and the results found in the ASME study.

We determined the RDL for each pollutant using data from tests of all the best performers for all of the final regulatory subcategories (i.e., pooled test data). We applied the same pollutant-specific RDL and emissions limit adjustment procedure to all subcategories for which we established emissions limits. We believe that emissions limits adjusted in this manner better ensure measurement variability is adequately addressed relative to compliance determinations than did the procedure applied for the proposal that may have been based on data sets smaller than seven tests and as few as one test. We also believe that the emissions testing procedures and technologies available now and in the future will be adequate to provide the measurement certainty sufficient for sources to demonstrate compliance at the levels of the adjusted emissions limits.

Comment 2: Commenter 17620 states that the EPA asserts that in its experience, test results near the detection limit of the test method employed are accurate to within 40 percent, but when the result is three times the detection limit, the expected accuracy of its test methods improves to 15 percent. Thus for example, if the detection limit was 1 ppm, the EPA would expect the result to be accurate within a range of 0.6 to 1.4 ppm; although if the result was 3 ppm, the Agency would assess the range to be 2.55 - 3.45 ppm. However, in designing the test program, the EPA instructed sources to utilize a very high "detection limit," one set at the 99th percentile, which should increase the confidence level of the result.[55] The EPA then assigned a value equal to three times the highest detection limit to any test result in the group that was BDL of the method employed in analyzing the results. Thus, it would assign 3 ppm (not 1.4 ppm) as the test result if the detection limit was 1 ppm. Thereafter, the EPA assigns a second variability factor to the results that include this multiplier. The scientific community has adopted several approaches for the use of BDL values, including an assumption of zero, an assumption that the value is half of the detection limit and an assumption that the value is the detection limit itself.

Comment 3: Commenters 8443 and 17621 suggest that the EPA should recognize that laboratory MDLs are often not an appropriate indicator of the capability of stack test methods. For some HAP, below detection limit test results were reported at much higher concentrations than typical MDLs (e.g., 10,000 times higher for HCl). These differences are due to matrix effects in samples exposed to flue gas that are not present in the clean laboratory samples used for MDL studies. Thus, commenters suggest that the question is not what substitution procedure should be used to represent BDL values in the UPL calculation, but rather, what is the lowest concentration of the HAP that a majority of competent labs measured accurately in the ICR.

Commenter 8443 adds that detection limit information was inconsistently reported by lCR test contractors and that how the EPA uses these very low measurements will have significant impacts on the MACT floors the EPA calculates as well as later compliance demonstrations. The commenter states that the EPA's presentation material fails to explain how the EPA will address measurements at or below a methods detection limit and quantitation limit.

Comment 4: Commenters 18498 and 17716 state that, although many sources provided emissions data identified as BDL or "detection level limited" ("DLL"), it is unclear whether these are all the BDL instances, given the possibility of reporting errors or inconsistencies in the approach used by the various laboratories to identify such values. The MDL represents the threshold for assuming a pollutant is present in the sample, but the uncertainty associated with the MDL is very high makes it impossible to meaningfully quantify the concentration.

Commenters add that emission measurements that are below the detection limit of a sampling method do not represent the quantifiable data necessary to perform a technically sound emissions floor analysis. The point at which a measurement can be deemed meaningfully quantifiable – known as a "limit of quantification" ("LOQ") -- is at a much higher concentration than the MDL, albeit still with some degree of measurement uncertainty. It is commonly accepted that LOQ represents the value that will produce a relative standard deviation ("RSD") of 10% in the measurements. A key issue for the UPL analysis is how to treat values that are greater than the MDL but below the LOQ be treated. This is especially important here where relatively small data sets are involved because not only might the results fail to represent the entire range of operating conditions or fuel supplies, but also these measurements are subject to variability and uncertainty.

Commenters recommend that the EPA conduct the UPL analysis using only values that are above MDL with values deemed to be below the actual MDL of the method replaced by an approximation of the MDL. This approach would reduce the danger that truncating the emissions at the MDL values will significantly affect the UPL calculation by underestimating the variance as well as avoid the fundamentally flawed problem of calculating an emission floor using a dataset that contains non-quantifiable data. See 76 FR 25044/2 ("There is a concern that a floor emissions limit based on a truncated data base may not account adequately for data measurement variability and that a floor emissions limit calculated using values at or near the MDL may not account adequately for data measurement variability, because the measurement error associated with those values provides a large degree of uncertainty"). Commenters agree with this concern and concur with the decision not to adjust the MDL values for the individual run that were used in the floor calculation.

Comment 5: Commenter 17730 notes that the EPA relied on the ICR testing data to establish the emission standards for Hg, each of the HAP metals, acid gases, and the associated surrogates. In the ICR, the EPA required sources to submit data from emissions testing regardless of whether that data was below the method detection limit or not. Subsequently, the EPA used the data submitted by sources that was recorded below the method detection limit in establishing the emission standards for the individual HAP, setting the below detection limit data at the detection limit value. This practice is inappropriate and the EPA should not use the ICR test results that are below the detection limit of the method. Emission test results that are recorded below the detection limit are invalid data. Additionally, the EPA's artificial adjustment of the data value to the level of the detection limit is inappropriate and should not be allowed. The EPA should discard the test results that are below the detection limit, and use test results that are above the detection limit of the method prescribed by the EPA for use in the ICR data collection request.

Comment 6: Commenter 17739 notes that the EPA has erroneously included emissions data in the MACT floors that are below the MDL. In the Boiler MACT, the EPA concluded that "it is not appropriate, for development of MACT floor, to use any value less than the MDL." 76 FR 15624. The EPA reached this conclusion because "such values have not been demonstrated to have been met." Although the EPA has reached a correct conclusion with respect to use of values below the MDL for the Boiler MACT, due to inadequate or non-existent QA/QC analysis, 51 values in the Hg floor spreadsheet are below the applicable MDL. It is clear from the assessment of the EPA's QA/QC procedures that individual sampling results are incorrectly identified as ADL in the MACT database. The EPA's decision to use these BDL values as if they were the "true" values is contrary to widely accepted scientific practice and arbitrarily skews the emission averages to lower values. It may also mask sampling and analytical problems which should completely invalidate the subject data. The commenter did not have the time or the resources to evaluate this issue for the other HAP datasets, but the number of identified basic data errors the EPA has made thus far would suggest that additional errors in other data sets would be likely.

Response to Comments 2 - 6: In addition to the general response provided above under Comment 1, the EPA agrees with commenters on several points regarding the handling of very low or below MDL measured emissions values in establishing the floor. We agree with the assertion that developing a floor using data that include reported BDL values requires an additional accounting for measurement uncertainty. We agree that measurement uncertainty is related more to the measurement method than to individual subcategories of sources in the same general source category. We also agree that assessment of the largest pool of data available would provide a more realistic estimate of MDL than an analysis of a very few or even one data value from of subset of method detection levels.

We disagree with commenters who suggested using values less than the MDL or arbitrarily adjusted higher reporting values (e.g., LOQ) be applied to substitute for data otherwise reported as below detection level in the data set used to calculate the floor. We recognize that a test-specific MDL derived in accordance with the method(s) will be variable from test to test and to some extent from testing laboratory to laboratory. We believe that test method measurement imprecision, including the inherent test-to-test variability in MDL values, can be a significant contributor to the variability in a set of emissions data. We believe that emissions data sets that reflect the inherent variability of test specific method detection levels that are determined and defined using relatively consistent procedures, as discussed above, provide a reasonably reliable platform from which to assess process variability and intrinsic measurement uncertainty.

We also recognize that several tests reported detection levels much higher than the either the lowest reported detection levels or the lowest measured values. As some commenters suggested, we believe this is the result of laboratories reporting the arbitrarily higher LOQ values. We do not agree that the higher BDL values are a result of site specific matrix effects. All tested facilities were combusting typical coals or oils with no identified unique situations that we would expect to result in adverse matrix effects. We disagree that using data reported as BDL at that value is arbitrary. While the use of the BDL reported value in the UPL calculation may result in a slightly higher emissions standard, alternatives other than using the BDL value or using 0.5 of the BDL value (exclusion of value, setting the value at 0, or setting the value at an arbitrary multiple of the MDL) introduce an unacceptable bias. The use of the BDL value increases the likelihood that the final emissions standard would be based upon the UPL calculation rather than three times the average BDL value. We do not agree that an emissions standard calculated using the greater of the UPL or three times the average reported RDL cannot be measured with reasonable accuracy to demonstrate compliance. As stated above. Should the new source limit be based

upon a source which reported all test runs as BDL, setting the standard at three times the RDL provides ample ability to demonstrate compliance with the standard using test procedures which are accurate and precise.

Comment 7: Commenter 17621 states that it is important that the EPA carefully review all emission data used in the MACT floor calculation to ensure that the data are free of errors and are reported according to ICR requirements. The resulting emission limit should be measurable with acceptable precision in actual field samples, using standard methods with a sampling duration that is practical for routine stack testing. To determine that emission value requires consideration of the precision of methods in the field, not simply taking a laboratory MDL and applying a multiplier. The most appropriate means to determine method precision is to conduct multi-train stack tests at full-scale power plants, at the approximate flue gas concentration considered for the MACT limit. Recognizing that such test data generally do not exist and will take a considerable effort to collect, the commenter recommends setting the limits for existing EGUs such that most BDL-flagged ICR results are below the MACT limit. Any BDL-flagged values above the limit should be reviewed to determine whether the elevated detection limits are the result of unusual source characteristics, poor laboratory performance, or sampling, analytical, or reporting error. As discussed earlier, in setting limits for new/reconstructed EGUs, the MACT limit should not be based on BDL-flagged values.

Reference: based on results of a statistical study provided in commenter's Appendix D section: "regarding EPA's unit limit calculation procedures and why these procedures may produce a new unit limit below the actual capability of the test method."

Response to Comment 7: See response to Comment 1, above.

Comment 8: Commenter 17716 notes that, in the final IB MACT Rule, the results for new units were tied to each specific new unit. Because the objective of the exercise is to ensure that emissions can be reasonably quantified during future tests, the levels should be set for any reference method test based on the pollutant of interest. The same level set for existing unit floor should be used to evaluate the new unit limit to assure compliance with each limit. This would avoid the possibility that new unit emissions limits would markedly differ from or otherwise be unrepresentative of the existing source limits due to the vagaries of testing as well as establish a consistent reasonable range of quantification to establish future compliance.

Commenter states that the issue of measurement uncertainty is fundamental to the analysis and is unrelated to any sub-categorization. To the extent the proposed approach present difficulties for some pollutants or surrogates, a possible alternative for Method 29 metals measurements would be to establish reasonable values based upon the reported detection limits in the ICR database and then set a limit for total metals using the sum of the ten individual metal limits.

Response to Comment 8: See responses to Comment 1 and Comments 2-6, above.

Comment 9: Commenter 17716 suggests that, for PM, a different procedure for handling non-detect values is warranted because very few sources reported non-detect values in the ICR database for filterable PM test methods or for the calculated total PM values, which consisted primarily of Method 5 or modified Method 29 measurements (or Method 202 for condensable PM). The field study that the EPA conducted to validate the recent revisions to Method 202 suggested a MDL of 2.5 mg for filterable PM and a MDL of 4.1 mg for condensable PM. (Field Evaluation of Condensable Particulate Matter

Measurement, U.S. EPA Office of Air Quality Planning and Standards, Sector Policy and Program Division Monitoring Policy Group (prepared by Eastern Research Group, Inc. under EPA Contract No. EP-D-07-097), 2010.) In combination with a minimum sampling volume of 4 dscm, these values would suggest an MDL of about 1.7 mg/dscm or 0.0015 lb/MMBtu for total PM and approximately 0.6 mg/dscm or 0.0006 lb/MMBtu for filterable PM. Using these values would result in limits of 0.0045 lb/MMBtu (for 3xMDL) or 0.0075 lb/MMBtu (for 5xMDL) for total PM. For filterable PM, the limits would be roughly 0.002 lb/MMBtu (for 3xMDL) or 0.003 lb/MMBtu (for 5xMDL) for total PM (These PM limits should be considered conservative because the reported MDL values may not be representative of actual field measurements, especially for total PM. For both filterable and condensable PM, blank values can vary significantly due to contamination such as acetone residues. The practices of stack testers might vary even during presumably well-controlled studies. For condensable PM, lingering SO_2 artifacts can (as discussed previously) have a significant impact on low-level measurements, even when a nitrogen purge is used after the tests.)

Response to Comment 9: The EPA agrees with the commenter on several issues raised in these comments. First, we note that the final rule does not include emissions testing for condensable PM and it is unnecessary for us to respond to comments on that issue. Second, few, if any, emissions testing contractors reported detection levels for particulate matter. For the Phase III ICR data, all but two sources reported the measured weight gains. Three sources reported values were lower than what we would consider the minimum mass that can be reasonable measured (i.e., BDL). Prior to using this data to calculate the UPL, we increased the reported weight gain to 1 mg. For the Phase II ICR data we did not have the detailed test data that we had for the Phase III ICR data. We did make similar adjustments although the adjustments were based upon assumed sampling volumes, moisture content and flue gas characteristics. As a result, we are confident that we have accommodated the lack of precision of the particulate test methods at the low emissions levels achieved by the best performing sources.

Comment 10: Commenter 17716 states that, for Hg the EPA's approach will tend to overstate the limit because some used Method 29 and because of misunderstanding regarding the limitations of Method 30B, which was the predominating Hg reference method used for the ICR. The commenter suggests the use of a limit for Hg of 0.04 µg/m3, which translates to roughly to 4 x 10-8 lb/MMBtu.

The MDL reported during the ICR for HCl seems to be somewhat higher than expected due to a number of sources combining the Method 26 trains with CTM-033 to jointly measure HCl, HF and HCN. Commenter recommends using a limit for HCl of 8 x 10-6 (3 x MDL) or 1.3 x 10-5 lb/MMBtu (5 x MDL).

Comment 11: Commenter 17716 states that determining the proper MDL and LOQ for Method 30B is paramount to assure data collected are of acceptable quality and known uncertainty. However, the commenter notes that these values will vary from lab to lab, analyzer to analyzer, and analyst to analyst. Therefore, simply stating a generic MDL/LOQ for the entire method, in their opinion, is folly at a minimum. Although the theoretically calculated MDL and LOQ has been shown to be as low as 2 ng, in practice the QA/QC at that level is not obtainable. That is, to validate a 2 ng mass on the calibration curve, a CCVS would have to be within ± 0.2 ng and that level of precision is below the MDL. Furthermore, the field recovery test (section 8.2.6 of Method 30B details the requirements for the field recovery test which is required to be successfully completed before any field samples are validated) portion of the method adds additional challenges and uncertainty that have not been discussed in this write up. Based on a tremendous amount of field experience in performing the analysis required of this method and the ongoing QA/QC requirements of the method, the author believes that in practice 10 ng is

a reasonable range for the LOQ to collect data of acceptable quality and known uncertainty (i.e.,±10%) and 5 ng is pushing the envelope on the lowest LOQ that should be used when evaluating low level effluent concentration data (i.e.,_ 0.1μg/m3). The response factor approach is used for merely estimating masses below the LOQ, but above the MDL and should not be used when establishing an emission limit as the data of are of unknown quality and uncertainty. It then follows for a typical ICR test (i.e.,2 hr test run collecting 120 liters of volume) that effluent concentrations ranging between 0.04 μg/m3 and 0.08 μg/m3 are the lowest that can be reasonably be determined with acceptable quality and uncertainty.

Response to Comments 10 - 11: Method 29 was an approved testing method for Hg measurement for the ICR and, so, testers were free to use it. The EPA agrees that it is important to assure that the data collected are of known and acceptable quality and that is precisely what the performance criteria of Method 30B are designed to accomplish although also providing significant operational flexibility. The lower limit of quantitation or LOQ is not a fixed value, but a value that can be improved by maximizing total sample volume and analytical sensitivity. With recent improvements to the Method 30B analytical equipment and reagents, this is now routinely accomplished. Commercially available Method 30B sorbent traps are being used with nominal sampling rates over 4 liters per minute (lpm) and we routinely see analytical calibration curves with Hg masses as low as 1-2 ng; this although meeting all the Method 30B performance criteria. As a result, Hg stack concentrations as low as 0.004 ug/m3 can be measured by using 2 hour sampling time with all the Method 30B performance criteria being met. Even in consideration of the commenter's recommendation of a 10 ng LOQ, Hg concentrations as low as 0.01 ug/m3 can be measured using a 4 hour emissions test.

We believe that this was demonstrated as part of the ICR testing program where an average stack Hg concentration of 0.01 ug/m3 was measured as part of triplicate 4 hour emissions test where all Method 30B performance criteria were met.

Comment 12: Commenter 17739 notes that the EPA required respondents to Part III of the 2009 ICR to use EPA Method 30B to determine Hg emissions. According to section 1.1 of the EPA's description of the method (see below), it is intended to measure Hg concentrations of 0.1 μg/dscm or greater. Assuming an F-factor of 9,780 (the standard F-factor for bituminous coal, from EPA Method 19), and a flue gas oxygen content of 5%, this 0.1 μg/dscm Hg concentration corresponds to an emission rate of 8 x 10-8 lb/MMBtu. However, 51 Hg emission rates below this level are listed in the spreadsheet that the EPA used in its revised Hg MACT floor determination of 5/18/2011 (See, "National Emissions Standards for Hazardous Air Pollutants (NESHAP) Maximum Achievable Control Technology (MACT) Floor Analysis for Coal-and Oil-fired Electric Utility Steam Generating Units – REVISED, " May 18, 2011]. The EPA should revise its Hg floor dataset to correct for these emission rates below the method detection limit, and then revise its Hg floor and variability analyses. As further evidence of detection limit problems, Method 30B, which the EPA required for Hg measurements, provides that sampling times must be determined based on the expected flue gas Hg content, and increased to accurately measure the low concentrations expected for well controlled units, as stated in the protocol for the method. 8.2.5 Determination of Sample Run Time. Sample run time will be a function of minimum sample mass (see Section 8.2.2), target sample volume and nominal equipment sample flow rate.

It is not clear from the QA documentation if this procedure was followed consistently because some of the reported sampling times appear to be impossibly short for the Hg emission level to have been reported accurately. Did the EPA ensure in all cases, and particularly for the data used in the MACT floor calculations, that adequate sampling times/volumes were determined and employed, and if so, how?

Response to Comment 12: The commenter correctly points out that, in section 1.1 of Method 30B, we quote a 'typical' range of 0.1 ug/dscm to >50 ug/dscm. The EPA specified the range as 'typical' as we recognized the method range would likely expand over time. In fact, as noted in the response above, recent improvements in analytical technology, sorbents, and traps have resulted in current capability to make measurements of known quality down to levels of approximately 0.004 ug/dscm with sampling times of 2 hours. In regard to the data used to set the MACT Hg floors, we have reviewed the data set used in determining the new source standard. In particular, this test program utilized a 4 hour sampling time, yielding mass catches of approximately 8 ng of Hg, and measured concentrations approximating 0.01 ug/dscm. Analyses were conducted using a lower calibration point of 5 ng Hg and all Method 30B performance criteria were met.

Considering the above information, we believe that it is reasonable to conclude that the data constituting the MACT floor for existing sources would be reliable based on 1 to 4 hour sampling runs.

Comment 13: Commenter 17775 states that the EPA's focus on the method detection limit reported by a given laboratory ignores many sources of measurement error that can affect a reported result. Accuracy considerations are not limited to the ability of a single laboratory to precisely measure the amount of a substance in a given sample it receives. Measurement errors also occur during the collection of a sample at the stack, the transfer of that collected sample to whatever means are used to transport the sample to an analytical laboratory, and the inter-laboratory inaccuracies of a different laboratories testing the same sample. The EPA's proposed rule does not address these areas of collection and analytical error. Furthermore, a laboratory MDL value is often not an accurate indicator of the true capability of a stack test method. MDL studies generally use clean samples for analysis. Samples from EGU stacks present far more challenging matrix effects because of flue gas chemistry. For these reasons, the EPA's detection limit analysis is fatally flawed.

Response to Comment 13: See responses to Comment 1 and Comments 2-6, above. The EPA believes that the adjustments and clarifications used to finalize the emission standards represent a scientifically-sound basis for this rule.

Comment 14: Emission value below detection limits (BDL) should not be used.

Multiple commenters (17621, 17851, 17886, 17912, 17914, 18014, 18021, 18443, 18449, 18498, 19536, 19537, 19538, 18023) state that an emission value below detection limits should not be used to calculate emissions for a "lowest-emitting unit," because these values understate measurement variability and do not have acceptable accuracy and precision.

Several commenters (17725, 17730, 17820) state that emissions data may have actually been below the detection limit but not identified as such in the ICR database because of reporting errors or inconsistencies in the approach used by the various laboratories to identify such values. Emission measurements that are below the detection limit of a sampling method do not represent quantifiable data, which is necessary to perform a technically sound emissions floor analysis. Commenter 17730 adds that the emissions data that was collected for the ICR for the proposed rule showed that approximately 50 percent of the data was below the detection limit of the method, yet in evaluating the data, it appears that the EPA has assigned the detection limit value to that data. The EPA should not arbitrarily assign an emission value to this data that is not accurate.

Commenter 17795 recommends that the EPA change the statistical approach for this rule and not use values BDL of the method when calculating the floor. At a minimum, all BDL values should be raised to 0.04 ppmv and the floor should be recalculated. This issue is highlighted by the proposed NSPS standard of 0.3 lb/GWh. Converting this standard to a ppm equivalent, a 7,700 Btu/kW heat rate would be required to meet 0.026 ppm of HCl, which is 35 percent lower than the method detection limit. It is unreasonable for the EPA to adopt standards below method detection limits.

Commenter 17878 recommends that measurements below MDLs should not be used for standard setting without adjustment. Many of the Hg emission rates in the EPA's MACT floor are at or below the MDL. The EPA required respondents to Part III of the 2009 ICR to use the EPA Method 30B to determine Hg emissions. According to section 1.1 of the EPA's description of the method (see below), it is intended to measure Hg concentrations of 0.1 μg/dscm or greater. Assuming an F-factor of 9780 (the standard F-factor for bituminous coal from the EPA Method 19), and a flue gas oxygen content of 5 percent, this 0.1 μg/dscm corresponds to an emission rate of 8 x 10-8 lb/MMBtu. However, Hg emission rates at or below this level are listed in the spreadsheet that the EPA used in the revised Hg MACT floor determination of 5/18/2011.

Commenter 17627 states that the use of data below MDLs to establish MACT limits for utility boilers is technically incorrect. When all three runs from a submitted emission test indicate data below the MDL, the EPA used the maximum of the three runs as the test average. For example, commenter's Bay Shore Unit 1 ICR data for 2,3,7,8-TCDD yields an average of the three runs of 1.097E-13 although the EPA's spreadsheet lists an average of 1.49E-13 for Bay Shore Unit 1. Additionally, all three of Bay Shore Unit 1 dioxin/furans runs were below the MDL, but the EPA used the maximum value, Run 3, to represent the 3-run average. This type of data accounting is inaccurate and results in erroneous and biased-low MACT emission limits.

Commenter 17775 states that the detection limits reported in the ICR responses are inconsistent and are not even based on a common understanding of the term "detection limit" or "method detection limit" ("MDL"). Most EGU owners seem to have reported the "detection limit" value they were provided by the laboratory analyzing the ICR samples. A cursory review of the ICR data shows that some "reported" values are actually below the detection limit values reported in other ICR tests.

Commenter 17851 states that the EPA should re-examine the data used to set the standards to make sure that all reported data is either reported as ML or RL. Any value below the RL is an estimated value and will be qualified (flagged) as such in the report from the laboratory. A number that has a qualifier is not a defensible number and should not be used for any purpose - either to set standards or to show compliance with that standard. A data point that is above the ML but below the RL is a result of extrapolation below the lowest calibration point. Extrapolation below the lowest acceptable calibration point simply does not result in a defensible number. Unless the current standards are developed from data that is defensible, the entire standards setting process is suspect. Commenter strongly recommends that the EPA examine or re-examine their data base to ensure that all data reported meets these quality requirements.

Several commenters (17725, 18014, 6637) state that the point at which a measurement can be deemed meaningfully quantifiable is at a much higher concentration than the MDL. This level is often referred to as a "limit of quantification" (LOQ). LOQ values represent a quantifiable measurement that still contains some degree of measurement uncertainty. Although there is no formal definition of LOQ even within analytical chemistry, it is commonly accepted that LOQ represents the value that will produce a

relative standard deviation (RSD) in the measurements of 10 percent. Below MDL, the measurement data cannot be said to have any meaning. Above this threshold, the data might have only very limited meaning, but if there are a large number of low level measurements, then even though each individual measurement will have a very high level of uncertainty, the average of all the data will tend to approximate the population.

Commenter 17886 states that the appropriate metric to report or use in regulatory actions is the quantitation limit, which is usually three to ten times the detection limit. The quantitation limit is that level at which one can accurately determine the amount of a material that is present. Where ICR results fall in these low ranges, the EPA should determine the quantitation levels and use those levels as the basis for establishing MACT floors. The EPA should also ensure that MACT floors are not set lower than the quantitation limit for the applicable measurement method.

Commenter 17912 states that Part II test data submitted by Logan would not meet the Agency's proposed HCl emission limit: Logan's additional HCl data submitted is 6.6E-04 lb/MW, as compared to the proposed emission limit of 3.0E-04 lb/MW. Logan's would not be capable of meeting the surrogate SO_2 emission rate of 0.045lb/MMBtu set by the EPA, given that Logan reported SO_2 emissions of 0.091 lb/MMBtu. The EPA's proposed MACT floor for HCl for new units was calculated as three times the lowest MDL for the three sampling runs at Logan. The EPA can't use test results that are reported as "non-detect" from a single unit, especially when subsequent HCl tests for the same unit and reported to the Agency would constitute non-compliance if the proposed emission limit were adopted.

Response to Comment 14: See responses to Comment 1 and Comments 2-6, above.

Comment 15: Method 26A would not be able to measure HC1 or HF accurately.

Commenter 17621 states that unless better sensitivity can be obtained than indicated in Method 26A, this method would not be able to measure HCl or HF accurately in future EGUs at the proposed limit. Method 26A states that the typical analytical detection limit for HCl is 0.2 µg/ml and that the detection limits for other analytes (e.g., HF) should be similar. Assuming that 300 ml of liquid is recovered from the acidified impingers and the basic impingers, this would result in a MDL of 120 µg. Assuming that the sample volume is 2.5 cubic meters, the minimum required by the ICR, this mass corresponds to an emission rate for a coal-fired EGU of 4.4E-5lb/MMBtu. Comparing this analytical detection limit with the MACT proposal, the limit for existing coal-fired EGUs (0.002 lb/MMBtu) is well above the analytical detection limit. The limits for HCl and HF in existing oil units (3E-4 and 2E-4 lb/MMBtu, respectively) are above the analytical detection limit; however, the limit for all future EGUs (0.3 lb/GWh, equivalent to 3E-5 lb/MMBtu) is not.

Commenter 17621 also states that at 40 mg/dscm (about 0.04 lb/MMBtu), 99 of 100 future triplicate measurements will be within 11 percent of the true concentration. This concentration is 20 times higher than the MACT limit for existing coal-fired plants (0.002 lb/MMBtu) and about 1,300 times the MACT limit for new units. At 1 mg/dscm (9E-4 lb/MMBtu), 99 of 100 future triplicate measurements were predicted to be within ± 20 percent of the true value. At a stack gas concentration of 0.5 mg/dscm (4E-5 lb/MMBtu), the precision of the method (%RSD) fell to 30 percent. An acceptable level of precision for a test method is generally considered to be ± 15 percent. The ReMAP findings indicate that the lower limit of adequate precision for Method 26 is about 9E-4 lb/MMBtu. Over 90 percent of the HCl and HF ICR measurements made at coal-fired units were below 9E-4 lb/MMBtu, indicating that

the great majority of the ICR measurements may not be accurate. The proposed MACT limit for existing coal EGUs (0.002 lb/MMBtu) falls in the range where acceptable accuracy is expected. However, the MACT floors for new coal and liquid oil-fired EGUs are much lower (3E-5 and 5E-5 lb/MMBtu, respectively) and the test methods are not expected to perform accurately at those concentrations.

Commenter 17795 states that the majority of data used for establishing the proposed EGU MACT HCl standard (acid gas surrogate) includes units with FGD control devices (i.e., wet scrubbers and spray dryer absorbers) that produce flue gas at or approaching saturation.

Response to Comment 15: The agency has reviewed the commenters' concerns and believes that its procedure for establishing the floor and the emissions limit ensures that the Methods identified in the rule, along with their requisite sampling times, are appropriate for determining compliance with the emissions limits.

Comment 16: Commenter 17807 is concerned that non-HCl chlorides from FGD units are a potential source of interference with the EPA Method 26A not typically found in dry stacks. Commenter recently tested trace metals in condensable fluid to determine the presence of non-HCl chlorides. The test results show concentrations of ammonia, calcium and magnesium in the condensable fluid indicating potential interferences causing high bias in the method 26A results. The contribution of chlorides from metal salts (e.g., $CaCl_2$, $MgCl_2$, $MnCl_2$, and NH_4CI) is not known, but presence of total ammonia, calcium, and magnesium suggests a substantial contribution of chlorides and HCl biases.

Response to Comment 16: The EPA acknowledges the potential for trace metals salts in the "condensable fluid," but the information provided in the comment does not support a definitive empirical interference or bias. Due to other comments, the final rule allows the use of Method 320 for HCl testing. Should an EGU owner or operator believe there are source-specific matrix interferences, he or she may request an alternative method of compliance with the standard per the requirements of section 63.7.

Comment 17: Neither Method 5 nor Method 27 establishes a Method Detection Limit for FPM.

Commenter 17621 states that the ICR required FPM tests on stacks with wet FGD units (wet stacks) to be conducted with Method 5, which uses a heated, out-of-stack filter. Some testers combined the Method 5 FPM measurement with a Method 29 metals analysis, reporting FPM from the probe and filter of the Method 29 sampling train. FPM tests on dry stacks were required to be conducted with OTM-27 (promulgated in December 2010 as revised Method 201A), which uses particulate sizing cyclones and an in-stack filter at stack temperature. The FPM method required for monitoring compliance with the TPM limit is Method 5 (for wet and dry stacks). A PM CEM can be used to monitor compliance with TPM, in place of Method 5 testing. Neither Method 5 nor Method 27 establishes a method detection limit for FPM; however, each method states a minimum mass that will allow acceptable precision in the gravimetric measurement.

a. Method 5 has two sample fractions, the filter and the rinsate of the sampling probe and line. Each fraction is weighed and the weights are summed to obtain the final result. The particulate filter is repeatedly dried and weighed until consecutive weighings are within 0.5 mg. The final weights are recorded to the nearest 0.1 mg. Commenter calculated the lower limit of method precision based on 0.5 mg times 2 (1 mg). Assuming the 4-hour sampling period required by the ICR, a sample volume of 120 dry standard cubic feet (dscf) and a default F-factor of 9780 dscf/MMBtu at 0% oxygen (O2), FPM

residue can be measured accurately at 3E-4 lb/MMBtu. Very few ICR test runs reported FPM results lower than this: 1% of coal-fired EGU test runs and 3% of liquid oil-fired EGU test runs in the ICR Part III Access database would be considered inaccurate based on this metric.

b. OTM-27 (and Method 201A) has four fractions (the filter and three acetone rinses) that are repeatedly dried and weighed until consecutive weighings are within 0.5 mg or within 1% of total weight less tare weight. The final weights are recorded to the nearest 0.1 mg. Commenter calculated the lower limit of method precision based on 0.5 mg times 4 (2 mg). Based on this evaluation, Method 201A should be able to measure accurately at 6E-4 lb/MMBtu. About 16% of coal-fired EGU test runs in the Part III Access database, but only 3 percent of liquid oil-fired EGU test runs, fell below this emission value.

Response to Comment 17: Although the commenter is correct that neither EPA Method 5, Method 17, Method 29, Method OTM 27 or Method 201A identify method detection limits, there are several studies which have evaluated the detection limits for filterable particulate test methods. Generally, a minimum detectable mass of 1 to 1.5 mg was demonstrated. The majority of the imprecision was due to the weighing of the filter. Although there were few testers which recorded values less than these values, we made adjustments to samples which recorded values below these levels. We recognized the issue of detection levels prior to issuing the ICR which required four hour samples. As a result, we received very few particulate tests where the filter weight gain was less than 1.5 mg. With respect to testing to demonstrate compliance with either the existing source or new source standards, we do not expect any below detection level issues.

Comment 18: OTM-28 and Method 202 did not establish a Method Detection Limit.

Commenter 17621 states that most ICR test contractors used OTM-28; a few used the original Method 202. Neither method establishes a method detection limit. OTM-28 requires analysis of two sample fractions: inorganic (aqueous-phase) CPM and organic CPM. An ammonium hydroxide correction is applied to the inorganic fraction. The method allows for blank correction of residue in the field blanks of both fractions; however, the blank correction must be applied to the final CPM total (not the individual fractions) and the correction amount is limited to 2.0 mg. The median total CPM in blanks reviewed by Commenter exceeded 2.0 mg; thus, some of the ICR test results may have been biased high by this method restriction. No data sets had a gross inorganic catch less than 1 mg; however, 12 data sets reported an organic catch less than 1.0 mg. The data indicate that the MDLs were not an issue for the inorganic fraction, but reporting limits/MDLs may impact the organic fraction at some sites. Gravimetric detection limits ranged from 0.2–0.5 mg for the inorganic fraction and from 0.2–0.8 mg for the organic fraction. Assuming a 4-hour sampling period, an ICR sample volume of 120 cubic feet and a default F-factor of 9,780 dscf/MMBtu at 0% O2, total CPM emission rates corresponding to these detection limits range from 1.1E-4 lb/MMBtu to 3.5E-4 lb/MMBtu. The reporting limits for the inorganic fraction ranged from 0.5–1.0 mg; for the organic fraction they were all 1.0 mg. For the purpose of this evaluation, Commenter used a total CPM emission of 2E-4 lb/MMBtu (the middle of the range) to compare to the MACT limits. None of the total CPM emissions measured in coal- or oil-fired EGUs were lower than this value. The proposed TPM limit for new coal-fired EGUs is 0.05 lb/MWh (equivalent to 0.005 lb/MMBtu), about 20 times higher. This indicates that gravimetric imprecision is not a limiting factor for use of Method 202 at the proposed MACT limits.

Response to Comment 18: Although EPA Method 202 does not stipulate a method detection level in the method, the detection level as performed by EPA in a laboratory environment was reported in the preamble and response to comments for the method. The inorganic fraction has a detection level

comparable to EPA Method 5 and the organic fraction's detection level is about an order of magnitude lower. Method detection level issues for test methods with multiple components are not impacted equally when different components are below detection level. The overall impact of the measurement is affected most by the fraction(s) which are greatest in mass (or highest detection level) and least by the fraction(s) with low mass (or lowest detection level). As a result, the non-detect values for the organic condensable particulate did not significantly degrade the overall precision for total condensable particulate matter or for many of the total particulate measurements. With the adjustments in the final rule (namely the use of filterable PM and not total PM as the alternate equivalent standard for non-Hg HAP metals), concerns over the use of OTM-28 and Method 202 in the context of the NESHAP standard are no longer applicable.

Comment 19: The methodology to monitor detection limits does not ensure limits derived are achievable.

Commenter 17690 states that the methodology related to monitor detection limits does not ensure that the limits derived are "achievable". As a result, the ICR data set published in the Utility MACT docket for oil-fired units does not provide adequate information to specify controls that can be expected to reasonably reduce stack concentrations to meet the proposed limits.

Commenter 18014 states that in cases where multiple units have reported emissions results that are at or below the detection limit, one cannot definitively establish a single "best performer" since the results represent values that are indistinguishable from one another. Although one source that reported a BDL value may have reported a slightly lower detection limit than another source due to individual test calibration, sample volume, or equipment differences, it would be arbitrary to suggest that the unit's performance is better than the other's for that reason. The Agency will need to establish a limit at a practical measurement threshold. The uncertainty of the reference methods makes it impossible to measure differences in emissions at these levels, whether for the purpose of setting the emissions standard or for potential compliance purposes.

Response to Comment 19: See generally the responses to Comment 1 and Comments 2-6, above.

Comment 20: Errors with sample collection and equipment handling, preparation, and analysis.

Commenters 17711 and 17812 state that all source emission measurements have random (precision) errors associated with the sample collection, sample and equipment handling, sample preparation, and sample analysis. When emission levels are much higher than the magnitude of these errors, there is a high degree of confidence in the measured value obtained from a test run. However, as the measured value decreases, the contribution of these errors to the measured value increases, thus decreasing the confidence level in the accuracy of the measured value to the point where the measured value cannot be distinguished from the random error ("noise" level). This is the case with the utility boiler dioxin/furan data. When this occurs, the measurement cannot be distinguished from zero with high confidence. Although the EPA Method 23 procedures minimize measurement errors at the stack emission levels and applications for which it was intended, measurement errors are not zero and become significant at the extremely low levels in boiler exhaust. In setting recent MACT standards (e.g., Industrial Boiler MACT), the EPA has acknowledged that the emission limit should not be set below the capability of the applicable test method. However, the EPA did not use the widely accepted definition of test method detection limit, which is based on the capabilities of multiple commercial laboratories to collect and analyze a stack sample and identify the presence of a chemical above the "noise" level. This

erroneous methodology results in estimating D/F detection limits that are lower than those regularly achieved by commercial laboratories. Reported values below the method's quantitation limit should not be treated as real values.

Response to Comment 20: The final rule provides for a work practice standard to ensure that dioxin/furan emissions are minimized. The final rule does not require any testing of these emissions from affected EGUs, and thus the concerns raised in this comment are not applicable in the context of this rule.

Comment 21: Determination of coal rank and heating value should be based on long standing USGS classification.

Commenter 17725 recommends that the determination of coal rank and heating value be based on long standing USGS classifications of coal regions and sampling of coal properties within the U.S., and additional sampling and analysis only for imported coals.

Response to Comment 21: The final rule does not include fuel sampling and analysis requirements, and, thus, this comment is no longer applicable.

Comment 22: Sample size will determine the level of accuracy.

Commenter 17725 states that in MACT floor analysis, there are a fairly large number of low level measurements, such that performing the UPL analysis on the data can be a valid exercise, presuming that the measurements reflect the true variability. However, the same is not true for a small sample size. In assessing the performance of any unit based on the results of a single compliance test (or even a handful of tests), particularly if those results are below the LOQ, one must take special care not to fall prey to "Law of Small Numbers" fallacy. Not only might the results not represent the entire range of operating conditions or fuel supplies, but the measurements may be subject to significant uncertainty.

Response to Comment 22: There are situations in which the final rule relies on periodic testing to demonstrate compliance with the emission limits. In other cases, the rule provides for continuous monitoring. In all cases, the test methods established by the rule will be used to determine compliance. The UPL analysis, although used to aid the standard setting process, is not part of the compliance demonstration process.

Comment 23: Recommended adjustments for truncated data.

Commenter 17725 recommends that when evaluating the validity of any data set, the EPA must consider not only how the samples were acquired, but also how the analyses were performed. As the quantity of the analyte falls below the MDL, there is virtually no confidence in the measurement. However, if the quantity of the analyte is above the LOQ, reasonable results may be obtained. MDL may be described as the absolute lowest quantity that may be discerned from the baseline noise of an analytical device. This quantity allows determination of whether some versus none of the analyte is present. However, in most cases the inaccuracy and uncertainty of the quantity is too large to be considered a reasonable result. Therefore, additional quantities have been developed to add some degree of certainty to a measurement. These quantities may be referred to as either the LOQ or the practical quantification limit (PQL). These quantities are simply some multiplier, typically ranging from 5 to 10 times the MDL. PQL is typically defined as 5 times the MDL.

Commenter 17725 adds that a practical method for determining the MDL is to analyze 8 replicate samples of a concentration near the expected limit of detection. The standard deviation is then determined. The MDL may then be computed by multiplying the one-sided t distribution and the determined standard deviation. For eight samples (with seven degrees of freedom) the t value for a 99 percent confidence interval is approximately three. Thus, the standard deviation multiplied by three may be defined as the MDL. Once the MDL is determined, a LOQ may then be defined as anywhere between 5 to 10 times the MDL. Method 30B contains stringent requirements with regard to the calibration procedure, performance specifications, and ongoing checks of the analytical device. These procedures and specifications are present to ensure data of an acceptable quality and known uncertainty are obtained. However, the manner in which the analytical device is configured and calibrated affects the MDL and thus the LOQ.

Response to Comment 23: See generally the responses to Comment 1 and Comments 2-6, above.

Comment 24: Commenter 17877 states that the EPA's effort to set emission limits for all HAP emitted by coal-fired EGU boilers is greatly complicated by the fact that a number of HAP are emitted at levels at or below the MDL that was used to collect and analyze HAP emissions. Detection limit issues have significant impacts on MACT standard setting as well as later during compliance demonstrations. First, the Agency did not provide a clear and proper definition of detection limit in the EGU ICR. As a result, the detection limits reported in the ICR responses are inconsistent and are not even based on a common understanding of the term "detection limit." It is likely that most EGU owners seem to have reported the "detection limit" value they were provided by the laboratory analyzing the ICR samples. The ICR data shows that some "reported" values are actually below the detection limit values reported in other ICR tests. Second, the EPA's focus on the MDL reported by a given laboratory ignores many sources of measurement error that can affect a reported result. Accuracy considerations are not limited to the ability of a single laboratory to precisely measure the amount of a substance in a given sample it receives. Measurement errors also occur during the collection of a sample at the stack, the transfer of that collected sample to whatever means are used to transport the sample to an analytical laboratory, and the interlaboratory inaccuracies of different laboratories testing the same sample. The EPA's proposed rule does not address these areas of collection and analytical error. As a result, the EPA's detection limit analysis is fatally flawed.

Response to Comment 24: See generally the responses to Comment 1 and Comments 2-6, above.

Comment 25: Commenter 17878 recommends that the EPA clarify the role of analyte measurement. This method is designed to measure the mass concentration of total vapor phase Hg in flue gas, including elemental Hg (Hgo) and oxidized forms of Hg (Hg+2), in micrograms per dry standard cubic meter (μg/dscm).

Response to Comment 25: The commenter is correct in stating that Method 30B is designed to measure the mass concentration of total vapor phase Hg emissions from stationary sources, specifically the combination of elemental (Hgo) and oxidized (Hg2+) emissions, and this is specifically stated in Section 1.1 of the method.

Comment 26: Commenter 17914 recommends that the EPA reject the data below the PQL from the data set used to set the MACT floor limits. The PQL should be set at five times (or higher) the MDL and not the three times suggested in the MACT preamble. The emission limits should be set at a level which can be accurately and repeatedly measured by the reference method.

Response to Comment 26: See generally the responses to Comment 1 and Comments 2-6, above.

Comment 27: Commenter 6637 states that the ICR requirements for assigning data flags to indicate the detection status of an emissions value were not consistently followed. A significant percentage of emissions values (up to 20 percent for some parameters) were incorrectly flagged and thus did not indicate accurately whether a reported emissions value was detected.

Response to Comment 27: We have recognized that not all respondents followed the directions which were provided and many took shortcuts or other alternative data entry procedures. Although we may not have identified all of these situations, we did attempt to put out of character reports into perspective and use the data as appropriate for other data of similar reported values. We noticed that in addition to reports which either did not report detection level issues when values were low, testers did not report individual values for multi-component analyses, and reported detection level issues when values were significantly higher than other labs that reported measureable values.

Comment 28: Commenter 6637 states that for test methods that require multiple analyses for a single sample (for example, the filter and resin trap fractions of a speciated organics sample), the ICR required the emission values to be assigned a DLL flag when the sample fractions were a mixture of measurements above and below detection limits. Logically, if a chemical is above detection limits in any fraction of a sample, it can be assumed that the chemical is detected in that sample. However, the ICR required the same format to be used in the Excel template for both DLL- and BDL-flagged results. With this convention, results that are truly below detection will be indistinguishable from those in which one fraction is very high and one is below detection.

Response to Comment 28: We recognize that multi component analyses which have a mixture of measurements above and below detection limits require additional assessment to determine the precision of the overall measurement. Where the non-detect value is for a component that is typically a minor component of the overall emissions, this non-detect may have a minor impact on the overall precision of the test. On the other hand where the non-detect value is for a component that is typically most of the emissions, the impact of the non-detect value can be significant. As part of the identification of the best performing 12 percent and determination of the emissions limit we were cognizant that the lowest emitting sources could have greater issues with non-detect components. We believe that the procedures that we used in addressing BDL issues have adequately addressed not only the setting of a level indicative of the best performing 12 percent but also establish a level which can be reliably measured and therefore used to demonstrate compliance with the established level.

Comment 29: .Commenter 6637 states that very few ICR data packages provided sufficient detail on the detection limit used for non-detected emissions to determine if there were equivalent bases for different reports. The method used to derive the detection limit was rarely stated in the ERT or emissions spreadsheet. In some cases, an explanation was included in the stack test report, but more often the information was simply not provided.

Response to Comment 29: We agree that there was a general lack of documentation on the methods used by laboratories for assessing their analytical detection limits. For those pollutants for which we are establishing numerical emissions limits, we do not believe that we require this level of detail. We believe that BDL values reported by the laboratories of the best performing 12 percent of sources have generally employed methodologies for determining the BDL level that are consistent with our criteria.

Comment 30: Several commenters (6637, 19536, 19537, 19538) state that many of the "nondetect" values reported by laboratories were stated to be reporting limits, which represent the laboratory's best estimate of the lowest concentration that can be measured accurately in a particular sample matrix. A reporting limit is always higher than the method detection limit, but there is no set procedure for determining a reporting limit — it differs from one laboratory to the next. Ten randomly selected data packages were reviewed, representing different combinations of stack testers and laboratories that provided multiple sets of data for arsenic. Two issues are apparent in Table 3-1 (Table 3-1 Excerpted). First, none of these laboratories reported MDLs for arsenic to represent nondetects; in all but one case, a reporting limit was used. For one data set, the basis of the value was not provided. Second, even when a MDL was listed in the laboratory report in addition to the reporting limit, it was rarely possible to determine whether the MDL had been adjusted upward to reflect dilution of the sample. The implication of these observations for the ICR data is that it will be very difficult to put all of the nondetect values on a consistent basis.

Response to Comment 30: As stated earlier, we recognize that many respondents, including the laboratories they used, did not follow the procedures which we provided. We also believe that we have instituted procedures for the selection of the best performing 12 percent and for setting the emissions standard which minimize the impact of the non compliant-reporting of the detection levels.

Comment 31: Commenter 18021 is concerned that errors were found in some of the data that is being used as a basis for these standards including conversion errors related to establishing the MACT floor for Hg. Furthermore, we believe the EPA's approach to synthesizing a performing unit to generate what they consider to be usable data is not defensible. It is important that a regulation that has the degree of impact on the industry, inherent in these requirements, be based on a solid, documented, QA/QC review. Outliers should be eliminated or included with a specific justification. Additional explanation is needed for how data that is below an accepted MDL is being qualified.

Response to Comment 31: As noted elsewhere in this document, we believe that we have corrected all of the conversion errors brought to our attention, provided the necessary QA/QC, conducted the appropriate outlier analyses, and explained our approach to the use of MDL data. Further, we believe that we have established the MACT floors in accordance with the statute and Court decisions.

Comment 32: Commenter 17621 notes that the lowest emitting EGU is often one in which all runs are flagged BDL, indicating that emissions are below detection limit. However, those detection limits often are low not because the laboratory used unusually sensitive techniques, but because the reporting requirements specified in the ICR were not followed. A very common error, observed by the commenter in many ICR Part III ERT files, is failure to sum the fractions of a multi-fraction sample correctly. For example, if, rather than summing the detection limits of the front half and back half fractions of a Method 29 sample, as required for the ICR, the emission was reported using the MDL of only one fraction, this would result in a much lower "MDL" value. Blank-correcting metals results to below the MDL are another common error that results in an unrealistic, low emission value.

Response to Comment 32: While the commenter is correct that a large number of respondents did not follow the reporting requirements that we specified, we assessed the veracity of submitted data to correct or exclude data which would result in significant errors in the development of the emissions limits. We did not find any consistency in testers reporting values that were likely to result from the use of only one component of a multi component analysis. The commenter focuses on the submission of data which are reported at levels lower than the capabilities of a reasonably competent tester and laboratory. In the

development of the numerical limit for the best performing 12% of the sources, data similar to what the commenter describes are a very small component of the overall data. For the development of the numerical limt for the best performing source, our procedures for identifying a representative detection level and for using this value in establishing the numerical limit (described elsewhere) more than adequately address any issue that may be due to our inability to identify data similar to what the commenter describes.

4A04 - MACT Floor Methodology: Potential three-times method detection level approach for limits

Commenters: 17620, 17621, 17716, 17725, 17730, 17851, 18014, 18034, 18421, 18498, 19536, 19537, 19538

Comment 1: Commenter 17716 notes that the EPA proposes to account for measurement imprecision by determining the highest MDL below emissions limit in any data set and multiplying that number by three. If the multiplication shows a number "less than the calculated floor emissions limit, [the EPA] would conclude that measurement variability is adequately addressed and [the EPA] would not adjust the calculated floor emissions limit. If, on the other hand, the value equal to three times the representative MDL were greater than the calculated floor emissions limit, [the EPA] would conclude that the calculated floor emissions limit does not account entirely for measurement variability. [the EPA] then would use the value equal to three times the MDL in place of the calculated floor emissions limit to ensure that the floor emissions limit accounts for measurement variability." 76 FR 25044… EPA's suggestion that the three times for any UPL below MDL "ensure[s] measurement variability is adequately addressed in the floor or the emissions limit," 76 FR. 25044/3, is a valid objective. Using a three-times factor seems intended to address the fact that "environmental measurements used by EPA in other rulemakings exhibit accuracies of plus or minus up to 15 percent." 76 FR 25023; see also id. at 25044 ("pollutant measurement imprecision decreases to a consistent relative 10 to 15 percent for values measured at a level about three times the MDL"). Although the EPA cites the ASME Reference Method Accuracy and Precision ("ReMAP") report [American Society of Mechanical Engineers, Reference Method Accuracy and Precision (ReMAP): Phase 1, Precision of Manual Stack Emission Measurements, CRTD Vol. 60, February 2001] for the latter claim, no such statement appears in the document.

The commenter believes quite the opposite, i.e., that the results of the ReMAP study demonstrate that such accuracies will not be achieved at the 3 x MDL level. As shown in the table below, applying the ReMAP equations to the EPA's hypothesis demonstrates that a higher value than 3 x MDL must be used. Multipliers of five to ten are often used in conjunction with the MDL to represent the point where meaningful quantification occurs. Accordingly, the commenter recommends that the EPA use a value of at least 5 x MDL.

MDLs and PQLs Derived from ReMAP Study Results using EPA Assumptions

	MDL (50% Error)	**3 x MDL**	**LOQ (15% Error)**
Method 29 (Metals)	0.06 µg/dscm 5.34 x 10-8 lb/MMBtu	0.18 µg/dscm 1.60 x 10-7 lb/MMBtu	50 µg/dscm 4.45 x 10-5 lb/MMBtu
Method 26 (HCl)	0.003 mg/dscm 2.67 x 10-6 lb/MMBtu	0.0009 mg/dscm 8.01 x 10-6 lb/MMBtu	1 mg/dscm 8.90 x 10-4 lb/MMBtu

Comment 2: Commenter 17620 states that there is no technical basis for assuming that a value that is reliably reported as below the detection limit is three times higher than that value. This is especially true where the EPA has instructed sources to use a very high value for the detection limit. The EPA recognizes that use of three times the minimum detection limit may lead to inappropriately high MACT floor calculations and has requested comment on this issue as well as how to calculate variability, where a significant part of the data is below the detection limit. The EPA should use a figure no higher than the detection limit for its calculations.

Comment 3: Commenter 17621 states that the procedure described for limits based on an " MDL" requires clarification: The procedure for adjusting some MACT floors for new EGUs to be above a method detection limit (MDL) [FR 25044] does not clearly indicate that the " MDL" that is referred to is actually the lowest test run value in the 3-run test series of the lowest-emitting EGU. For example, in the coal HCl MACT floor worksheet (EPA-HQ-OAR-2009-0234-3036), cell C102 of the HCl_New_MW tab points to cell B7—a BDL value that is more than two times lower than the other two BDL values in the same test series. The selected value cannot be called a representative "MDL" for the method. Multiplying that "MDL" by three, as the EPA has done, results in a MACT limit that is exceeded by test series from the same EGU. The ICR database contains BDL-flagged HCl values 10,000 times higher than the one selected, indicating that it is highly unlikely that the "BDL" value selected is representative or achievable by all laboratories.

Reference: based on results of a statistical study provided in commenter's Appendix D section: "The procedure described for limits based on an " MDL" requires clarification." Commenter adds that basing the MACT limit on three times the lowest test run of the lowest test series of the lowest emitting EGU resulted in a limit that could not be detected at that EGU on a consistent basis. That is the case for HCl for new coal units, where all measurements in all test series were non-detect and several of the detection limits exceeded the proposed limit.
Reference: based on results of a statistical study provided in commenter's Appendix D section: "regarding EPA's unit limit calculation procedures and why these procedures may produce a new unit limit below the actual capability of the test method."

Comment 4: Commenter 17621 states the method of determining HCl and HF limits for new EGUs by selecting lowest test run values in the lowest test series of the lowest emitting coal-fired EGU and multiplying that by a factor of three without consideration for outlier identification or reporting errors, instead of statistically analyzing the ICR data, resulted in limits for new EGUs that are not achievable with the methods used in the ICR.

Commenter 17621 states that the new unit HCl and HF limits for coal-fired and oil-fired EGUs are based on low outliers, which can be noted when comparing the emission values to the average emissions for other test series of all flagged BDL from Part II and Part III data. Commenter adds that is would be more appropriate to set the limit at a concentration that most qualified labs could measure accurately in the stack gas samples.

Commenter 17730 states that the error band of 10 to 15 percent associated with using a value three times the method detention limit is too large; therefore, a larger multiplier is needed.

Commenter 17730 states the EPA needs to conduct broad based studies to determine the PQLs for the compliance methods it chooses for showing compliance with HAP limits, and then set MACT limits based on those PQLs.

Commenter 17730 states that a MDL supplied by a given laboratory does not account for all sources of variability in sample collection, nor inter-laboratory variability in analyzing a given sample.

Commenter 17851 suggests the EPA use work practice standards any time they do not have reliable data on which to develop standards.

Commenter 17851 agrees with conclusions made in the 1995 paper, *Development of Compliance Levels from Analytical Detection and Quantification Levels*, written by the Agency's Engineering and Analysis Division, stating that the lowest number that can be used for developing standards and showing compliance with those standards is the ML or RL. Commenter includes a copy of the paper in Appendix A to the docket entry EPA-HQ-OAR-2009-0234-17851.

Several commenters (17725, 18014, 18498) state that the EPA described a RQL (Representative Quantification Limit or three times the RDL) approach in the preamble similar to the one it used for the IB MACT floor analysis. The Agency said this approach could be used; however, the Agency did not actually apply the approach and did not adjust to address low level measurement variability in the proposed rule.

Commenters 17725, 18014, and 18498 support the Agency's RQL approach with the following exceptions:

> a. Because the issue of measurement uncertainty is fundamental to the analysis and is unrelated to any subcategorization, it is appropriate to establish "method-specific" detection limits based on all available data for that method regardless of subcategory.
>
> b. Although the agency cites the ASME ReMAP report to support the claim that using three times the MDL to estimate the RQL is sufficient to achieve the agency's target reference method uncertainty of 10 to 15%, commenters did not come to the same conclusion and actually used the information to determine the multiplier of three is insufficient. Using equations from the ASME ReMAP which characterized method uncertainty as a function of emission concentration, the commenter calculated the concentration at which the RSD will be 50% and assigned the value as the MDL, and calculated the concentration at a 15% RSD and assigned it as the LOQ threshold which is compared to three times the MDL. Commenters reference Table 6 in docket EPA-HQ-OAR-2009-0234-18014 for results of these calculations. Commenters recommend using a multiplier of five.
>
> c. The way that the agency implemented this adjustment in the final IB MACT Rule is problematic because it determined the RQL for assessing a new unit limit based solely on the MDL results reported for that top performing unit. The agency should use the same RDL that it determines for the existing unit floor when evaluating the new unit limit since the same methods are used to assure compliance with each limit. It is important to identify a representative quantification level for any reference method test for the pollutant of interest to ensure the limits can be reasonably quantified during future tests. If the EPA were to use only the MDL associated with the best performing unit test, the resulting RDL would not be representative.

Commenters 17725 and 18498 agree that some statistical screening should be applied to the data, but the suggestion that the RQL be limited to the floor emissions limit is a questionable practice since it assumes dependence between the RQL and the average. Although commenters would typically recommend a more standard statistical screening, they believe that the screening the agency described will be adequate in this case.

Commenters 17725 and 18498 recommend that the agency use the RQL determined in conjunction with the existing unit floor for the other smaller solid fuel sub-categories.

Several commenters (17725, 18014, 18498) agree with the agency's proffer of three times the RDL value as a replacement for any UPL below that threshold to address measurement variability and states that any limit that does not take measurement variability into account would be arbitrary.

Commenters (17725, 18014, 18498) states that a review of the data indicates that the agency may not be able to establish RQL values for pollutants or surrogates following the approach it described and suggests the following alternate procedures for specific pollutants/surrogates:

a. Commenters (17725, 18014, 18498) suggest for Method 29 metals measurements, the EPA should be able to establish reasonable RQL values based upon the reported detection limits in the ICR database following the approach. A RQL for total metals would then be represented by the sum of the ten individual metal RQLs.

b. Commenters (17725, 18014, 18498) note that the predominate Hg reference method used for the ICR was Method 30B and recommends using a RQL value for Hg of at least 0.04 $\mu g/m^3$ based on reasoning provided in "Discussion of Method Detection Limit and Limit of Quantification for Method 30B." The article is attached to the docket entry EPA-HQ-OAR-2009-0234-18014. Commenter adds that the EPA's approach will tend to overstate the RDL for Hg because some testers used Method 29.

c. Commenters (17725, 18014, 18498) state that the MDL reported during the ICR for HCl seems higher than expected due to some sources combining Method 26 trains with CTM-033 and recommends using an RQL of at least a multiplier of three or five times the MDL.

d. Commenters (17725, 18014, 18498) state that for PM a different procedure for handling non-detect values is warranted because few sources reported non-detect values in the ICR database for filterable PM test methods or for the calculated total PM values. Commenters suggest using MDLs of 2.5mg for filterable PM and 4.1 mg for condensable PM, as suggested in a field study (Field Evaluation of Condensable Particulate Matter Measurement, U.S. EPA Office of Air Quality Planning and Standards, Sector Policy and Program Division Monnitoring Policy Group (prepared by Eastern Research Group, Inc under EPA Contract No. EP-D. 07-097), 2010)) conducted by the Agency to validate revisions to Method 202, and a minimum sampling volume of 4 dscm. Commenters state that the RQL values for PM should be considered conservative because the MDL values from the field study may not be representative of actual field measurements due to variability in blank values and differences in practices used by stack testers and the test contractor. Commenters add that for condensable PM and SO_2 artifacts can have a significant impact on low level measurements.

Several commenters (17725, 18014, 18034, 18498) assert that the EPA should not set a limit below the LOQ of a compliance method since obtaining repeatable measurements below the LOQ is technically infeasible and a source with adequate performance could not be expected to demonstrate compliance with the standard on a consistent basis.

Commenters 17725 and 18498 state that if an emissions measurement is not feasible, the Agency could promulgate a work practice in lieu of an emissions standard in accordance with Section 112(h) of the CAA.

Commenter 18034 states that the EPA did not provide any technical or statistical analysis to support that using a value equal to three times the MDL sufficiently accounts for measurement uncertainty for the purposes of establishing compliance.

Commenter 18034 states that because the MACT floor limits are based on a series of three test runs on a single source, multiplying the MDL by a factor of three does not account for the range of variability of the detection limits across sources.

Commenter 18034 states a unit used to set the new unit HCl MACT floor for coal-fired EGUs is equipped with dry fFGD. Commenter adds that an emission limit based on MDL determined on a unit equipped with dry acid gas controls is likely biased against units equipped with wet scrubber control technology.

Commenter 18034 states that basing the proposed HCl emission limit and some of the other new unit emission limits on the MDL of the methods used for the ICR is technically unsound and may be impossible for sites to demonstrate compliance with using the prescribed test methods. Commenter asserts that basing emission limits on non-detectable test results is problematic because the in-stack detection limits for Method 26A are dependent on a number of variables and the MDL for these methods will vary depending on what control equipment is installed. Commenter adds that the Agency does not appear to have accounted for the fact that because the Method 26A impinger solutions are analyzed directly without concentration or extraction, the effective detection limit of the test on a specific source is increased as more moisture vapor is condensed in the sampling train impingers and the volume of impinger solution for analysis increases.

Commenter 18034 suggests the EPA abandon attempts to apply adjustment factors to determine emissions limits based on data close to the MDL or multiplier of the MDL when results are less than the MDL and should only include in the MACT floor analysis those emission results with data that are above the LOQ.

Commenter 18034 states that in the EPA's NESHAP for Boilers in response to similar suggestions about using MDL to determine emissions limits, the Agency rejected the idea of using LOQ or the practical quantitation limit (PQL) as criteria for screen emissions data for MACT floor analysis because such criteria are variable from laboratory to laboratory, and the Agency stated it cannot apply data arbitrarily adjusted in establishing the floor. Commenter adds that the MDL is variable from source to source, condition to condition, and can vary depending on laboratory procedures; therefore, commenter contends that the EPA's approach to adjusting and applying MDL values for establishing MACT floor limits for the utility NESHAP rule is arbitrary.

Commenter 18034 states that the agency's argument that LOQ and PQL are not defined statistically is contradictory to the EPA's definition of LOQ as being the level at which there is a known degree of confidence.

Commenter 18421 urges the agency to require greater reduction in emissions of Hg from coal-fired power plants, stating that technology solutions to reduce mercury are widely available and cost-effective. The commenter adds that many coal-fired units are already achieving or have emissions significantly lower than the Hg standards promulgated in the proposed rule and that standards promulgated under CAA section 112 of the CAA should represent the average emission limitation achieved by the best performing 12% of existing sources.

Commenters (19536, 19537, 19538) assert that the agency should not set limits at triple the MDL.

Commenters (19536, 19537,19538) state that the ReMAP study (included as an appendix to Docket No. The EPA-HQ-OAR-2009-0234-2937) cited by the agency to support the measurement imprecision suggested by the agency does not in fact support the EPA's statements that pollutant measurement imprecision decreases to a consistent relative 10-15% for values measured at a level about three times the MDL. Commenter adds that the ASME ReMAP used Method 26, and the EPA used 26A for HCl analysis in the ICR data collection. Commenters note that the data set does not fall in line with the assumption used in the ReMAP that the average pollutant concentration does not vary with time, noting that the current data sets have both random and systematic errors and temporal variations. Commenters state that, in the ReMAP data for 99 out of 100 triplicate measurements of HCl over a wide range of concentration, it is shown that over a very wide range of true concentrations the variability is such that the prediction range varied by 8-20%, which does not correspond to the agency's statement regarding imprecision of 40-50% at or near the MDL.

Commenters (19536, 19537, 19538) state that section 112 does not permit the agency to substitute triple the detection limit for standards based on the actual performance of the best performing similar source and requires new source standards to be no higher than the emissions of the best performing similar source. It does not suggest that actual emissions reported below the detection limit are triple the selected detection limit. Commenter adds that if the emissions data from sources at or near a detection limit are imprecise by 40-50%, then at most, the actual emissions would be 50% higher than the reported detection limit for that source.

Commenters (19536, 19537, 19538) state the CAA requires standards to be at least as stringent as the average emissions achieved in practice by the best performing 12% of existing sources, but the agency has substituted a figure that does not reflect the actual emissions of any source within the category.

Commenter 17621 asks the EPA to consider whether a MACT limit based on an EGU where all test runs were below detection qualifies as a "lowest emitting unit," because these emissions are not quantifiable.

Response to Comments 1 - 4: The EPA agrees with many of comments related to treatment of data reported as detection limit values in the development of MACT floors and emissions limits. The probability procedures applied in calculating the floor or an emission limit inherently and reasonably account for emissions data variability including measurement imprecision when the database represents multiple tests from multiple emissions units for which all of the data are measured significantly above the method detection level. That is less true when the database includes emissions occurring below method detection capabilities regardless of how those data are reported. The EPA's guidance to respondents for reporting pollutant emissions used to support the data collection specified the criteria for determining test-specific method detection levels.

Those criteria insure that there is only about a 1% probability of an error in deciding that the pollutant measured at the method detection level is present when in fact it was absent.[226] Such a probability is also called a false positive or the alpha, Type I, error. This means specifically that for a normally distributed set of measurement data, 99 out of 100 single measurements will fall within ±2.54 σ of the true concentration. The anticipated range for the average of repeated measurements comes progressively

[226] ReMAP): PHASE 1, Precision of Manual Stack Emission Measurements; American Society of Mechanical Engineers, Research Committee on Industrial and Municipal Waste, February 2001.

closer to the true concentration. More precisely, the anticipated range varies inversely with the square root of the number of measurements. Thus, if σ is the standard deviation of anticipated single measurements, the anticipated range for 99 out of 100 future triplicate measurements will fall within ± 2.54 σ/√3 of the true concentration. This relationship translates to an expected measurement imprecision for an emissions value occurring at or near the method detection level of about 40 to 50%.[227]

By assuming a similar distribution of measurements across a range of values and increasing the mean value to a representative higher value (e.g., three times minimum detection level), we can estimate measurement imprecision at other levels. For an assumed 3x representative method detection level (RDL), the estimated measurement imprecision for a three test run average value would be on the order 10 to 20 percent. This is about the same measurement imprecision as found for Methods 23 and 29 indicated in the ASME Precision of Manual Stack Emissions Measurements[228] for the sample volumes prescribed in the final rule (e.g., 4 to 6 dscm) for multiple tests.

Analytical laboratories often report a value above the method detection limit that represents the laboratory's perceived confidence in the quality of the value. This arbitrarily adjusted value is expressed differently by various laboratories and is called limit of quantitation, practical quantitation limit, or reporting limit. In many cases, the LOQ, PQL, or RL is simply a multiplication of the method detection limit. Multipliers range from three to ten. Consistent with findings expressed in reports of emissions measurement imprecision and the practices of analytical laboratories, we believe that using a measurement value of three times a method's detection limit established in a manner that assures 99 percent confidence of a measurement above zero will produce a representative method reporting limit suitable for establishing regulatory floor values.

On the other hand, we agree with commenters that an emissions limit set determined from a small subset of data or data from a single source may be significantly different than the actual method detection levels achieved by the best performing units in practice. This fact, combined with the low levels of emissions measured from many of the best performing units, led the EPA to review and revise the procedure intended to account for the contribution of measurement imprecision to data variability in establishing effective emissions limits. In response to the comments and internal concerns about the quality of measurements at very low emissions limits especially for new sources, we revised the procedure for identifying a RDL.

The revised procedure for determining an RDL starts with identifying all of the available reported pollutant specific method detection levels for the best performing units regardless of any subcategory (e.g., existing or new, fuel type, etc.). From that combined pool of data, we calculate the arithmetic mean value. By limiting the data set to those tests used to establish the floor or emissions limit (i.e., best performers), we believe that the result is representative of the best performing testing companies and laboratories using the most sensitive analytical procedures. We believe that the outcome should minimize the effect of a test(s) with an inordinately high method detection level (e.g., the sample volume was too small, the laboratory technique was insufficiently sensitive, or the procedure for determining the minimum value for reporting was other than the detection level). We then call the resulting mean of the method detection levels as the representative detection level (RDL) as characteristic of accepted source emissions measurement performance.

[227] Ibid.
[228] Ibid.

The second step in the process is to calculate three times the RDL to compare with the calculated floor or emissions limit. This step is similar to what we have used before including for the Portland cement MACT determination. We use the multiplication factor of three to approximate reduce the imprecision of the analytical method until the imprecision in the field sampling reflects the relative method precision as estimated by the ASME study that also indicates that such relative imprecision, from 10 to 20 percent, remains constant over the range of the method.es. For comparing to the floor, if three times the RDL were less than the calculated floor or emissions limit (e.g., calculated from the UPL), we would conclude that measurement variability was adequately addressed. The calculated floor or emissions limit would need no adjustment. If, on the other hand, the value equal to three times the RDL were greater than the UPL, we would conclude that the calculated floor or emissions limit does not account entirely for measurement variability. If indicated, we substituted the value equal to three times the RDL for the calculated floor or emissions limit which results in a concentration where the method would produce measurement accuracy on the order of 10 to 20 percent similar to other EPA test methods and the results found in the ASME study.

We determined the RDL for each pollutant using data from tests of all the best performers for all of the final regulatory subcategories (i.e., pooled test data). We applied the same pollutant-specific RDL and emissions limit adjustment procedure to all subcategories for which we established emissions limits. We believe that emissions limits adjusted in this manner better ensure measurement variability is adequately addressed relative to compliance determinations than did the procedure applied for the proposal that may have been based on limited data sets. By accounting for measurement uncertainty in this manner, we also believe that the emissions testing procedures and technologies available are adequate to provide the measurement certainty sufficient for sources to demonstrate compliance at the levels of the revised emissions limits.

4A05 - MACT Floor Methodology: variability

Commenters: 16849, 17621, 17681, 17725, 17774, 17776, 17798, 17807, 17820, 17904, 17930, 18443, 18498, 18500, 19114, 19122, 18023

1. Limitations of ICR data.

Comment 1: Commenter 16849 states that the ICR data reflects results obtained under optimal steady-state operating conditions and does not reflect real-world situations. Actual boiler operating load change and can even swing, equipment and parts deteriorate or fail without warning, maintenance cannot be geared toward 3 hours periods, weather conditions vary, and coal/fuel quality changes. The EPA has used a small number of tests that set the standards for all other existing sources, which often operate in less than perfect conditions.

Comment 2: Commenters 17621 and 17725 state that a significant limitation of the collected ICR data is that they do not reflect the full extent of emissions variability over time. The field measurements conducted for the ICR were generally limited to three short-term snapshots of stack emissions, conducted over a period of several days, with the unit burning a single fuel type and operating at full load. The ICR data do not adequately reflect process variability associated with fuel composition, control device operation, and other process variables. In those cases where the longer historical time perspective is lacking in the baseline data pool, the baseline variability used for the UPL calculations will be incompletely represented, and will not reflect the additional variability that the baseline EGUs would experience over time. Reference: Based on results of a statistical study provided in commenter's Appendix D.

Comment 3: Commenters 17681 and 19122 state that the EPA established the limit based on the ICR data during steady-state, full-load conditions, which does not account for emissions variability resulting from startup, shutdown, soot blowing and malfunction. The EPA needs to either propose a separate work practice standard or exempt any operational mode not included in the establishment of the MACT floor for demonstration of compliance with the PM limit.

Comment 4: Commenter 17904 states that the EPA's emissions data for the proposed MACT standards is taken from the 2009 ICR, which required certain individual EGUs to conduct stack sampling over a three-day period. The EPA used this data to establish the range of performance and variability for all EGUs. However, those three day tests can only provide a snapshot of a given unit's HAP emissions. Such tests are not indicative or representative of emissions over longer periods of time. In light of the snapshot nature of the ICR data, the data set does not represent the actual operating range of the EGUs covered by the rule (including the best performing sources).

2. Operational variability not accounted for.

Comment 5: Multiple commenters (17774,17776, 17798, 17820, 17904, 18443, 19114, 18023) state that the EPA has not fully accounted for operational variability (startup, shutdown, and load changing operations, ambient conditions, age of equipment, fuel variability causing changes in control equipment operations, etc.) of EGU's.

Comment 6: Commenters 17774 and 17904 state that the UPL statistics can never capture the variability of the operating range of the affected facilities. Without additional consideration of

operational variability, the EPA's UPL analysis is insufficient to ensure that the MACT floors are achieved under all foreseeable operational conditions by the best performing sources.

Comment 7: Commenter 17776 states that HCl and Hg results are likely to be constantly at or just below the proposed MACT limits for EGUs. It could take only one erroneous or higher than normal result to exceed a 30-day average limit.

Comment 8: Commenters 17798 and 17820 state that the resulting filterable PM limit does not account for operating variability. Commenters recommend that the EPA should consider such variability in response to the DC Circuit Court Action (Federal Register, Vol 76, No. 85, page 25041) when setting the limit for total PM. It does not seem reasonable that a source now has to comply with a CEM limit based on a one time test with no accounting for operating variability. It seems that sources will need to operate at their highest possible emission level in meeting the PM total limit during testing in order to establish the most flexible PM filter limitation. This is contrary to demonstrating real emission performance and the environmental benefits achieved by a source.

Comment 9: Several commenters (17774, 17820, 17904) state that the emissions of HAP are highly variable for even the best performing single EGUs. Commenters cite the DC Circuit in *National Lime Association vs. The EPA* [627 F.2d 416, 431 n.46 (D.C. Cir. 1980)] held that where a statute requires a standard to be "achievable," it must be achievable "under most adverse circumstances which can reasonably be expected to recur." Commenters again cite the *Sierra Club vs. The EPA* [167 F.3d 658, 665 (D.C. Cir. 1999)]"it is reasonable to suppose that if an emission standard is as stringent as 'the emissions control that is achieved in practice" by a particular unit, then that particular unit will not violate the standard". In order to assure that an emission limit is set at a level the best performing sources can and do actually achieve, the EPA must assess the variability in emissions of that unit.

Comment 10: Commenter 18023 states that the EPA has not provided information as to how to implement operating limits at varying loads.

3. Emissions variability not accounted for.

Comment 11: Commenter 17904 states that the EPA must account for emissions variability over the range of unit performance in order to determine the level of performance actually achieved by the best performing units.

Comment 12: Commenter 17930 states that the actual HAP emissions from sources will vary over time and variability was not properly taken into account.

Comment 13: Commenter 18023 states that the EPA's proposed emission limits do not capture the long-term emission performance under all foreseeable operating conditions.

Comment 14: Commenter 17820 states that for EGUs sharing a common stack, emissions from one unit were automatically assigned to the other unit if test data were available from only one unit, which discounts any emissions variability between the unit.

4. MACT data set consists solely of full load steady-state testing.

Comment 15: Several commenters (18498, 18500, 19114) state that the EPA's proposed MACT limits rely on testing done at steady-state conditions. The EPA's proposed limits did not account for effects of variable operating load, variability in fuel constituents, emissions profiles and other variables. Emissions controls generally work best when operated on a relatively static basis. The EPA did not test or consider startup and shutdown conditions in setting proposed limits. The EPA can help alleviate some of the effect of variability on unit emissions, that was not accounted for in ICR testing, by allowing annual averaging although still achieving the same emission reductions. The snapshot nature of the performance tests means the results will provide little insight on true range of variability.

Response to Comments 1 - 15: The EPA understands that the ICR data were collected under full load and steady state conditions. Variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of the proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that the EPA has promulgated. Additionally, the emission standard compliance is specified as being based on periodic stack tests, which will presumably be conducted under operating conditions similar to those during the ICR testing, or on a 30-day rolling average which provides an additional allowance of variability and will account for regular process and fuel variability over the averaging period.

The final rule includes operating limits only for the non-mercury metals and filterable PM emissions limits and only with the PM CPMS. One would expect that PM CPMS signals linked to PM concentrations would decrease under load conditions less than full load provided that control devices and processes are operated in a manner consistent with good air pollution practices as required for Part 63 sources. That is, we would expect that sources continue to operate control devices at levels consistent with those established during the most recent performance test even when operating at less than full load. If an operator is concerned about a change in fuel characteristics affecting a PM CPMS signal disproportionally to actual emissions, the rule certainly provides the opportunity for the source to conduct additional testing to re-verify or reset the PM CPMS operating limit. We believe that the final rule provides a much simplified approach to parametric monitoring that will provide flexibility that may not have been available in the proposal.

5. Opposition to 30-day average limit.

Comment 16: Commenter 17776 states that there will likely be complications with sorbent trap monitoring for Hg on a 30-day average. Because the Hg concentrations in stacks are likely to be at or just below the MACT limit, sorbent traps will need to remain in the stacks collecting Hg for possibly 10-14 days. This would result in two to three samples or data points being used in the 30-day average calculations. If one sample is rejected due to quality assurance and was unusable for the 30-day average, the remaining one or two sample points will bias the 30-day average.

Response to Comment 16: We recognize and agree with the commenter that sampling emissions at all times the process is operating is critical in obtaining representative measurements of emissions rates. We also agree that data quality certainty associated with any calculated value decreases with the collection of fewer data or missing operating periods such as would occur with extended periods of monitoring system downtime. The final version of Appendix A provides for the use of back-up monitoring when using sorbent trap Hg monitoring to provide data in the event of sorbent trap sampling or QA/QC failure relative to the primary monitoring system. In light of this potential for increased data quality uncertainty and given the provision in the rule that the source owner must report a deviation from the monitoring

requirements for monitoring system failure during required data collection or otherwise excepted periods, we believe it prudent for the source owner to apply this option:

> "2.2 *Primary and Backup Monitoring Systems.* In the electronic monitoring plan described in section 7.1.1.2.1 of this appendix, you must designate a primary Hg CEMS or sorbent trap monitoring system. The primary system must be used to report hourly Hg concentration values when the system is able to provide quality-assured data, i.e., when the system is "in control." However, to increase data availability in the event of a primary monitoring system outage, you may install, operate, maintain, and calibrate backup monitoring systems, as follows:
>
> 2.2.1 *Redundant Backup Systems.* A redundant backup monitoring system may be either a separate Hg CEMS with its own probe, sample interface, and analyzer, or a separate sorbent trap monitoring system. A redundant backup system is one that is permanently installed at the unit or stack location, and is kept on "hot standby" in case the primary monitoring system is unable to provide quality-assured data. A redundant backup system must be represented as a unique monitoring system in the electronic monitoring plan. Each redundant backup monitoring system must be certified according to the applicable provisions in section 4 of this appendix and must meet the applicable on-going QA requirements in section 5 of this appendix."

Performance Specification 12B (PS 12B) allows another couple of provisions that can help assure collection of samples sufficient to determine compliance with the 30-day applicable limits. PS 12B provides for the use of some measured data even when the analyzer fails to meet some of the quality control requirements. There are means built into PS 12B that allow for adjusting data for leak check failures, failed paired trap agreement, disproportional sampling, and trap breakthrough. Further, the sorbent trap sampling and analysis measurements are sensitive enough not to require 7-day or longer sampling. These periods are merely suggestions to follow within the context of the rule. One can operate sorbent traps following PS 12B on much shorter sampling periods, even as short as a few hours, so as to collect more samples and reduce the effect of one or two failed samples during the 30-day averaging period.

6. Recommendations.

Comment 17: Commenter 17776 recommends MACT standards based on a 12-month rolling average emission rate rather than a 30-day averaging period. A 12-month rolling average will provide much needed operational flexibility and accommodate real-world operating conditions for EGUs.

Comment 18: Commenter 18023 recommends that the EPA revise the methodology for estimating variability prior to issuing a final rule. As stated in UARG's comments, which are endorsed by the commenter, a proper variability adjustment would result in a Hg MACT limit of at least 1.42 lb/TBtu and a filterable PM MACT limit in the range of 0.022 lb/MMBtu to 0.033 lb/MMBtu.

Response to Comments 17 - 18: We believe that a 30-day boiler operating day period provides flexibility sufficient for sources to operate processes and control devices to assure ongoing compliance and that the 30-day period provides for the level of environmental protection intended for this rule. The 30-day rolling average requires that the operator review and act on measurement data on at least a daily basis consistent with the enforcement and compliance provisions of the Act (e.g., CAA §113(d)). A

rolling 12-month average would reduce that frequency to once per month. Variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of the proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that EPA has promulgated.

4A06 - MACT Floor Methodology: Fuel analysis variability

Commenters: 16849, 17254, 17621, 17696, 17711, 17716, 17725, 17739, 17807, 17808, 17813, 17914, 17925, 17930, 17975, 18024, 18498, 18963, 19114, 8443, 19536/19537/19538, 18023

Comment 1: Commenter 16849 recommends the adjustment of the calculated floor by a statistical method that allows for the variability in total fuel-borne HAP input, sampling and analysis methods, and variability resulting from site-to site differences for all units as compared to the best performing units and disregarding any truncated number seen as statistically insignificant. The commenter recommends the EPA's use of the research included in the white paper published by EPRI titled, "Data Quality Evaluation of Hazardous Air Pollutants Measurements for the U.S. Environmental Protection Agency's Electric Utility Steam Generating Units Information Collection Request." Commenter suggests as an example the EPA could consider is the 12-month rolling average as is currently prescribed by the Illinois Hg rule.

Comment 2: Multiple commenters (8443, 17621, 17696, 17716, 17739, 17725, 17813, 18498, 18023) state that the EPA's methodology does not adequately address fuel variability. The proposed emissions standards should adequately account for fuel-related variability for fuel-based pollutants because it is likely the most significant contributor to overall variability particularly for units firing a multitude of fuel types. There does not appear to be any attempt to address fuel variability here, though the IB MACT Rule did acknowledge the need for such consideration. Failing to account for the impact of fuel variability could lead to anomalous situations where a unit might be categorized as a "top performer" simply due to the happenstance of the fuel burned during the day of testing. Trace fuel impurities (e.g., metals, chlorine) that reflect natural characteristics of the fuel (coal or oil) can vary from deposit to deposit or even within seams. Sources may obtain fuels from a single or several sources. The potential caprice of trace HAP concentrations for oil or petroleum coke sources is even greater due to changing crude supplies at the refinery, which change the trace elements in its product.

Commenters state that establishing a limit that is based solely on the fuel burned during a single test could also result in a limit that has very little to do with the underlying performance of the source(s). For example, a unit with sub-par emission controls that burned a fuel on the test day that was low in trace metals might nonetheless be included in the floor analysis, despite otherwise falling outside the range of units that should be included in setting floor standards. See A Legislative History of the Clean Air Act Vol. II, p. 2897 (Rep. Collins) (floor should establish a "minimum degree of control in relation to the control technologies that have already been attained by the best existing sources"). The wide availability of fuel sources for EGUs distinguishes this situation from the Cement Kiln or National Lime cases where it was not economically feasible to change their limestone source, precluding such changes from consideration as part of the "worst reasonably foreseeable circumstances" that should be reflected in the floor analysis. Fuel variability and changes are reasonable expected occurrences for coal- and oil-fired units; such "reasonably foreseeable circumstances" must be accounted for when creating standards. Commenter 17725 adds that by not making allowances for such "reasonably foreseeable circumstances," the limits would be arbitrary and the EPA would be creating standards that are beyond-the-floor, which would require additional justification.

Comment 3: Commenter 17725 adds that it would be inappropriate to suggest that a unit with no emission controls should be considered a top performer because it happened to burn fuel with a lower pollutant concentration during the test. It is possible that this same unit might burn a fuel with a lower pollutant concentration the very next day. This approach would suggest that all EGUs purchase their fuel

from the same single source, which obviously undermines the benefits of maintaining robust and diverse coal and oil supplies.

Comment 4: Commenters 17621 and 18024 state that the tests (undertaken for the ICR) do not characterize stack emissions over an extended period, when burning different coals as facilities often burn coals from multiple sources. Based on ICR data, no liquid oil-fired boiler could ever comply with the proposed standards based on fuel analysis for fuel HAP content because the ICR shows reductions in HAP between the fuel and stack emission data. Either MACT emission limits should be increased to allow for a viable fuel monitoring option, or the EPA should provide a divisor (percent factor) to equate fuel and stack HAP concentrations as equally stringent compliance alternatives.

Comment 5: Commenter 8443 adds that the presentation material provided by the EPA does not provide a detailed answer how the EPA plans to modify the stack emissions reported during the ICR to account for all these sources of variability. It simply notes that the EPA used a UPL of 99% in other MACT rulemakings without explaining how it would apply a UPL to the specific facts of the EGU MACT rule. The commenter states they cannot provide meaningful comments on the EPA's variability adjustments without more detailed information from the EPA. What remains essential is that the EPA properly and fully accounts for variability in setting MACT limits when proposing any rule.

Comment 6: Commenter 17739 notes that, in the Boiler MACT, the EPA addressed fuel variability as part of its acknowledged obligation to "account for sources' variability in assessing sources' performance when developing technology-based standards." 76 FR 15627. It did so there through a "fuel variability factor." Here, the EPA has made no attempt to address fuel variability at all, nor explained why it is rational not to do so. HAP emission rates from coal units, floor units or otherwise, are greatly impacted by the elemental composition of the fuel burned at a particular unit. Although fuel variability is significant between coal ranks, there is also variability within coal ranks, with the maximum content reported for arsenic and manganese in bituminous coal reported to be over 70 times greater than their average contents for that coal rank. (Based on data in the US Geological Survey COALQUAL database, V. 2.0, http://energy.er.usgs.gov/products/databases/CoalQual/index.htm .Ibid) Since floor units burning a given rank of coal can be expected to experience the significant impacts of fuel variability within a given coal rank, the EPA is obligated to account for this source of variability. (For example, the average bituminous coal contains about 30 ppm arsenic, whereas the average subbituminous coal contains about 5 ppm, based on data in the US Geological Survey COALQUAL database, V. 2.0, http://energy.er.usgs.gov/products/databases/CoalQual/index.htm . Similarly, the average bituminous coal has 9 times the average chlorine content, as the average subbituminous coal. On the other hand, subbituminous coals tend to have much higher concentrations of manganese.)

Comment 7: Several commenters (17716, 17725, 18498, 18023, 18014) believe that the fuel-related variability should be treated here using an approach similar to one the Agency used in the final IB MACT Rule. Westar recommends that the fuel variability factors ("FVF") for the individual units should be calculated based on a fuel pollutant concentration measured during the emissions test and some reasonable maximum fuel concentration derived from the entire pool of the units in the emissions floor. Specifically, the following procedure should be adopted for developing and implementing adjustment for fuel-related variability:

> 1) Conduct the analysis using the average fuel concentration data (lb/MMBtu) for each source within the best performing 12 percent of sources that reported fuel analysis data in conjunction with the ICR tests;

2) Exclude average fuel concentration data outliers using a three screening approach to exclude inordinately high (or low) fuel analysis results from influencing the FVF value;

3) Select the 95th percentile value as the representative "maximum" fuel concentration;

4) For each source not excluded by the three screening, calculate the ratio of the "maximum" fuel concentration to the average fuel analysis value from the ICR test;

5) Calculate the FVF as the average of the ratios for all units;

6) Use the FVF to assess whether new and existing unit UPLs fully reflect the fuel variability.

Despite the UPL value accounting for some fuel-related variability, the above suggested approach addresses what the average impact from all floor units burning the representative maximum fuel. This can be done by comparing the result of multiplying the average emissions for the floor by the FVF to the UPL value. A FVF adjusted average greater than the UPL shows the UPL does not adequately consider fuel variability. In such cases, the UPL would be replaced with the FVF adjusted value. A UPL value greater than FVF would adequately address the variability, and no adjustment is necessary. As shown on attached Table 7 [17739-A1_Table7Page78.doc], fuel related variability may be reasonably addressed in UPL values for filterable PM and Hg, but additional fuel adjustments are warranted for total metals and HCl.

Comment 8: Commenters 17725 and 18498 add to this exercise above by saying that RMB performed an independent floor analysis following the UPL procedure changes recommended in the comments using ICR test run data obtained via the Microsoft Access database that the EPA posted to its Air Toxics Standards for Utilities webpage. The results suggest that fuel related variability may be reasonably addressed in UPL values for filterable PM and Hg (if properly done with the top 131 units represented in the ICR test pool) but additional fuel adjustments are warranted for total metals and HCl. It is important to state that the recommended approach for handling fuel variability is not inconsistent with section 112(d) or court decisions (e.g., Brick MACT, Cement Kiln MACT, or National Lime decisions).

Response to Comments 1 - 8: The EPA believes that the statistical method used to calculate the UPLs for Hg, PM, and HCl emissions from the existing units already accounts for fuel variability and no further adjustment factor is needed. The statistical analysis spreadsheets analyzing Hg, PM, and HCl emissions from the existing units utilize multiple emission test averages, per boiler (where available), in their UPL calculations. There are often twice as many data points as there are floor averages (Hg: 47 boilers in floor 90 total data averages, filterable PM: 130 boilers in floor 399 total data averages, HCl: 130 boilers in floor 185 total data averages). These large numbers of data points were unavailable in the IB MACT rule effort and account for variance in emissions over time and would therefore also account for fuel variability.

The EPA is mindful of the need to account for sources' variability in assessing sources' performance when developing technology-based standards. The EPA reviewed subcategory floor calculations in light of these comments and believes that the two-step MACT floor analysis process adequately addresses: (1) performance testing variability and (2) fuel analysis variability estimations. The EPA revised the MACT floor calculations in light of data submitted during and after the public comment period and also modified the approaches used at proposal for various aspects of the floor calculations.

The EPA first took fuel into consideration, to the extent it is reflected in differences in boiler design, when we divided the source category into subcategories. The EPA is aware that differences between given types of units, and fuel, can affect technical feasibility of applying emission control techniques, and has addressed this concern in the final rule. For a fuel based pollutant, such as PM, performance testing must be conducted under representative full load operating conditions, which, along with the parameter monitoring requirements, provides an assurance that the standards are being met at all times. For Hg and HCl, we modified the fuel based variability analysis in consideration of comments received on this approach. The first modification to the analysis was the introduction of a solid fuel subcategory, which includes any unit burning at least 10 percent, on an annual heat input basis, of any coal, fossil solid, biomass, or bio-based solid fuel. Given the wide variety in fuel types that compose the floor, the statistical analysis accounts for some of the inter-unit variability for different fuel types identified to be in the floor. The second modification was the development of a fuel variability factor (FVF). The FVF calculations were similar to the calculations used at proposal, but they were simplified to remove the control efficiency calculation and the method for identifying outliers in the data was also adjusted. The revised FVF analysis calculated a ratio for all fuel analysis data points for units in the top 12 percent for existing units and the top performing unit for new units in each subcategory. This ratio compared the reported fuel analysis data, converted to units of lb/MMBtu, to the emission test outlet data, converted to units of lb/MMBtu, during the stack tests. At proposal we conducted an outlier analysis of only the maximum ratios for each unit, but we revised the outlier analysis to consider all of the ratios from top performers within each subcategory. We then defined and identified outliers using the test of 3 times the standard deviation and 3 minus the standard deviation for all of the ratios in the subcategory. After removing outliers, the remaining maximum ratio for each subcategory was identified and multiplied by the 99 percent UPL.

For a discussion of how the EPA considered other non-fuel variability operations, such as boiler load, see response to the comments provided in section 4A07.

Comment 9: Commenter 17730 notes that the EPA provides no discussion in the proposed rule about how it may have considered the chemistry of the coal in determining the effectiveness of an emission control system, and its subsequent selection of a proposed emission limit. The mere fact that some units may achieve a low emission rate for a single constituent using a given emission control technology does not give due consideration to the fact that the base fuel may have had little to no concentration of the constituent in the fuel to begin with. The EPA's approach to setting the emission standards also does not take into consideration those fuels that may have had high initial base fuel constituent concentrations that are greatly reduced by a given emission control technology.

The commenter notes that the EPA aptly notes in the discussion of the proposed work practice standard for controlling the emissions of organic compounds; "a single component of the operating system; the burners and the burner components, play a great role in the combustion efficiency and the balance of carbon monoxide and oxides of nitrogen emissions that are created". The EPA should further consider these factors in establishing the emission standards for electric generating units.

Response to Comment 9: A review of the respective MACT floor spreadsheets reveals that a wide range of boiler, coal, and control types are represented in the respective MACT floor pools, indicating that such factors as noted by the commenter were included in the analyses.

Comment 10: Commenter 17725 states that their contractor also recommends that the EPA include percent reduction limits for fuel-related emissions (filterable PM, metals, HCl/HF) as an option in

addition to the currently proposed lb/MMBtu or output standards. Commenter recommends using the following equation to establish the alternative percent reduction floor values each fuel-related pollutant:

%Rfloor = (1− Efloor/Efuel) ×100
where:
%Rfloor = Percent reduction floor value for fuel related pollutant
Efloor = lb/MMBtu emission floor value for pollutant
Efuel = Average lb/MMBtu fuel concentration for pollutant based on all available fuel emissions data reported by the sources in the emissions floor analysis

This approach assures that the alternative percent reduction value represents the average emission achieved by the best performing units as required by section 112 of the CAA.

Response to Comment 10: The EPA noted in the proposal preamble that it questioned whether a percent reduction format would comply with D.C. Circuit interpretations of CAA section 112, and we also stated that we did not have sufficient data to establish a percent reduction standard even if we believed we had such authority under CAA section 112. The agency believes the rule's emissions limitations and work practice standards are appropriate to meet the CAA's requirements.

Comment 11: Commenters 17807and 18024 state that the EPA's proposed rule severely constrains fuel supply reliability and operational flexibility due to overly broad HCI standards. TEC requests that the EPA publish the coal blends in the top 12% of each coal type category and develop specific nonmetal HAP and HCI permit limits based on chemical composition from each major coal region.

Response to Comment 11: The EPA addresses subcategorization issues elsewhere. This proposed subcategory approach suffers from the same flaws as others suggested by commenters and the commenter has not provided data to evaluate its suggested approach. The agency disagrees that the rule severely constrains fuel supply reliability and operational flexibility. On the contrary, the suite of choices available in the rule to owners or operators affords numerous ways of demonstrating compliance with HCl emissions limits, ranging from HCl CEMS to monthly emissions testing.

Comment 12: Commenter 17808 found, by examining the ICR database, that chloride and fluoride concentrations in oil can vary widely. In the MACT floor calculations the HCl reported was a much lower average chloride concentration during the test period, suggesting that the emission rates at these units could be higher with a different shipment of fuel. The wide variability in the chloride concentrations in fuel oil suggests that the EPA's variability adjustment may not result in a standard that would be achievable by the units that were included in the calculation of the MACT floor for liquid oil-fired EGUs.

Response to Comment 12: As mentioned elsewhere in this document, the agency believes its procedure used to establish floors and emissions limitations takes potential variability into account. The rule now offers liquid oil-fired EGUs the ability to demonstrate compliance with the acid gas emissions limits by documenting that their fuel moisture does not exceed one percent.

Comment 13: Commenter 17914 states that the emissions standard needs to consider the technical limitations of AQCS equipment operation and control in a real-world setting to achieve the proposed limits, as fuel composition changes within a single fuel category. The commenter recommends that the EPA set the standards at the levels that can be achieved "under the most adverse conditions which can

reasonably be expected to occur," which is the appropriate legal standard 627 F.2d 416, 433 n. 46 (D.C. Cir. 1980).

Response to Comment 13: The EPA believes the approach for setting emission limits (as described in the proposal preamble) adequately accounts for fuel composition changes since the limits were set using data from a wide variety of facility configurations and coal types.

Comment 14: Several commenters (17813, 17925,17930,17975, 19114, 17254) state that the EPA's proposed rule does not adequately account for HAP variability in lignite or the variation in specific metals from sample to samples (e.g., arsenic). Hg content varies for lignite with no predictable pattern (even within the same mine). Since all lignite burning power plants are co-located with the mines that supply their lignite, this variability cannot be avoided. In order to account for this Hg variability in lignite seams, the averaging period needs to be extended to an annual averaging period and emissions limits should be raised to the MACT limit. Moreover, there are differences in constituents of coal grades such as subbituminous versus bituminous(because coal is not homogeneous), so different mercury emission limits for these two grades should be established and further subcategorization between the coal types should be applied so that more reasonable limits and treatment can be applied.

Comment 15: Commenter 17930 states that continuing with the proposed PM limits poses a dual problem for lignite units:

1. Lignite has a higher ash content than other types of coals
2. More lignite must be burned to generate the same level of energy produced as other types of coals.

The EPA states that :"[t]he boiler of a coal-fired EGU designed to bum [<8,300 coal] is bigger than a boiler designed to burn coals with higher heat values to account for the larger volume of coal that must be combusted to generate the desired level of electricity."

Comment 16: Commenter 17975 adds that the .03 lb/MMBtu standard that the EPA has proposed could result in emissions at levels well above the specific limits that the EPA has indicated are appropriate for arsenic and other non-Hg metals. The occasional sampling of metals that the EPA has proposed is inadequate due to the variation over numerous samples and at a minimum, they should be required to sample the metal content of coal, as it is burned on a daily basis.

Comment 17: Commenter 17254 believes that EPA should take into account coal sulfur content in setting the alternative acid gas SO_2 standard and coal switching at scrubbed units should not be required.

Comment 18: Commenter 17904 states that the EPA's MACT analysis does not capture the variability inherent in lignite fuel and limited blending capability due to the "mine-mouth" nature of most lignite fired units. Lignite core samples show mercury concentrations from these mines range from a low average of about 20 lb/TBtu to a maximum of over 240 lb/TBtu. These units must be able to operate in compliance with any final MACT notwithstanding the high variability of mercury in any seam which supplies the facility. The EPA must develop additional data on variability, specifically including fuel variability, both in the coal from a single mine as well as variability at plants that burn coals from multiple sources.

Commenter 17904 further states that fuel concentrations are critical because the EPA's 1999 ICR confirmed the high degree of elemental Hg remaining in flue gases of low rank coal, showing

concentrations that ranged from 56 percent to 96 percent of total Hg. Additionally, lignite typically has relatively high total Hg content (on a lb/TBtu basis).

Comment 19: Commenters 17807 and 17930 state that notwithstanding attempts to use statistical averaging methods and an averaging period of 30 days, the EPA's proposal does not properly take into account the extent of variability documented in lignite. Commenter 17930 states that lignite variability is not adequately accounted for in the ICR testing data. Depending on the seam being mined that day, Hg emissions data could vary significantly. The EPA tests (Sandow 5B and Oak Grove) were not conducted over a consistent and long enough period to reflect the potential lignite variability that could be experienced at these units.

Response to Comments 14-19: The EPA has recognized the differences in Hg emissions from units burning low rank, virgin coal by setting a separate emission limit. The EPA also knows that control technologies and monitoring techniques are available to allow operators to adjust to changes in Hg concentrations in the fuel. The EPA has also offered several options to show compliance for emission limitation of the non-Hg HAP metals. Operators have the option to meet limits for filterable PM, individual metals, or total metals. Although fuel switching is a legitimate compliance options, the EPA does not require any unit to switch fuel to comply with the emission limits in the rule. The EPA used all available data to establish the standards and commenters are incorrect to the extent they imply there is some flaw in the final rule because we did not collect additional data from low rank, virgin coal-fired EGUs.

Comment 20: Several commenters (19536, 19537, 19538) recommend that to better account for variability in the emissions of the top performing 12 percent of EGUs, the EPA should determined the 99th percentile UPL to the test data for the lowest emitting 40 EGUs. The EPA stated: "there are two fundamentally different approaches to incorporating variability into the proposed [MACT] rule: (1) including variability in the MACT floor calculation; or (2) including variability in the compliance method." Averaging over a month or year of data would provide opportunity for variations in the amount of a constituent in the fuel to be accommodated without exceeding the emission limitation. Use of a long-term average versus long-term testing evens out the ups and downs of variability in measured data. The EPA's approach to account for variability in emissions at the 12% best performing units results in a MACT floor determination that fails to reflect the average emissions of the best performing units. Specifically, the EPA determined the 99th percentile UPL Hg emission rate to be 1.1812 x 10-6 lb/MMBtu. This is over 55 times higher than the actual average emission rate (i.e., 2.1250 x 10-8 lb/MMBtu) of the EPA's data for the lowest emitting 40 EGUs. Of all the test results presented in the EPA's Hg MACT floor spreadsheet from the lowest emitting 40 EGUs, only two test results were over 1.1812 x 10-6 and the majority was at least an order of magnitude lower than 1.1812 x 10-6 lb/MMBtu. Further, in the entire 330 EGU Hg emissions dataset, more than half of the EGUs (153 units) had minimum Hg emission rates lower than the EPA's 99th percentile UPL.

Response to Comment 20: The EPA appreciates the suggested alternative approach for including variability in the emissions. However, the EPA is confident in the approach described in the proposal preamble and this final rule and we will continue to use that approach.

Comment 21: Commenter 17711 requests that the EPA re-examine the logic of establishing a MACT floor for a source subcategory for which emissions variability is the result of unmeasurable differences in fuel quality, and then setting MACT floor limits that can be consistently achieved only through use of a control technology that is not being used by any of the sources in the subcategory.

Response to Comment 21: The EPA did not base the MACT emission limits on fuel quality but, rather on measured stack emissions. We disagree with commenter that achievement of the MACT floor limits could only be accomplished by use of a control technology given the fact that the limits are based on emissions data from existing EGUs. However, we note that an alternate compliance method (1 percent moisture in the liquid oil) is included in the final rule.

Comment 22: Commenter 18963 states that coal refuse is created by the segregation of naturally occurring materials, and the specific characteristics of any individual coal refuse pile necessarily vary to some degree based upon geological and other considerations. Even to the extent that separate coal refuse piles were created from mining activity in the same general location, variability in coal refuse characteristics has been widely documented between, and even within, such piles. One of the reasons for this variability relates to the evolution of coal mining and processing activity over time. During the early history of coal mining and preparation, the relative value of the "virgin" coal did not justify significant effort to segregate all combustible material for sale or use as fuel. Therefore, material that had been segregated into piles and left at the mining or coal preparation site exhibits distinct characteristics relative to fuel parameters.

Over the course of time, separation techniques, and the economic return on the investment of effort, evolved to achieve different degrees of segregation, and different characteristics in coal refuse. Both the lack of precision in these mining and preparation activities, and the changes in practices and implementation of such activities, contributed to the variability in characteristics of coal refuse.

The variability in characteristics of coal refuse has been substantially documented and demonstrated through numerous sampling events. Analytical information from such sampling has been submitted to federal agencies, including FERC, in the context of routine filing. Such data clearly evidence the variability in coal refuse characteristics, relative to heat value, ash content and other relevant constituents, even among multiple samples collected from the same coal refuse piles.

Response to Comment 22: The EPA believes that variability associated with the composition of coal refuse was captured in the 2010 ICR data as there were several units tested that were using coal refuse as the primary fuel source.

4A07 - MACT Floor Methodology: Other

Commenters: 16513, 17265, 17385, 17402, 17620, 17621, 17627, 17637, 17718, 17725, 17758, 17776, 17796, 17803, 17808, 17812, 17848, 17867, 17904, 17914, 17975, 18018, 18034, 18421, 18444

1. Stringency/numerical limit recommendations.

Comment 1: Commenter 17620 states that as a result of the work of the 2001-2002 CAA Advisory Committee, they previously recommended the following limits: 1) 0.4 to 0.6 lb/TBtu for Hg, with an alternate 90 percent control requirement; 2) 0.015 lb/MMBtu for PM; 3) 95 percent reduction requirement for SO_2 and HCl, based on the then-existing recorded BACT decisions; 4) 100 ppm CO as a surrogate for organic HAP; 5) a CO MACT limit, based on BACT levels, be established, and; 6) short-term CO limits be established to cover transient operating conditions. Commenter 17620 states that the most recent testing demonstrates that their earlier recommendations were readily attainable and recommends that the EPA incorporate higher control efficiencies for Hg and SO_2 because of the advances in pollution control systems over the past decade and consider recent BACT determinations for PM and CO in setting MACT standards.

Response to Comment 1: The EPA has based the emission limits in the final rule on the newest control installations as commenter appears to be suggesting and believes that its approach complies with the statutory mandate and recent Court decisions. The EPA is constrained by the statute to establish MACT floors based on the emissions data of the best performing similar source or the existing sources in the category. The EPA also considered whether a beyond-the-floor standard was achievable for the final rule, but, except for one subcategory, we determined it was not achievable to establish beyond-the-floor standards primarily due to the costs of attaining additional HAP emission reductions.

Comment 2: Commenter 17848 states that except for the PM limits, the proposed EGU limits are substantially more stringent than those in the final boiler MACT. Commenter is concerned that issues of acceptability with the boiler MACT will be multiplied for sources subject to the EGU MACT. The states enabling legislation directs the commenter to consider technical practicability and economic reasonableness of regulations to reduce emissions. Commenter states that to the extent, if any, that the proposed limits are not technically practicable or economically reasonable, they request that the EPA revise the limits.

Comment 3: Commenter 17928 states that the final EGU MACT should be more consistent with the technical approaches used in the final ICI Boiler MACT.

Response to Comments 2 - 3: The EPA believes that the analytical approaches used on the final rule are appropriate for the source category and, where appropriate, consistent with those employed on other NESHAP rulemakings. The EPA has based its analyses on data obtained from EGUs and believes that the analyses comply with the statutory mandate and recent Court decisions. MACT standards must be at least as stringent as the emissions limitations achieved by the best controlled similar source for new source standards or the average emission control achieved by the best performing 12 percent of existing sources for the existing source standards (or best performing five sources for subcategories with less than 30 sources). This level of control is called the MACT floor and costs may not be considered when establishing the MACT floor. Further, we maintain that the standards are technically feasible to achieve for all EGUs.

Commenter 4: Commenter 18444 recommends that the EPA should require that the air pollution control systems needed to achieve these emission standards be operated in such a manner to reasonably minimize HAP emissions after construction.

Response to Comment 4: The EPA believes that the emission limits in the final rule are sufficient to ensure that emission controls are operated in a manner that will minimize HAP emissions.

Comment 5: Commenter 17718 argues that the total PM limit for existing sources is excessively stringent in that it requires compliance during startup and shutdown events without providing any margin for the higher emissions that unavoidably occur during those periods. Commenter requests that the EPA adopt separate work practice standards applicable during startup and shutdown events specific to the unit's boiler type and control equipment.

Response to Comment 5: The EPA is establishing work practice standards for periods of startup and shutdown in the final rule as discussed elsewhere in this document. We are not, as commenter seems to suggest, establishing different subcategories for startup and shutdown periods.

Comment 6: Commenter 18421 states that the ability for coal-fired units to meet strong standards is evidenced by the reductions achieved through existing state programs. Commenter adds that 17 states have a Hg emissions standard for EGUs, and the technology is available for all coal types and boiler configurations. The commenter goes on argue that state rules have stronger standards and timelines regarding regulation of Hg emissions.

Response to Comment 6: The EPA agrees that the standards in the final rule are consistent with the statute and we believe that all existing sources can meet the standards. We also note that states may establish more stringent standards than those contained in this final rule.

2. Variability.

Comment 7: Commeter 17621 states that there is no consistency in the equation used to calculate variability and the pooled mean in the MACT floor calculations. Examples given with discrepancies in the pooled mean are: the coal Hg >=8,300 Btu/lb, total PM for coal EGUs; calculations with discrepancies in the variability: Hg limit for existing coal >=8,300 Btu/lb and the total PM and metals in existing coal EGUs. Commenter recommends that the EPA standardize the equations used in the different datasets.

Response to Comment 7: The EPA has standardized the equations used in these different data sets. Also, the EPA is now finalizing a filterable PM surrogate standard for non-Hg metallic HAP limit rather than a total PM limit.

Comment 8: Commenter 17620 states that the Court decision that the EPA can calculate MACT floors considering the worst-case testing conditions that can reasonably be expected to recur does not mean the highest theoretically conceivable emissions. Rather, it should be understood to encompass the full use of installed pollution control devices, at those regularly used operating loads that maximize emissions and with the range of variation of fuels typically used by the facility.

Response to Comment 8: The EPA believes that the emission limits in the final rule satisfy the conditions noted by the commenter.

Comment 9: Commenter 17725 states that since neither the CEMS measurement variability or the plant operational variability, that will be an inherent part of the CEMS data, will be reflected in the reference method-based UPL, a separate multiplier should be applied to the UPL (or applied as an additional multiplier to the FVF adjusted floor average) to address for the CEMS/operating variability issue.

Response to Comment 9: The agency disagrees with the commenter's assertion that an additional multiplier related to CEMS variability should be applied to the UPL. As mentioned elsewhere, variability – including that attributed to load/operational variability, fuel variability, and other sources of variability – has been accounted for in the setting of the proposed and final emission limits. The method used to account for this variability was described in the preamble for the proposed rule. The method is consistent with methods used in other NESHAP rules that the EPA has promulgated. In general terms, the UPL procedure addresses variability from stack tests, while the 30-boiler operating day rolling average provides an additional allowance of variability for CEMS use and accounts for regular process and fuel variability over the averaging period.

Comment 10: Commenter 17821 adds there are a number of factors that may cause Hg, HCl, metals, particulate and other emissions to vary from power plant boilers and more importantly at the same boiler. These factors include variability in the fuel (i.e., variability in Hg content, chlorine content and heat content of coal, etc.), changes in operating conditions, measurement error, intermittent maintenance events, load variation, and unburned carbon in flyash.

Response to Comment 10: As explained above, we believe that we have adequately accounted for variability in the final rule through application of the 99% UPL and inclusion of a 30-day rolling average for compliance.

3. Work practice standards.

Comment 11: Commenter 17620 states that EPRI's evaluation of the ICR dioxin/furan/PCB HAP emission tests (EPRI, 2010) confirms the EPA's finding that most congeners in this group were not detected. The commenter's own evaluation found that contamination of the samples from non-power plant sources biased emissions high in many samples. The chemicals in this HAP group are ubiquitous in the environment and the test method is so sensitive that it is very difficult to avoid contamination of the sample during sampling and analysis.

Response to Comment 11: The EPA proposed and is finalizing work practice standards for organic HAP emissions from EGUs because a significant majority of the organic-HAP emissions data was below the method detection limit, notwithstanding the fact that we required sources to test for certain organic HAP almost twice as long as normal, and we therefore conclude that it is not technologically and economically practicable to measure such emissions from EGUs.

4. Technical/data issues – MACT floor.

Comment 12: Commenter 17621 states that technical shortcomings and inconsistencies in the EPA's MACT floor calculation procedure should be resolved prior to issuance of a final rule.

Response to Comment 12: Although the commenter has not provided any specifics, partly based on comments received, the EPA has reevaluated its data base and we believe that we have resolved the identified inconsistencies prior to issuing the final rule.

5. Ability to/means of achieving compliance.

Comment 13: Commenter 17758 states that plants burning primarily eastern bituminous coal will have to install wet FGD for compliance because of the higher chlorine content, which will necessitate a more aggressive control technology to remove higher levels of HCl.

Response to Comment 13: The EPA acknowledges that different sources will have to employ different approaches to comply with the final standards. The EPA believes that all existing sources are able to comply with the final standards through the installation of control devices and/or other mechanisms that may reduce HAP emissions.

Comment 14: Commenter 17975 argues that in order to achieve PM capture consistently at all ranges, units need either baghouses or EPSs in combination with a scrubber. Commenter 17975 adds that PM emissions around the range of the proposed floor have much lower opacities than those seen in startup/shutdown/malfunction events, which means much greater PM emission and HAP metal emissions during such events.

Response to Comment 14: The EPA has established work practice standards for startup and shutdown periods in the final rule as discussed elsewhere in this document. We are retaining the affirmative defense for malfunction periods. The 30-day averaging period will provide sources the ability to comply with the standard by operating somewhat below the standard to accommodate intermittent periods of minor malfunctions. The use of CPMS will provide to sources the need to investigate and correct minor malfunctions. Sources will be able to use affirmative defense provisions for major malfunctions that occur in spite of reasonable attention to good operating and maintenance practices.

6. Data used to determine MACT floors and establish standards

Comment 15: Commenter 17796 states that the Department of Energy has investigated technologies to reduce Hg and other pollutants from EGUs and should be evaluated as part of the MACT floor evaluation for this rulemaking. The commenter noted that SCR reduces NO_X and increases the proportion of oxidized Hg allowing it to be removed by traditional controls. The commenter also states that ACI using halogenated activated carbon is effective in removing Hg.

Response to Comment 15: To the extent that technologies noted by commenter are in use on existing EGUs and were in use during any testing used to provide data to the EPA through the 2010 ICR, the technologies' performance is included in the MACT floor analyses.

7. Miscellaneous.

Comment 16: Commenter 17637 discusses over 20 years of projects implemented to reduce emissions from fossil fuels, including SCR, supplemental precipitators and other control technologies and operation modifications to reduce NO_X, SO_2, CO_2, Hg and PM emissions. Commenter requests that facilities that have self-initiated good controls not be disadvantaged compared to other competitors with fewer controls.

Commenter 17637 states that they have already implemented multiple projects including SCR, supplemental precipitators among other control technologies and modified its operations and fuel burned to reduce emissions of NO_X, SO_2, CO_2, Hg and PM. The commenter requests that the EPA provide a

level economic playing field by ensuring those facilities that have initiated such actions and have good controls in place are not disadvantaged relative to our competitors with less or no controls.

Response to Comment 16: The EPA does not understand the comment. All EGUs in a given subcategory must comply with the final standards so no EGUs are disadvantaged as compared with other sources. Sources that are well controlled may already comply with one or more of the final standards and poorly controlled EGUs will likely have to install controls to comply with the final standards.

Comment 17: Commenter 17265 states that it is not clear if or how the agency has taken into account the dramatic decline in EGU emissions over the last decade, citing that in their state EGU Hg emissions have declined over 80% since 1997.

Response to Comment 17: As required by CAA section 112, the EPA has based the emission limits in the final rule on emissions data obtained from existing EGUs. Historical emission trends do not play a role in the development of MACT limits under CAA section 112, except to the extent that data from the newer, better controlled sources will be used to establish the MACT floor standards.

Comment 18: Commenter 17385 supports the output-based limits for new and modified facilities because of their energy efficiency incentive.

Response to Comment 18: The EPA appreciates the support of the commenter.

Comment 19: Commenter 17385 asks if the EPA would consider for the NESHAP the benefit allowed in the NSPS for CHP units to account for avoided electric power transmission and distribution losses.

According to commenter 17385, the proposed NESHAP defines "gross output" in a way that credits useful thermal energy recovery from combined heat and power operations. However, in the proposed NESHAP, output-based limitations in Tables 1 and 2 of the rule are in units of mass of pollutant per electrical output. Table 10 of the preamble clarifies that output-based limitations are in unit of mass of pollutant per gross electrical output. The proposed NESHAP does not appear to allow any credit to CHP EGUs for thermal energy recovered. It is not clear if the NSPSs allow a thermal output credit for CHP. Commenter asks the EPA to clarify and consider a thermal output credit for applicable CHP EGUs.

Commenter 18439 encourages the EPA to consider allowing for a larger than five percent benefit for avoided transmission and distribution (T&D) losses. The commenter also encourages the EPA to consider an avoided T&D loss credit for CHP under the NESHAP rule as well. The commenter encourages the EPA to consider the comments from various members of commenter's organization recommending approaches for settling on a specific approach to settling line loss figures.

Commenter 18434 indicates that in the NSPS Rule, the EPA requests comment "on whether it is appropriate to recognize the environmental benefit of electricity generated by CHP units by accounting for the benefit of on-site generation which avoids losses from the transmission and distribution of the electricity." We agree that these avoided losses should be recognized. Indeed, such savings are one of the key benefits of distributed generation, and we commend the EPA for trying to find a way to account for this benefit in the NSPS rule. As an initial matter, we urge the EPA to account for avoided line losses in the NESHAP rule as well.

The commenter asserts that roughly two-thirds of energy inputs (68%) are simply emitted into the air with conventional generation, with a mere 32% actually delivered to customers. A sizeable portion of this loss can be attributed to transmission and distribution (1,596 TWh or 9% of net electricity production in the figure below). The unfortunate results are lost competitiveness and jobs, as well as increased emissions. By recognizing the transmission and distribution benefits of CHP and WHR, the EPA can help incentivize investments in these technologies.

The commenter believes, however, the suggested 5% multiplier for line losses is too low. According to EIA data, national, annual electricity transmission and distribution losses average about 7% (6.7%) of the electricity that is transmitted in the U.S., costing nearly $26-billion in foregone revenue in 2009 alone. These losses are even greater during peak hours. In fact, a recent report by the Regulatory Assistance Project finds that a grid segment or area with average line losses of 7% could have marginal line losses of 20% at the time of the system peak. Studies at Carnegie Mellon University and MIT have shown that one megawatt-hour (MWh) of local generation, like CHP, can displace up to 1.47 MWh of central generation, suggesting a 47% benefit for efficient CHP. Although 47% is clearly not a reasonable multiplier, these numbers nonetheless imply the CHP benefit should be well above 5%. Moreover, where facilities can credibly demonstrate higher local or regional line losses (which can be verified by a third party), a larger multiplier may be appropriate. In addition to being more efficient and less polluting, CHP and WHR projects significantly reduce line losses, free existing transmission, provide less expensive back-up electricity, and generate sustainable base-load power. The final rule should adopt a multiplier that fully credits the transmission and distribution savings of CHP and WHR and therefore incentivizes such investments.

Response to Comment 19: The EPA has clarified its terminology in the final rule.

8. Comments not requiring responses.

Comment 20: Commenter 17620 states that opportunities for improvement in the heat rate of existing EGUs are relatively small. In addition, many efficiency improvement options, such as soot removal, are not permanent and require ongoing maintenance to sustain improved performance. The EPA should develop a record in upcoming GHG regulations that would enable accurate measurement and determinations of sustainable efficiency improvements.

Response to Comment 20: The EPA is not establishing standard for GHGs in this rule, and, therefore, we need not respond to this comment.

Comment 21: Commenter 17812 states that the EPA's reasoning for applying numeric dioxin/furan limits to coal-fired ICI boilers is flawed. The EPA is splitting hairs to say that dioxin/furan emissions from ICI coal units are significantly different from EGUs from a testing feasibility perspective. Using the EPA data for both boiler and EGU regulations, the commenter compared average and total emission rates of dioxin/furan from the two sectors. Total dioxin/furan emissions estimated for the two sectors differs by only about 32 percent (2.5 grams for ICIs vs. 1.7 grams for EGUs). Average dioxin/furan emissions for ICI coal boilers is only 2.8 times higher than for EGUs, not 7 times higher as reported by the EPA (no documentation of the EPA's comparison has been found to date in the dockets). Commenter 17812 adds that because the EPA did not require eight hour test runs for the ICI boiler testing, it does not know what percentage of ICI boiler test runs would also be below the MDL with the extended test runs.

Response to Comment 21: The EPA is regulating EGUs in this final rule. This comment is out of scope and we are not responding to it.

Comment 22: Commenter 17867 argues that the EPA has a large degree of discretion in determining which HAP to included in the rule and requests that the EPA phase in standards for HAP based upon the EPA's expanding knowledge of HAP emissions from EGUs and their effects on human health and the environment. Commenter believes there is no reason for the EPA to allow limitations on Hg to be put at risk by including them in a rule with other HAP and Hg control devices have the potential to reduce other HAP emissions.

Response to Comment 22: Comments on the scope of this rulemaking are addressed in the proposed rule and in response to other comments in this RTC and the preamble to the final rule. We also note that we do not necessarily agree with commenter in its assertion that a phased approach is benefitial given it would create a level of regulatory uncertainty about potential future investments and also limit a sources ability to optimize control configurations when designing approaches to comply with the final standards.

Comment 23: Commenter 18018 argues that the EPA failed to prove any public health risk from non-Hg metal HAP and acid gases and that it is only appropriate to develop limits for Hg and nickel.

Response to Comment 23: Comments on the scope of this rulemaking are addressed in the proposed rule and in response to other comments in this RTC and the preamble to the final rule.

4A08 - MACT Floor Methodology: Mercury floor analysis

Commenters: 16469, 17409, 17620, 17621, 17623, 17689, 17712, 17716, 17718, 17725, 17728, 17732, 17739, 17740, 17758, 17761, 17775, 17776, 17795, 17796, 17800, 17816, 17820, 17821, 17869, 17871, 17878, 17881, 17885, 17886, 17904, 17909, 17931, 18014, 18015, 18021, 18033, 18034, 18038, 18428, 18443, 18444, 18445, 18449, 18498, 19114, 18023

1. MACT floor methodology.

Comment 1: Many commenters (16469, 17689, 17712, 177718, 17725, 17732, 17740, 17758, 17775, 17776, 17795, 17816, 17820, 17871, 17816, 17820, 17909, 17886, 17931, 18033, 18428, 18443, 18023) disagree with the EPA's methodology for establishing the Hg MACT for existing units. These commenters argue that the Hg standard must be recalculated because it was not established as the average of the best performing 12 percent of existing sources, but rather was based on an unrepresentative sample group (i.e., 40 units for subcategory 1, and 2 units for subcategory 2). Commenter 16469 states that by using only 40 units the EPA has omitted many units burning bituminous coals with wet scrubbers and SCRs, and notes that this combination of fuels and technologies is widely recognized as highly effective for Hg control. Commenter further states that virtually all of the top 131 units the EPA used to set the HCl and PM limits are equipped with controls that remove Hg, ranging from fuel pre-treatment to scrubbers and baghouses.

Comment 2: Multiple commenters (17689, 17712, 17732, 17775, 17740, 17820, 17885, 17909, 18033, 18443) believe that the EPA has developed a MACT standard that is more stringent than allowed under CAA section 112(d) of the CAA. Commenter 17740 believes that the EPA set artificially lower MACT standards by arbitrarily limiting the number of sources from which the MACT floor sources are to be selected and argues that this approach is not allowed by the CAA. Commenter 17776 argues that the CAA does not allow the EPA to artificially lower MACT standards by arbitrarily limiting the number of sources from which the MACT floor sources are to be selected.

Comment 3: Multiple commenters (17718, 17725, 17740, 17775, 17816, 17886, 18428, 18023) believe that the data the EPA used to determine the Hg standard were skewed toward potentially better performing units. These commenters note that the EPA's 2010 ICR request required stack testing of the best performing units. In the supporting statement that accompanied the EGU ICR, commenters note that the EPA described how it specifically selected sources for Hg testing with the "newest PM controls" that it believed to represent the best PM performers. As a result, the tested units included many sources with high efficiency fabric filter baghouses and included a number of sources with ACI, both of which tend to provide higher Hg removal characteristics. These new PM sources, they note, would also tend to have other new high efficiency NO_X and SO_2 controls that can also have an impact on Hg. The EPA supplemented the stack testing data from Part III of the 2010 ICR with additional historic test data from Part II of the 2010 ICR. Commenters assert that this approach resulted in the data for the top 12 percent of existing sources being skewed toward potentially better performing units. They argue that the EPA incorrectly treated the data used to set the standard as though it were randomly selected by using the top 12 percent of the data obtained in the floor analysis instead of assuming that the top 12 percent would be within the data collected as it did for all other pollutants.

Comment 4: Several commenters (17689, 17712, 17775, 17885, 17931, 18033) state that the EPA should not have proposed a rule if it lacked the necessary data to evaluate the top 12% of performing units. Commenter 17740 was obligated to collect information from additional sources so that the

resulting standard would be based on the top performing 127 units in Subcategory 1 and top performing four units in Subcategory 2. Similarly, commenter 17776 believes the EPA should have collected information from additional sources.

Comment 5: Commenter 17775 believes that the EPA's use of 40 units to set the proposed Hg limits reneges on statements the EPA made to UARG and OMB about how it selected units to conduct Hg stack sampling when it sought approval of its EGU MACT ICR. According to the commenter, the EPA asserted in the preamble that the testing required for Hg did not target the best performers. Commenter states that the ICR to OMB states that the EPA believes it is testing the top performers for Hg.

According to commenter 18644 there is no rational basis for the proposed Hg emission floor. The commenter adds that the floors should simply be set at the simple average of the best performing 12% of emissions sampled from the test population.

Comment 6: Commenter 17739 states that the EPA is obligated to issue a new proposal to address the basis for, and number of units in, its Hg MACT floor for existing units. The CAA requires the EPA's proposed rules to contain a statement of basis that covers, among other things, the "factual data" and "methodology" underlying its proposal. Since the basis for the EPA's proposed 40 unit floor is factually incorrect based on the agency's own statements, the EPA needs to propose a new one, and it needs to establish a new methodology for selecting a floor. Commenter also believes the EPA's ICR assertions, as well as the data obtained, compel the EPA to propose for comment a 130 unit floor, and not a 40 unit floor.

Comment 7: Commenter 17620 agrees that the EPA has substantial latitude in determining the performance achieved by the best performing 12% of the units for which it has data and consider the results to be reasonable. They also believe that this approach provides the most useful data for the least cost and avoids problems associated with the use of statistical procedures and small data sets. However, the commenter is concerned that environmental groups will correctly argue that the floor should be based, not on all 131 test results, but on the top 12% of those results (i.e., the best 16 test results), although at the same time industry will correctly argue that to do so would result in the floor being based on "the top 12 percent of the top 12 percent."

Comment 8: Multiple commenters (17623, 17716, 17728, 17739, 17758, 17775, 17904) took issue with the pool of emissions data used to set the Hg MACT floor. Commenters state that although the EPA used emissions data from all sources in the EGU pool when setting HCl and PM emissions limits, the MACT floor for Hg in the coal-fired > 8300 Btu/lb subcategory contained only 40 units, or roughly 4% of the sources in that subcategory. Commenters state that the CAA requires the EPA to consider data from all sources for which it has data and not just those that performed mercury testing. Commenters state that the EPA requested testing of the best performing units and it only used Hg data from the Part II test data for emissions tests performed on or after 12/2007 through 12/2009, thus, the pool is not a random selection but instead the "best of the best." Commenters state that the EPA had 330 units with Hg data in the ICR data set and selected the top 12 percent from that portion of units rather than using data from all units that participated in the ICR. Commenters state that the EPA should consider all the available information at its disposal to set limits that accurately depict what the best performers in the source category achieve. Commenter 17904 states that because the EPA relies heavily on its 1999 for appropriate and necessary finding in proposing this rule, the Agency should better explain why it is deviating from its prior proposal or the agency would be establishing MACT on MACT.

Comment 9: Commenters 17878 and 18023 believe that had the EPA done the Hg MACT floor analysis correctly it would have concluded that the plants sampled during the Part III of the ICR were, in fact, the best performing units for Hg emissions.

Comment 10: Commenter 17716 states that the EPA selected sources with the newest controls, which represent about half of the Hg test sources in the EPA's database, but comprise the overwhelming majority of the lowest 128 Hg test results. Contrary to the statutory directive that the top 12% be selected from the all sources for which information is available, Commenter states that the EPA pre-selected sources with the newest controls for inclusion with knowledge that they were likely to, and did, produce the lowest test results. This not only contravenes the CAA, but also results in an average emissions limitation that underestimates the actual performance of the top 12 percent of all sources.

Comment 11: Commenter 17758 states that the Part III stack emissions testing, upon which the EPA bases the proposed non-Hg standards, included units with the lowest Hg emissions (they were equipped with ACI systems) contrary to the EPA's assertion that the ICR data did not represent the top 12% of sources for Hg. According to the commenter, 73% of the units with ACI (33/45) were required to conduct Part III Hg testing. This inordinately high percentage of ACI-equipped units required to conduct Part III testing is not random; rather, it demonstrates the EPA's intent to require Part III emissions testing at units that it believed had the lowest Hg emissions.

The commenter states that another indication that the ICR testing was improperly aimed at obtaining Hg emissions information from the lowest-emitting units is the large number of units equipped with baghouses that were required to test for Hg. Plants equipped with baghouses have long been known to have better than average Hg removal because as ash builds up on the filter bags, any unburned carbon in the ash acts like a carbon bed that adsorbs Hg from the gas stream. Of the 127 units with the lowest Hg emissions, 120 are equipped with fabric filters.

Comment 12: Commenters 17869 and 18021 believe the EPA needs to include emission values from more boilers with dedicated Hg reduction systems. Commenters point out that it makes sense to subcategorize CFBs separately from conventional coal-fired boilers, but since CFB boilers are heavily represented in the Part III ICR Hg testing, removing them from the dataset leaves few boilers on which to set a "best 12 percent" MACT floor. Commenters states that many or all of the boilers with Hg control systems such as ACI should be included in the sampled population since they will have the lowest Hg emissions. Commenter 17869 recognizes that subcategorizing CFBs will likely create very low floors, leading to measurement issues or compliance problems and suggests a CFB floor around 0.3 lb/TBtu, based on Hg measurement limitations.

Comment 13: Commenters 18014 and 18498 describe how the EPA selected units for testing that would tend to be among the best performers for Hg, although representing only half of the Hg test sources in the EPA's database, the EPA treated the data as if it were randomly selected by using the top 12% for floor analysis instead of assuming that the top 12% would be within the data collected.

Comment 14: Several commenters (17796, 17816, 17820, 17909) analyzed the types of unit design and control devices utilized by the best performing units. Commenter 17796 points out three units (Spruance unit Gen4, Spruance unit Gen1, Cherokee unit 4) that have high anomalous high data points, and their inclusion creates a great margin of variability an is merits from existing units that have already demonstrated significant Hg control. Commenter 17796 also states that the EPA has conducted a MACT floor determination using the 45 units reporting ACI usage, six of which were identified in the 12

percent. Commenter 17816 discusses that of the 40 units the EPA selected from the 2010 ICR data for the Hg MACT floor analysis for existing units designed to fire coal >8300 BTU/lb, 14 were fluidized bed units, but only six percent of the total industry population is made up of FBC units. Commenters 17820 and 17821 state there are several other reasons to conclude that the ICR Part III testing focused on units with the lowest Hg emissions. Commenters 17820 and 17821 cite that disproportionately high number (73 percent) of units tested were equipped with ACI, which is installed for the sole purpose of controlling Hg emissions. Commenters 17820 and17821 also note that that large number of units tested equipped with baghouses and fabric filters and a result the only appropriate action is for EPA to use 127 units to determine the MACT floor for Bituminous and Sub-bituminous Subcategory.

Comment 15: Commenter 17909 similarly states that the EPA cannot artificially lower Hg emission numeric standards by limiting the number of units used to set the floor. The EPA must revise its methodology to include all sources in its data set.

Comment 16: Commenter 17740 believes the EPA's approach to setting the Hg MACT floors for existing coal-fired units is an abuse of discretion because it allows the EPA to cherry pick from which sources to collect data and set a floor at whatever level it wants. Commenter argues that the EPA cannot arrogate to itself the authority to determine how stringent a MACT standard is by deciding not to acquire data from sources in a subcategory or only acquiring data from certain sources. Commenter states that Congress did not intend the EPA to have such unbridled discretion.

Comment 17: Commenters 17931 and 18033 disagree with the EPA's use of emissions data from only 40 units to calculate the MACT floor average for Hg, with variability accounted for by calibrating the UPL. The commenters point out that the UPL is larger than the MACT floor average and 154 units submitted Hg emissions data below the final UPL for Hg. Commenters question how many of the known units actually comply with all the proposed emission limits and estimates that only 3 percent of the total population are able to meet the proposed standards. Commenters are concerned that even this may be an overestimate, since achieving compliance once does not mean the unit is able to continuously achieve compliance. Because the EPA did not investigate a fundamental aspect of the proposed rulemaking by not basing the MACT floor on the top performing 12% of units, Commenters consider the rule arbitrary and capricious. Commenter 18033 calls on the EPA to reconsider the emissions standards to reflect the performance of actual operating units, as the HAP-by-HAP approach is not authorized by the CAA.

Comment 18: Commenter 17402 supports the EPA's calculation of the MACT floor pool for Hg. As the EPA did for acid gas and non-Hg metallic HAP, the EPA based its Hg MACT floor pool calculation on the top 12% of the total number of EGUs for which the EPA had Hg emissions information—330 sources. Thus, the MACT floor pool for Hg properly consists of 40 EGUs (12% of 330 sources).

Unlike the decades of emissions information that the EPA has for SO_2 and PM, which formed the basis for the pool of units from which it calculated the best performing 12% of sources, the EPA does not have the equivalent data for Hg emissions. Although the EPA assumed that "ACI may be an effective control technology for controlling mercury emissions in coal-fired plants, . . The EPA has no direct stack test results showing how effectively these ACI-equipped plants reduce their mercury emissions." Thus, in selecting units for metallic HAP stack testing, the EPA chose a number of units with ACI installed. Thus, the EPA's MACT floor pool was properly calculated and the EPA's approach was entirely appropriate. Neither the statute nor case law interpreting it requires the EPA to collect additional emissions information before making the MACT floor determination. On the contrary, the Court in

Cement Kiln Recycling Coalition, affirmed the EPA's "wide latitude in determining the extent of data-gathering necessary to solve a problem" and explained that courts "generally defer to an Agency's decision to proceed on the basis of imperfect scientific information, rather than to invest the resources to conduct the perfect study."

Comment 19: Several commenters (17715, 17757, 17681, 17871, 17877, 17904) believe the EPA's approach for setting the Hg limit was inconsistent with its approach for setting the limits for HCl and PM. Specifically, the EPA chose not to base the Hg limit on the top 12 percent of the 131 units that it required to test for Hg. Rather, the EPA chose to base the Hg limit on only 40 units, because it "did not believe those [other] units represented the top performing 12 percent of sources for Hg in the category at the time we issued the ICR and we made no assertions to that affect." A review of the Hg ICR data shows that the best performing units were indeed tested during the ICR and that the EPA should have used 131 units to set the MACT floor. That the EPA does not like the data obtained from these 131 units is not a sufficient reason not to use it, as required by CAA section 112(d)(3)(A). The fact that the EPA "did not believe" or "made no assertions" regarding the data is an insufficient basis to exclude the data. Accordingly, the EPA's decision to use a subset of the data, and the basis for that decision, is arbitrary, capricious and contrary to the CAA.

Commenter 17638 states, further, that the EPA's approach for setting the Hg limit was inconsistent with its approach for setting the limits for HCI and PM. Specifically, the EPA chose not to base the Hg limit on the top 12% of the 131 units that it required to test for Hg. Rather, the EPA chose to base the Hg limit on only 40 units, because it "did not believe those [other] units represented the top performing 12 percent of sources for Hg in the category at the time we issued the ICR and we made no assertions to that affect." A review of the Hg ICR data shows that the best performing units were indeed tested during the ICR and that the EPA should have used 131 units to set the MACT floor. That the EPA does not like the data obtained from these 131 units is not a sufficient reason not to use it, as required by CAA section 112(d)(3)(A). The fact that the EPA "did not believe" or "made no assertions" regarding the data is an insufficient basis to exclude the data. Accordingly, the EPA's decision to use a subset of the data, and the basis for that decision, is arbitrary, capricious and contrary to the CAA.

Commenter 17871 adds that the data set on which the EPA based the Hg MACT floor also contained errors that affected the determination of the MACT floor, which the EPA corrected without providing public notice and the opportunity to comment. The EPA's decision to quietly make corrections to the data set, which required revisions to the MACT Floor Memorandum and a change to the emission standard itself, prejudiced the public's ability to meaningfully comment and is inconsistent with the notice-and-comment provisions of the APA.

Response to Comments 1 - 19: The EPA selected for testing for non-Hg metallic HAP those 175 EGUs with the newest PM control devices installed, both ESPs and fabric filters. This selection was based on the premise that effective control of PM would also provide effective control of non-Hg metallic HAP and "...that these units represent those units having to comply with the most recent, and, therefore, likely most stringent, emission limits for PM" and that "...efforts by units to comply with stringent PM limits will likely represent the top performers with regard to non-Hg metallic HAP emissions." As we had selected the "best performing" 15% of units from among the entire coal-fired EGU population, the EPA used 12% of the entire population as the pool of units from which the MACT floor was derived.

However, the EPA stated in the proposed rule "[f]or Hg from coal-fired units, we used the top 12 percent of the data obtained because, even though we required Hg testing for the units testing for the

non-Hg metallic HAP, we did not believe those units represented the top performing 12 percent of sources for Hg in the category at the time we issued the ICR and we made no assertions to that effect." (76 FR 25023.) This position is supported by statements made in the final Supporting Statement for the 2010 ICR where on pages 6-7 of Part B we stated:

> Emissions of certain non-mercury metallic HAP (i.e., antimony (Sb), beryllium (Be), cadmium (Cd), cobalt (Co), lead (Pb), manganese (Mn), and nickel (Ni)) have been assumed to be well controlled by particulate matter (PM) control devices. However, mercury (Hg) and other non-mercury metallic HAP (i.e., arsenic (As), chromium (Cr), and selenium (Se)), because of their presence in both particulate and vapor phases, have been reported, in some instances, to be *not well controlled by PM control devices*. There are very few recent emissions test data available showing the potential control of these metallic HAP from coal-fired utility boilers.
>
> The capture of Hg is dependent on several factors including the chloride content of thecoal, the amount of unburned carbon present in the fly ash, the flue gas temperature, and the speciation of the Hg. Based on available data, EPA believes that ACI may be an effective control technology for controlling Hg emissions in coal-fired plants. However, EPA has no direct stack test results showing how effectively these ACI-equipped plants reduce their Hg emissions.
>
> EPA has identified the 175 units with the newest PM controls installed. The EPA believesthat these units represent those units having to comply with the most recent, and, therefore, likely most stringent, emission limits for PM (Attachment 11). *Even though PM may not ultimately be an adequate surrogate for some of the non-mercury metallic HAP, efforts by units to comply with stringent PM limits will likely represent the top performers with regard to non-mercury metallic HAP emissions.* The units selected also include a number with ACI installed. As units have been identified as meeting the criterion of being a "top performing" unit, substitution of units will not be permitted. However, units selected for testing in this group that share a PM control system with another unit, testing after the PM control system will be allowed. (*emphasis added*)

As shown above, the EPA acknowledges that units using ACI were included among the units selected for non-Hg metallic HAP testing because they also were among the pool of units having the newest PM controls. However, the EPA also stated that "...EPA has no direct stack test results showing how effectively these ACI-equipped plants reduce their Hg emissions." We noted further that an unknown amount of Hg and several other non-Hg HAP (e.g., Se) vaporize in the EGUs and may not be effectively captured by the PM control devices. With Se, we understand that it generally forms the acidic gas SeO_2 in the post-combustion environment and, as discussed elsewhere, we believe that it is adequately addressed through a combination of PM and acid gas HAP controls.[229] Because of its unique chemical properties, we are unable to make similar conclusions about Hg. The EPA understands that there are a range of available technology options and strategies for controlling Hg emissions. Some plants choose to apply "mercury specific" control technology while others rely on co-benefit Hg control

[229] Mercury and selenium are sufficiently volatile to remain in the vapor phase as the temperature decreases. Other HAP metals, such as arsenic, antimony, and lead may partially vaporize in the high temperature combustion environment and subsequently condense on fly ash particles in the flue gas. These metals are then effectively removed in the PM control device.

using existing air pollutant control equipment. Some facilities enhance the co-benefit control by addition of supplemental halogen (usually bromine) to the coal and others do not attempt to optimize the co-benefit control. Mercury oxidation and control can be affected by the age and activity of the SCR catalyst. Due to the complexity and unit specific nature of Hg control, the EPA did not believe that it could reasonably identify the top performing units.

For these reasons, the EPA did not select the units required to test for Hg and non-Hg metal HAP for testing based on a presumption that they would be among the "best performing" units for Hg and any statements made that imply that we could identify the best performing sources for Hg are not well founded. Our assumption was borne out by the data, , which included a considerable amount of Hg emissions data from not only the Part III testing but also from the Part II collection of available information. The EPA ranked all the Hg data and approximately 32 sources that were not selected as best performers for PM submitted Hg data that placed them among the best performing 126 units in the subcategory for Hg, and, of those, 10 were included among the best performing 47 units in the subcategory. In addition, none of the 11 low Btu, virgin coal units had data that placed them among the best performing 12% of sources for the entire subcategory. This fact confirms that the 175 best performing units for PM did not represent the best performing sources for Hg. In this situation, we could not reasonably state, as the commenters suggest, that the 175 units tested for PM were, in fact, the best performers for Hg. As such, we reasonably based the floor for Hg on 12% of the Hg data available to the Agency.

Finally, to the extent the commenters attack the EPA for failing to obtain additional emissions data, such assertions should be rejected. Neither the statute nor case law interpreting it requires the EPA to collect additional emissions information before making the MACT floor determination. On the contrary, the agency can base the floor on the emissions information available to the Administrator. In this case, the agency could not reasonably state that the sources tested were the best performing sources for Hg. It, therefore, used the top 12% of the data available to it (data from 339 units) in developing the proposed MACT floor for Hg.

Units selected as being potentially "best performing" units for non-Hg metallic HAP were required to test for Hg because the reference test and analytical methods employed obtained Hg results along with the non-Hg HAP metals. Thus, the EPA did not select "best performing" units for Hg as alleged by commenters. One commenter latches on to a statement in the November 5, 2009, Response to Comment on the proposed ICR. While that statement could be interpreted as suggesting that the EPA believed it had identified the best performing units for Hg, we also stated that "[e]ven though PM may not ultimately be an adequate surrogate for some of the *non-mercury metallic HAP*, efforts by units to comply with stringent PM limits will likely represent the top performers with regard to *non-mercury metallic HAP* emissions*."* See final Supporting Statement for the 2010 ICR (12-24-09) page 7 of Part B (*emphasis added*). In any case, we cannot reasonably interpret statements made in support of the ICR in a manner that is not consistent with our understanding of our ability to assess the best performing sources for Hg. Commenters also have failed to demonstrate that EGUs that are best performers for non-Hg metal HAP are also best performers for Hg. In fact, some of the commenters alleging that EPA has identified best performed because we included units with ACI, also claim that ACI may actually reduce PM control efficiency. Further, the EPA used all of the data provided to it in assessing the MACT floors. That is, data obtained through "Part II" of the 2010 ICR (the available data part) as well as data obtained through the required 2010 ICR testing ("Part III") were used in evaluating the best-performing units. In fact, the EPA had more "available data" for Hg than it did for any other HAP. As noted above, the EPA had no basis for claiming that it had selected the "best performing" units and, therefore, it used the top

12% of the data available to it (data from 339 units) in developing the proposed MACT floor for mercury.

Comment 20: Commenter 17758 states that the EPA should use data from the best-performing 12% of existing sources to determine the Hg standards. The Hg standard must be recalculated because it was not established as the average of the best-performing 12% of existing sources, but rather was based on an unrepresentative sample group. The EPA erred in establishing the Hg standard by using a data set different than the 127 units used to calculate the other MACT standards, particularly since the ICR stack emissions data that the EPA collected are adequate to calculate the Hg standard correctly.

Once this regulatory floor is established, the EPA could consider more stringent ―beyond-the-floor options, only after taking into consideration cost, energy and environmental impacts, as the Agency did when establishing the Hg standard for lignite units in the proposed Utility MACT.

Response to Comment 20: The EPA disagrees and responds to this comment above.

Comment 21: Commenter 17740 notes that the MACT Floor Memo states that "30 sources are included in Subcategory 2" although the next paragraph states that Subcategory 2 "includes fewer than 30 sources." The commenter argues that the EPA should gather sufficient data to use at least four sources to set the MACT floor for this subcategory. They further believe that the EPA's decision to use less than four sources to set the MACT floor for Subcategory 2 is based on a very narrow interpretation of section 112(d)(3). Commenter believes that a review of the entire language of section 112(d)(3) "evidences Congress' true intent." Under CAA section 112(d)(3)(A) that MACT standards for existing sources may not be less stringent than "the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)" for sources in categories or subcategories of 30 or more sources. For categories or subcategories with fewer than 30 sources, the commenter states that the EPA must set the standards at a level not less stringent than "the average emission limitation achieved by the best performing five sources (for which the Administrator has or could reasonably obtain emissions information)." (*See* CAA section 112(d)(3)(B)). Commenter asserts that the EPA is incorrectly using the parenthetical in section 112(d)(3)(A) to conclude that it can set the Hg MACT floor for Subcategory 2 based on only two units.

Response to Comment 21: There are 36 sources in the low rank, virgin coal EGU subcategory. Therefore, by the language of CAA section 112, the EPA is to use the top performing 12% of data, rather than data from five units, in calculating the MACT floor levels as would be required if the subcategory had less than 30 units. CAA section 112(d)(3)(B). The EPA does not agree that CAA section 112 (d)(3) mandates a minimum of five sources in all instances, and the literal language of the provision appears to compel a contrary result. The EPA recognizes that it indicated that there were less than 30 EGUs in the MACT standard memorandum for this subcategory, but that typographical error does not alter the fact that we have identified 36 units in the subcategory.

Comment 22: Commenter 17869 recommends that the EPA propose a Hg floor based on a simple geometric average of the top 12% and base compliance on long-term moving averages of emissions. The commenter argues that basing compliance on a long-term moving average, all "variability" (even from SSM periods) will be accounted for so UPL and FVF would be inappropriate. The commenter also states that Hg's health effects are unrelated to short-term spikes and Hg emissions are high at lower loads which would also be captured by long-term averaged measurements. The commenter also states that skewness analysis may be appropriate however, kurtosis evaluation or hurdle would be inappropriate.

Response to Comment 22: As noted elsewhere in this document, the EPA has used the geometric mean. However, we disagree that use of a longer-term moving average would be better than use of the 30-day rolling average that we are using. Our handling of the skewness and kurtosis analyses are discussed elsewhere.

Comment 23: Commenter 18038 points out that the proposed rule includes the addition of controls beyond those used to reduce Hg emissions, and which are not required under the CAA or the EPA's HAP study. Commenter requests that the EPA withdraw the rule and re-propose it in a way that addresses only methylmercury.

Response to Comment 23: Methylmercury is not emitted from stationary sources, including EGUs. Further, CAA section 112(b) does not list "methylmercury," but, rather, "mercury compounds" as the HAP that must be regulated. Neither the CAA nor the EPA's Utility Toxics Report to Congress requires the installation of any controls; sources are only required to comply with the final limits in any manner they choose. The final rule is based on the emission levels achieved in practice by EGUs with all types of emission controls installed.

2. Beyond-the-floor determination.

Comment 24: Commenter 19686 states that the EPA's proposed floors for MACT standards in the rule do not represent the best performing sources in the industry. The EPA's limits are well in excess of the average test emissions data of the best-performing sources, the sum effect of which is to establish standards that substantially diverge from the statutory standard. The commenter argues that:

- The EPA uses inconsistent measures of plants' "actual" emissions to assess the floor. When *selecting* its best-performing sources, the EPA defines their emissions according to their lowest test, but when *establishing the floor*, the EPA defines plants' emissions as the variability-adjusted average of all of the EPA's data for that plant based on a ranking of all the available emissions data from lowest emissions to highest emissions. The EPA fails to provide any substantive analysis or rationale for using this variability-adjusted average for establishing the MACT floor, and why Hg controls operating under normal condition would experience extreme variations.

- The EPA has failed to consistently apply the statutory–or any–standard by refusing to consider whether reductions beyond the statutory floor are achievable. For example, the EPA assumes that the top 12 percent of performers for non-lignite EGUs can do nothing further to reduce their Hg emissions although failing to conduct an analysis of the control technologies that these EGUs use and what further emission reductions are possible. The commenter notes that the EPA could and should have considered other control technologies, *i.e.,* coal blending, coal cleaning and oxidation catalysts.

The commenter states that the EPA has violated the CAA by not setting a MACT standard that reflects the most stringent emission reductions achievable. The commenter recommends that the EPA set floors consistent with the statutory directive to reflect the actual performance of the best performers in this industry, and that the EPA conduct a beyond-the-floor analysis sufficient to ensure that the standards demand the maximum achievable reduction in hazardous pollutants.

Response to Comment 24: The EPA believes that its analyses comply with the statutory requirements of CAA section 112 and with the Court's interpretations of those requirements. The EPA is finalizing a beyond-the-floor emission limit for Hg from EGUs in the subcategory for units burning low rank, virgin coal. The basis for our determination is contained in elsewhere in the final rule record.

Comment 25: Commenter 18034 expresses concern that older units, even when retrofitted with ACI and fabric filters, will not be able to meet the beyond-the-floor emission limits based on a subset of emissions data from the two best-performing units. The commenter points out that the beyond-the-floor analysis is invalid because it is biased low and the EPA provides no justification for the technological feasibility of the beyond-the-floor emission limit beyond the preamble statement regarding the units in the floor analysis using ACI "to its fullest extent." The commenter also discusses the potential need for some facilities to switch fuels. The commenter believes the possibility that a facility would have to switch to a different fuel outside of its subcategory to comply with a beyond-the-floor emission limit, which the EPA acknowledges warrants separate categorization on establishing the emission limits, demonstrates the infeasibility of the beyond-the-floor limit. Fuel switching also contradicts the EPA's claim that lignite units only need to enhance the use of ACI to some unspecified extent in order to comply with the proposed beyond-the-floor Hg limit.

Response to Comment 25: The EPA disagrees with the commenter. The EPA established the beyond-the-floor Hg standard based on data from existing sources in the category and after considering the non-air quality health and environmental impacts as required in the statute. *See* CAA section 112(d)(2). We note that, based on the data available to the agency, there are currently five EGUs in the low rank, virgin coal subcategory that are meeting the beyond-the-floor standard in the final rule. In addition, the commenter has not identified any sources in the subcategory that will be unable to comply with the final standard and the EPA has also not identified any such sources. That sources may have to install additional controls and potentially maximize use of ACI or other Hg-specific controls does not render the final standard invalid as the commenter seems to imply. The EPA did not state that some units in this subcategory would have to switch fuels in order to comply with the beyond-the-floor Hg standard as the commenter suggests, but even that conclusion would not have made the beyond-the-floor standard invalid. Our analysis was based on the use of ACI in conjunction with other controls required under this final rule to reduce HAP emissions, and we determined the cost of going beyond the floor was reasonable as explained in the beyond-the-floor TSDs. As with all MACT standards, sources are required to comply with the emissions limits and the EPA does not dictate how compliance must be attained. Fuel switching is certainly among the available options for all EGUs subject to this final rule, including EGUs in the low rank, virgin coal subcategory. We disagree with the commenter that the beyond the floor standard assumes sources will have to switch fuels to comply and we have no data to suggest that is the case.

3. Variability.

Comment 26: Commenter 18449 questions if three short duration tests spread over 1 or 2 days can accurately capture the long-term emissions and whether the EPA's statistical techniques used to calculate the MACT limit are appropriate.

Comment 27: Commenter 19114 states that levels established for new and existing units are so low they do not accommodate the full range of operating conditions. The commenter requests that the EPA re-evaluate these sources for variability and recalculate the EGU-MACT limits.

Comment 28: Commenter 17621 states that there are different types of variability not available in the datasets used to calculate the MACT floors. Those types of variability are highly associated with the observed emissions. Measurement variability, the commenter states, includes both sampling variability (associated with obtaining a representative sample) and analytical variability (associated with precision of the method, accuracy with the matrix and potential interferences). Another source of variability is the process variable (associated with power plant process). All these sources need to be included in data analysis. Commenter notes how Hg emissions are affected by several factors.

Comment 29: Commenter 17796 has concerns with the EPA's Hg MACT analysis after finding upon review that 4 performance tests out of 20 are driving the variability and 3 of these units were not specifically controlled for Hg at the time of testing. Commenter also mentions that the fourth unit, BL England Unit 2 in New Jersey's, test results could not be reconciled with the commenter review of the facilities reported Hg results on file with NJ DEP.

Response to Comments 26 - 29: The EPA believes that it has adequately addressed variability in the final rule as explained elsewhere in the final rule record. We have addressed the UPL analysis and its inclusion of variability elsewhere in this document (including discussion of the tests noted by commenter). We would also note that the fact that, as commenter points out, some EGUs among the Hg MACT floor pool are not specifically controlled for mercury supports our position that we did not know how to determine the best performing EGUs for the purposes of mercury reduction.

4. Additional subcategorization.

Comment 30: Commenter 18015 argues that western EGU Hg emissions contribute very little to Hg deposition in western streams and lakes. The commenter adds that due to the low-chlorine content of western coal, western Hg emissions are mostly in elemental form and thus have lower deposition levels compared to the rest of the country. The commenter presents Hg deposition that to support this claim and argues regulating EGUs in the west will have little impact on reducing Hg deposition and limited health benefits.

Response to Comment 30: The EPA made no distinction between coals in its December 2000 regulatory finding or in the current Appropriate and Necessary Determination and, therefore, is not making any distinction in the final rule.

Comment 31: Commenter 17761 states that additional subcategorization is necessary to avoid establishing a performance standard for Hg that cannot be met by facilities that are already well controlled and employ specific Hg reduction controls.

Response to Comment 31: The EPA has provided discussion and responses elsewhere to comments related to additional subcategorization. The EPA believes the final limits are achievable by EGUs such as those noted by the commenter and that additional subcategories are not warranted.

5. Data used.

Comment 32: Commenter 17795 believes the EPA should not have used ICR Part II data in their floor analysis for Hg. The commenter argues that the EPA should not have included in its MACT floor analysis emission rates for sources that may not have been collected with the same methods or faced as strict quality assurance scrutiny as the ICR Part III data. The commenter notes that 8 of the 40 units

included in the MACT floor for were from Part II data and that these 8 sources should be removed if the EPA decides to use only 40 units to set the MACT floor. The commenter states that the EPA used an emission rate of 5.33 E-09 lb/MMBtu for Hg from the Part II data for the Nucla facility. However, this same unit during Part III testing reported a Hg emission rate of 9.85 E-09 lb/MMBtu, which is 46% higher than the rate the EPA ultimately used as its NSPS for Hg.

Comment 33: Commenter 17623 states that the proposed Hg limits are based on data from only those plants that provided Hg testing information in Phase I of the ICR. In contrast, the emission limits for HCl and PM are based on data from all units submitting data under the ICR. According to the commenter, the CAA requires the agency to use the emissions information in its possession when developing MACT standards, which may not require the EPA to perform exhaustive testing and sampling but it does not excuse the EPA from not considering data already at their disposal, which would include all data collected from the information collection request and not just selective test data from one particular phase of the information collection request process.

Response to Comments 32 - 33: The EPA disagrees with the commenter that suggests we should not use all the available data even if it was provided in response to Part II of the ICR and we are confused by the commenter that suggests we did not use all the data from the ICR. The EPA believes that all quality assured data submitted in the proper format and obtained under current control configurations should be used in the analyses. The statute requires the EPA to establish standards based on data and information available to the agency. *See* CAA section 112(d)(3). In addition, absent use of all of the data, the EPA would have difficulty addressing variability. The EPA believes the two emission levels cited by commenter for the Nucla facility should be considered because the Part II test data was generated at a time the facility had the same control configuration currently in place and thus it is reasonable to consider that data when establishing the standards. In addition, the difference in Hg emissions is indicative of the level of variability that may be encountered at the facility for use in our variability analysis. The EPA does not understand commenter's statement that we used only Phase I data as no data were provided under that phase of the ICR. Should this be a typographical error and the commenter intended to mean either the Phase II or Phase III data, we did not rely on only one of these data sets for establishing the best performing 12% nor for determining the numerical emissions limit. Both data sets were used for both purposes.

Comment 34: Commenter 18499 questions the reliability of low level ICR data on which the MACT floor is based, stating that these measurements were conducted using Method 30B and occurred at or below the normal detection limit. The commenter adds that scientifically there is not a way to establish an emission limit with values at or below the detection limit and that QA/QC determine if the results are repeatable but not accurate. The commenter also performed a study demonstrating that CEMS was capable of measuring very low levels and could detect background levels reliably. The commenter concludes that routine monitoring of stack gas emissions of MACT limits that translate to 0.25 µg/m3 and higher is practical, but that the measurement of MACT limits that translate to stack concentration limits such as 0.02 µg/m3 would be far more problematical and accuracy would be questionable.

Response to Comment 34: We disagree with the commenter. Although sources with low Hg emissions may have measurement issues with Method 30B and short sample times, we did not find a significant number of with non-detects due to the use of sample times that were appropriate for the low Hg levels that we expected. In addition, we disagree that there is no way to establish an emissions limit with values at or below the detection limit and that provide repeatable and accurate results. The process which we are using to calculate the numerical standard achieves both. Although under the most extreme

situation we may establish the numerical limit at a value that is three times the RDL, the process makes the best use of the available data and provides for a repeatable and accurate measurement of the pollutant.

Comment 35: Commenters 17775 and 17886 state that the existing source Hg limit is also unduly stringent because the EPA used minimum (instead of mean) values to calculate the average performance of the top 12 percent, employed a statistical method that does not account for all emissions variability of the best performing units, and failed to correct errors in its use of the ICR data. A proper MACT analysis produces an existing source Hg MACT limit of at least 1.42 lb/TBtu.

Response to Comment 35: The proposed Hg MACT floor was based on the average performance of the top 40 performers. Selection of the best performers was done by ranking the performance of each source using their 3-run emission averages, and selecting the 40 sources with the lowest emission average values. The statistical approach used to calculate the MACT floor has two main components; one is the average of the emissions of the best performers and the other is an estimate of the variability. The top 40 performers are the sources with minimum emissions, and the average is calculated using the emissions data from the best performers. The variance component in the statistical approach accounts for the variability of the best performing EGUs based on the data available. Calculations of this variance term incorporates the emissions values used to calculate the average and additional available data from the best performers to capture the within and between source variability. Based on data corrections and comments received, the number of data points in the Hg MACT floor pool is 47 for the final rule; the approach taken, however, remains the same as at proposal. The EPA believes it has adequately addressed variability in its development of the final rule based on the available data.

Comment 36: Commenter 18034 states that three Hg emissions data test runs from Sandow Unit 5B used for existing unit MACT floor analysis are not consistent with data used for the new unit MACT floor analysis for the same unit. The commenter adds that the new unit data used from the same unit is lower.

Response to Comment 36: Partly based on comments received, we have reassessed all of the MACT floor analyses and believe that the data are correct and consistent.

Comment 37: Several commenters (18444, 18445,17796) request that the EPA address the fact that test data used for BL England to calculate the Hg MACT appears to be incorrectly high. Commenter 18444 adds that quarterly tests used to calculate the MACT floor by the EPA at "EU_ICR_partl_and_partll" 3/16/11 database at http://www.epa.gov/ttnlatw/utilitv/utilitypg.htrnl are inconsistent with attached quarterly Hg test runs the commenter submitted. Commenter 17796 states that the test data cannot be reconciled with the test results on file with the NJ DEP and requests that the EPA review the data.

Comment 38: Commenter 17843 requests that the EPA review the variability among "complying units" for the MACT floor determination with ACI. The commenter concludes based on a review of the data that a unit from BL England that reported 2.4 lb/TBtu was an outlier and substituting this value with the maximum value otherwise reported results in a much lower MACT floor for ACI sources using the pooled variance statistical calculation accounting for 99% UPL.

Response to Comments 37 - 38: The company operating BL England was contacted and it was determined that the company's ICR submittal contained incorrect data for this test at the BL England facility. The data was corrected in the current Hg floor analysis.

Comment 39: Commenter 19114 states that it is inappropriate to derive the PM MACT from not equivalent methods and the EPA should conduct an analysis for the filterable PM MACT floor using either the Method 5 or the Method 29 data. The commenter argues that the EPA should recalculate a PM limit based on like-method comparison and use an average of the test series instead of the lower form the runs.

Response to Comment 39: As noted elsewhere in this document, the EPA is finalizing a filterable PM limit as a surrogate for the non-Hg metallic HAP.

Comment 40: Commenter 17677 is concerned that the EPA has set the Hg limit based off of a select few sources that do not represent a reasonable cross-section of coal-fired electric generation sources. The EPA did not use all the ICR sources to determine the mercury limitation, for some reason the EPA selected only 12 of the best performing sources and set the limit from those few sources.

Response to Comment 40: The commenter is incorrect in its assertion that the Hg limit in the proposed rule was based on 12 sources. As explained elsewhere in this document, the EPA based the Hg limit on 12% of the Hg emissions data available to the agency. *See* CAA section 112(d)(3)(A). We believe that the units in the Hg floor represent a broad range of EGUs of differing boiler types and sizes, burning varying ranks of coals from different regions, and using different combinations of controls.

6. Data corrections.

Comment 41: Commenter 17871 states that by failing to provide public notice of the changes to the corrections to the MACT standard, the EPA has acted contrary to the language of the CAA, rendering the MACT floor determination arbitrary and capricious under the APA. 42 U.S.C. section 112(d)(3)(A); 5 U.S.C. section 553(c). The commenter also disagrees with the EPA's decision not to re-propose the rule. The commenter argues that the EPA updated the data set and the MACT Floor Memorandum without any public notice of the change and that the docket does not indicate how correcting this significant error changed the MACT floor determination.

Comment 42: Commenter 17409 states that a statistical transcription error over estimated the removal efficiencies by a factor of 1,000, and although the EPA has contended this is an acceptable margin of error for variability, these errors and the cost of the proposal justify a comment period extension.

Comment 43: Multiple commenters (17761, 17800, 17821, 17878, 17881, 18449, 17931, 17871, 18014, 18023) have concerns regarding the conversion error that resulting in measurements for both existing and new source units being incorrect by a factor of 1,000. All commenters recognize that this error has been revised. Commenter 18449 adds that the although the errors were corrected, the proposed value is: unrealistic, impossible to achieve via Hg controls, based on suspect test results, and there are not NIST traceable calibration gases available for low level Hg measurements. Commenter 17931 argues that account for the error still does not provide persuasive evidence based on data that a coal-fired EGU can meet all the new source emissions standards. Commenter 17931 states 2007 EIA-860 report data from new coal-fired EGUs proves that on average, without considering variability, these units cannot meet the Hg limits. Commenter 17871 adds that the EPA said this error resulted in a "slight" increase in the Hg standard, when if fact it was not slight by a 20% increase. Commenter 18014 believes that, regardless of whether the conversion error was the genesis of the "top 40" approach used in the initial Hg floor analysis, it should be clear that using only the top 40 sources in the Hg floor analysis for existing coal-fired sources inappropriately biased the results.

Comment 44: Commenters 18034 and 17871 state that in violation of APA, the EPA did not adequately disclose critical errors and the effect of those errors on the standards to the public. Commenters add that the public must be given an opportunity to comment on how the revised MACT floor analysis will be applied.

Comment 45: Commenter 17800 states that the EPA needs to retract this rule and fix the errors before republishing and that if one substantial error has already been found it is indicative of possible other errors.

Response to Comment 41 - 45: The EPA corrected the error as soon as we were made aware of it and posted the revised spreadsheets both to the agency website and the docket. The fact that commenters were aware of this (through the docket) indicates that the public was aware of the change with sufficient notice to be able to provide comment. In addition, the EPA would have acted reasonably even if we had not made the correction and posted it to the docket at that time. The EPA often receives data corrections during the comment period and the agency is not required to re-propose standards when it revises emission limitations in the final rule based on those corrections. The EPA used the same methodology to establish the revised Hg standard after industry pointed out the conversion error. We could have waited until the close of the comment period to revise the standard based on the data correction, but we determined it was appropriate in that instance to immediately address the conversion error and provide the revised information for review.

The EPA addresses the remainder of these comments in response to other comments in this document and the preamble to the final rule.

Comment 46: Commenter 18034 states that in multiple parts of the preamble of the proposed NESHAP rule, the EPA mentions encouraging or achieving cleaner fuels for EGUs. By undertaking regulatory initiatives that the EPA admits result in a complete shift in new electrical power production capacity, the commenter believes that the EPA is setting energy policy for the country. The commenter believes that CAA section 112 may not be used as a mechanism for the EPA to drive national energy policy. In particular, CAA section 112(d)(3) specifies that the EPA must determine MACT limits based on the best controlled "similar" source. By establishing emission limits that are "fuel neutral," as the EPA describes, to encourage and achieve cleaner fuel-burning EGUs and thereby affect the fuel mix of the nation's electrical energy fleet, the EPA is ignoring this provision of CAA section 112(d)(3).

Response to Comment 46: The EPA is establishing CAA section 112(d) standards for EGUs consistent with statute and does not believe that this constitutes "setting energy policy for the country." Further, we disagree with the commenter's contention that we have established "fuel neutral" emission limits given that we have established limits for multiple subcategories of coal- and oil-fired EGUs based on data obtained from EGUs within those subcategories.

4B01 - MACT Floor Results: Existing Coal (>8,300 Btu/lb) (Proposed)

Commenters: 16469, 16513, 17622, 17730, 17754, 17772, 17775, 17796, 17801, 17807, 17808, 17817, 17818, 17838, 17843, 17869, 17871, 17873, 17880, 17926, 17928, 17931, 17973, 17975, 18017, 18033, 18039, 18421, 18500, 18539, 18644, 18666, 18963, 19122, 19595, 19536/19537/19538, 18023

1. Opposition to proposed HCl limits.

Comment 1: Commenter 16469 states that many well-controlled plants equipped with flue gas scrubbers may not be able to meet the proposed HCl limits. Commenter illustrates this in referenced table - Well-controlled Units Not Meeting HCl Floor of 0.002 lb/MMbtu (see 16469-A1_table page 10. Commenter recommends that the EPA consider subcategorizing the HCl standard based on coal chemistry (e.g., chlorine or sulfur) to ensure that well-controlled units equipped with scrubbers and SCRs are able to meet the HCl standard.

Comment 2: Commenter 17754 states that coal refuse-fired facilities can't meet both HCl limits and Hg limits simultaneously. The relatively high levels of chlorine in the fuel promote the formation of oxidized Hg in the stack. By reducing the amount of HCl in the flue gas, the extent of oxidation of Hg in the stack would also be reduced, resulting in an overall reduction in Hg control efficiency. The use of different injection to control HCl from coal refuse-fired CFB units affects the quality of the ash residue. Such ash is currently used in the environmentally beneficial step of reclaiming lands and protecting and enhancing streams damaged by acid mine drainage. The HCl emission limit should be revisited with an appropriate health-based analysis for HCl.

Commenter 17838 states that although coal refuse fired CFB units achieve very low Hg emission rates and most would likely even satisfy the stringent applicable emission limits for Hg under the proposed rule, these clean-burning units generally could not simultaneously meet the proposed limits for HCl. In this respect, the proposed emission limitation for HCl is inappropriately stringent and inconsistent with statutory directives for establishing HAP emission standards.

Commenter 17838 states that the proposed HCl emission limit fails to reflect the relationship between the control of this pollutant and the simultaneous control of Hg emissions. Specifically, at facilities that combust coal refuse, the relatively high levels of chlorine in the fuel promote the formation of oxidized Hg in the stack, which can be readily controlled by a baghouse. By reducing the amount of HCl (and, therefore, chlorine) in the flue gas, as would be required in order to satisfy the stringent HCl standard under the proposed rule, the extent of oxidation of Hg in the stack (and, therefore, the efficiency of Hg control through the baghouse) would also be reduced, resulting in an overall reduction in Hg control efficiency. Accordingly, a proposed regulatory scheme that requires significant reductions in HCl emissions, but does not account for the direct relationship between the presence of chlorine and a facility's ability to control Hg, may have the unintended result of increasing Hg emissions as a consequence of reducing HCl emissions.

Response to Comments 1 - 2: Partly based on comments received, the EPA has reassessed the emission limits and believes that the emission limits in the final rule are consistent with the statutory mandate and achievable by all sources. The EPA addresses elsewhere in this document comments related to subcategorizing coal-fired EGUs by chlorine content of the coal and the health-based emission limits. The EPA disagrees with commenter's assertion that coal refuse-fired EGUs cannot achieve the HCl emission limit in the final rule as such units are in the MACT floor pool of sources from which the limit

was derived. Further, based on data available to the Agency, there are at least two coal refuse fired CFBs unit that are meeting both the final Hg and HCl existing-source limits. In addition, there are at least 19 coal refuse-fired CFB EGUs that are meeting the final Hg existing-source limits. The EPA does understand the relationship between chlorine in the fuel and the oxidation of Hg. It is true that capturing HCl in a CFB may affect Hg oxidation. However, because subbituminous coal and lignites are faced with the same issue (unoxidized Hg), numerous technologies have been specifically developed and are available to capture mercury that is present in the combustion flue gas as elemental Hg vapor.

Comment 3: Commenter 17812 states that the proposed HCl emission limit fails to reflect the unique nature of coal refuse-fired EGUs utilizing CFB combustion technology in several ways. First, the commenter states that the incorrect proposed HCl emission limit identified in the proposed rule apparently results from the EPA's use of an improper methodology in developing the emission limits under the proposed rule. The commenter asserts that the proposed HCl emission limit fails to reflect the relationship between the control of this pollutant and the simultaneous control of Hg emissions. In developing the HCl emissions standard under the proposed rule, the EPA failed to consider any coal refuse-fired CFB units and, therefore, did not even evaluate any EGUs that employ CFB technology. The EPA clearly recognized the distinguishing characteristics of CFB technology in the context of developing the recently-promulgated MACT standards for industrial, commercial, and institutional boilers, by establishing a specific subcategory of existing coal-fired units for CFB boilers. See National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers", 76 FR 15,689 (to be codified at 40 CFR pt. 63, subpart DDDDD) (the "Boiler MACT"). Second, there have been no commercially demonstrated applications of DSI for the control of HCl from coal refuse-fired CFB units.

Specifically, at facilities that combust coal refuse (e.g., waste coal plants), the relatively high levels of chlorine in the fuel promote the formation of oxidized Hg, which can be readily controlled by a baghouse. By reducing the amount of HCl (and, therefore, chlorine) in the flue gas, as would be required in order to satisfy the stringent HCl standard under the proposed rule, the extent of oxidation of Hg (and therefore the efficiency of Hg control through the baghouse) would also be reduced, resulting in an overall reduction in Hg control efficiency.

Accordingly, a proposed regulatory scheme that requires significant reductions in HCl emissions, but does not account for the direct relationship between the presence of chlorine and a facility's ability to control Hg, may have the unintended result of increasing Hg emissions as a consequence of reducing HCl emissions.

Accordingly, the [HCl] emission limits included in the Proposed Rule are based on an improper emission limit-setting methodology, and are unduly stringent and inappropriate for application to Northampton Generating Company coal refuse-fired CFB boiler. For these reasons, commenter 18963 requests that the EPA revise the proposed HCl emission limit in the Proposed Rule for existing coal-fired EGUs. As discussed more fully in section V.H., the EPA's analysis under the Proposed Rule demonstrates that the projected benefits from the Proposed Rule are primarily associated with reducing emissions of fine particles ("$PM_{2.5}$"), rather than the other pollutants regulated under the Proposed Rule, including but not limited to, HCl. Therefore, the proposed emission limit for HCl under the Proposed Rule is unsupported by the associated projected health impacts for this pollutant. Accordingly, such emission limit should be revised consistent with an appropriate health-based analysis for HCl.

Comment 4: Commenter 17804 states that in addition to transforming waste coal piles into energy, coal refuse facilities produce a beneficially useful solid ash product which, with its alkaline quality and binding characteristics, is ideal for reclaiming abandoned mine lands because it binds with other reclamation materials and prevents migration of heavy metals and other pollutants that are the vestiges of historic mining activity. Therefore, the EPA's final Utility MACT rule should not establish HCl limits that would adversely impact the environmental beneficial use of waste coal.

The commenter is also concerned that the majority of the well-controlled CFB combustion units in Pennsylvania cannot meet the stringent HCl limits, 0.002 lb. HCI/MMBtu. Due to the uniqueness of the coal refuse, it is burned in CFB combustion units which do not employ the same type of control for acid gases that PC burning units employ (i.e., wet FGD units).

Commenter 17838 states that the proposed HCl emission limit fails to reflect the unique nature of coal refuse-fired EGUs utilizing CFB combustion technology in several ways. First, in developing the HCl emissions standard under the proposed rule, the EPA failed to consider any coal refuse-fired CFB units and, therefore, did not even evaluate any EGUs that employ the unique technology used by the commenter's plants. The EPA clearly recognized the distinguishing characteristics of CFB technology in the context of developing the recently-promulgated MACT standards for industrial, commercial, and institutional boilers, by establishing a specific subcategory of existing coal-fired units for CFB boilers.

Commenter 17838 states there have been no commercially demonstrated applications of DSI for the control of HCl from coal refuse-fired CFB units. Further, even to the extent that it is technologically feasible to use sorbent injection to control HCl from coal refuse-fired CFB units, the use of different sorbents for this purpose may affect the quality of the ash residue. Such ash is currently used in the environmentally-beneficial step of reclaiming lands and protecting and enhancing streams damaged by acid mine drainage.

Commenter 17838 states that the HCl emission limits included in the proposed rule are based on an improper emission limit-setting methodology, and are unduly stringent and inappropriate for application to the commenter's coal refuse-fired CFB boiler. The EPA's analysis under the proposed rule demonstrates that the projected benefits from the proposed rule are primarily associated with reducing emissions of fine particles ($PM_{2.5}$) rather than the other pollutants regulated under the proposed rule, including but not limited to, HCl. Therefore, the proposed emission limit for HCl under the proposed rule is unsupported by the associated projected health impacts for this pollutant. Accordingly, such emission limit should be revised consistent with an appropriate health-based analysis for HCl. The commenter states that if the EPA does not revise the HCl limit to be consistent with a rate that prevents health impacts, they requests that the limit be revised to be consistent with the HCl limit under the Boiler MACT.

Comment 5: Commenter 17754 states that in establishing such limitations, the EPA must ensure that the MACT regulation does not establish applicable standards that cannot be reasonably achieved because of technology or fuel-specific considerations. The unique characteristics of CFB emission units must be considered in this context.

Response to Comments 3 - 5: We maintain that FBC/CFB units are able to meet all of the standards in the final rule and we explain that conclusion in response to other comments elsewhere in the final rule record. We also address comments related to the benefits of the final rule and health-based emission

limits elsewhere in this document and in the preamble to the final rule. We have reassessed all of the analyses used in developing the MACT floor limits and believe that they are appropriate.

The EPA disagrees with the commenter that no FBC/CFB unit can meet, or is meeting, the final emission limit for HCl. As noted elsewhere in this document, there are a number of such units among those in the MACT floor pool for both Hg and HCl and, based on the data available, at least two coal refuse-fired CFB EGUs are meeting the final Hg and HCl limits (including variability). Further, the EPA is aware of a number of FBC/CFB units that have add-on "polishing" controls for acid gases (e.g., Seward, Foster Wheeler Mt. Carmel Cogen). We address the remaining assertions in this comment in response to other comments elsewhere in the final rule record.

The EPA disagrees with the commenter's assertion that it did not consider coal refuse-fired FBC units in setting the HCl emission limit. One of the very best performing units for HCl emission was a coal refuse-fired FBC EGU. Regarding the effect of HCl control on the oxidation and the subsequent control of Hg, the EPA understands that flue gas halogens will promote the oxidation of Hg which enhances its control. However, the EPA is also aware of several commercially available control options that have been specifically developed to control mercury that is present in the flue gas stream as elemental mercury vapor. Western subbituminous and many lignite coals have inherently low chlorine levels and tend to produce elemental Hg vapor in the post combustion flue gas. Facilities burning those fuels may also use those technologies (bromine injection, halogenated activated carbon, etc.).

2. Support for proposed HCl limits.

Comment 6: Commenter 17873 supports the EPA standard of 0.0020 lb/MMBtu for HCl to control acid gas emissions from low-chlorine coal-fired plants.

Comment 7: Commenter 17808 recommends that the EPA finalize the HCl emissions standard as proposed for existing coal EGUs; i.e., 0.0020 lb/MMBtu or 0.020 lb/MWh. Based on commenter's analysis of the 217 coal units that conducted stack emissions testing in 2010 as part of EPA's ICR emissions testing program, commenter found that more than 70% of all coal-fired generating units that submitted stack test data to the EPA are currently achieving the proposed HCl emissions standard. This translates to 158 units (out of a total of 217). The commenter also supports allowing existing sources the option to comply with the input or output-based standards, and recommends that the EPA maintain this flexibility in the final rule.

Response to Comments 6 - 7: The EPA appreciates the support of the commenters. The EPA has reassessed the HCl emission limit partly based on comments received and believes that the emission limits in the final rule are consistent with the statutory mandate.

3. Opposition to proposed SO_2 limits.

Comment 8: Commenter 16469 states that the higher-sulfur coals supplied to scrubbed plants in the eastern U.S. may not be able to achieve the SO_2 emission rate of 0.20 lb SO_2/MMBtu even with an assumed 95% SO_2 removal rate. The impacts on individual midwestern states (Ohio, Indiana and Illinois) could be particularly severe. The commenter recommends that the EPA consider subcategorizing the alternative SO_2 standard to reflect sulfur content. For example, a higher standard could be set for units burning higher-sulfur coals with sulfur contents such as 2.0% and higher, with a lower standard set for units consuming lower-sulfur coal.

Comment 9: Commenter 17973 states that the SO_2 limits for EGUs in western states without access to adequate water supply for wet scrubbers may need emission limits for acid gases more in line with that achievable through use of dry scrubbing techniques.

Comment 10: Commenter 18963 states that the proposed HCl emission limit for existing coal-fired EGUs should be revised consistent with an appropriate health-based analysis for this pollutant. Commenter further states that the proposed HCl emission limit for existing coal-fired EGUs is unduly stringent and inappropriate for application to coal refuse-fired CFB unit. Reducing the amount of HCl (and, therefore, chlorine) in the flue gas, as would be required in order to satisfy the stringent HCl standard under the proposed rule, would also reduce the extent of oxidation of Hg in the stack (and, therefore, the efficiency of Hg control through the baghouse), resulting in an overall reduction in Hg control efficiency. The EPA clearly recognized the distinguishing characteristics of CFB technology in the context of developing the recently-promulgated MACT standards for industrial, commercial, and institutional boilers, by establishing a specific subcategory of existing coal-fired units for CFB boilers. (*See* National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers," 76 FR 15,689 (to be codified at 40 CFR Part. 63, subpart DDDDD) (the "Boiler MACT").) The commenter requests that the proposed emission limit for HCl be revised to be consistent with the EPA's rulemaking efforts for the same pollutant and similar source types. Specifically, the EPA could impose an HCl emission rate through the Utility MACT equivalent to the corresponding limit for HCl for existing coal-fired CFB boilers established in the EPA's Boiler MACT.

Response to Comments 8 - 10: The EPA addresses elsewhere in this document comments related to subcategorizing coal-fired EGUs by sulfur content of the coal and the health-based emission limits. The EPA disagrees with commenter's assertion that coal refuse-fired EGUs cannot achieve the HCl emission limit in the final rule as such units are in the MACT floor pool of sources from which the limit was derived. As noted elsewhere, based on the data available, there are at least two coal refuse-fired CFB EGUs meeting both the final Hg and HCl MACT floor limits (including variability). The EPA also disagrees with commenter's suggestion that EGUs should be subcategorized by wet- and dry-FGD use. Both types of FGD system are installed on EGUs in the MACT floor pool, indicating an ability to achieve the HCl emission limits in the final rule. In addition, we believe it is legally impermissible to subcategorize based on the type of air pollution control device. *See Chemicals Manufacturers Association* v. EPA, 870 F. 2d 177, 218–19 (5th Cir. 1989), modified on different grounds on rehearing, 884 F. 2d 253 (5th Cir. 1989) (rejecting subcategorization based on type of control device for purposes of the technology-based standards under the Clean Water Act, which are analogous to the CAA section 112 standards).

4. Support for proposed SO_2 limits.

Comment 11: Commenter 17873 supports the use of an SO_2 surrogate for compliance demonstration purposes. The use of surrogate allows facilities to demonstrate compliance with the HCI limit through periodic testing and continuous SO_2 monitoring.

Response to Comment 11: The EPA appreciates the support of the commenter.

Comment 12: Commenter 17844 notes although the proposed SO_2 surrogate standard (0.20 lb/MMBtu) is not as stringent as the New Jersey 2012 emission standard (0.15 lb/MMBtu 30-day average), it requires a good scrubber that should meet the MACT requirements. Recent data demonstrated that

operation of spray dryer FGD at PSEG Fossil LLC's Mercer Generating Station Units I and 2 have achieved compliance with New Jersey's SO_2 emission rate using 2 percent coal (see attached test data).

Response to Comment 12: The EPA established the emissions standards in the final rule consistent with the CAA. The EPA is not required to establish MACT standards that are at least as stringent as state standards applicable to HAP emissions or HAP surrogates, and states are authorized to establish HAP standards more stringent than those established pursuant to CAA section 112.

5. Establish lower MACT standard.

Comment 13: Commenter 16513 recommends the EPA establish a lower Hg NESHAP standard, as many northeastern states, particularly Connecticut coal-fired EGUs, comply with 0.6 lb/TBtu or an emissions rate equal to a 90% reduction of Hg from measured inlet concentrations.

Comment 14: Commenter 17926 recommends the EPA establish a lower Hg NESHAP standard of 0.6 lb/TBtu to 0.8 lb/TBtu to further reduce toxic emissions and improve public health. Montana maintains a standard of .9 lb/TBtu, and the industry has been able to comply.

Comment 15: Commenters 17926 and 18039 recommend that a lower MACT standard is both possible and appropriate. Commenter 18039 states that Massachusetts has already promulgated regulations limiting Hg emissions from the large coal-fired power plants.

Comment 16: Commenter 18421 states that many coal-fired units are already in compliance with the EPA's proposed emission standards for Hg, acid gases, and non-Hg metals and are meeting standards within a significant margin. In fact, nearly 60% of units that reported data to the 2010 ICR are in compliance with the EPA's proposed Hg standard for existing coal-fired units designed for coal >8,300 Btu.

Comment 17: Commenter 19595 states that the EPA should consider a lower standard for facilities other than lignite. This is both technologically and financially feasible, and would further protect public health and the environment.

Comment 18: Commenter 17844 notes that the EPA's proposed Hg emission limit of 1.2 lb/TBtu (equivalent to 5.45 mg/MWhr) is not as stringent as New Jersey Hg concentration limit of 3 mg/MWhr. If the MACT standard included an alternative limit of 90% control of Hg emissions, this would enable the concentration limit to be lower than the level proposed by the EPA and still allow high Hg coal to be burned with good air pollution control.

Response to Comments 13 - 18: The EPA established the emissions standards in the final rule consistent with the CAA. To the extent commenters are suggesting the EPA establish beyond-the-floor standards for Hg for units in the >8300 Btu subcategory based on, among other things, state Hg limits, we do not believe that we can justify such a standard based on the information currently available to the agency. The EPA is not required to establish MACT standards that are at least as stringent as state standards applicable to HAP emissions or HAP surrogates; however, states are authorized to establish HAP standards more stringent than those established pursuant to CAA section 112.

6. Support for Hg emission limits.

Comment 19: Commenters 17808 and 17926 support the Hg emissions standards as proposed for existing coal EGUs.

Comment 20: Several commenters (19536, 19537, 19538) supports the EPA for assuming the lowest emitting 12 percent of the EGUs for Hg emissions data.

Response to Comments 19 - 20: The EPA appreciates the support of commenters.

Comment 21: Commenter 17754 states that because of the clean-burning nature of the coal refuse-fired CFB facilities, it is anticipated that its member's plants could generally satisfy this stringent Hg standard under most operating conditions. However, the plants would be challenged in certain operating scenarios to consistently maintain this very low Hg emission rate, due in significant part to variability in fuel characteristics.

The commenter suggests that, at a minimum, due to the marked stringency of the 1.0 lb/TBtu emission limit, the agency must ensure that such standard would not be made even more stringent through the rulemaking process. It would likely be technologically and/or economically infeasible for affected units to demonstrate compliance with a Hg emission limit that is any more stringent than the current proposed 1.0 lb/TBtu standard.

Response to Comment 21: The existing source Hg standard has increased slightly since proposal based on data corrections and the inclusion of additional Hg emissions data.

Comment 22: Commenter 18039 states that the experience of Massachusetts in imposing stringent emissions limits for Hg and other pollutants clearly shows that the EPA's proposed limits are achievable and effective. For example, although the Massachusetts' Hg emission limits for existing coal-fired power plants are considerably more stringent than those proposed by the EPA, Massachusetts' facilities have been able to install control equipment with no impact on reliability of the electric power grid and have demonstrated consistent compliance with the limits. Moreover, ongoing monitoring efforts in Massachusetts and other states indicate that Hg levels in fish and other biota have fallen as the region's sources of Hg pollution have been addressed. This evidence indicates that Hg reduction requirements like those enacted in Massachusetts are effective at reducing environmental Hg levels, and are a worthwhile investment.

Response to Comment 22: The EPA agrees that the Hg standards in the final rule are consistent with the statute and achieveable by coal-fired EGUs. We note that the Hg standard for the EGUs in the >8300 Btu subcategory is a MACT floor level of control, which is the minimum stringency level under the statute. *See* CAA section 112(d)(3). The EPA's final standards will not affect EGUs responsibility to comply with the Massachusetts' Hg limit.

7. Opposition to Hg emission limits.

Comment 23: Commenter 17622 believes that the recalculated Hg emission limit of 1.2 lb/TBtu for existing coal-fired units >8,300 Btu/lb is achievable. However, the commenter states that the proposed MACT floor Hg emission limit for the subcategory of existing coal-fired units with a coal heating value of greater than 8,300 Btu/lb should be much tighter. The commenter adds that instead of the EPA's proposed value of 1.2 lb of Hg per trillion Btu, a review of the available data from the docket indicates

that the appropriate MACT-floor emission limit should be 0.44 lb of Hg per trillion Btu (or 0.0042 lb per Gigawatt hour (GWh) based upon 32 percent efficiency).

Comment 24: Commenter 17730 states that the Hg emission control and monitoring equipment are still in limited use and the industry does not have substantial long term experience with use. Continuous Hg monitoring data as determined by certified Hg CEMS is not available or is only available in limited applications.

Comment 25: Several commenters (17754, 17838, 18963) state that the Hg emission limit of 1.0 lb/TBtu is four times more stringent than the already stringent limit for EGUs designed for coal < 8,300 Btu/lb subcategory. It would be technologically and/or economically infeasible for affected units to demonstrate compliance with a Hg emission limit that is more stringent than the current proposed 1.0 lb/TBtu standard.

Comment 26: Commenter 17801 states that the proposed IGCC Hg floor limit is not supported by the record and should be consistent with the minimum detection limits of monitoring technology. The commenter further states that IGCC plants do not have ability to reliably and accurately measure Hg at the proposed level of 0.0002 lb/GWhr (~2.28 x 10-8 lb/MMBtu at 39 percent HHV efficiency representative of new IGCC EGUs). The EPA's Method 30 B for the ICR and a qualifying test method for compliance testing in this proposed rule has a MDL of 8 x 10-8 lb/MMBtu – more than three times higher than the proposed limit. There is no commercially available CEMS that is capable of measuring at the required concentration levels. Monitoring by sorbent trap may also not be viable if required sampling times exceed a 30-day compliance period.

Comment 27: Commenters 17871 and 18644 state that the MACT floor for Hg represents emissions test data from 12% of the 330 sources that submitted emissions data pursuant to Part B of the ICR. These 40 sources are not representative of emissions of the top 12% of the subcategory as a whole, and the resulting Hg MACT standard for the subcategory is inappropriate.

Comment 28: Several commenters (19536, 19537, 19538) state that the EPA ignored the two lowest emitting units (Spruance Genco Units 2 and 3) in the >8,300 Btu/lb subcategory in the determination of the new source MACT floor for Hg. The Spruance units are comparable to other coal-fired EGUs, and can be controlled with the same Hg controls as other coal-fired EGUs. The EPA has not explained why smaller size affects a plant's ability to control Hg emissions. The EPA has not provided adequate justification for ignoring the lowest two emitting coal-fired EGUs in determining the new source MACT floor for Hg.

Comment 29: Several commenters (17807, 19536, 19537, 19538) state that the EPA's proposed Hg emission limits do not require 90% Hg removal at all EGUs. In Table 5-11 of Chapter 5 of the EPA's August 2010 Documentation for EPA Base Case version 4.10 Using the Integrated Planning Model (at page 5-17), the EPA identified various coal types by sulfur grade and uncontrolled Hg emission factors based on Hg concentration in the coal. The proposed 1.2 lb/TBtu Hg emission limit would only require 90% Hg control or better at those EGUs burning low-medium sulfur bituminous coal in Cluster #3, medium sulfur bituminous coal in Cluster#1, and high sulfur bituminous in Clusters #2 and #3. There are numerous coal-fired EGUs for which the 1.2 lb/TBtu Hg emission limit won't require anywhere near 90% Hg removal, including those units that burn all grades of subbituminous coals, low sulfur western bituminous coals, and low-medium sulfur eastern bituminous coals. Although the EPA modeled 90% Hg control for the policy case in the IPM, the proposed Hg MACT floor limit will not require that 90% Hg

removal be achieved at a majority of the coal-fired EGUs in the >8300 Btu/lb subcategory. There have been numerous studies showing that high levels of Hg removal can be achieved with this technology.

Comment 30: Commenter 18023 states that Nucla Unit 1 in Colorado achieved an inexplicably low Hg emission rate, but no guidance is provided on how to achieve a similar emission rate, particularly at different types of coal-fired boilers.

Response to Comments 23 - 30: The EPA has reassessed its MACT floor analyses for all HAP and believes that the emission limits in the final rule are consistent with the statutory mandate. The EPA believes that the Hg emission limit in the final rule is consistent with the measurement capabilities of current Hg CEMS or sorbent trap systems and that such systems are widely available. Further, the Hg emissions data were obtained through both Parts II (available data) and III (new required testing) of the 2010 ICR. Partly based on comments received, the EPA has revised the emission limits for IGCC units in the final rule.

The EPA does not believe that Spruance Genco represents a "similar source" with respect to the types of coal-fired EGUs that will be constructed in the future. *See* CAA section 112(d)(3). We believe we have discretion in the context of new source standards, unlike with existing source standards, to evaluate what a new source would look like when determining the best controlled "similar source." The Spruance Genco units are spreader stokers and cannot be built in a size large enough to be economical for general use as EGUs, and we do not believe such units will be built in the future. The EPA does not think it is appropriate to set a new source standard based on the performance of an EGU that is not likely to ever be constructed in the future. Therefore, the EPA has not used Spruance Genco Units 2 and 3 as the basis for new-source MACT. The EPA has based the new-source MACT limits on an EGU configuration that is consistent with the type of EGU that we believe will be constructed in the future. We have included all available data in the existing source MACT floor as the statutory mandate requires us to establish standards based on "the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information) . . . in the category or subcategory for categories and subcategories with 30 or more sources." *See* CAA section 112(d)(3)(A); see also CAA section 112(d)(3)(B) (requiring the MACT floor be based on "the average emission limitation achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory for categories and subcategories with fewer than 30 sources.").

The commenter's assertion about the Nucla EGU is moot given that, upon reassessment of the MACT floor data sets, this EGU was not the best performing unit. However, had it remained the best performing unit, the EPA would have used it as the basis for the new-source MACT limits because we do not have the same concern with regard to CFB units as we do with stoker units. There are existing CFB EGUs as large as 300 MW and CFB units are among the newest EGUs constructed in the U.S. indicating that they do represent one type of EGU that the utility industry will construct in the future. We also disagree with commenter's contention that we must provide guidance on how any given EGU could achieve the final limits. The statutory language only provides that we base the limits on what has been achieved in practice, the inference being that if one or more units have "achieved" the limit, other units can also.

The EPA does not believe that CAA section 112 requires 90% reduction as one commenter asserts. Rather, the statute mandates that the emission limits be based on the average of the top performing 12% of sources for categories and subcategories with 30 or more sources. As discussed in the proposal

preamble, the EPA also believes that a percent reduction format may not comply with the Court interpretation of the statute and, in any case, we do not have sufficient data to establish such a standard.

We address the remainder of these comments elsewhere in the rule record.

8. Opposition to non-Hg HAP metals emission limits.

Comment 31: Commenter 17772 opposes the development of average emission factors from the ICR test data collected for the 131 units to establish emission factors for non-Hg HAP metals emission limits.

Comment 32: Commenter 18500 states that the EPA should not use test data from unrepresentative units/fuels to set an emission limit applicable to existing coal-fired units for total non-Hg metals or PM as a surrogate. The EPA should not use fluidized bed unit test data to set limits for a category that largely consists of conventional boilers. There are only about 60 fluidized bed firing units in the U.S. However, fluidized bed units are significantly over-represented on the listed best-performing 131 units used to set the proposed total non-Hg HAP metals limit. Likewise, there are only about 62 lignite or other (waste coal or petroleum coke) coal units in the U.S. However, lignite/other fueled units are significantly over-represented on the listed best-performing 131 units used to set the proposed total non-Hg HAP metal limits and the listed best-performing 131 units used to set the proposed PM surrogate limits. Existing units using bituminous or subbituminous coal cannot be reasonably reconfigured to use or are not reasonably able to receive lignite or other fuels.

Comment 33: Commenter 17621 states that emissions of Hg from coal-fired EGUs differ significantly between FBC units and conventional PC units. These differences are associated with fundamentally different combustion technologies.

Response to Comments 31 - 33: As noted elsewhere in this document, the EPA did not find reason to subcategorize FBC EGUs from the remainder of EGU types because (1) their emissions did not differ significantly from other types of EGUs, and (2) because FBC EGUs are among the newest in the industry indicating that they are viable options for new EGUs in the future. Thus, all FBC data are included among the data from other EGU types. The EPA also finds no basis for subcategorizing lignite-fired EGUs on the basis of their PM emissions. All coal ranks (e.g., bituminous, subbituminous, coal refuse, lignite) and boiler types (e.g., PC, FBC) are represented among the MACT floor pool for PM and non-Hg metallic HAP and at least some of all the different types of units burning different types of coal are, based on the data available to the agency, currently meeting the MACT standards established in the final rule.

9. Opposition to conversion factor for total PM emissions.

Comment 34: Commenter 17818 opposes the conversion factor of 10,000 Btu/KWh for total PM to obtain the alternate emission rate limit of 0.3 lb/MWh from the emission rate of 0.03 lb/MMBtu. The commenter states that the accuracy of the correction factor values is a concern, and the lack of consistency for similar classes of units throughout the table is very questionable.

Response to Comment 34: The EPA did not use a conversion factor in developing the output-based format (e.g., lb/MWh). Rather, the EPA used data submitted by each EGU to develop the output-based

limit for each EGU boiler. Furthermore, as stated elsewhere, we are not finalizing the total PM surrogate limit, instead we are finalizing a filterable PM surrogate standard.

10. Doubts regarding Hg performance test data.

Comment 35: Commenter 17843 recommends the EPA re-examine four performance test values (3.0, 2.4, 1.6 and 1.1 lb/TBtu) to determine why these tests represent a 10 to 30 fold difference compared to the mean of the majority of other tests. The inclusion of these units' anomalously high test values in the EPA's variability analysis is the primary driver of the variability spread, introducing a greater margin of variability than one might expect from units that will be required to control for Hg.

Response to Comment 35: The EPA has reassessed the emissions test data and made any necessary corrections in the final data set. We did not remove the test data averages identified by the commenter because these were test data averages that were achieved in practice by the sources in the floor. The EPA used these data, and others, in the Hg floor variability analysis to account for variance where a source was tested over time. This time-based variance would also accounts for fuel variability.

11. Support MACT requirements for organic HAP.

Comment 36: Commenter 17869 states that just because surrogates like CO for organic HAP have not worked well, it does not necessarily follow that there should be no MACT floors for organic HAP. Perhaps 80% of the health benefits from organic HAP emission reductions can be captured with only 20% of the costs. Because of the recognized toxicity of PAHs in particular, including the recent data from coal-fired power plants in Krakow and China, it would be prudent to propose, or at least to ask for comment on the possibility of a PAH floor.

Response to Comment 36: The EPA explained in the proposal preamble its rationale for not establishing emission limits for the organic HAP, including PAH. No data were provided that would allow the EPA to revisit that decision.

12. Support emissions limitations.

Comment 37: Commenter 17880 supports the emission limitations of existing coal-fired EGUs generating greater than or equal to 8,300 Btu/lb to be limited to 0.30 lb/MWh for total PM, 0.020 lb/MWh for HCl, and 0.008 lb/GWh for Hg. New units would be limited to 0.050 lb/MWh for total PM, 0.30 lb/GWh for HCl, and 0.000010 lb/GWh for Hg.

Response to Comment 37: The EPA appreciates the commenter's support. We note that we have revised the standards based on data corrections and new data as explained elsewhere in response to comments.

13. Support for different control technology options for PM emissions.

Comment 38: Commenter 17975 states that well managed ESPs combined with scrubbers can reduce emissions during startup and shutdown as good as baghouses.

Commenter 17975 also states that coal cleaning techniques are good options to control filterable PM emissions. The commenter believes that the EPA should recognize these options for limiting the

concentration and volume of toxic metals that enter the combustion chamber, and identify these alternatives in its final rule.

Response to Comment 38: The EPA does not mandate the types of control technologies or other practices that companies use to comply with the final emission limits. To the extent that such technologies as noted by commenter were in use during testing conducted to provide the data through the 2010 ICR, such data are included in the MACT floor analyses.

14. Opposition to PM emission limits.

Comment 39: Commenter 18017 states that the 0.03 lb/MMBtu PM standard in the MACT Rules is also far lower than the BART limit of 0.05 lb/MMBtu. Plants using ESPs experience variations in PM removal efficiency performance over time, particularly during times of startup, shutdown and other abnormal conditions that would make continuous compliance with an operating limit established during optimal conditions difficult. Compliance with such operating limits may not even be achievable by units with fabric filter PM removal equipment.

Comment 40: Commenter 19122 states that the proposed PM limit of 0.030 lb/MMBtu is a total limit that includes filterable and condensable particulates. The facilities that use total PM as a surrogate for non-Hg HAP will need to install a PM CEMS and perform performance tests which measure both filterable and condensable particulates. Since PM CEMS only measure filterable particulates, the actual limit that facilities would need to meet will be somewhat lower than 0.030 lb/MMBtu, as the PM numeric limit would be adjusted based on the proportion of total PM emissions that are condensable PM. This actual amount would need to be determined by performance testing. This creates much uncertainty, as affected EGUs will likely experience changes in total PM limit after each performance test.

Comment 41: Commenter 17622 suggests that in the interest of having to achieve a total PM emission limit during normal plant operations that is accurately verifiable and thus not an impediment to construction of new coal-fired EGU's including the application of IGCC technology, commenter suggests that a factor be added to the total PM emission limit for new EGU's to account for the current measurement uncertainty of the new Reference Method 202. The factor needs to cover uncertainty in test methods and variability in plant operations. ICR tests were conducted under "ideal" test conditions and may not reflect variations in daily plant operations.

Comment 42: Commenter 17775 states that their ability to comment on the proposed total PM limit for existing units of 0.030 lb/MMBtu is hindered by the EPA's failure to explain how it derived the proposed total PM limit. The problem begins because total PM cannot be measured directly. Total PM emissions are typically computed as the sum of the filterable and condensable PM measurements. In Part II of the ICR, the EPA required all units to submit their historic PM data. The EPA required 175 units to conduct Part III stack sampling for filterable PM emissions using Method 5 or Method 29 and for condensable PM emissions using Method 202. These ICR requests produce a PM emissions database that contains filterable PM measurements using different methods and that does not include a condensable PM measurement for every unit that reported filterable PM results. The EPA fails to explain how it produced its proposed total PM limit from this "hodgepodge" of PM emissions information.

The commenter also states that their ability to comment is further complicated by the fact that the EPA did not perform its PM calculations in the way it says it did. The EPA states in its MACT floor memorandum that it used additional data from Part II and Part III to calculate the variability adjustments for the emission categories; including PM. The EPA claims it did so to reflect the variability of emissions at the unit over time. However, the EPA did not follow this approach for total PM. The EPA only used the minimum values in its variance calculation. By failing to include all Part II and Part III PM data to calculate variability, the EPA fails to account for the full variability of PM emissions over time.

Comment 43: Commenter 17975 states that the emission limits for HAP under CAA section 112 of the CAA must be at least as stringent as the limits achieved in practice by the best performing 12% of the sources within the specific category subject to MACT standards. The EPA suggests that the 0.03 lb/MMBtu PM limit is appropriate, because the 131 facilities that achieved this standard in the agency's sample represent approximately 12% of the EGUs in operation today. But the EPA examined PM data from only 245 facilities, which were presumably sampled because they were representative of the industry at large, and it has no basis for assuming that none of the more than 800 EGUs that were not included in the EPA's sample could meet a more stringent standard than the one the EPA has proposed. The EPA should have set PM limits based on results demonstrated by units representing 12% of its sample, which is exactly the approach that the EPA took in determining MACT standards for Hg elsewhere in its proposal.

Response to Comments 39 - 43: The EPA has reassessed the emission limits partly based on comments received and we believe that the emission limits in the final rule are consistent with the statutory mandate. We maintain that the standards are achievable at all time, even with an ESP, because we have incorporated sufficient variability and we require compliance based on a 30-day rolling average when sources demonstrate compliance on a continuous basis instead of through periodic stack testing. In combination (variability and 30-day average), we believe that any variation from a well maintained control device is adequately addressed. Comments related to startup and shutdown periods are discussed elsewhere in this document.

As noted elsewhere in this document, the EPA has changed the format of the PM emission limit in the final rule to the filterable fraction, rather than total. The EPA has also taken into consideration the performance of the emission test methods in establishing the final limit, and we maintain that the available test methods are sufficient to demonstrate compliance with the final rule standards.

15. Support for proposed PM limits.

Comment 44: Commenter 17808 recommends that the EPA finalize the total PM emissions standard as proposed for existing coal EGUs; i.e., 0.030 lb/MMBtu or 0.30 lb/MWh. Based on the commenter's analysis of the 172 coal units that conducted stack emissions testing in 2010 as part of the EPA's ICR emissions testing program, they found that nearly 70% of all coal-fired generating units that submitted stack test data to the EPA are currently achieving the proposed total PM emissions standard. This translates to more than 119 units (out of a total of 172). The commenter also supports allowing existing sources the option to comply with the input or output-based standards, and recommends that the EPA maintain this flexibility in the final rule.

Comment 45: Commenter 17622 notes that although the proposed total PM emission limits for existing sources is more stringent than the previous requirements (that didn't include condensables), in reality,

dry particulate emissions removal may need to be at a level of 0.015 lb/MMBtu to allow for condensable materials. The commenter believes that this performance level can be achieved in many instances by modifying the existing ESPs.

Response to Comments 44 - 45: As noted elsewhere in this document, the EPA has changed the format of the PM emission limit in the final rule to the filterable fraction, rather than total. The EPA does agree sources with ESPs may be able to comply with the revised standard by modifying their existing ESP. We also agree that a significant number of EGUs may already be in compliance with the final filterable PM limits and we believe that result stems from the fact that all coal-fired EGUs currently have some form of PM control installed.

Comment 46: Commenter 17844 supports the proposed PM emission limit for existing coal-fired EGUs. Better particulate control for many older coal-fired power plants is a core measure for the control of HAP. In addition to the control of particulate HAP such as lead, cadmium, arsenic, and chromium, good particulate control enables more cost effective control of certain gaseous HAP, including Hg and HCl.

Response to Comment 46: The EPA appreciates the commenter's support. We are finalizing a filterable PM limit that we believe will achieve, in conjunction with the acid gas HAP standard, the same level of control of non-Hg metal HAP as the proposed total PM limit. In addition, the final standard provides relief from the compliance assurance measures that commenters noted are currently difficult to implement and costly.

16. Opposition to startup and shutdown emission limitations.

Comment 47: Commenter 18539 states that normal emission limitations should not apply during periods of startup and shutdown. If that is not possible, then separate emissions limitations should apply during periods of startup and shutdown. The commenter strongly recommends that those periods should not be included in the 30 operating day rolling weighted average.

Response to Comment 47: As noted elsewhere in this document, the EPA is finalizing work practice standards for periods of startup and shutdown.

4B02 - MACT Floor Results: Existing Coal

Commenters: 17270, 17813, 17815, 17818, 17878, 17880, 17904, 17925, 17926, 17930, 18034, 18421, 18426, 18498, 19143, 19205, 19214, 19595, 19536/19537/19538

1. Support for stronger regulations.

Comment 1: Commenter 17270 supports stronger regulations for emissions for coal facilities to protect human health and the environment. The EPA's proposed standards are an excellent start, but need to be tighter and more comprehensive.

Comment 2: Commenter 17926 states that Lewis and Clark has entirely complied with Hg emissions standards and emissions have been below 1.5 lb/Btu every quarterly average. The numbers clearly demonstrate the ability of L&C, a lignite powered facility, to comply with Montana's lignite standard of 1.5 lb/Btu. The ability of L&C, a lignite facility, to comply with Montana's stringent Hg control regulations is contrary to the EPA's rationale for a weaker national standard.

Response to Comments 1 - 2: The EPA established the standards in the final rule consistent with the requirements of CAA section 112(d)(2) and (3) and Court decisions interpreting those provisions. This final rule does not prohibit individual states from mandating more stringent Hg or other HAP standards for sources in their states; therefore, Lewis and Clark will be required to comply with the Montana mercury standard as long as it remains in place.

2. Opposition to apparent conversion factor.

Comment 3: Commenters 17818 and 17878 state that the accuracy and consistency of the correction factor values in Table 10 of the docket entry EPA-HQ-OAR-2009-0234 for the apparent conversion factor (unit heat rate) for relating the primary and secondary emission rate limits for Hg (18182 Btu/KWh), and the apparent conversion factor (unit heat rate) for total PM (10000 Btu/KWh) are questionable.

Response to Comment 3: The EPA has reviewed the data and the analyses and corrected all data errors identified by commenters or on our own review, and the corrected data have been incorporated into the standards in the final rule.

3. Need for decrease in floor standard.

Comment 4: Commenters 17878 and 17926 oppose the subcategorization of lignite coal-fired units based on the above the floor standard of 11 lb/TBtu which is high and unjustifiable. Commenters cite Montana's current regulation in which EGUs, including lignite coal (Admin. Rules of Mont. 17.8.771), requires that coal plants do not exceed a Hg standard of 1.5 lb/TBtu.

Comment 5: Commenter 19214 recommends that the EPA reconsider its proposed limits for coal-fired EGUs "designed for coal <8,300 Btu/lb" to reflect the lower limits in the permits. The commenter states that out of five permit application they received, two EGUs would meet a Hg limit lower than the EPA's proposed 0.040 lb/GWh limit for new EGUs, and three would meet a limit lower than the EPA's proposed 4.0 lb/tBtu (0.040 lb/GWh) beyond-the-floor limit for existing EGUs.

Comment 6: Several commenters (19536, 19537, 19538) state that according to the EPA's Hg MACT floor spreadsheet, Sandow Station Unit 5B's three Hg test results were below the detection level of the test method used. When a unit's emissions are at or below the detection level, the emissions could be at the detection level or lower. To account for such test results in developing emission factors, the EPA has typically assumed emissions were at half the detection level when there are other test results for the unit that measured above detection limits. The EPA has assumed that actual Hg emissions were equal to the detection limit of the test at that unit. By doing so, the EPA has overestimated the average Hg emission rate being achieved at this unit.

Commenters (19536, 19537, 19538) state that when the EPA determined the MACT floor in terms of lb/MMBtu, the EPA accounted for variability in the top ranked EGU in the <8300 Btu/lb subcategory by determining the 99th percentile UPL value. The EPA then did the same analysis for Hg emissions in terms of lb/MW-hr. However, the EPA determined the 99th percentile UPL emission rate in terms of lb/MW-hr, and then 'rounded' up that value in coming up with a new source MACT floor emission limit. The EPA has provided no justification for that increase. Further, a comparison of the proposed Hg MACT floor limit in terms of lb/GW- hr to the 99th percentile UPL Hg emission rate in terms of lb/MMBtu reflects an unreasonably high thermal efficiency that does not reflect the design and operation of a new EGU. The end result is that the EPA's proposed 0.04 lb/GW-hr falls well short of the Hg emissions achieved at the best controlled source in the <8300 Btu/lb subcategory.

Response to Comments 4 - 6: The EPA believes that the limits in the final rule are supported by the available data and consistent with the statute. The EPA has addressed comments related to use of the minimum detection level and its statistical analysis elsewhere in this document. Concerning the rounding issue, the EPA does not believe it is appropriate to round down in establishing the MACT floor standards because the standards are required to reflect what is actually achieved by the best performing unit or units. Rounding the final MACT floor emissions number down would equate to establishing a MACT floor that is less than what we have determined is achieved by the best performing existing units, and we think that approach may be inconsistent with CAA section 112(d)(3).

4. Opposition to exemption from emission reductions.

Comment 7: Commenters 17926 and 19143 state that the EPA should take a more distinct approach for lignite facilities and propose rules that effectively guard the public from Hg. A complete exemption from emissions reductions for lignite facilities is unwarranted.

Comment 8: Commenter 18666 recommends that lignite burning plants should not be exempt from standards for other coal burning plants.

Response to Comments 7 - 8: As noted elsewhere in this document, the EPA has modified its approach to defining the subcategory partly based on comments received. The EPA disagrees with commenters that the public is not effectively protected from emissions of Hg from EGUs or that low rank, virgin coal-fired EGUs are exempted from the final limits. The EPA subcategorized and established MACT standards for such units consistent with the statute.

5. MACT floor analysis is flawed.

Comment 9: Commenters 17815 and 17930 state that the creation of the MACT floor which was based on only a single test run from just two newly commissioned units (Sandow 5B and Oak Grove 1) suffers

from legal, pragmatic, and technical faults. The CAA requires the EPA to use at least five units to set the MACT floor and, thus, the Subcategory 2 must be modified to properly reflect the emissions reduction and monitoring capabilities of the units within Subcategory 2.

Comment 10: Commenter 17930 states that the EPA needs to remove the beyond-the-floor requirement entirely, as this limit has not been proven to be technically achievable, is not an economically viable option, and would result in high costs and shutdowns despite very little proven gain.

Comment 11: Several commenters (17815, 17925, 18034, 18498) state that the EPA's MACT floor analysis for the existing lignite coal-fired EGU subcategory (designed to burn coal with a caloric value less than 8,300 Btu/lb and a height-to-depth ratio of 3.82 or greater) is flawed and does not include the minimum number of units required by 40 CFR section 112(d)(3)(A). For existing sources, the MACT floor cannot be less stringent than the average emission limitation achieved by the best-performing 12% of existing sources for source categories with 30 or more sources, or the best-performing five sources for source categories with fewer than 30 sources (National Emission Standards for Hazardous Air Pollutants (NESHAP) Maximum Achievable Control Technology (MACT) Floor Analysis for Coal- and Oil-fired Electric Utility Steam Generating Units – REVISED, dated May 18, 2011). Furthermore, the beyond-the-floor analysis of this same category is flawed and the EPA has provided no clear technical justification regarding the feasibility of coal-fired EGUs in this subcategory being able to meet the proposed beyond-the-floor Hg limit. The two units that the EPA used in the floor analysis are two recently permitted state-of-the-art units in Texas, and Commenters are concerned that the EPA's MACT floor analysis is inappropriately biased low. Based on just including all five test runs from the two selected units in the lb/MMBtu floor analysis, Commenters estimate the existing unit MACT floor would be increased by approximately 15%. The approach that the EPA has used to set the existing unit MACT floor for this subcategory artificially skews the MACT floor lower than what the available data would support and is actually closer to the methodology used for a new unit MACT floor. The EPA has provided no justification for this deviation from the requirements of 40 CFR section 112(d)(3)(A).

Comment 12: Commenter 19686 recommends that the EPA eliminate the subcategorization of bituminous and subbituminous coal, and lignite coal. Commenter asserts that the EPA's justification for subcategorization of units burning coal based on calorific value is not adequate in that it fails to show that the subcategorization is needed based on the different emission characteristics of the coal that affect the technical feasibility and the effectiveness of emissions control. Instead, the subcategorization encourages EGUs to switch to a dirtier, less fuel efficient coal (*e.g.*, lignite) and avoid more stringent MACT standards. The commenter recommends that the EPA eliminate the subcategorization of bituminous and subbituminous coal, and lignite coal.

Comment 13: Commenter 17878 states that the EPA has identified units that have "technically impossible to achieve" low heat rates. Fourteen of the 130 lowest emitting units in the Hg database ostensibly have heat rates below 8000 Btu/kWh and seven have reported heat rates below 7000 Btu/kWh. These low values indicate underlying errors that can affect the emission rates and therefore the MACT floor calculation. Similarly, implausibly low heat rates are reported for units in the PM and HCl database as well.

Response to Comments 9 - 13: The EPA was made aware of miscalculations with respect to the heat rates used at proposal and has corrected those data. There are more than 30 sources in the low rank, virgin coal-fired EGU subcategory. Therefore, by the language of CAA section 112, the EPA is to use

the top performing 12% of data in calculating the MACT floor levels, rather than data from 5 units as would be required if the subcategory had less than 30 units. *See* CAA section 112(d)(3)(B). The EPA does not agree that CAA section 112 (d)(3) mandates a minimum of 5 sources in all instances, and the literal language of the provision appears to compel us to use less data in certain circumstances for source categories of 30 or more (e.g., 12% of 30 would round to 4 units if we had data on all 30 units in a category). The EPA recognizes that it indicated that there were less than 30 EGUs in the MACT standard memorandum for this subcategory, but that typographical error does not alter the fact that we have identified more than 30 units in the subcategory. Further, the fact that the two EGUs forming the basis for the floor are the two newest units in the subcategory does not exclude them from consideration as being the best performing units. The commenter has not explained a legal basis for its claim that the data from the newest best performing units' data should not be used. The EPA has also corrected data errors brought to its attention related to one of the sources in the final rule. The beyond-the-floor limit is based on data from the top-performing EGU in the subcategory and that limit is being currently met by at least one EGU in the subcategory, thus, it is technically achievable.

6. Need to address lignite variability.

Comment 14: Commenter 17930 states that the EPA needs to address lignite variability and propose CAA compliant and obtainable emissions limits.

Comment 15: Commenter 18421 states that the EPA determined that existing coal <8,300 Btu warranted a separate subcategory because no facilities burning coal <8,300 Btu were in the top 12% of performers for Hg in the ICR database. However, the EPA's calculated mean of this subcategory was 1.0672E-06 before the variability (UPL) test and rounding were applied. The actual mean of the subcategory, therefore, is about 1.07 lb/TBtu.

Response to Comments 14 - 15: The EPA believes it has adequately addressed variability based on the available data. Further, the EPA has followed the guidance provided in recent Court decisions with regard to the inclusion of variability in the final limits. We believe the mean to be irrelevant until the variability has been incorporated. We were consistent in our application of the UPL analyses for all HAP MACT floor data sets.

7. Need for annual-averaging timing.

Comment 16: Commenter 17930 recommends that the EPA establish an annual-averaging timing, instead of a 30-day average, in order to account for the variability of coal-seams.

Response to Comment 16: The EPA does not believe that there is any basis for expanding the averaging period to an annual time period and has addressed variability, as discussed elsewhere in this document.

8. Not possible to achieve emission rate.

Comment 17: Commenter 17813 states that it is impossible for them to meet a SO_2 emission rate of 0.2 lb/MMBtu.

Response to Comment 17: The EPA established in the proposed rule an HCl standard as a surrogate for all acid gas HAP and an alternative equivalent SO_2 standard for all acid gas HAP, including HCl.

Sources must comply with either standard, not both, thus, commenter is not constrained to meeting the SO_2 limit but could, instead, comply with the HCl limit in the final rule.

9. Support emission limitations.

Comment 18: Commenter 17880 supports the emission limitations of existing coal-fired units designed for coal less than or equal to 8,300Btu/lb to be limited to 0.3 lb/MWh for Total PM, 0.02 lb/MWh for HCl, and 0.2 lb/GWh for Hg. The commenter supports the emission limitations of new units to be limited to 0.05 lb/MWh for Total PM, 0.3 lb/GWH for HCl, and 0.04 lb/GWh for Hg.

Response to Comment 18: The EPA appreciates the commenter's support. We have revised the standards at final to address the inclusion of new and corrected data.

10. Proposed Hg emission limit mirrors the MDEQ rule.

Comment 19: Commenter 18426 states that the proposed Hg emission limit of 0.008 lb/GWh mirrors the requirement in Michigan's Hg rules which were developed through an intense rulemaking process. Michigan's rules outline a Hg reduction program for coal-fired EGUs starting January 1, 2015. For existing EGUs, the basic components include three compliance options:

a. A minimum of 90 percent reduction from baseline input Hg levels or an output-based Hg emission standard of 0.008 lb/GWh.

b. A multi-pollutant compliance demonstration project which must achieve 75 percent reduction from baseline input Hg levels along with significant reductions in NO_X and SO_2. (This would be equivalent to a Hg emission limit of 0.020 lb/GWh.)

c. Very Low Mass Emitting unit that is limited to 9 pounds of Hg per 12-month rolling time period with an alternative compliance demonstration project.

Response to Comment 19: The EPA appreciates the commenter's support but notes that the EPA has not established a percent reduction standard in this final rule.

11. Ninety-nine percent confidence interval led to a large disparity.

Comment 20: Commenter 18421 states that the EPA's decision to apply a stringent, 99% confidence interval has led to a large disparity between the mean and the calculated floor. For this subcategory, the standard shifts from approximately 1.07 lb/TBtu to 11 lb/TBtu. The EPA does apply a beyond-the-floor limit to this category, setting the standard at 4.0 lb/TBtu, which is equivalent to the standard used for new or reconstructed sources burning coal <8,300 Btu.

Response to Comment 20: The EPA believes that its statistical approach is consistent with other recent NESHAP rulemakings, with the statutory mandate, and with recent Court decisions. The EPA has finalized a beyond-the-floor limit for Hg emissions from existing sources in this subcategory. We are not finalizing a beyond-the-floor limit for Hg emissions from new sources in this subcategory.

12. Recommendations.

Comment 21: Commenter 17270 recommends that lignite burning facilities should also be required to control their Hg emission levels to protect public health. Lignite burning facilities in Montana are complying with a 1.5 lb/TBtu standard, so it is feasible.

Comment 22: Several commenters (17270, 19205, 19595) recommend that a tighter standard can and should be achieved for facilities other than lignite. Montana's standard (0.9 lb/TBtu) is both technologically and financially feasible.

Response to Comments 21 - 22: The EPA believes that the final limits are supported by the data and are consistent with the statute and applicable case law. Further, this final rule does not prohibit individual states from mandating more stringent Hg or other HAP standards for sources in their states; therefore, units located in Montana will be required to comply with the more stringent Montana Hg standard as long as it remains in place.

4B03 - MACT Floor Results: Existing IGCC (Proposed)

Commenters: 17191, 17801, 17807, 17821, 17881, 19536, 19537, 19538

Comment 1: Commenter 17191 notes that there are only two existing, operating IGCC facilities in the U.S. EPA acknowledges this in the preamble, page 25,041, left column. The EPA further reports that there are only two IGCC units in their subcategory. The EPA correctly concluded that the IGCC units were sufficiently unlike other operating facilities such that they deserved their own subcategory, as indicated by making that subcategory in the proposed rule.

However at this junction, the commenter concludes that a subcategory of two facilities cannot be subject to the calculation of a MACT floor level. As the EPA clearly acknowledges: "In determining the MACT floor limitations, we first determine the floor, which is the level achieved in practice by the average of the top 12 percent of similar sources for subcategories with more than 30 sources." (preamble, page 25,041, center column). Of course, this is not possible which only two sources in the subcategory, which the EPA further acknowledges: "The IGCC and solid oil-fired EGU subcategories each have less than 30 units so the MACT floors were determined using the five best performing sources (or two sources for IGCC because there are only two such sources in the subcategory.) (preamble, page 25,041, left column). A sample size of two, even if it represents 100 percent of the existing facilities in the subcategory, cannot meet the legal criteria of "top 12 percent". The numerical sample size is too small; the percentage sample size is too big. The standards development for IGCC is contrary to that imposed upon other generating facilities.

Rather the commenter states that the EPA should acknowledge these two units for what they are. They are older, first generation examples of a promising new technology that could allow the use of America's abundant energy resource although dramatically reducing air emissions. Using a sample size of two to calculate a MACT standard defies reason and flies in the face of DOE Clean Coal Technology efforts. Sufficient incentives are currently being applied to these facilities in the form of ambient air quality standards, transport rule, etc. without imposing MACT emission limits based on two facilities using different gasification technologies.

Response to Comment 1: The commenter has not provided any information upon which to base a distinction between the two existing IGCC units. Further, the existing rules noted by the commenter do not address HAP emissions from these units. Therefore, the EPA is bound to use the data from both units in establishing the MACT floor for existing IGCC EGUs.

Comment 2: Commenter 17821 states that the EPA has very limited HAP data for setting the emission rates for existing IGCC units. The CAA requires that MACT standards for existing sources must be at least as stringent as the average emissions limitation achieved by the best performing 12% of existing sources in the category or subcategory, the best performing five sources for source categories or subcategories with less than 30 sources. There are only two operating IGCC sources. Assuming that these two sources are in the same source category, the EPA's own criteria have not been met to adequately evaluate and set standards for IGCC area sources. For new sources, MACT standards must be at least as stringent as the control level achieved in practice by the best controlled similar source. With only two IGCC sources, questions remain as to what represents a similar source. Both of these sources use different gasification technologies. The design and operational differences between these historic gasification processes and more recently permitted IGCC projects provide for minimal comparisons of potential performance or emissions. Other differences in IGCC facilities that can affect

emissions can be found in fuel types and syngas cleanup systems. The commenter suggests that these need to be taken into consideration when categorizing IGCC sources.

Commenter 17821 explains that IGCC facilities have two methods of specifying emission rates. Emission rates can be based on lb/MMBtu of gasifier (coal) heat input on lb/MMBtu gas turbine (syngas) heat input. Comparing these can result in a 30% difference in emissions. The EPA has determined that IGCC emission rates should be based on the heat content of the syngas burned in the combustion turbine. However, the initial Polk Power Station air permit based emission rates on the coal going into the gasifier although the initial Wabash River IGCC air permit based emission rates on the syngas fired in the combustion turbine. The commenter states that the EPA needs to provide the basis for the emission rates from each of these two facilities. The EPA correctly concluded that with only two sources comprising the IGCC subcategory, they did not have the data to propose a beyond-the-floor limit for existing IGCC units.

Response to Comment 2: The EPA believes it is reasonable to keep the two existing IGCC units in the same subcategory, notwithstanding any potential differences in the gasification technology. In fact, we are not regulating the gasification technology; instead, we are establishing standards for the EGU. Existing and new IGCC units will have to comply with the final rule by either installing controls on their units or ensuring that the gasification process provides a fuel that is MACT compliant. We do not know, and the commenter does not suggest, how the agency could take into account the factors it identified.

The EPA is proposing to establish the new source limit on the permit limits from an as yet constructed IGCC EGU. That source is a similar source, as contemplated in section 112(d)(3), and the source will be required to achieve the limits in its permit upon commencing operations.

Comment 3: Commenter 17801 states that due to the wide variety and broad potential applications of such units (IGCC units that supply more than 25 MWe output to any utility power system and convert substantial form of original energy in feedstock to co-produce salable product streams), the emissions standards should be based on the following criteria:

Gross output: Gross output means the gross useful work performed by the steam generated and/or fuel combusted in the gas turbine(s). For such units the gross useful work performed is the gross electrical and/or mechanical output plus 75% of the thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output (i.e., steam delivered to an industrial process), and the amount of electricity generated rather than percent coal converted to useful salable product streams. Units that are intended to supply less than 25 MWe output for sale to any utility power distribution system using IGCC technology should be evaluated and permitted on a case-by-case basis to determine appropriate regulatory applications.

Response to Comment 3: The statute requires the EPA to establish standards for listed source categories, and the EPA as part of a NESHAP employ a case-by-case standard setting process.

Comment 4: Commenter 17807 concludes that the total maximum heat input used in the IGCC Floor Analysis is flawed (See 17807-A1_Table_5_&_6.doc) (Commenter included a table of "EPA's IGCC FIoor Analysis Heat Input Assumptions".) Heat input used in the analysis for Polk Power Station is the higher heating value (HHV) of the coal into the plant and the heat input for Wabash appears to be the syngas heating value to the combustion turbine (CT). This inconsistency must be corrected and

accounted for in the EPA' s consideration of the floor analysis. The commenter requests that the EPA reevaluate the IGCC floor analysis and use heat input numbers that are representative.

Commenter 17807 states that the proposed rule has limits for several non-Hg metals and Hg. Table 6 below shows the correlation between alternative forms of the same proposed emission limits and the associated calculation methodologies (See 17807-A1_Table_5_&_6.doc). As shown in the table, several of the limits show inconsistencies between the power weighted vs. heat weighted methods of compliance. The calculated heat rate column below is a calculation based on the EPA's proposed limits. The shaded heat rates illustrate which limits do not correlate. Commenter states that the heat input used in the analysis was flawed and inconsistent. The inconsistency is reflected in the calculations performed to find the limits themselves. Commenter requests that the EPA revise the calculations using the correct inputs.

Comment 5: Commenter 19114 states that for IGCC units, the EPA should clarify the use of heat input and generation output terminology to account for (1) differences between coal-based (gasifier feedstock -based) and syngas-based heat input; and (2) differences between syngas-based and natural gas-based output during co-firing operations.

Response to Comments 4 - 5: In the final rule, we have clarified that emission standards for IGCC units are based on the heat-input to the combustion turbine (i.e., the energy content of synthetic gas exiting the gasifier) and the gross megawatts generated by the combined cycle system. The emissions data submitted for Polk Power Station's IGCC unit were converted to the same basis as submitted for the Wabash IGCC unit and the MACT floor emission rates were re-calculated. Thus, in the final rule, we established the existing source MACT floors for IGCC units in a similar manner as for other EGU subcategories.

Comment 6: Commenter 17881 asks why there is a run time different than the run time for existing units firing coals > 8300 Btu/lb when the PM emission limit is identical in Table 2 – Emission Limits for Existing EGUs For Coal < 8300 Btu/lb, Total PM? IGCC units – and states that there seems to be a mismatch between the lb/MMBtu and lb/MWh emission limits for total PM, a few of the metals, and HCl (i.e., back calculated heat rate of 6,000 Btu/kWh vs. an expected value of about 10,000 Btu/kWh).

Response to Comment 6: The final rule requires the same sample volume per run for both of these subcategories. The differences in heat rates apparent in the proposed standards for IGCC units were due to different heat rate calculation methods used by the two IGCC operators affected by the rule. This discrepancy has been addressed in the promulgated rule by using the syngas heating value as the basis for heat rate calculations. The agency has reviewed the run durations mentioned by the commenter, and the rule now has the same duration as for the coal-fired filterable PM categories. Other emissions limits in the rule were reviewed and adjusted where appropriate.

4B04 - MACT Floor Results: Existing Oil - Liquid (Proposed)

Commenters: 17620, 17690, 17711, 17725, 17803, 17808, 17870, 17880, 17928, 18020, 18024, 18025, 18026, 18433, 18477, 18502, 18023

1. Establish Hg-specific cap instead of metals plus Hg.

Comment 1: Commenter 17620 recommends that the EPA establish a Hg-specific cap of 0.4 - 0.6 lb/TBtu as an alternative for the "metals plus Hg limit." The proposed regulation for a "metals plus Hg" limit of 30 lb/TBtu that sources could choose to meet in lieu of the Hg-specific floor is reasonable for only few EGUs. However, there are several gross emitters of Hg in the EPA's data set for oil-fired units that currently emit in the range of 50 to 90 lb/TBtu. There is no reason why a handful of oil-fired units should be permitted to emit Hg at levels that exceed emissions of coal-fired units.

Response to Comment 1: The EPA proposed, and is finalizing, alternate individual metal HAP emission limits, including mercury, for liquid oil-fired EGUS should companies wish to use that approach.

2. Decrease nickel floor.

Comment 2: Commenter 17620 states that the appropriate floor for nickel should be no higher than the 90th percentile UPL of 4.62 lb/TBtu. The EPA's "metals plus Hg" option would allow oil-fired units to comply with a 30 lb/TBtu limit, which may allow nickel emissions in the range of two to three times the proposed limit. The emissions of nickel should either be excluded from the metals plus Hg option or capped within that limit at the 4.62 lb/TBtu level.

Response to Comment 2: The EPA is not adopting the approach suggested by the commenter and we maintain that the final standards are established consistent with the statute.

Comment 3: Commenter 18502 cites review of the EPA's docket regarding the rulemaking process for subpart UUUUU, and concludes that the EPA's primary concern associated with HAP emissions from oil-fired boilers was nickel, specifically nickel subsulfide. The EPA has concluded in other rulemaking (e.g., the background documents supporting 40 CFR 264, Subpart H-Hazardous Waste Burned in Boilers and Industrial Furnaces) that nickel subsulfide is formed only in reducing (oxygen deficient) environment and is not formed in oxidizing environment associated with fuel combustion. Commenter recommends re-examination of the reasonableness of controlling emissions from oil-fired boilers, since nickel subsulfide is not present in the exhaust gases.

Response to Comment 3: Comments related to the appropriate and necessary finding, including that for nickel, are addressed elsewhere in this document. We would note that the form of nickel being emitted is immaterial as the HAP listed in CAA section 112(b) is "compounds of nickel" which would include all compounds, not just nickel subsulfide.

3. Need exemption from rule.

Comment 4: Commenter 17690 recommends that the EPA establish an exemption for units that burn oil for reliability reasons. The commenter suggests a series of changes to the Utility MACT rule that will

allow owners of these critical units to comply with the rule without the addition of expensive control technologies.

Response to Comment 4: In the final rule, the EPA is establishing a low capacity-factor oil subcategory for units that are utilized for less than 5% of their capacity factor. Units in this subcategory will be required to comply with CAA section 112(h) work practice standards.

4. Opposition to total HAP metals standard for oil-fired EGUs.

Comment 5: Commenter 17803 states that the current proposed standard for total HAP metals (0.000030 lb/MMBtu) was calculated based on seven units, most of which were burning distillate fuel oil during ICR testing. The EPA has proposed a standard that is not reflective of the residual oil-fired subcategory and not achievable by 99% of the units in this category.

Comment 6: Several commenters (17725, 17808, 17928) state that the distillate oil-fired EGUs represent more than 70% of the units in the MACT floor used to calculate the proposed standard. The distillate oil-fired EGUs represent less than five percent of oil-fired EGUs within the liquid oil subcategory nationwide.

Comment 7: Commenter 18502 states that use of distillate oil to define the MACT floor for residual oil boilers will effectively eliminate the use of oil in many existing boilers. Recalculation of the MACT floor for total metals using data from residual fuel oil fired units only yields values about five times the values determined using all of the oil fired units.

Comment 8: Commenter 18026 recommends that the EPA reevaluate the decision to include distillate oil-fired EGUs in the Utility Toxics Rule and recalculate the total HAP metals standard for oil-fired generating units based on all existing oil-fired EGUs. The ICR data set is biased toward very low emitting units, burning a distinctly different fuel type (distillate fuel oil). If the EPA concludes that this is not a viable option, the commenter recommends, at a minimum, that the EPA subcategorize between residual and distillate oil-fired EGUs. Distillate oil-fired EGUs represent more than 70% of the units in the MACT floor used to calculate the proposed standard. In contrast, nationwide, distillate oil-fired EGUs represent less than 5% of oil-fired EGUs within the liquid oil subcategory.

Comment 9: Commenter 17621 states that distillate (No. 2) oil and residual (No. 6) oil differ significantly in their emissions of trace metals.

Response to Comments 5 - 9: We disagree with the commenters. The MACT floor for the oil-fired units subcategories is based on distillate oil-fired EGUs with no controls and residual oil-fired EGUs with an ESP. Thus, these units have similar emissions, and, thus, we believe it is reasonable to keep these similar types of units in the same subcategory. Sources that are not complying with the final standard will have a compliance choice of installing an ESP or switching to distillate oil. As explained elsewhere, we must regulate distillate oil-fired EGUs in this final rule because the 2000 listing was not limited to a particular type of oil-fired EGUs.

5. Need revisions to HCl and HF standards for oil-fired EGUs.

Comment 10: Commenter 17808 states that there are no installed or demonstrated control technologies for limiting HCl and HF emissions from liquid oil-fired EGUs, as there are for the other HAP regulated under the proposed rule.

Comment 11: Commenter 17870 states that requiring oil-fired units to install controls for acid gases would incur substantial unnecessary cost without a demonstrable environmental benefit based on the risk.

Comment 12: Commenters 17711 and 17870 state that no oil-fired units are intentionally controlling HCl or other acid gases. HCl emissions seem to be dependent on both inherent chlorine (which may be correlated with sulfur content) and HF for liquid oil-fired EGUs. There are no installed or demonstrated control technologies for limiting HCl and HF emissions from liquid oil-fired EGUs, as there are for the other HAP regulated under the proposed rule. Table 3 of the docket entry EPA-HQ-OAR-2009-0234 illustrates that the vast majority of the oil-fired boilers that participated in the ICR testing would emit HCl at levels well below the major source threshold of 10 tons per year for any individual HAP - particularly for low to intermediate utilization rates common among residual oil-fired boilers. The wide variability in the chloride concentrations in fuel oil (combined with the lack of control technologies for limiting HCl emissions) suggests that the EPA's variability adjustment may not result in a standard that would be achievable by the units that were included in the calculation of the MACT floor for liquid oil-fired EGUs. Therefore, the commenter recommends the EPA sets a percent water content limit for fuel oil at a level of 1.0 percent, rather than setting HCl and HF emissions limits.

Comment 13: Commenters 17803 and 18502 state that the HCl emissions during the ICR testing varied by a factor of 20 due to the variability in fuel oil chlorine content (even though they are subject to the same fuel specification) and the presence of chlorine in ambient air used for combustion. The proposed HCl limit for existing units is below the detection limit of chlorine in residual oil. As a result, it is not possible to assure compliance with the proposed HCl emission limit by establishing a stringent fuel specification because the supplier is not able to accurately measure the chlorine content of residual oil. The reason for the variations in fuel oil chorine content is uncertain, but may be due to contamination by sea water or chlorinated city water that was used for tanker ballast or for cleaning oil storage tanks. It appears that the only option for achieving continuous compliance with the proposed emission limit would be to install a wet scrubber, even though there are no oil-fired units in the U.S. that use this technology to reduce HCI emissions.

Comment 14: Commenter 18025 states that the proposed standards for HCl and HF were calculated based on seven units. With the exception of Jefferies 2, all of the liquid oil-fired EGUs report low concentrations of HCl emissions.

Comment 15: Commenter 18433 states that neither chloride nor fluoride emissions were measured during the ICR testing. An estimate of the chloride and fluoride emissions can be derived from the AP-42 emission estimates as reflected in the permit application for the Cabras power plant. The estimate is 0.0014 for chlorides and 0.00015 for fluorides. That means that 78 percent control of chloride emissions may also be required and no control of fluoride emissions would be required.

Response to Comments 10 - 15: The EPA is retaining the HCl and HF limits for oil-fired EGUs in the final rule. We agree that oil-fired units HCl and HF emissions are primarily due to water content in the oil; therefore, we are providing an alternative compliance demonstration method that allows source to test the water content of the oil and if the content is less than one percent the unit is not required to test

for HCl and HF emissions. EGUs whose fuel moisture exceeds one percent will be required to use HCl or HF CEMS or to conduct quarterly emissions testing, provided their annual capacity factor is 5 or more percent. We believe this alternative compliance assurance measure will adequately address the commenters concerns.

6. Opposition to new controls on a subcategory.

Comment 16: Several commenters (18023, 17711, 17725) state that the EPA should explain how an existing unit MACT floor can impose new controls on a subcategory of sources that have never utilized such controls before. The EPA should also address the potential economic impact of imposing such controls on oil-fired units, which the preamble omits entirely.

Comment 17: Commenter 18024 states that there is no commercially available oil that meets specifications that would enable a source to confidently and continuously comply with all MACT Floor limits. An affected facility has no practical control alternative or operational method to ensure compliance with the proposed EGU MACT limits.

Comment 18: Commenter 18025 states that the units ultimately selected for ICR testing unintentionally represented the best performing oil units as a whole, and thus, setting a MACT floor based on a subset of the best performing units creates an unachievable standard. The total HAP metals standard as proposed is not currently achieved in practice by efficient units with effective ESPs, as indicated in the ICR data. There are no installed or demonstrated control technologies for limiting HCl and HF emissions from liquid oil-fired EGUs, as there are for the other HAP regulated under the proposed rule.

Comment 19: Commenter 18433 states that when compared with the proposed MACT standard for oil-fired units, metals emissions would have to be controlled by 96.5% for Cabras Unit 1. The Hg emissions are more than 10,000 times smaller than the most stringent proposed emission limit for coal-fired EGU's.

Comment 20: Commenter 18433 states that the suggested method of controlling PM emissions from oil-fired units is ESP because the PM is generally too "sticky" from organic content to be collected reliably in fabric filters due to plugging the pore holes in the bags.

Response to Comment 16 - 20: Commenters appears to assert that section 112 technology based standards cannot be valid if they require sources to install controls where units generally do not have controls. Commenters are wrong. The EPA is required to establish MACT floors based on available data, and the HAP content of the material inputs may be different such that the resultant standard requires controls for sources where in the past none were used. The D.C. Circuit stated that "'[t]he Clean Air Act requires the EPA to set MACT floors based upon the "average emissions limitation[s] achieved"; it nowhere suggests that this achievement must be the product of a specific intent.' 233 F.3d at 640 (citation omitted). The EPA's decision to base floors exclusively on technology even though non-technology factors affect emission levels thus violates the Act." *Sierra Club v. EPA*, 479 F.3d 875, 833 (D.C. Cir. 2007), quoting *National Lime Association v. EPA*, 233 F.3d 625, 640 (D.C. Cir. 2000). In addition, section 112(d)(2) requires the EPA to consider beyond-the-floor levels of control and EPA could clearly require controls it deemed achievable after considering costs and non-air quality health and environmental impacts.

In this case, however, commenters are also factually wrong because there are oil-fired EGUs with controls in place. We also disagree with the commenter that suggested we targeted the best controlled oil-fired EGUs, as explained in the ICR supporting statement. We address the remainder of the comments elsewhere.

7. Support emissions limitations.

Comment 21: Commenter 17880 supports the emission limitations of existing liquid-fired EGUs to be limited to 0.0003 lb/MWh for total HAP metals, 0.003 lb/MWh for HCl, and 0.002 lb/MWh for HF. New EGUs would be limited to 0.0004 lb/MWh for total HAP, 0.0005 lb/MWh for HCl, and 0.0005 lb/MWh of HF.

Response to Comment 21: The EPA appreciates the commenter's support.

8. Establish work practice standards for non-continental oil-fired EGUs.

Comment 22: Commenter 18477 states that in *Sierra Club v. EPA*, 551 F.3d 1019, 1027-28 (D.C. Cir. 2008), the U.S. Court of Appeals confirmed that 40 CFR section 112 must be read in light of 40 CFR section 302(k). The CAA specifically recognizes that numeric emissions standards are not feasible where "hazardous air pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State or local law."

Comment 23: Commenter 18477 recommends that the EPA finalize work practice standards for non-continental liquid oil-fired units that are similar to the work practice standards proposed for organic HAP, but with less frequent inspections and tune-ups. The 12 to 18 month inspections and annual tune-ups would impose unnecessary logistical and economic burdens on non-continental units. Commenter recommends the EPA conduct inspections every three to five years to better correspond to planned outage schedules.

9. Establish annual source testing requirement for non-continental EGUs.

Comment 24: Commenter 18477 states that the EPA needs to establish annual source testing requirements for non-continental units. Non-continental EGUs pay disproportionately higher costs for source testing and face significant logistical challenges to conduct source testing. An annual source test requirement (as opposed to the proposed bi-monthly or monthly requirements) would make the challenge of compliance monitoring and the associated costs substantially more manageable.

Response to Comments 22 - 24: The EPA is not establishing work practice standards or annual testing requirements for non-continental oil-fired EGUs, but we are subcategorizing such units in the final rule. We do not believe work practices or annual limits are justified for this subcategory because these units are often base load units and similar units are controlling their PM emissions with an ESP. There is no evidence in the record that emissions from non-continental oil-fired EGUs are not emitted through a stack just like other oil-fired EGUs, and use of a stack or control device on such units is not inconsistent with any law. Further, the final rule now offers simplified compliance demonstration procedures for acid gas emissions limits for units whose fuel moisture does not exceed one percent. Owners or operators of non-continental EGUs whose fuel moisture exceeds one percent will be required to choose from among a number of compliance assurance techniques, including use of CEMS or quarterly emissions testing.

The EPA generally agrees with the commenter and has modified the period of the work practice standards for inspections and tune-ups on a schedule that is more likely to coincide with planned major outages.

10. Establish filterable PM standard as a surrogate for total HAP metals.

Comment 25: Commenter 18477 recommends that the EPA establish a filterable PM standard as a surrogate for non-Hg metallic HAP for liquid oil-fired EGUs. EPRI analyzed the correlation between PM and HAP metals and concluded that there is a statistically significant correlation between filterable PM and total HAP metals and between filterable PM and nickel emissions. The filterable PM standard has the potential to greatly simplify the proposed monitoring requirements and reduce the costs associated with ongoing EGU MACT compliance. The commenter supports the proposed rule for total metals or individual metals as surrogates for non- Hg metals. The U.S. Court of Appeals for the D.C. Circuit upheld the agency's authority to use PM as a surrogate for HAP metals in *National Lime Association vs. The EPA*, 233 F.3d 625 (D.C. Cir. 2000). In *National Lime*, considering whether the agency may use PM as a surrogate for metal HAP, the Court held that the EPA "may use a surrogate to regulate hazardous pollutants if it is 'reasonable' to do so**."** ***Id. at 637.***

Comment 26: Commenter 18025 recommends that the EPA consider setting a PM limit for liquid oil-fired EGUs to control total HAP metals. Units equipped with ESPs for PM control generally have the lowest reported total HAP metals emission rates. This suggests that a PM limit would be a reasonable surrogate for total HAP metals for oil-fired EGUs. Liquid oil-fired EGUs would have the option of complying with a PM limit, a total HAP metals limit, or individual HAP metal limits.

Response to Comments 25 - 26: The agency has reviewed the data and the commenters' concerns, and the rule now contains an alternative filterable PM emissions limit for liquid oil-fired EGUs.

11. Doubts regarding validity of ICR test data.

Comment 27: Commenter 18502 states that the four boilers listed as burning No. 2 distillate have not been commercially operated for a number of years and are maintained solely as emergency backup units. These units are operated less than 1% of the time. The commenter does not believe that these boilers should have been included in the MACT floor analysis. Furthermore, the EPA should not have included the two Eagle Valley units in the data base as separate observations, since they are based on the same test data and are not independent measurements. Inclusion of the same data set twice in the statistical analysis violates the need for independent observations in determining the mean and standard deviation of the data.

Commenter 18502 further states that the reported HCl measurement at the East River EGU is an order-of-magnitude lower in concentration than the second lowest reported value, is an "outlier," and should not be used in any MACT floor analysis. East River is reportedly burning No.6 residual oil and is not equipped with emission control equipment.

Response to Comment 27: Partly based on comments received, the EPA checked with every liquid oil-fired EGU for which testing had been required to confirm the type of oil burned during the testing. Many EGUs had reported, in separate sections of the ERT, that they burned both types of oil. Based on the information received, we reassessed the MACT floor limits. Further, as noted elsewhere in this document, we are establishing a limited-use liquid oil-fired EGU subcategory for units. We discuss

elsewhere in this document comments related to use of data from common-stack installations and the statistical outlier analyses performed.

Comment 28: Commenter 17690 states that the ICR data used in this analysis are not sufficiently accurate and precise to meet two conditions necessary to demonstrate an "achievable" MACT limit. The first condition is to show a positive correlation between parameter fuel content and parameter stack emission rate and the second condition is to demonstrate that the observed data indicate that the derived limit could be achieved. Because the majority of parameters do not have a positive relationship between fuel and stack concentration measurements and those that meet that criterion have a large fraction of results that could not meet the MACT limit using a fuel specification, the proposed standards do not reflect the maximum degree of reduction in the HAP emissions that is achievable.

Comment 29: Commenter 18502 states that the reported concentrations in lb/MMBtu of metals and acid gas constituents in the fuel are 1 to 3 orders-of-magnitude higher than in the stack gas, even on units that do not have emission control technology.

Response to Comments 28 - 29: The agency reviewed the data and the commenters' concerns, and the agency finds the ICR data to be acceptable. Owners or operators were required to obtain, submit, and certify the data as being accurate and complete, so the agency has no ability or need to revise the data. Rather, if an owner or operator believed his or her submitted data were in error, he or she should have taken steps to correct the erroneous data. As mentioned elsewhere in this document, the agency believes its procedures for determining the emissions floor and emissions limits remain appropriate.

4B05 - MACT Floor Results: Existing Oil - Solid (Proposed)

Commenters: 17880, 19536, 19537, 19538

Comment 1: Several commenters (19536, 19537, 19538) state that the EPA has proposed an HCl MACT limit for existing pet coke burning EGUs of 0.0050 lb/MMBtu or 0.080 lb/MW-hr. The proposed rule states the 0.080 limit in terms of lb/GW-hr. Commenters believe this reference to be a mistake. The EPA's pet coke MACT floor spreadsheet indicates a 99th percentile UPL emissions level in terms of lb/MW-hr. Commenters believe the EPA's proposed existing source HCl limit for pet coke is 0.080 lb/MW-hr. These emission limits fail to reflect the existing source MACT floor for pet coke-fired EGUs.

Response to Comment 1: The finalized HCl emission limit for pet coke fired facilities is 0.080 lb/MWh.

Comment 2: Several commenters (19536, 19537, 19538) state that the EPA did not evaluate in any meaningful way control technologies or methodologies that would enable units to achieve HCl emission reductions beyond the EPA's proposed HCl and SO_2 floor emissions rates for pet coke-fired EGUs. The EPA's justification was that they could not identify any control technologies that could achieve greater emission reductions of HAP than the control technologies they expected to be used to meet MACT. However, the EPA has not adequately demonstrated that there are no beyond-the-floor control techniques or methodologies that could be implemented to further reduce acid gases to the maximum achievable level.

The existing source HCl MACT floor determination includes units that don't have the top acid gas controls. For example, the Manitowoc and Hanford EGUs in the existing source MACT floor determination are fluidized bed boilers without any add-on SO_2/acid gas controls, in comparison to the Northside units which are fluidized bed units and have dry scrubbers. Thus, the existing source MACT floor determination does not reflect the available acid gas controls for pet coke-fired units.

Beyond-the-floor technologies for acid gas HAP at coal-fired EGUs can be applied to pet coke-fired EGUs. The EPA must evaluate beyond-the-floor technologies for acid gases at pet coke-fired EGUs and ensure that its proposed MACT standards truly reflect the maximum degree of acid gas HAP emission reduction that is achievable at these units.

Response to Comment 2: The EPA believes that it followed statutory guidance in setting all limits specified in the final rule.

Comment 3: Several commenters (19536, 19537, 19538) state that the EPA rounded up its HCl MACT floor determination from the 99th percentile UPL emission rate. Specifically, the EPA determined the 99th percentile UPL from the top 5 pet coke-fired EGUs with the lowest HCl emissions to be 4.0628 x 10-3 lb/MMBtu. Yet, the EPA has proposed an HCl limit for existing sources of 5.0 x 10-3 lb/MMBtu, a limit that is 23% higher than EPA's 99th percentile UPL value. The EPA has not provided any justification for going beyond the 99th percentile UPL in setting the HCl MACT floor for existing pet coke-fired EGUs. The EPA determined the HCl MACT floor in terms of lb/MW-hr to be 0.078803 lb/MW-hr, based on the EPA's determination of the 99th percentile UPL. The limit proposed as MACT is 0.080 lb/MW-hr, which is higher than EPA's 99th percentile UPL emission rate. Commenters state that the EPA has not provided any justification for going beyond the 99th percentile value in its MACT floor determination of HCl.

Response to Comment 3: Comments related to the rounding approach used are addressed elsewhere in the final rule record.

Comment 4: Several commenters (19536, 19537, 19538) state that the EPA has proposed the use of SO_2 as a de facto surrogate for HCl and other acid gases at pet coke burning EGUs with some sort of FGD system. Commenters assert that the EPA has not provided adequate legal or technical justification for its decision to use SO_2 as a surrogate for HCl, HF, HCN, or SeO_2.

Further, commenters state that in determining the SO_2 MACT floor, the EPA re-ranked the data collected for the ten pet coke-fired EGUs not by HCl emissions but by SO_2 emissions. See the EPA spreadsheet titled "floor_analysis_pet coke_031611.xls." The top ranked pet coke-fired unit in the HCl ranking is AES Deepwater, whereas the top ranked unit in the SO_2 ranking is Hanford Unit 1A. AES Deepwater is not even in the top five SO_2 emitters for the pet coke units that the EPA used for its SO_2 MACT floor determination. Further, Hanford Unit 1A is only ranked fourth for HCl emissions among pet coke burning units. This re-ranking of the top performing units and the fact that the top units change when ranked for SO_2 emissions compared to the ranking for HCl emissions adds to the argument that SO_2 is not likely a good surrogate pollutant for HCl or other acid gas HAP at pet coke-fired EGUs.

Response to Comment 4: The EPA does continue to believe that SO_2 is a reasonable alternative emission limit to indicate control of HCl and other acid gases. This has been explained in detail in response to other comments, as well as how emission limits (and alternative emission limits) were determined.

Comment 5: Several commenters (19536, 19537, 19538) state that the EPA should not apply a 99^{th} percentile UPL in setting an SO_2 limit for pet coke fired EGUs. The EPA took the average of its new ranking of the lowest SO_2 emitting units and determined the 99^{th} percentile UPL of that SO_2 data. Specifically, the EPA calculated the average SO_2 emission rate of the lowest SO_2 emitting units to be 0.2113 lb/MMBtu and then determined that the 99^{th} percentile UPL of that data was close to double the average emission rate at 0.39862 lb/MMBtu. Commenters state that the EPA provided no justification for the application of the 99^{th} percentile UPL.

Commenters (19536, 19537, 19538) further state that the EPA's proposed rule would evaluate compliance with the surrogate SO_2 limit based on a 30-day rolling average. Such a long term average adequately accounts for variability in SO_2 emissions. The SO_2 data used by the EPA in ranking the SO_2 emission rates of the pet coke-fired EGUs was based on short term average data. Long term averages are typically at the same level or lower than that measured on a short term basis. And they are less variable; had the EPA run its UPL formula with 30-day average emissions, it would have inflated the limit by far less (indeed, if the EPA wishes to set a limit based on 30-day averages, it must calculate its UPL based on a similar duration of emissions). If the EPA is setting the SO_2 MACT limit based on short term average testing, the 30-day average compliance time provides all of the flexibility needed to reflect the best performing sources under the worst reasonably foreseeable conditions. Given that all pet coke-fired EGUs are required to measure SO_2 with CEMS under requirements of the Acid Rain Program, a 30-day average SO_2 limit will be readily achievable by these sources.

Commenters (19536, 19537, 19538) explain that operators of EGUs routinely use SO_2 CEMS data to guide adjustments to the SO_2 control equipment. This is especially so when the unit has a strict SO_2 limit to meet. For example, if a unit operator sees SO_2 emissions spiking, the concentration of lime or limestone in the scrubber slurry can be increased which in turn increases the removal efficacy of the

scrubber. Plant operators use such methods on a daily basis. Commenters note that a long-term averaging time provides sufficient flexibility to EGU owners/operators to deal with spikes in SO_2 emissions, and thus no adjustments to the SO_2 emission rate considered to be reflective of the lowest HCl emitting units is warranted. Further, an SO_2 MACT limit that is based on an appropriate subset of the lowest HCl emitting units will ensure that the SO_2 controls at each EGU are operated to maximize SO_2 and HCl removal.

Response to Comment 5: The EPA has explained the rationale and methodology that was used in setting emission limits and how variability was included in the final emission limits. The EPA believes that the methodology is consistent with that used in the development of other NESHAP and with statutory requirements.

Comment 6: Several commenters (19536, 19537, 19538) state that the EPA's SO_2 emission rates in terms of pounds per megawatt-hour fail to reflect energy efficient EGUs. The EPA's proposed existing source MACT standard for SO_2 reflects a very poor heat rate and thermal efficiency for new units. Specifically, the proposed 5.0 lb/MW-hr limit reflects an assumed heat rate of 12,543 Btu/kW-hr and a thermal efficiency of 27.2% when compared to the EPA's 99th percentile MACT floor value of 0.39862 lb/MMBtu. This is significantly higher than the annual average of the existing coal-fired EGU fleet average heat rate of the coal-fired EGU fleet of 10,400 Btu/kW-hr. Existing pet coke-fired EGUs should be able to operate at much lower heat rates, in line with coal-fired EGUs, i.e., closer to 10,500 Btu/kW-hr (approximately 33% thermal efficiency). Based on the EPA's floor emission rate of 0.39862 lb/MMBtu, that means the EPA's proposed existing source MACT floor limit should not be any higher than 4.185 lb/MWhr assuming a heat rate of existing pet coke-fired units of 10,500 Btu/kW-hr. Commenters state that the EPA's proposed existing source SO_2 surrogate MACT limits of 5.0 lb/MW-hr and 0.40 lb/MMBtu fail to reflect the MACT floor for pet coke-fired EGUs.

Response to Comment 6: The EPA did not use assumed heat rates when setting emission limits. All emission limits were set using data that was provided to the EPA. Further, the EPA has explained the rationale and methodology that was used in setting emission limits and believes that the methodology is consistent with that used in the development of other NESHAP and with statutory requirements.

Comment 7: Several commenters (19536, 19537, 19538) state that the existing source HCl MACT floor determination also includes units that do not have the top acid gas controls. For example, the Manitowoc and Hanford EGUs in the existing source MACT floor determination are fluidized bed boilers without any add-on SO_2/acid gas controls, in comparison to the Northside units which are fluidized bed units and have dry scrubbers. Thus, the existing source MACT floor determination does not reflect the available acid gas controls for pet coke-fired units.

Commenters suggest that the EPA evaluate beyond-the-floor technologies for acid gases at pet coke-fired EGUs and ensure that its proposed MACT standards truly reflect the maximum degree of acid gas HAP emission reduction that is achievable at these units.

Response to Comment 7: The EPA has explained the rationale and methodology that was used in setting emission limits and believes that the methodology is consistent that used in the development of other NESHAP and with statutory requirements.

Comment 8: Commenter 17880 supports the following emissions limitations: Existing units combusting solid oil-derived fuel be limited to 2.0 lb/MWh for total PM, .080 lb/MWh for HCl, and .0020 lb/GWh for Hg. New units to be limited to .050 lb/MWh for total PM, .00030 lb/MWh for HCl, and .0020 lb/GWh for Hg.

Response to Comment 8: The EPA thanks the commenter for providing the suggested emission limitations. However, the EPA has explained the rationale and methodology that was used in setting emission limits and believes that the methodology is consistent that used in the development of other NESHAP and with statutory requirements.

4B06 - MACT Floor Results: New Coal (>8,300 Btu/lb) (Proposed)

Commenters: 12991, 17626, 17718, 17730, 17775, 17876, 17881, 17912, 18033, 18034, 18449, 18500, 18932

1. Opposition to proposed limits for new coal-fired EGUs.

Comment 1: : Commenters 17881 and 18034 oppose the proposed limits on new coal-fired generation facilities and think that these limits will restrict new coal-fired generation in the U.S. Commenter 18034 further adds that the EPA has set MACT emission limits for new units under CAA section 112(d), but the EPA cannot establish emission limits that cannot be achieved with available technology. The proposed NESHAP is expected to severely impact the reliability of the electrical power system. It is not reasonable for the EPA to claim there is no risk to electrical power reliability from this proposed NESHAP when the proposed rule would prohibit new construction of coal-fired EGUs.

Response to Comment 1: We have revised the new source MACT limits in the final rule based on new data and data corrections. The EPA established the revised new source standards consistent with the CAA and we believe they are achievable, as we have identified at least one existing source that is currently complying with all the new source limits. Thus, we do not believe that construction of new coal-fired generation will be restricted in the U.S. Comments specific to the reliability of the electrical power system are addressed in the preamble and elsewhere in the record.

Comment 2: Commenter 17881 states that proposed EGU MACT limits are different from the emission limits of most of the pollutants recently permitted by the Michigan DEQ.

Response to Comment 2: The EPA established the standards in the final rule consistent with the requirements of CAA section 112(d)(2) and (3) and Court decisions interpreting those provisions. This final rule does not prohibit individual states from mandating more stringent standards for sources in their states, and the existence of different state specific standards does not control the manner in which EPA establishes MACT standards under CAA section 112(d).

Comment 3: Commenter 18449 points out that new EGUs that burn high Btu coal (>8300 Btu/lb) would have emission limits 4000 times lower (in lb/GWh) than plants that burn lower rank coal (<8300 Btu/lb).

Response to Comment 3: We do not understand the point that the commenter is making nor do we know to which HAP the commenter is claiming lower emissions would result from EGUs burning high Btu coal.

Comment 4: Commenter 17626 is confident that the proposed existing unit emission limits for total PM, HCl and Hg based on 30-day rolling averages can be met and reliably measured and monitored, including startup and shutdown periods. Based on information provided in the proposed rule, however, the commenter has severe reservations about the emission limits for new units. Commenter is particularly concerned about the Hg and total PM limitations on new units as these limits may be at levels that approach the “noise” of practical measurement methods which would make the provided systems and their performance impossible to guarantee.

Commenter 17622 states that the new unit limitations would have a major impact on the future of coal generation, and therefore it is critical for these limitations to be correct. The commenter is particularly concerned about the Hg, HCl and total PM limitations on new units as these limits may be at levels that approach the "noise" of practical measurement methods. For this reason, the commenter urges the EPA to verify the following: That the reported performance for the best performing unit that is the basis of the limit is in fact correct. This should be done through thorough reexamination of the test reports and procedures. We urge the EPA to validate the ICR test data using the ASME program ReMap and ASME's 19.1 Test Uncertainty.

Response to Comment 4: We have revised the new source MACT limits in the final rule based on new data and data corrections. The EPA established the revised new source standards consistent with the CAA and we believe they are achievable, as we have identified at least one existing source that is currently complying with all the new source limits. The EPA has also taken into consideration measurement limitations in establishing the final limits and determined that the methodologies are sufficient to demonstrate compliance with the final standards as discussed elsewhere in response to comments. The commenter's concern should be lessened, if not eliminated, because the rule now requires work practice standards, not emissions limits, during periods of startup or shutdown. The agency has adjusted sampling durations in Table 2 to the rule where necessary to ensure the listed test methods can measure the emissions appropriately.

Comment 5: Commenter 18932 states that the CAA requires that the emission standards for new sources "shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source" (i.e., the new source MACT floor). For existing sources, the MACT floor "may be less stringent than standards for new sources . . . but shall not be less stringent and may be more stringent than . . . the average emission limitation achieved by the best performing 12 percent of the existing sources." The D.C. Circuit Court of Appeals has made it clear that for both new and existing sources, the MACT floor standards must reflect "what the best performers actually achieve."

It is axiomatic that establishing the MACT floors requires identifying the best-controlled similar source for new sources and the best performing 12% of existing sources. But the EPA's methodology for identifying the universe of best performing EGUs is fundamentally flawed. The EPA's approach to identifying the best-controlled sources for HCl and total PM is instructive. First, the EPA identified a pool of approximately 245 units for total PM and slightly more than 300 units for HCl for which it had test data. From this pool, the EPA selected the 131 units with the lowest single stack test results and designated them as the best performing 12% of existing EGUs for total PM and HCl. The conceptual flaw in this selection is obvious. It assumes, without evidence or support, that the subset of units for which the EPA gathered test data (i.e., 245 units for PM and around 300 units for HCl) include all of the lowest emitting units for these pollutants. In other words, the EPA excluded from the MACT floor analysis all of the units for which it did not gather test data on the assumption that none of those sources would have qualified as one of the top performing 12%. There is no basis for this assumption.

As a result of this flawed approach, the EPA failed to consider the most recent and representative tests from one of the top performing 12% of existing source EGUs with respect to HCl control performance – Duke Energy's (Duke) Marshall Steam Station Unit 4 – in its MACT floor analysis for existing sources. In March 2009, after installation of a new FGD, Duke conducted HCl stack testing at its Marshall Steam Station Unit 4, testing at both the inlet and outlet of its new FGD absorber, in order to determine HCl removal efficiency across the absorber. Duke conducted the test based on the EPA Method 26, using both glass and teflon fittings. The average of 16 tests at the FGD outlet (or stack) was 8.3E-05

lb/MMBtu.385 But, although Marshall Unit 4 appears in the EPA's analysis of the top 131 EGUs for HCl control (at number 84), the EPA assigned this unit an emissions rate of 2.83E-04 lb/MMBtu, and a calculated removal efficiency of 99.61% based on that emission rate. The EPA did not explain in the record its failure to use the lower HCl emission rate of 8.3E-05 lb/MMBtu.

This omission is significant. Duke has used the March 2009 stack test results, along with pilot testing of a spray dry absorber at Cliffside Unit 5, to argue that its new 800 MW Unit 6 at the Cliffside Steam Station is a minor HAP source that is exempt from the case-by-case MACT requirements of CAA section 112(g). The state permitting authority has accepted Duke's representations and, based on the results of the Marshall Unit 4 stack tests and the Cliffside Unit 5 spray dry absorber pilot test, issued Duke a minor HAP source permit for Cliffside Unit 6. Notably, in the minor source permit, the permitting authority assigned and Duke accepted a minimum HCl removal efficiency requirement of 99.913% in an effort to qualify Unit 6 as a minor source. The EPA at least should evaluate these available data as part of the MACT floor analysis. If nothing else, these data should supplant the obsolete Marshall Unit 4 tests on which the EPA relied in developing the proposed rule. Relying, instead, on older tests with higher emissions rates, would improperly skew the floor upward. The EPA should verify that it is basing its MACT floor analyses on complete and representative data.

Response to Comment 5: The EPA's rationale for the selection of the EGUs to be tested and for its approach with regard to the use of these data in the MACT floor analysis was provided in the proposal preamble and in the Supporting Statements for the 2010 ICR sent to industry to collect data for this rule. Further, the commenter is mistaken in saying that the EPA did not use data from the Duke Marshall facility in the HCl analysis. Data available to the EPA indicates that the new scrubber system on Marshall Unit 4 was installed in October 2006. Duke Energy provided three sets of data from tests conducted on this unit in 2007 as a part of their 2010 ICR submittal, in addition to a required data set obtained in 2010. These data are in the MACT floor pool. We, therefore, disagree with the commenter that we incorrectly processed that data from the Duke Marshall facility. We have reevaluated the data partly based on comments and do not agree with commenter that we erred in establishing either the existing or new source HCl standards.

Comment 6: Commenter 17730 states that it is unlikely that new units, even if equipped with sorbent injection, will be capable of routinely achieving the proposed new unit standard of 0.0002 lb/GWh. The proposed Hg emission standard for new units of 0.0002 lb/GWh or the approximate equivalent of 0.021 lb/TBtu is an extremely stringent emission limit that will likely prevent the future development of any new coal-fired electricity generation in the U.S. The commenter supports the separate submittal by the UARG challenging the ability to continuously measure Hg at this level, which equates to about 0.25 mg of Hg /Nm3 of flue gas. These proposed limits are generally judged by industry to be unattainable and would result in persistent noncompliance by any source that pursued construction of a new unit. Further, comments submitted by EPRI on this matter demonstrate that the continuous Hg monitoring equipment that is available today from either Tekran or Thermo Scientific is incapable of accurately measuring Hg emissions at the new unit level for coal-fired electric generating units. The emission standards for new units are infeasible and should be revised.

Commenter 18500 states that the EPA analysis did not account for the fact that no single unit has demonstrated the ability to meet all the proposed MACT standards for new coal units. This indicates that no new coal units could be built that could actually meet all of the EPA's proposed MACT standards for new coal units.

Comment 7: Commenter 17621 states that based on the commenter's review of the ICR data, none of the coal-fired EGUs that reported data to the EPA for total PM, Hg, and HCl (or the alternative acid gas surrogate, SO_2) would consistently meet all three new unit MACT limits. Only two EGUs had lowest test series average below each of the new unit limits. However, both of these units reported multiple test series; when those test series are included, the average of all the data is greater than the new unit limit. In addition, neither of these two units is typical of the broader U.S. coal-fired power industry: one is a stoker boiler and the second fires a waste coal.

In detail, the commenter's review of the ICR Part II and III test data indicated that 115 EGUs reported measurements for all three of the regulated parameters (Hg, HCl, and total PM). Using the lowest test series average for comparison, only 6 of the 115 EGUs would meet the new unit HCl limit, 10 would meet the Hg limit, and 46 would meet the total PM limit. Only 2 of the 115 (Seward Unit 1 and Spruance Generator 2) would meet the new unit MACT limits for Hg, HCl, and total PM, using the lowest test series average. However, both Seward and Spruance reported additional Hg measurements; the average of all the measurements is above the new unit limit. Thus, both Seward and Spruance likely would not consistently meet the new unit limit for Hg. Spruance also reported an HCl value above the new unit limit.

Comment 8: Commenter 17621 states that, as noted in a previous comment, using the lowest test series average for comparison, only 6 of the 115 EGUs would meet the new unit HCl limit, 10 would meet the Hg limit, and 46 would meet the total PM limit. The commenter further evaluated the additional measurements reported and whether these EGUs likely would consistently meet the new unit limits. This analysis was limited to HCl and Hg, as additional data for total PM were not available for evaluation. Of the 6 EGUs that would meet the new unit HCl limit, 4 EGUs have additional measurements above the limit, so would not consistently meet the new unit limit. The remaining 2 EGUs— Spruance Generators 2 and 3—would meet the new unit limit using the lowest test series average, but their sister unit, Spruance Generator 4, would not meet the limit. For Hg, 3 of the 10 EGUs have additional measurements that have values above the limit, and thus would not consistently meet the new unit limit. The remaining 7 EGUs do not have a second measurement for comparison.

Response to Comments 6 - 8: The EPA believes that the final limits are achievable and have been established consistent with both the statute and recent Court decisions. Further, based on the data available to the agency, at least one EGU in the data set (Logan Generating Plant Unit 1) is able to meet all of the new-source limits in the final rule. Based on the data available to the agency, there are 24 EGUs that are able to meet the new-source Hg limit; 8 EGUs that are able to meet the new-source HCl limit; and 12 EGUs that are able to meet the new-source PM limit. In addition, the EPA has taken into consideration measurement capabilities in establishing the final limits and we maintain the measurement methodologies are sufficient to demonstrate compliance with the standards in the final rule. Companies have available to them options with regard to monitoring their emissions; should an owner or operator find mercury CEMS do not provide necessary compliance assurance, he/she could choose to employ sorbent traps or quarterly emissions testing to meet compliance requirements.

2. Opposition to proposed Hg emission limits.

Comment 9: Commenter 17718 states that the proposed Hg emission limits for new sources are extremely stringent. The proposed limits may effectively preclude permitting of new coal-fired units. A new facility with extensive control technology measures would find it virtually impossible to meet the proposed Hg limit for new sources on a consistent basis. The proposed Hg limit could possibly be met

by a limited number of new facilities whose owners might identify atypical coal seams meeting highly specific fuel box parameters compatible with control efficiencies of current technologies. However, such atypical coal supplies would be unavailable to the vast majority of new facilities. Consequently, from a practical standpoint, the proposed Hg limit is unachievable on an industry-wide basis.

Commenter 18033 states that the EPA proposed a Hg standard for new sources of 0.00001 lb/MWh rather than 0.00001 lb/GWh. The standard appears to be three orders of magnitude more stringent than the standard for existing plants and would require greater than 99 percent total Hg removal at all new coal-fired plants. This proposed standard is also below the detection limit of CEMS instrumentation.

Response to Comment 9: The EPA believes that the final limits are achievable and have been established consistent with both the statute and recent Court decisions. Further, based on the data available to the agency, at least one EGU in the data set (Logan Generating Plant Unit 1) is able to meet all of the new-source limits in the final rule.

Comment 10: Commenter 12991 states that the MACT floor for new coal-fired units (NSPS) is intended to represent the emission rate of the best-performing similar source. In its May 18, 2010 data revision, the EPA identified the 20-year-old Nucla plant as the best-performing U.S. electric generating unit with the lowest Hg emissions. Like most other fluidized-bed combustion units equipped with fabric filters the Nucla plant has a low Hg emission rate. However, besides the fluidized-bed, fabric-filter technology, the low Hg emission rate for the Nucla plant is also due its unusual coal feedstock. The Nucla plant burns coal from the Dakota Formation that is locally produced by the New Horizon mine.

Notably, this coal contains about 50% inertinite, whereas most U.S. coal contains less than 15% inertinite and rarely more than 30%. Inertinite is more difficult to burn than other materials and consequently increases the amount of unburned carbon in fly ash and promotes Hg capture. Given this unusual feedstock, the Nucla plant Hg emission rate would likely be higher if it were to burn any other U.S. coal. Indeed, the Hg emission rate from the newly built Spurlock Unit 4 is probably a better measure of what can be achieved with fluidized-bed, fabric-filter technology when burning virgin U.S. coal.

Response to Comment 10: The EPA has reassessed all of the MACT floor analyses partly based on comments received. The commenter's assertion about the Nucla EGU is moot given that, upon reassessment of the MACT floor data sets, this EGU was not the best performing unit. The basis for the new-source Hg limit is a bituminous-fired PC EGU. The EPA believes that this EGU is typical of what a new EGU could look like both in firing type and control technology utilized. Thus, the EPA believes it is an appropriate "similar source." *See* CAA section 112(d)(3). However, had Nucla remained the best performing unit, the EPA would have used it as the basis for the new-source MACT limits because there are existing CFB EGUs as large as 300 MW and CFB units are among the newest EGUs constructed in the U.S. indicating that they do represent one type of EGU that the utility industry will construct in the future. Comments on the subcategorization of FBC units are discussed elsewhere in this document.

Comment 11: Commenter 17621 believes that the EPA's decision to calculate the MACT limit for Hg from coal-fired units greater than or equal to 8,300 BTUs based on only 40 EGUs was an artifact of the Hg errors that the EPA later corrected in the supporting documentation on May 18, 2011. The appropriate procedure, in the commenter's opinion, is to calculate the MACT floor based on 12% of all units in this category, as the EPA did for the HAP limits for HCl and PM. Thus, the number of EGUs in the Hg MACT floor pool should be 127 rather than 40.

Response to Comment 11: We do not agree with the commenter as explained in response to other comments on this issue.

3. Opposition to proposed PM emission limits.

Comment 12: Commenter 17718 states that the proposed PM emission limits for new sources are extremely stringent. There is serious question as to whether a new facility with even the extensive emission control technology measures could comply with the proposed total PM limit on a consistent basis. Due to the levels of sulfur, chlorine, and Hg typically found in most coals, it would generally be necessary to achieve emission control efficiencies in the range of 99.6% to 99.99% or greater in order to assure continuous compliance with the proposed limits. Establishing standards applicable to PC boilers based on levels achieved at FBC units is entirely inappropriate. FBC units and PC boilers employee such significantly different combustion processes that they should be in separate categories.

Comment 13: Commenter 17912 states that the total PM emission standard of 0.050 lb/MWh is based on a computational error. In deriving the limit, the EPA mistakenly assumed that each AES Hawaii unit has a capacity of 180 MW when, in fact, the capacity of the two-unit plant is a total of 180 MW. Applying the correct heat rate, the total particulate emission rate from the AES Hawaii Unit 1 test results would be at least 0.10 lb/ MWh. Also, the total PM standard that the EPA proposed would be much higher, because many of the other "low emitting units" in the data base lack wet scrubbers. Compliance with these emission limits cannot be achieved without the use of a baghouse or ESP and a wet scrubber.

Comment 14: Commenter 17912 states that the proposed EGU MACT also establishes a single total PM standard for new units, expressed in pounds per megawatt-hour, for all coals with heat content greater than 8,300 Btu per pound. This ignores the fact that not all coals have the same heat content. For subbituminous coal with a heat content of 8,400 Btu/pound and a higher ash content than a bituminous coal with a heat content of more than 11,000 Btu/pound and a lower ash content per Btu, the output-based standard penalizes the coal that has a lower chlorine content and hence will generate fewer HCl emissions that must be controlled by costly pollution control devices. By the same token, the subbituminous coal, with its lower chlorine content, may be more difficult to control when considering the removal of Hg emissions.

Comment 15: Commenter 18034 states that the EGU that the EPA used to establish the new unit PM surrogate emission limit is only equipped with fabric filters for PM control; however, the EPA indicates that a wet ESP in combination with DSI represents best demonstrated technology (76 FR 25060). The EPA indicates that fabric filters and FGD represent the existing baseline of control for condensable PM under the NSPS rule. It is counter intuitive that the EPA establish the PM surrogate emission limit under the proposed NESHAP rule to only have what the EPA characterizes as existing baseline control technology for the current NSPS rule and not have the control technology that the EPA describes as BDT for the NSPS rule. This contradictory outcome indicates that other factors such as unit design or fuel type affect the total PM emissions from coal-fired EGUs and that the EPA needs to subcategorize coal-fired EGUs further.

Response to Comments 12 - 15: The EPA believes that the final limits are achievable and have been established consistent with both the statute and recent Court decisions. Further, based on the data available to the agency, at least one EGU in the data set is able to meet all of the new-source limits in the final rule. The EPA has reassessed all of the MACT floor analyses partly based on comments received. The basis for the new-source filterable PM limit is now a bituminous-fired PC EGU, rather

than a FBC unit as at proposal. The EPA believes that this EGU is typical of what a new EGU could look like both in firing type and control technology utilized. Thus, the EPA believes it is an appropriate "similar source." However, even absent the reassessment and re-ranking of the data, should an FBC unit have remained as the best-performing source, the EPA would have selected it as the basis for the new-source limits based on the determination that subcategorization of FBC units is not warranted as discussed elsewhere in this document.

Comment 16: Commenter 17775 states that the new source limit for total PM is based on a unit that is not a best controlled "similar source"- AES Hawaii Unit 1. AES Hawaii is the only coal-fired unit in Hawaii and has a generating capacity of only 180 MW. The unit burns coal imported from Indonesia. It supplements this fuel by burning old tires, used motor oil, and carbon filters from the local water authority. CAA section 112(d)(3)(A) requires the EPA to set new source limits based on the "the emission control that is achieved in practice by the best performing similar source." There clearly are no other EGUs similar to AES Hawaii in the continental U.S. EPA's choice of this unique unit as the "best performing similar source" again points to the problems caused by trying to meet an unreasonably abbreviated rulemaking schedule.

Response to Comment 16: The EPA has reassessed all of the MACT floor analyses partly based on comments received and revised the data calculations accordingly. Based on the re-ranking of units, the best performing source for PM for the new-source filterable PM limit is a bituminous-fired PC unit rather than an FBC unit as at proposal. The EPA believes that this PC EGU is typical of what a new EGU could look like both in firing type and control technology utilized. Thus, the EPA believes commenter's concerns are moot. However, as noted elsewhere in this document, even absent the reassessment and re-ranking of the data, should an FBC unit have remained as the best-performing source, the EPA would have selected it as the basis for the new source limits based on the determination that subcategorization of FBC units is not warranted as discussed elsewhere in this document.

4. Opposition to proposed metal emission limits.

Comment 17: Commenter 17881 states that the projected emissions for the New Clean Coal Plant do not even come close to being in compliance with the proposed new plant EGU MACT metal emission limitations, with the possible exception of chromium. The EGU MACT rule would effectively eliminate the construction of new coal plants because none could comply with these new emission limits.

Response to Comment 17: The EPA believes that the final limits are achievable and have been established consistent with both the statute and recent Court decisions. Further, based on the data available to the agency, at least one EGU in the data set (Logan Generating Plant Unit 1) is able to meet all of the new-source limits in the final rule. The EPA has reassessed all of the MACT floor analyses partly based on comments received. Companies are not required to select the alternative individual or total metal HAP emission limits in the final rule as their compliance option. Rather, they may select the alternate filterable PM limits. We disagree that the final rule will eliminate the construction of new coal-fired EGUs.

5. Lack of adequate test methodologies.

Comment 18: Commenter 17876 states that without accurate testing methodologies, contractors will not guarantee that potential emission control technologies will meet the proposed standards. Without

accurate test methodologies and vendor guarantees, financing of new facilities will be virtually impossible to secure. This in turn will effectively preclude the construction of new coal-based units.

Response to Comment 18: The EPA believes that the test methodologies and requirements identified in Tables 1 and 2 to subpart UUUUU are available and appropriate and provide accurate results for all of the limits in the final rule. As noted elsewhere, we disagree that the final rule will eliminate the construction of new coal-fired EGUs.

4B07 - MACT Floor Results: New Coal

Commenters: 17696, 17801, 17885, 18426

Comment 1: Commenter 17696 states that the EPA's decision to establish non-Hg trace metal emission limits for EGUs is largely based on analysis of 16 case study facilities, only four of which indicated greater than a one-in-a-million risk of cancer. 76 FR 25016. As with acid gases, the EPA's justification for regulating non-Hg metals is not based on reducing the impacts of such pollutants, but based on the benefits of reducing PM emissions. It is improper and inappropriate for the EPA to credit the EGU NESHAP with such benefits because PM is not –and may not be -- regulated by CAA section 112 but, instead, is directly regulated by other CAA provisions addressing criteria air pollutants. Furthermore, by regulating EGU non-Hg trace metals based on the health benefits of PM reductions, The EPA again improperly overstates and double-counts PM emission reduction benefits. The EPA has not independently justified regulating non-Hg trace metal emissions from EGUs.

Response to Comment 1: As stated elsewhere in the final rule published in the Federal Register and supporting materials, the EPA does not agree with commenter's characterization of the legal and factual basis for the proposed rule or with its assertion that the agency has failed to adequately justify the final rule. Among other things, the commenter notes that the EPA is establishing a PM standard and that such regulation is not proper under CAA section 112. The commenter is incorrect because the EPA correctly established PM as a surrogate pollutant for the non-Hg metal HAP and based the PM limit on the best performing existing source or sources. The EPA also established alternative equivalent standards for total metal HAP and individual metal HAP. The EPA provided these three alternatives so that the regulated industry has compliance alternatives. The EPA also disagrees that the EPA is double counting PM emission reduction, but, in any case, the benefits associated with the final rule do not form the basis for the rule as the commenter seems to suggest.

Comment 2: Commenter 17885 states that the EPA's basis for the proposed Hg MACT of 11.0 lb/TBtu and a beyond the floor limit of 4.0 lb/TBtu is that it "believes" that ACI, installed on units in this subcategory "could' achieve the beyond the floor standard. The EPA's suppositions and belief cannot serve as a rational basis for determining MACT beyond the floor limits. The statutory requirements are clear, the MACT standards must be achieved in practice, and thus the proper limit for this subcategory is 11 lb/TBtu.

Response to Comment 2: The commenter is incorrect in its characterization of the standard setting process under CAA sections 112(d)(2) and (3). Under those provisions, the minimum level of stringency, or the MACT floor, is based on the emission control that is "achieved in practice" by the best controlled similar source for new sources and on "the average emission limitation achieved by the best performing 12 percent of the existing sources" in the category or subcategory for existing sources with 30 or more sources. *See* CAA section 112(d)(3). After determining the MACT floor level of control, the EPA must determine whether a beyond-the-floor level of control is "achievable" after considering costs and non-air quality health and environmental impacts and energy requirements. *See* CAA section 112(d)(2).

In addition to commenter's legal error, we further note that factually the commenter is incorrect. The top-performing EGU in the lignite subcategory is equipped with ACI and the unit is currently meeting the beyond-the-floor limit in the final rule. According to data available to the EPA, at least four other

units are also meeting the existing-source Hg MACT limit for low rank, virgin coal-fired EGUs in the final rule, thus demonstrating that the standard in not only achievable but achieved in practice.

Comment 3: Commenter 18426 states that Michigan's Hg rules for new EGUs do not allow the emission of Hg in excess of the maximum allowable emission rate based on the application of best available control technology for Hg. At a minimum, a new EGU shall comply with 90% reduction from input Hg levels on a 12-month rolling average basis or an output-based Hg emission standard of 0.008 lb/GWh on a 12-month rolling average basis. The commenter states that the proposed limit of 0.000010 lb/GWh for new coal-fired units may not be achievable on a reliable basis with the Hg control options available now, and in the foreseeable future based on the information gathered during Michigan's rulemaking process.

Response to Comment 3: The EPA noted in the proposal preamble that it questioned whether a percent reduction format would comply with D.C. Circuit interpretations of CAA section 112, and we also stated that we did not have sufficient data to establish a percent reduction standard even if we believed we had such authority under CAA section 112. The EPA has made a number of corrections to the Hg data partly based on comments and we have revised the standard accordingly. We are finalizing the proposed standard of 0.040 lb/GWh. We believe that the new-source Hg limit in the final rule is achievable for new sources, and, based on data available to the agency, we know of at least five sources that are currently achieving the limit.

Comment 4: Commenter 18034 states that the unit that the EPA used to determine the PM surrogate limit for new coal-fired EGUs is a different unit from those EGUs used to establish the non-Hg metal HAP. Data from the EPA's PM floor analysis spreadsheet indicates that only three of the EGUs used to establish the non-Hg metal HAP limits for new units had total PM emissions data determined using the same PM test methods and all were higher than the single unit used to set the PM emission limit. One of the units (PSEG Mercer Generating Station) that was used to set non-Hg metal HAP limits for chromium and selenium had PM emissions ten times greater than the PM floor limit and more than five times higher than the proposed PM surrogate limit. The EPA's approach to establishing the PM surrogate limit is without any technical merit and is therefore arbitrary and capricious.

Response to Comment 4: In setting the new source emission limit for filterable PM (and for individual metals and total metals which are alternative emission limits), the EPA ranked the top performing unit for filterable PM emissions using the available data from the 2010 ICR. Similarly, the EPA set the alternative emission limits for the individual metals and total metals using the same approach. Differences in the rank order for the best performing filterable PM, individual metals, and total metals can be affected by normal fuel composition and operational variability and in measurement uncertainties at the very low levels achieved by the very best performing units.

Comment 5: Commenter 17817 attaches and quotes a report which states that the proposed HCl standard for new units is 66 times more stringent than the proposed standard for existing units and states "There is no plausible explanation for how a new scrubber can be 66 times more efficient than the average of the best performing 12 percent of existing scrubbers." The commenter considers this to be an example of why subcategorization is necessary, so as to be able to make logical similar source analyses for the purpose of establishing MACT.

Response to Comment 5: The EPA established the new source limit for HCl from coal-fired EGUs based on the best-controlled similar source as required by section 112(d)(3), after accounting for

variability. It stands to reason that the best controlled single source will achieve emissions limitations far in excess of the average emissions limitation achieved by the best performing 131 sources on which the existing source standard was based. We do not agree with the commenter that additional subcategories are warranted and we have established the new source standard for HCl based on an EGU that is similar to a type of unit that would be constructed prospectively as discussed elsewhere in response to other comments.

4B08 - MACT Floor Results: New IGCC (Proposed)

Commenters: 17620, 17621, 17678, 17761, 17775, 17821, 17880, 18498, 19536, 19537, 19538, 18023

Comment 1: Commenter 17621 requests clarification on whether the proposed limit for Hg in new IGCC units should have been revised, as that beyond-the-floor value was based on the limit for new coal EGUs greater than or equal to 8,300 Btu/lb that was reissued by the EPA on May 18, 2011.

Response to Comment 1: As noted elsewhere, the limits for new IGCC EGUs have been adjusted partly based on comments received.

Comment 2: Commenters 17775 and 17821 state that the EPA proposed new source MACT limits for IGCC units based on a beyond-the-floor analysis because the agency believed that HAP emissions data obtained from the two operating IGCC units were "not representative of what a new IGCC unit could achieve." A "beyond the floor" analysis requires the EPA to take into consideration "the cost of achieving such emission reductions, and any non-air quality health and environmental impacts and energy requirements." Yet, the EPA acknowledges that it did not conduct such an analysis before proposing its new source MACT limit for IGCCs: "EPA has no information upon which to base the costs and non-air quality health, environmental, and energy impacts of this proposed approach. The EPA solicits comment on this approach."

Commenters 17775 and 18023 state that the EPA's failure to conduct a proper beyond-the-floor analysis violates the CAA and is yet another example of the shortcuts the EPA took to propose this rule on a rushed rulemaking schedule. The EPA has not presented any information that the proposed new source IGCC limits are achievable. The EPA instead seems to rely on DOE's projections of future IGCC emissions but the emission limits the EPA proposes are actually more stringent than DOE's projections. The proposed Hg limit is 500 times more stringent than the DOE projections (25 times if one looks at the corrected Hg floor for new sources). Although a direct PM comparison cannot be made because the EPA proposed total PM instead of filterable as a surrogate, it is clear the EPA's proposal is more stringent than DOE's projection. For example, if half of the EPA's total PM is filterable and half is condensable, then the EPA's filterable PM limit is more than 2.5 times more stringent than DOE projects. Moreover, IGCC processes are inherently different from other methods of coal-based electric generation. Any proposed standards must address the unique characteristics of IGCC processes. Issues the EPA must examine to properly consider the design and operational characteristics of IGCC include: operating scenarios in which the IGCC units (combustion turbines and duct burner) are combusting different fuels or a combination of fuels such as natural gas, coal or other carbonaceous compound (petcoke, biomass, municipal solid waste, etc.) derived syngas, and/or syngas produced off-site; the applicability of the proposed work practice and fuel sampling provisions as they relate to the design and operation of IGCC units; and the use of heat input and generation output terminology specific to IGCC units.

Response to Comment 2: As noted by commenters, the EPA had insufficient information at proposal with which to conduct the required analyses. However, as noted elsewhere, the EPA is revising the limits for new IGCC EGUs.

Comment 3: Commenter 18498 states that there are many serious data quality issues involving a data conversion error in the mercury data. The EPA incorrectly converted Hg emissions for numerous sources under Part II of the ICR. The conversion errors caused the EPA to introduce many values in the

floor analysis that were a factor of 1000 times lower than the actual test results. The EPA appears to have corrected the problem on a revised Hg floor analysis spreadsheet posted on the Air Toxics Standards for Utilities webpage but the fact that such a significant error was overlooked seems to be the effect of a "hastily" proposed rule. Commenter suggests the Agency spend more time reviewing the data prior to preparing the final rule.

Response to Comment 3: The EPA has reassessed the emissions test data and made any necessary corrections in the final data set. We then reassessed the MACT floor analyses for all HAP and maintain that the emission limits in the final rule are consistent with the statutory mandate.

Comment 4: Commenter 17880 states that existing IGCC units would be limited to .30 lb/MWh for total PM, .0030 lb/MWH for HCl, and .020 lb/GWh for Hg. New units would be limited to .050 lb/MWh for total PM, .030 lb/GWh for HCl, and .000010 lb/GWh for Hg.

Response to Comment 4: The commenter has cited proposed limits for new IGCC units. As noted elsewhere, the limits for new IGCC EGUs have been adjusted.

Comment 5: Commenter 17821 disagrees with the EPA's concept of using data from one subcategory to set the standards for another subcategory. The EPA has not presented any information that the proposed new source IGCC limits are achievable or that they should be set at a level equal to the limits for conventional boilers. The EPA's actions are unsupported.

Response to Comment 5: As noted elsewhere, the limits for new IGCC EGUs have been adjusted.

Comment 6: Commenter 17761 supports the implementation of reasonable and scientifically-based Hg emission reduction standards that are established appropriately considering the capabilities of commercially available technology to achieve the required emission levels.

Response to Comment 6: The EPA maintains that it has established standards consistent with the statute and relevant case law.

Comment 7: Commenter 17620 suggests that the use of the 99th percentile UPL is not in the public interest and the treatment of outliers and significant digits in the proposal's calculation process is inappropriate. The commenter recommends the use of their Category 1 Hg MACT floor of 0.4 - 0.6 lb/TBtu because it is supported by more recent data and can provide the basis for a final rule that is more protective of public health more sound legal footing than the current proposal provides. The commenter generally supports the use of output-based emission standards but do not support providing an option to allow existing sources to select a less protective limit. The commenter is also concerned about the quality of existing heat rate data for EGUs and does not feel it is adequate to support development of such standards.

Response to Comment 7: The EPA established the standards in the proposed rule based on the available data as contemplated in CAA section 112(d). We maintain that the standards are reasonable and that the 99th percentile UPL is appropriate to account for variability. The EPA was not able to justify beyond-the-floor levels of control except for the Hg standard applicable to low rank, virgin coal-fired EGUs and the commenter has not indicated how its proposed limit is achievable considering costs and non-air quality health and environmental impacts. Further discussion on these points is provided

elsewhere in the rule record. We have used the data, including heat rate, provided by the companies themselves.

Comment 8: Commenter 17801 suggests that the EPA revise the particulate, SO_2, and NO_X/CO standards for new IGCC EGUs. The EPA proposes total PM as a surrogate for non-Hg metallic HAP. The EPA has chosen a beyond-the-floor MACT limit for total PM for new IGCC units (0.050 lb/MWh) that is neither derived from the IGCC test data obtained from its ICR nor justified from a technology capability assessment specific to IGCC. Relative to the latter point, the EPA cites DOE's 2007 fossil energy study "For example, DOE projects that future IGCC units will be able to meet a PM (filterable) emissions limit of 0.0071 lb/MMBtu…" (0.053lb/MWhr gross output basis also per DOE). DOE also reiterated this expected performance in its 2010 update to its 2007 study. DOE's estimate is also consistent with GE's assessment of IGCC with state of the art particulate control as it will be implemented in future IGCC plants. This performance is based on multiple stages of particulate removal used in IGCC (i.e.,syngas PM scrubbing, sulfur solvent scrubber knockout chamber, final turbine syngas screen and high efficiency turbine inlet air filtration). This level is reliably achievable, reflects the capability of PM control in new IGCC plants, incorporates the variability in day-to-day fuel and operating variation, variability of particulate testing and compares favorably (<50 percent of) with the EPA's 2006 amendments of 0.034lb/MMBtu. Combustion turbines firing syngas are expected to have inherently lower PM emissions than a traditional coal-fired EGU; however, variability and uncertainty of the PM measurement methods as demonstrated in the field result in unreliable measurement results.

Given that the EPA's preferred surrogate for non-Hg metal HAP is filterable particulate, the commenter therefore recommends that the particulate standard for new IGCC EGUs (MACT and NSPS) be set at 0.053 lb/MWhr of filterable PM, or alternatively 0.11 lb/MWhr total PM.

Response to Comment 8: As noted elsewhere, the EPA is revising the limits for new IGCC EGUs.

Comment 9: Commenter 17678 requests that the proposed new MACT floor limit for total PM of 0.050 lb/MWh gross energy output for IGCC units in Table 1 to subpart UUUUU of part 63 be modified to address the two scenarios for duct burners at IGCC plants, syngas-fired and natural-gas-fired. The commenter requests the 0.050 lb/MWh limit be increased to at least 0.068 lb/MWh based on gross energy output from the combined cycle generating unit when operated with duct burners fired with syngas. The 0.068 lb/MWh value is consistent with the calculated emission ceiling for permitted to construct, Texas Clean Energy Project (TCEP) for this operating scenario. The TCEP will be an IGCC plant located in Penwell, Texas. There is not sufficient experience with syngas turbines for manufacturers to guarantee performance in the 0.050 lb/MWh range. The 0.0681b/MWh performance basis proposed, here, was calculated based on the emission guarantees that the commenter was able to obtain for a turbine fired on the syngas expected at TCEP; it is the total PM limit in the TCEP NSR permit. The calculated contributions to the total PM emissions from the turbine, syngas-fired duct burner, and SCR system were approximately 0.038 lb/MWh, 0.02 lb/MWh, and 0.009 lb/MWh, respectively. The commenter assumes for purposes of their comments that the "point of compliance" will be downstream of the duct burners and SCR.

Commenter 17678 requests the 0.050 lb/MWh limit be increased to 0.083 lb/MWh based on gross energy output from the combined cycle unit when operated with duct burners fired by natural gas. Depending on market conditions, the syngas produced at an IGCC unit may have more value as a raw material for producing coproducts than it would have as duct burner fuel. Where that is the case, the economic viability of an IGCC unit would be enhanced by firing the duct burners on natural gas and

diverting that syngas to manufacture of a coproduct. The commenter's TCEP air permits are currently based on the use of syngas as duct burner fuel; however, the commenter is currently examining an alternative operating scenario that may result in amendments to the air permits to authorize firing natural gas in the duct burners. Preliminary calculations indicate that the PM limit would need to be set at 0.083 lb/MWh gross energy output when operated with duct burners fired with natural gas. The calculated contributions to the total PM emissions from the gas turbine, duct burner, and SCR system were approximately 0.038 1b/MWh, 0.02 lb/MWh, and 0.025 1b/MWh, respectively.

Commenter 17678 notes that IGCC units are still in their infancy. Funding for them will be very difficult or unavailable; if there is a regulatory limit below the level that can be supported by vendor guarantees. Given the important role that IGCC Units may have in meeting global energy and climate stability goals, the commenter believes it would be a mistake to erect barriers to the implementation of this technology. The EPA can reevaluate the appropriate level for future IGCC Units after demonstration units like TCEP have been built and tested.

Response to Comment 9: The EPA has revised its emission limits for new IGCC EGUs in the final rule as noted below. Commenters are correct in stating that there are little data upon which to base the emission limits. Therefore, the EPA believes it appropriate to base the new-source limits on the permit information provided by commenter 17678. Because the source is a "similar source" as contemplated in section 112(d)(3), and the unit will have to comply with the permit limits when it commences operation, we believe the limits in the permit are appropriate for the new source standards for IGCC units.

HAP	Proposed limit	Revised limit
PM (total)	0.050 lb/MWh	0.0680 lb/MWh (duct burners on syngas)
		0.0830 lb/MWh (duct burners on natural gas)
Or		
Total non-Hg HAP metals	0.000040 lb/MWh	
Or		
Individual HAP metals		
Antimony (Sb)	0.000080 lb/GWh	
Arsenic (As)	0.00020 lb/GWh	
Beryllium (Be)	0.000030 lb/GWh	
Cadmium (Cd)	0.00040 lb/GWh	
Cobalt Co)	0.020 lb/GWh	
Lead (Pb)	0.00080 lb/GWh	
Manganese (Mn)	0.00090 lb/GWh	
Nickel (Ni)	0.0040 lb/GWh	
Selenium (Se)	0.0040 lb/GWh	
Hydrogen chloride (HCl)	0.030 lb/GWh	
Or		
Sulfur dioxide (SO_2)	0.40 lb/MWh	
Mercury (Hg)	0.000010 lb/GWh	0.0030 lb/GWh

Comment 10: Commenter 17678 believes that there is an error in the proposed Hg limit. The commenter understands, from the EPA's May 2011 correspondence with the UARG, that the EPA acknowledges an error in its conversion of Hg emissions to a common "base" unit. As noted, IGCC units are still in their infancy, and there is not sufficient test data to precisely predict the Hg emissions

performance of even the best-controlled IGCC units, other than that IGCC Hg emissions are expected to be much less than those for units that directly burn coal. In its NSR permit application for the Texas Clean Energy Project (TCEP), the commenter proposed to establish a new standard for Hg removal in IGCC units by treating the syngas in catalytic reactors. The catalytic reactor system is expected to achieve greater than 95%t Hg removal using either sulfur-impregnated activated carbon or alumina catalyst. In the absence of actual stack test data, the commenter has had to estimate expected emissions based on engineering estimates of how much Hg may arrive in the syngas routed to the catalytic reactors. Based on these engineering estimates and 95% Hg removal in the catalytic reactors, the resulting Hg emission limit for a state-or-the-art IGCC unit would be 0.003 lb/GWh, which is much less than the Hg emissions for units that directly burn coal.

Again, because IGCC units are still in their infancy, the commenter believes there is not sufficient test data to precisely predict Hg emissions performance. Extreme difficulties in obtaining financing can be expected, if there is a Hg limit below the level that can be supported by engineering estimates. Given the important role that IGCC units may have in meeting global energy and climate stability goals, it would be a mistake to erect barriers to the implementation of this technology. The commenter requests that the Hg limit for IGCC units be initially set at 0.003 lb/GWh or higher. The EPA can reevaluate the appropriate level for future IGCC units after demonstration units like TCEP, which incorporate effective Hg controls, have been built and tested.

Response to Comment 10: As noted above, the EPA has revised its emission limits for new IGCC EGUs in the final rule.

4B09 - MACT Floor Results: New Oil - Liquid (Proposed)

Commenters: 17316, 17648, 17760

Comment 1: Commenter 17316 notes that review of Tables 1 and 2 of the rule indicates that the proposed total HAP metals emissions limit for new oil-fired EGUs is actually higher (i.e., less stringent) than the proposed total HAP metals emission limit for existing oil-fired EGUs (0.0004 lb/MWh vs. 0.0003 lb/MWh). The commenter believes it does not seem reasonable, or consistent with MACT procedures, that the limit for new EGUs would be less stringent than the limit for existing EGUs.

The commenter assumes the limit for existing oil-fired EGUs is incorrectly specified in Table 2, as this limit is lower than for the other EGU categories. In any case, the total HAP metals emission limits for oil-fired EGUs should be corrected, or the preamble should explain why the limit for existing oil-fired EGUs is lower than that established for new oil-fired EGUs.

Response to Comment 1: The final new source emission limits for total metals are all equivalent to or more stringent than the corresponding existing source limit.

Comment 2: Commenter 17648 states that the EPA correctly proposes emission limitations for HCl for oil-fired EGUs (a direct emission limitation for HCl from liquid oil-fired units, and an emission limitation for HCl as a surrogate for all acid gas HAP for solid oil derived fuel-fired EGUs). Some have suggested that these emission limitations are inappropriate because oil-fired EGUs are not presently controlling for HCl with add-on controls. Even were this assertion true, it is inapposite to whether or not the EPA must set an emission standard for that HAP. The EPA must promulgate an emission standard for all HAP emitted by sources in a source category, without regard to whether those HAP are controlled with technology. *Nat'l Lime*, 233 F.3d at 633-34. Chlorine appears in the emissions of oil-fired units on which the EPA has data; irrespective of whether it is a contaminant in the fuel used by these EGUs, or whether the chlorine has another origin, HCl clearly is among the HAP emitted by those EGUs. See 76 FR 25,045. Therefore, the EPA has no discretion to elect not to promulgate an emission standard for HCl emissions from oil-fired EGUs.

Response to Comment 2: The EPA has established HCl and HF standards in the final rule.

Comment 3: Commenter 17648 states that concerns about the applicability of technology to control HCl emissions from oil-fired EGUs are unfounded. There is no technological basis for concluding that control technologies that will control HCl emissions from coal-fired EGUs (whose operation provides, in part, support for the EPA's decision to use HCl as a surrogate for other acid gases for coal-fired EGUs), cannot be applied to oil-fired EGUs. Even more significantly, fuel switching from No. 6 fuel oil to No. 2 fuel oil or to natural gas is a mechanism to reduce HCl. No. 6 fuel oil is the dirtiest fraction in the petroleum refining process, so that contaminants, such as chlorides, in the crude oil are more likely to appear in that fraction. Natural gas does not contain chloride. If a source cannot install add-on controls, it can readily switch fuels to meet the HCl limit.

Response to Comment 3: The EPA has established HCl and HF standards in the final rule.

Comment 4: Commenter 17648 believes that the EPA has no discretion to promulgate a work practice standard for HCl emissions from oil-fired EGUs. Pursuant to the authority in section 112(h), the EPA may exercise its discretion to promulgate a so-called "work practice" standard only when "not feasible

to prescribe or enforce an emission standard," which is limited to situations where "measuring emission levels is technologically or economically impracticable." 42 U.S.C. section 7412(h)(1)-(2); Brick MACT, 479 F.3d at 883-84. Oil-fired EGUs clearly are capable measuring their HCl emissions, as many have done so in the context of data collected for the ICR upon which the emission limitations in this rule rely. Nothing in the emissions control or measurement technology for HCl prevents oil-fired EGUs from determining whether they are complying with proposed emission limitations. Accordingly, the EPA would have no basis upon which it could elect to promulgate standards under CAA section 112(h) in lieu of numerical emission limitations derived consistent with section 112(d).

Response to Comment 4: The EPA has established HCl and HF standards in the final rule.

Comment 5: Commenter 17760 states that the MACT floor for new liquid oil-fired units listed in Table 11 is less stringent than the standard for existing liquid oil-fired units. The new source standard is the limit achieved by the best controlled similar source. This cannot be less stringent than the average emission limitation achieved by the best performing 12% of sources in the category.

Response to Comment 5: The final new source emission limits for filterable PM, HCl and HF are all equivalent to or more stringent than the corresponding existing source limit.

4B10 - MACT Floor Results: New Oil - Solid (Proposed)

Commenters: 17817, 19536, 19537, 19538

Comment 1: Several commenters (19536, 19537, 19538) state that the EPA has proposed an HCl standard for new pet coke-fired EGUs of 0.00030 lb/MW-hr. The EPA also determined the MACT floor emission rate in terms of lb/MMBtu to be 2.3618 x 10-5 lb/MMBtu based on the 99th percentile UPL. The EPA's determination of the 99th percentile UPL HCl emission rate for the best performing source, AES Deepwater, is higher than the three HCl emissions results provided in the EPA's MACT floor spreadsheet. Specifically, the highest HCl emission rate measured at AES Deepwater was 1.9592 x 10-5 lb/MMBtu, yet the EPA's proposed 99th UPL value of 2.3618 x 10-5 lb/MMBtu is 20% higher than the highest HCl emission rate measured at this unit. Thus, the EPA's proposed MACT floor value in units of lb/MMBtu fails to reflect the HCl emissions of the best performing unit under the worst reasonably foreseeable circumstances.

In addition, according to the commenters, the EPA determined the HCl MACT floor in terms of lb/MWhr to be 0.00027169 lb/MW-hr, based on the EPA's determination of the 99th percentile UPL. Yet, the limit the EPA proposed as MACT is 0.00030 lb/MWhr, which is 10 percent higher than EPA's 99th percentile UPL emission rate. The EPA has not provided any justification for going beyond the 99th percentile value in its MACT floor determination for HCl.

The commenters state that the EPA's proposed new source MACT standard for HCl reflects a very poor heat rate and thermal efficiency for new units. Specifically, the proposed 0.00030 lb/MW-hr limit reflects an assumed heat rate of 12,702 Btu/kW-hr and a thermal efficiency of 26.8% when compared to the EPA's 99th percentile MACT floor value of 2.3618 x 10-5 lb/MMBtu. A heat rate of 12,702 Btu/kW-hr is higher than the annual average of the existing coal-fired EGU fleet. New pet coke-fired EGUs should be able to operate at much lower heat rates, in line with coal-fired EGUs, i.e., closer to 9,000 Btu/kW-hr (approximately 38% thermal efficiency). Based on the EPA's floor emission rate of 2.3618 x 10-5 lb/MMBtu, that means the EPA's proposed new source MACT floor limit should not be any higher than 0.00021 lb/MW-hr assuming a heat rate of new pet coke-fired units of 9,000 Btu/kW-hr. Commenters state that the EPA's proposed HCl limit for new pet coke-fired units fails to be at least as stringent as the best controlled similar source.

Response to Comment 1: We have discussed our approach with regard to rounding elsewhere in this document. We used the data provided through the 2010 ICR for both the input- and output-based limits; we did not convert one to the other. Therefore, the heat rates used in the calculations are those provided by the individual companies for their EGUs. Partly based on comments received, we have made corrections to the data as appropriate. We believe that our MACT floor analyses comply with the statute and with applicable case law.

Comment 2: Several commenters (19536, 19537, 19538) state that the EPA's proposed new source SO_2 MACT surrogate limit fails to reflect the MACT floor. The EPA has proposed a new source SO_2 MACT limit of 0.40 lb/MW-hr as a surrogate limit for acid gas HAP if the EGU has some sort of FGD system installed. Similar to the SO_2 surrogate limit for existing pet coke-fired EGUs, the EPA's proposed new source SO_2 limit fails to reflect the lowest HCl-emitting unit and it also fails to reflect the SO_2 emissions of the lowest SO_2-emitting pet coke-fired EGU.

The best controlled source for HCl was determined by the EPA to be the AES Deepwater EGU, but the best controlled source for SO_2 was determined by the EPA to be the Hanford Unit 1A EGU. These differing determinations of the best controlled similar source for HCl and SO_2 emissions adds to the argument that SO_2 is not likely a good surrogate pollutant for HCl or other acid gas HAP at pet coke-fired EGUs

Response to Comment 2: In setting emission limits for HCl (and for SO_2 which is an alternative emission limit available to those units with operational flue gas desulfurization controls), the EPA determined the top performing unit for HCl emissions using the available data from the 2010 ICR. Similarly, the EPA set the alternative emission limit for SO_2 using the same approach. The EPA continues to believe that HCl and HF, due to their chemical and physical properties, will be controlled at least as well, and likely much better than, SO_2 using flue gas sulfurization technologies. The EPA also believes that it is unreasonable to expect a 1:1 correlation between best performers for HCl and SO_2 (i.e., the top performer for SO_2 is not necessarily the best performer for HCl and the 25th best performer for HCl should not be expected to be the corresponding 25th best performer for SO_2). Differences in the rank order for the best performing HCl and SO_2 can be affected by normal fuel composition and operational variability and in measurement uncertainties at the very low levels achieved by the very best performing units.

Comment 3: Several commenters (19536, 19537, 19538) state that the EPA's proposed SO_2 MACT limit for new sources of 0.40 lb/MW-hr has flaws with respect to the existing source SO_2 surrogate MACT limit. First, the EPA's 99th percentile UPL SO_2 rate of 0.36175 lb/MW-hr is higher than the highest SO_2 rate measured at the Hanford Unit 1A EGU of 0.2678 lb/MW-hr. Second, the EPA's proposed MACT limit of 0.40 lb/MW-hr is 10% higher than the EPA's 99th percentile UPL emission rate, and the EPA has not provided justification for going beyond the 99th percentile UPL emission rate in setting the MACT floor limit. Third, in comparing the EPA's proposed SO_2 limit of 0.40 lb/MW-hr to its 99th percentile UPL MACT floor emission rate in terms of lb/MMBtu of 0.03755 lb/MMBtu shows that the EPA's 0.40 lb/MW-hr limit reflects a poor heat rate for new sources of only 10,652 Btu/kW-hr. New sources should be able to achieve heat rates of 9,000 Btu/kW-hr, meaning a more appropriate new source SO_2 emission limit that reflects the EPA's determination of SO_2 MACT floor would be 0.0338 lb/MWhr.

Response to Comment 3: The EPA thanks the commenter for providing the suggested emission limitations. However, the EPA has explained the rationale and methodology that was used in setting emission limits and believes that the methodology is consistent with that used in the development of other NESHAP and with the statute. Also, for clarification, the EPA did not assume a heat rate in setting emission limits, but rather used the actual data that was provided.

Comment 4: Commenter 17817 states that they received a PSD construction permit in December 2011 and are at risk of becoming subject to the EPA's new-unit standards for purposes of the EPA's proposed EGU MACT Rule. Based upon the commenter's extensive testing experience of unit 1, the commenter asserts its belief that the proposed MACT standards will foreclose development of new solid-fueled units, including their permitted unit 2 EGU. The permitted unit is not a major source of HAP.

A report by an industry consultant, filed in this docket, highlights the methodological problems with the EPA's proposed rule and demonstrates why he believes new coal-based generation cannot be built under the proposed rule. The consultant, who has decades of relevant experience and nearly a full decade of

experience on Commenter's Unit No.1, worked with the commenter extensively to permit their new unit. The report is attached to the comment letter.

Response to Comment 4: The EPA has reassessed new source emission limits and is finalizing limits that have changed slightly since proposal. The EPA is aware of at least one coal-fired unit that is currently meeting all new source limits.

Comment 5: Several commenters (19536, 19537, 19538) state that the EPA did not evaluate in any meaningful way control technologies or methodologies that would enable units to achieve HCl emission reductions beyond the EPA's proposed HCl and SO_2 floor emissions rates for pet coke-fired EGUs. The EPA's justification was that they could not identify any control technologies that could achieve greater emission reductions of HAP than the control technologies they expected to be used to meet MACT. However, according to commenters, the EPA has not adequately demonstrated that there are no beyond-the-floor control techniques or methodologies that could be implemented to further reduce acid gases to the maximum achievable level.

Commenters state that the EPA's new source HCl MACT floor determination for pet coke fired EGUs is based on the AES Deepwater unit's HCl emissions, and this unit is a conventional boiler with a wet scrubber. This unit also has among the lowest fuel chlorine content of any of the seven pet coke-fired EGUs tested in the EPA's ICR, in some cases two orders of magnitude lower than other pet coke-fired units. Although the unit has a wet scrubber that is typically among the most effective in removing HCl emissions, the pet coke chlorine content used at this unit also contributed to its HCl emission rate. This is especially clear given that the wet scrubber appears to only be removing 91 percent of the HCl emissions at best, based on the data provided regarding chlorine in the coal and the minimum HCl emission rate. Yet, there are numerous coal-fired EGUs achieving over 99% HCl removal. Thus, the best performing pet coke-fired EGU determined by the EPA does not reflect the maximum degree of HCl emission reduction that can be achieved at these units.

According to commenters, beyond-the-floor technologies for acid gas HAP at coal-fired EGUs can be applied to pet coke-fired EGUs. The EPA already determined that an HCl emission limit of 0.0001 lb/MMBtu is cost effective.

Commenters assert that the EPA must evaluate beyond-the-floor technologies for acid gases at pet coke-fired EGUs and ensure that its proposed MACT standards truly reflect the maximum degree of acid gas HAP emission reduction that is achievable at these units.

Response to Comment 5: The EPA stands by the original justification and is not finalizing a beyond-the-floor emission limit consistent with the proposed rule. The EPA has explained the rationale and methodology that was used in setting emission limits and believes that the methodology is consistent with that used in the development of other NESHAP and with the statute.

4B11 - MACT Floor Results: Other

Commenters: 17197, 17265, 17283, 17402, 17620, 17621, 17622, 17627, 17648, 17675, 17677, 17681, 17696, 17705, 17711, 17714, 17716, 17730, 17735, 17736, 17754, 17758, 17775, 17776, 17790, 17800, 17812, 17813, 17817, 17818, 17837, 17851, 17852, 17878, 17914, 17929, 18015, 18034, 18039, 18437, 18444, 19536, 19537, 19538

1. General.

Comment 1: Commenters 17197 and 17705 note that the proposed existing unit HCl MACT floor limit is much lower than the new unit limit, which is already exceedingly low.

Commenter 17197 notes that the HCl limit for existing coal-fired units is 0.020 lb/MWh although the new unit limit is 0.30 lb/MWh. The proposed existing unit limit is 15 times more restrictive than the new unit limit. This discrepancy is also present for both coal unit subcategories. Similarly, the surrogate SO_2 emission limit for existing coal-fired units is shown as 0.20 lb/MMBtu, although the new unit limit is higher at 0.4 lb/MMBtu. The proposed Hg limit for existing coal-fired units (≥ 8,300 Btu/lb) is 0.008 lb/GWh although the new unit limit is 0.000010 lb/GWh. The proposed new unit limit is basically unachievable and 800 times more restrictive than the new existing limit. The commenter understands the Hg emission limit issue may have been addressed and that the EPA has recalculated the existing coal-fired unit (≥ 8,300 Btu/lb) Hg limits at 0.008 lb/GWh or 1.2 lb/TBtu, and that the revised new unit limit is 0.002 lb/GWh. It is not clear whether these limit discrepancies are the result of MACT determinations emission limit miscalculations or are simply typos. If discrepancies are due to miscalculation, the commeter is concerned that these errors may invalidate or alter the preamble's assumptions and justifications that all proposed rule provisions are necessary and appropriate.

Commenter 17705 believes it is highly probable that the proposed new source limits are so low that vendors will not guarantee performance of control equipment.

Response to Comment 1: The EPA has reassessed all emission limits in response to comments. The final HCl emission limit for new coal-fired plants is more stringent than the limit for existing units.

2. Output-based standards.

Comment 2: Commenters 17283 and 17620 support the EPA's setting of output-based standards for the proposed rule. Commenter 17283 believes that reverting to an input-based standard that does not incorporate efficiency into the regulatory limit is an inappropriate step if the regulatory goal is to both reduce emissions and promote efficiency.

Commenter 17620, however, notes that the EPA has not developed the MACT floors using net output-based data and is not proposing to promulgate mandatory output-based MACT limits. Rather, it has converted the results of MACT data for sources selected as best performing units on an input-basis and proposes to offer sources the option of complying with either the input-based limits or the converted limits. In addition, Commenter 17620 adds that the uncertainties associated with past and future determinations of the unit's net heat rate are larger than potential efficiency gains that may result from adoption of output-based standards for existing units using common factors. The commenter believes that the most significant effect of offering existing sources the option of output-based standards based on

a pre-determined conversion factor will be a reduction in the effectiveness of the rule, rather than any measureable improvement in efficiency of generation.

Commenter 17620 adds that, for existing units, the principal effect of an "optional" output-based standard would be to establish a class of "winners" that qualify for lower emission rates based on their currently existing condition, rather than providing an incentive to reduce emissions. Since facilities with low efficiencies (high heat rates) may elect to comply with the input-based limit, the only "losers" in this process are the members of the public who are subjected to higher emissions of HAP than would otherwise be the case. For this reason the commenter asserts that the EPA should not allow an output-based standard as an option for existing sources to employ, but should set standards based on net output emissions data. This could be accomplished at the next review of the standard, as required by the CAA every 8 years.

Comment 3: Commenter 17808 supports allowing existing sources the option to comply with the input or output-based standards, and recommends that the EPA maintain this flexibility in the final rule. Commenter 17844 states that whether allowable emissions are based on gross or net MWh should be clearly identified in all the emission tables. The commenter recommends limits for new units be based on net MW/hr.

Response to Comments 2 - 3: Incorporating efficiency into the output based limit is not consistent with the EPA's understanding of section 112 statutory guidance on the setting of emission limits. The EPA agrees that it may consider net output based limits in the next review of the standard.

Comment 4: Several commenters (17620, 17818, 17800) state that the EPA has acknowledged that it does not have data reflecting net electrical output of the "best performing units" at the time that the testing was conducted and that it identified the "best performing units" on an input basis. Moreover, commenters' review of the EPA's data reveals serious discrepancies in the conversion of rates from lb/MMBtu to lb/MWh. The EPA proposes output-based limits for most pollutants and categories that reflect a heat rate of 10,000 Btu/kWh, slightly less than the average heat rate for all coal-fired EGUs, and substantially less than the average heat rate for oil-fired EGUs. However, there are a number of proposed limits where the imputed heat rates are unrealistically low, although others are far higher than experienced in practice. These variations occur both within and across subcategories and are far, far larger than any efficiency improvements that one might anticipate. For Hg, the imputed heat rates range from 6,667 Btu/kWh to 18,181 Btu/kWh across the five proposed subcategories; although within Subcategory 5, imputed heat rates for different metals range from 1,818 Btu/kWh to 17,500 Btu/kWh. Commenters recommend that the EPA revisit each of its proposed output-based limits and resolve the apparent discrepancies.

Commenter 17818 believes that the EPA should ensure that such "correction factors" are representative of a reasonably achievable value and are utilized in a consistent fashion through all of the calculations associated with this proposed rulemaking. It is also the commenter's opinion that the EPA should provide discussion in the rulemaking regarding the process used for the determination of the selected "correction factors." Without a consistent, achievable value being used as the target heat rate, there will be little opportunity or incentive for owners and operators to pursue the alternate limit, thereby negating the EPA's effort to promote energy efficiency. Commenter 17818 also questions the methodology used for determination of these new limits for oil-fired units when the results are such that the proposed emission rate limit for new units are higher than the proposed emission rate limit for existing units. Although the commenter understands that there have not been new oil-fired units constructed in some

time to provide a great deal of data, it seems counter-intuitive that new units would be allowed to be constructed with emission rate limits higher than existing units.

Comment 5: Commenter 18034 states that the EPA's MACT floor analysis for the proposed output-based PM surrogate limit for new coal-fired EGUs is not correct. The power output used to determine the output-based PM emissions limit for new EGUs appears to include both units at the site (AES Hawaii – ORIS Code 10673) which artificially reduces the projected output based emissions by a factor of two. The EPA must reevaluate output-based emission calculations for the facility and all others to ensure that similar error have not been made evaluating the MACT floor values for other pollutants.

Response to Comments 4 - 5: The EPA did not convert input based limits to corresponding output based limits using conversion factors or assumed heat rates. Rather, the EPA used actual data that was supplied by facilities in the 2010 ICR.

Comment 6: Commenter 17620 notes that the EPA suggests that it may be too difficult for existing sources to measure their net electrical output. For this reason the EPA proposes to adopt an output-based standard based on gross electrical output, which would only provide incentives for efficiency improvements at part of the facility. The commenter finds it difficult to accept the assertion that most EGUs do not know their net electric output at all times, as well as the assertion that it would be technically challenging for EGUs to measure net electric generation at the point of connection to the grid. Measuring electric generation at the bus bar would appear to be far less technically challenging than providing accurate determinations of the quantity and heat content of the fuel being consumed at any point in time. The commenter suggests that this issue an important matter that deserves a fuller evaluation. The EPA should identify the specific information that it relies on in rejecting net output-based standards and state why, especially for new sources, measuring electric delivery to the point of interconnection to the grid (which is where commercial sales of electricity generally occur) is technically infeasible. Commenter 18444, however, believes that the EPA's selected format for the standard of "lb/MWh gross" should be changed to "lb/MWh net" to encourage improvement in overall energy efficiency at new electric utility plants. Use of a net MWhr-based standard should in the long run lead to lower Hg emissions from the electricity generation sector per a given amount of useful electricity production.

Response to Comment 6: The EPA appreciates the comment and understands the potential benefit of net output based limits. The EPA will finalize gross output based limits but may reassess the format of the emission limits during the 8-year review required by CAA section 112(d)(6).

Comment 7: Commenter 17620 suggests that, if sufficient reliable data were available, the EPA could establish a single net output standard in this rulemaking and not promulgate an input-based limit at all. The EPA could develop the list of "best performing units" initially in terms of the emissions per unit of net electric output of the unit at the time of the test, rather than using a conversion factor for all units at the end of the calculating process. As data to support such an approach are not in the record, the commenter recommends an alternate approach to encourage and reward efficiency improvements, without increasing overall HAP emissions. The commenter understands that, as part of its NSPS rulemaking for GHG emissions from EGUs, the EPA may develop standardized procedures for quantifying efficiency improvements at regulated EGUs. The commenter recommends that the EGU MACT standards be adopted as input-based standards in this rule and that the EPA establish procedures by amendment of this rule that would allow a conversion to an output basis on a plant-specific basis and adjustment of the applicable limit, based on demonstrated efficiency improvements in individual units.

In this way, a unit that demonstrated an actual improvement in its efficiency would receive a benefit without adverse impact to the public.

Response to Comment 7: The EPA appreciates the comment and understands the potential benefit of net output based limits. The EPA will finalize gross output based limits but may reassess the format of the emission limits during the 8-year review required by CAA section 112(d)(6).

Comment 8: Commenter 17620 recommends that the conversion factor for new units be based on a heat rate that is consistent with the decision of the Agency in its GHG rulemaking as to the minimum acceptable generating efficiency for such units. In this way, a unit that demonstrated an actual improvement in its efficiency would receive a benefit without adverse impact to the public.

Response to Comment 8: The EPA did not convert input based limits to corresponding output based limits using conversion factors or assumed heat rates. Rather, the EPA used actual data that was supplied by facilities in the 2010 ICR.

3. Ultra-low sulfur oil.

Comment 9: Commenter 17620 notes that the EPA has proposed a total metals limit for oil-fired EGUs that includes Hg, in lieu of a PM limit, based on compliance through fuel analysis. Commenter supports this concept for ultra-low sulfur oil, but not for more polluting grades of oil that can be expected to have high levels of particulate organic matter. Commenter further notes that the EPA's proposed fuel analysis incorporates the 90^{th} percentile of fuel variability and have commented elsewhere that the compliance obligation should be consistent with the assumptions used in establishing the standard.

Response to Comment 9: Fuels analysis is not included in the final rule. Compliance with the total metals or filterable PM limits is established through use of CEMS or stack testing.

4. New source limits too stringent.

Comment 10: Commenters 17621 and 17735 state that many of the proposed MACT limits for new generating units are below the measurement capabilities of the test methods used in the ICR and the CEMS that are proposed for compliance monitoring. Commenters state that in their opinion the principal reason for this is that the EPA's procedure for determining the MACT floor for new units selected outlier and erroneous emissions values, and did not take into account method performance with actual stack gas samples.

Commenter 17735 notes that, for example, a unit burning bituminous coal with a nominal chloride content equal to 750 ppm will require approximately 99.95% removal to comply with the proposed new source HCl standard. The commenter states that, in their experience, no APCD vendor will guarantee 99.95% removal, which would be necessary to secure financing. Moreover, the proposed HCl standard is 66 times more stringent than the proposed standard for existing units even though all of the existing units selected for acid gas testing in the EPA's 2010 ICR used either wet or dry scrubbing systems. As Roberson states, "There is no plausible explanation for how a new scrubber can be 66 times more efficient than the average of the best performing 12% of existing scrubbers."Similar control efficiencies for Hg would also be required, again with no guarantees available.

Comment 11: Commenter 17800 states that in determining the MACT floor for new units, the EPA selected outlier and erroneous emissions values, and did not take into account method performance with actual stack gas samples. Some limits as proposed may not be attainable because pollution control equipment suppliers will not guarantee performance that achieves the emission limits. One example is the Hg limit for new sources. Limits set for new units do not represent the best performing unit. The commenter states that the EPA has chosen the strictest limit irrespective of the unit. No one existing unit is currently meeting these limits. Hence, according to the commenter, these limits are unrealistic and not representative of the existing source population. This is not the intent of CAA section 112.

Comment 12: Commenter 17914 states that as an equipment supplier, they are unable to offer commercial guarantees on the ability of their control equipment to control HCl or Hg emissions to the levels identified for the new coal category, which means facilities would have to control fuel chlorine and Hg levels. The commenter considers this to be impractical in many cases, so the detection limits and accuracy of the test method should be taken into consideration when proposing low emission values. The commenter believes the EPA should collaborate with the National Institute of Standards and Technology (NIST) to initiate NIST protocol for traceability of Hg generators for Hg concentrations less than 0.51 Jg/m3. NIST should be capable of providing support in the range of 0.0 – 1.01 Jg/m3 with defensible set points at nominally 0.1, 0.25, 0.5 and 1.01 Jg/m3. The commenter points out that for new units, calibration standards would need to be 1-2 orders of magnitude lower than this, but emission rates below 0.5 lb/ TBtu are considered difficult to detect reliably. The commenter explained the compliance with the rule will most often be measured by continuous emissions monitors with a minimum reliable detection limit of 0.005 lb/GWh.

Response to Comments 10 - 12: As stated elsewhere in response to comments, the EPA has revised the new source standards based on new data and data corrections and we maintain that the new source standards are all based on units that are similar to units that would be constructed in the future. In addition, we have determined that at least one existing source complies with all the new source limits, thus, the standards are achievable. Even if no source was meeting all of the new source limits, we maintain the standards would still be valid because we established the standards based on the available information from existing sources. We respond to the remaining comments in response to other comments elsewhere in this RTC and the preamble to the final rule.

5. Need for additional controls.

Comment 13: Commenter 17622 is confident that the proposed existing unit emission limits for total PM, HCl and Hg can be simultaneously met, and reliably measured and monitored, based on 30-day rolling averages; however, additional controls may be required.

Response to Comment 13: We agree that the final rule standards can be met and that there are reliable measurement methodologies available to assure compliance.

Comment 14: Commenter 17621 states that the fuel oil metals analysis methods are not sensitive enough to support compliance monitoring for limited-used oil EGUs.

Response to Comment 14: As noted elsewhere in this document, the final rule does not include fuel analysis requirements.

Comment 15: Commenter 17696 is concerned that the standards proposed by the EPA for oil-fired units may be unachievable, and thus applicability of these standards is particularly inappropriate to units that are infrequently operated. The EPA claims confidence with respect to the limits it is proposing for oil-fired units, yet the ICR data set does not provide adequate information to specify controls that can be expected to actually comply with the proposed limits. As detailed under comments submitted to this docket by the Environmental Energy Alliance of New York, the majority of parameters do not have a positive relationship between fuel and concentration measurements and those that meet that criterion have a large percentage of results that could not meet the MACT limit using a fuel specification. Thus the proposed standards do not reflect reductions in HAP that are actually achievable. Requiring controls to achieve standards that may be unachievable, particularly on units that are seldom operated, is not appropriate. The commenter urges the EPA to provide an exemption from these standards for limited use oil-fired units, i.e., oil-fired units with capacity factors equal to or less than 10%. In the event that the EPA does not pursue an exemption, the commenter also urges the EPA to alternatively pursue only work practice standards for a limited use oil-fired unit subcategory.

Response to Comment 15: The EPA has established a limited use oil-fired EGU subcategory in the final rule for units with capacity factors of up to 5%. We believe the 5% threshold is sufficient to address the units that are truly used only to maintain grid reliability. We are establishing work practice standards for this subcategory as explained elsewhere in this document.

6. LEE.

Comment 16: Commenter 17696 believes that the LEE cutoff should be set at 29 lb/year for Hg as proposed in section 63.10005(k), to qualify as a LEE for Hg and thus avail itself of less burdensome Hg performance testing and monitoring requirements, an existing unit must demonstrate that it emits less than 10% of the Hg emission limit or less than 22.0 pounds lb/year. According to the EPA, the 22.0 lb/year LEE cutoff represents a threshold approximately equivalent to 5% of the nationwide Hg mass emissions from coal-fired EGUs and was chosen because "comments received on CAMR indicated that 5 percent of the total mass was a reasonable cut point." 76 FR 25032.

The commenter supports the LEE provisions but believes the LEE cutoff should set at 29.0 lb/year, an equally reasonable cut point that matches the low mass emitter Hg monitoring cutoff in CAMR and the low mass emitter Hg monitoring cutoff that several states have adopted, including Illinois, 35 Ill. Admin. Code section 225.240(a)(4). (See, e.g., Colorado (5 Colo. Code Regs. section l 00 l-8, Reg. No.6, Part B, Section VIII.B.l0); Michigan (Mich. Admin. Code R. 336.2160); Montana (Mont. Admin. R. 17.8771(12))) A LEE cutoff of 29.0 lb would eliminate conflicts and confusion with low mass emitter provisions in existing state Hg programs and significantly reduce compliance costs and burdens for the additional qualifying units without adversely affecting compliance assurance with the EGU NESHAP Hg emission limits or materially increasing the number of potential qualifying LEEs. Given the many other costly burdens that the rule would impose, the benefit of LEE to a qualifying unit is not insignificant.

Response to Comment 16: The agency reviewed the commenter's suggestions, and one of the LEE eligibility criteria in the rule has been revised from 22.0 to 29.0 pounds of Hg per year. The agency finds the result of consistency with existing state regulations outweighs the two percent difference in nationwide Hg mass emissions, from 5% to 7%, for LEE eligibility. Of course, obtaining LEE status would not negate compliance with the applicable Hg emissions limit (e.g., an EGU owner or operator must continue to meet the EGU's mercury emissions limit, whether or not LEE status is granted).

7. Percent reduction standards.

Comment 17: Commenter 17716 suggests that the EPA should offer percent reduction limits for fuel-related emissions (filterable PM, metals, HCl/HF) as an option in addition to the currently proposed lb/MMBtu or output standards. The following equation should be used to establish the alternative percent reduction floor values each fuel-related pollutant:

$$\%Rfloor=(1-Efloor/Efuel)\times 100$$

where:

%Rfloor= Percent reduction floor value for fuel related pollutant

Efloor= lb/MMBtu emission floor value for pollutant

Efuel= Average lb/MMBtu fuel concentration for pollutant based on all available fuel emissions data reported by the sources in the emissions floor analysis.

This approach assures that the alternative percent reduction value represents the average emission achieved by the best performing units as required by section 112 of the CAA.

Comment 18: Commenter 17716 notes that the EPA has used an "either/or" lb/MMBtu (or mass/output-based) standard coupled with a percent reduction alternative approach in a number of previous rules. For example, the current version of subpart Da NSPS requirements for EGUs as well as the revised version that the EPA proposed along with the EGU MACT Rule contains lb/MMBtu (or output-based) standards along with optional alternative percent reduction standards. The EPA has also proposed "either/or" mass and percent reduction options for NESHAP standards (e.g., 40 CFR Part 63, subpart FFFF).

According to the commenter, the EPA states that they "considered using a percent reduction format for Hg," but percent reduction limits alone would not provide adequate flexibility. The EPA's stated "desire to promote, and give credit for, coal preparation practices that remove Hg and other HAP before firing" would not be realized if the percent reduction option is based on on-site post-beneficiation fuel analysis because that would mean the percent removal values would simply be conservatively low.

The commenter states that although the EPA stated that it did not have "the data necessary to establish percent reduction standards" for a mine-to-stack based reduction scheme, sufficient fuel analysis data along with stack test results collected under the ICR are available to establish an on-site removal value. The EPA also expressed concerns that using a percent reduction limit would be inconsistent with the Brick MACT Court decision. But that concern is alleviated by the fact that the alternative percent reduction would be based on the emissions achieved in practice by the top performing sources, is therefore is consistent with the requirement of the statute.

Comment 19: Commenter 17737 requests that percent reduction should be available as an alternate to a numerical emission rate and could be established to be based on percent reduction from the boiler inlet Hg concentration in a manner similar to the procedure under 40 CFR 60 subpart Da. The percent reduction could be set at 91%, which is the same level as the EPA expects to be achieved nationwide. The numerical limit may be difficult if not impossible to achieve should a source be limited to using coal with a high Hg concentration (above 13 lb/TBtu). Switching coal sources may not be possible due to the

presence of long term coal contracts, mine-mouth configuration, or boiler design. If the Hg coal concentration increases over time, the commenter may not be able to meet the standard with available technology and could be faced with curtailment as the sole compliance option. This concern could be somewhat alleviated; however, if the compliance averaging time were to be on a 12-month rolling basis.

Commenter 17737 states that ICR data shows some EGUs would achieve a lower emission rate with 75-85% removal than others with removal rate in excess of 91%. By not including a percent removal, the EPA is penalizing those EGUs that are not able to obtain coals with relatively low Hg content.

Commenter 17737 states that the EPA's primary rationale for not allowing the percent reduction option is that it may discourage or complicate the use of coal washing as a compliance technology. This would only be the case if the EPA elected to adopt a percent removal standard in lieu of a numerical limit.

Comment 20: Commenter 19032 states that the EPA should propose percent reduction alternatives to the numerical MACT limits.

Response to Comments 17 - 20: The EPA continues to believe that a percent reduction standard is not appropriate. As we stated at proposal and in response to comments, we question the viability of a percent reduction standard under CAA section 112 given D.C. Circuit precedent. Equally important, however, the EPA does not believe it has sufficient data to establish a percent reduction standard that would accurately capture the proper percent reduction for the various standards. Commenters expressed reasons for wanting a percent reduction standard that only reinforce the legal concerns associated with such a standard, and we are not sure how we would justify a percent reduction based on projected estimates of reductions that are not established in the same manner as the standards in the final rule (i.e., those reductions estimated for purposes of the RIA). For all these reasons, we decline to establish a percent reduction standard in the final rule.

8. Heat input-based standards/energy output-based standards.

Comment 21: Commenter 17730 notes that the EPA has proposed to use heat input based standards for existing sources and energy output based standards for new sources. The commenter believes that the EPA should continue to use heat input based emission standards for new and existing sources. The EPA should seek an alternative method for promoting energy efficiency at coal-fired electric utilities, but should not mandate it in this rule.

Response to Comment 21: The EPA appreciates the suggestion; however, the EPA has decided to finalize emission limits in the formats that were present at proposal.

Comment 22: Commenter 17730 states that the EPA should consider allowing sources to meet either a heat input based emission standard and an energy output based emission standard. The EPA should also consider allowing sources to make energy efficiency upgrades to the source to improve energy efficiency without further regulatory penalty. This approach could give sources the incentive necessary to implement energy efficiency improvements, and create some operating head-room to better ensure ongoing compliance with the proposed requirements.

Response to Comment 22: The EPA has provided input/output based options for existing sources and an output only option for new sources. Specific incentives for energy efficiency improvements are not part of the MACT program.

9. Other.

Comment 23: Commenters 17711 and 17852 support the EPA's determination that MACT limits and NSPS PM/Opacity limits are not necessary for natural gas-fired utility boilers. Commenters state that limiting the regulatory burden for gas-fired boilers acknowledges that PM and HAP emissions from gas-fired boilers are minimal and are not technically feasible to control or cost effective to regulate. Commenter 17852 also states that the option to integrate combustion turbines and/or fuel cells with steam generating units is another good way to reduce emissions. The commenter agrees that it is appropriate to provide the option for regulated entities to integrate fuel cells or combustion turbines in the definition of steam generating unit for the permitting of a unit. However, the commenter also states that if an owner chooses to connect a fuel cell or CT to a steam boiler to use waste heat to improve efficiency, they should be able to elect to consider them an integrated unit for compliance purposes.

Response to Comment 23: The EPA appreciates the comment and the suggestion. Comments specific to the NSPS portion of the rule are addressed in a separate document.

Comment 24: Commenter 17817 expresses concern that proposed emission limits are set below method detection limits.

Response to Comment 24: As described elsewhere in this document, the agency has taken steps to ensure the rule's emissions limits are not below method detection limits.

Comment 25: Commenter 18437 questions the assumption that all coal types may be used with available control technologies, as fuel switching or fuel blending can be very expensive.

Response to Comment 25: The EPA does not understand the comment. The fact that all available control technologies are available for all coal types implies that coal switching would not be required. The fact that fuel switching or blending can be expensive does not affect the availability of controls. In any case, the EPA does not dictate how sources will comply with the final standards and sources are able to implement any mechanisms to comply, including fuel switching.

4C01 - Beyond-the-Floor Analysis: ACI control on Existing Coal

Commenters: 17383, 17712, 17813, 17815, 17843, 17876, 17930, 18033, 19114, 19214, 19536, 19537, 19538

Comment 1:.Commenters 17815 and 17930 state that the proposed beyond-the-floor Hg limit for low rank coal units is based on too little data and is technically and economically unattainable. The EPA's proposed beyond-the-floor Hg limit for low rank coal units is based on only three samples from a single test held at only one unit, which is not enough data to develop such limit, especially as more data was available for this unit in the database. Although this one unit may have been able to achieve the proposed limit during this one test, the three samples are not adequate to demonstrate the long-term ability of this unit to meet that limit consistently, let alone the long-term abilities of the top 12% of all low rank coal units to meet that limit consistently. Given Texas lignite's particularly high rates of variability of Hg concentration, and the inability to minimize this variability, commenters assert that the EPA is obliged to have more, not less, data to support the proposed beyond-the-floor Hg limit for low rank coal units. Commenter 17930 adds that the EPA's decision to require a beyond-the-floor limit for lignite units does not comply with section 112(d)(2) of the CAA.

Comment 2: Several commenters (17383, 17712, 17813, 17876) argue that the beyond-the-floor Hg MACT was improper and not in accordance with the CAA. These commenters base their argument on the fact that the standard must be achievable in practice and that this has not been demonstrated. Commenter 17813 specifically states that the limit is based on too little data (only three tests held at one unit for the lignite Hg limit) and is technically and economically unattainable. Commenter 17813 also states that the EPA is obligated to also obtain more data to support the achievability of the limit proposed for new units.

Comment 3: Commenters 17813 and 17876 state that the ACI technology cannot and will not deliver results that approach the degree of control or consistency that the EPA alleges in order to reach the proposed beyond-the-floor limit for lignite. Commenter 17813 also states that the EPA has not taken into account the effect on energy requirements and reliability if lignite units are closed due to inability to meet the proposed limit.

Comment 4: Commenter 19114 argues that the EPA fails to provide any support for the claim that beyond-the-floor is appropriate for unit burning coal <8,300 But/lb with a furnace height-to-depth ratio of 3.82 or greater and should rely on MACT floor for subcategory 2 units. The commenter also states that the cost effectiveness in terms of $/lb-Hg removed is inaccurate in terms of real-world implementation and meaningless unless the EPA can justify that the benefits exceed the cost. Further the commenter states that health benefits of only addressing a small subset of mercury emissions is much less than claimed and the projected costs are an order of magnitude high and the total benefit from all mercury reductions under the rule.

Comment 5: Commenter 17925 states that the EPA's beyond-the-floor proposal for Hg limits for coal units burning coal less than 8300 Btu/lb with a furnace height to depth ratio of 3.82 or more should be withdrawn. The EPA has listed a beyond the floor limit for Hg for units designed to burn coal that is less than 8,300 btu/lb. The beyond-the-floor Hg MACT limit is listed at 4 lb/TBtu. It is unclear how the EPA determined this limit as achievable when the most recently permitted Gulf Coast lignite unit case-by-case MACT analysis performed in 2008 demonstrated that 9.2 lb/TBtu was the appropriate MACT limit

for this type of unit. Since 2008, the commenter does not believe there have been significant changes in Hg control technology for lignite fired coal units.

Comment 6: Commenter 17724 states that the beyond-the-floor Hg MACT for lignite is improper and not in accordance with the CAA. The proposed Hg MACT for lignite establishes a floor level of 11.0 lb/TBtu and a beyond-the-floor limit of 4.0 lb/TBtu. The EPA's basis for proposing the beyond-the-floor limit is that it believes ACI installed on units in this subcategory could achieve the beyond the floor standard. The EPA's "supposition and belief" cannot serve as a rational basis for determining MACT beyond-the-floor limits. The statutory requirements are clear, the MACT standard must be achieved in practice and as such the proper limit for this subcategory is 11 lb/TBtu.

Comment 7: Commenter 17689 notes that the proposed Hg MACT for this coal rank establishes a floor level of 11.0 lb/TBtu and a beyond-the-floor limit of 4.0 lb/TBtu. The EPA's basis for proposing the beyond the floor limit is that it "believes" the same technology, ACI, installed on units in this subcategory "could" achieve the beyond the floor standard. The EPA's suppositions and beliefs cannot serve as a rational basis for determining MACT beyond the floor limits. The statutory requirements are clear. The MACT standards must be achieved in practice, and thus the proper limit for this subcategory is 11.0 lb/TBtu.

Comment 8: Commenter 17904 states that the EPA's beyond-the-floor analysis must be reassessed because the EPA's MACT floor for Hg emissions for low rank fuel boilers was not calculated correctly. In support of their argument, the commenter cites the following two court cases *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855, 872 (D.C. Cir. 2001) ("Because EPA will have to set new floors, we need not address the . . . additional arguments [regarding] whether to set beyond-the-floor standards pursuant to CAA section 7412(d)(2) . . . .") and *Northeast Md. Waste Disposal Auth. v. EPA*, 358 F.3d 936, 955 (D.C. Cir. 2004) ("the Agency's beyond-the-floor determinations cannot be evaluated if, as we have concluded, the MACT floors themselves were improperly set.").

Comment 9: Commenters 17722 and 17775 have concerns about the 4.0 lb/TBtu standard that the EPA has proposed. This standard is based on a "beyond the floor" analysis that estimated the level of Hg emissions a lignite unit could achieve if it installed ACI. Commenter 17775 states that the EPA's estimate is too low and that the EPA should revisit the wisdom of its "beyond-the-floor" approach. Commenter 17775 adds that should the EPA return to a traditional MACT floor analysis, the MACT floor should be based on the average performance of the best five units, not the best two as the EPA did in developing its proposed MACT limits. Commenter 17722 generally agrees that the proposed Hg emission rate is achievable during normal operation, but that the EPA has not provided sufficient justification for this decision.

Response to Comments 1 - 9: The EPA notes that all of the low rank virgin coal units for which data were submitted in response to the 2010 ICR were meeting the Hg floor limit (11 lb/TBtu). Four of the units have activated carbon injection systems installed and three of the four units tested were also meeting the beyond-the-floor Hg emission limit of 4.0 lb/Tbtu. Those three units were achieving control levels of greater than 95 percent (fuel to stack). Two other low rank virgin coal units meet the beyond-the-floor limit with no installed Hg-specific control technology. The other low rank virgin coal units that are not currently meeting the beyond-the-floor emission limit do not have installed Hg-specific controls (e.g., activated carbon injection). An analysis of the Hg content of the fuel used during the ICR testing suggests that control in the range of 80 – 90 percent (fuel to stack) would be needed to meet the beyond-the-floor limit of 4.0 lb/TBtu. Two facilities met the beyond-the-floor emission limit by achieving 84

percent control with no Hg-specific control technology. Another unit achieved 75 percent control, also with no Hg-specific control technology.

The EPA believes that the decision to require a beyond-the-floor limit for low rank, virgin coal units does comply with CAA section 112(d)(2). Further, the EPA believes that its analysis is consistent with that done for new sources where a single data set is also used. The EPA believes that its beyond-the-floor analysis is appropriate, including the costs analyzed. The EPA's cost analysis is meant to serve as an average recognizing that some EGU's costs will be more and some less; EGUs whose costs are higher are not exempted from the regulation. As with all MACT standards, sources can comply with the final standards through any combination of controls and other mechanisms to reduce HAP emissions. Based on the data available, EPA believes that the beyond-the-floor limit is currently being achieved by at least five units in the subcategory, which indicates that the limits are achievable and achieved in practice.

To the extent one commenter questions our costs assessment, we note that the cost effectiveness numbers in the beyond the floor analysis are consistent with other numbers used to justify regulating mercury emissions under CAA section 112(d). We are not required to specifically consider the value of the benefits as the commenter implies. Comments related to compliance time, reliability of the electrical system, and retirements are addressed in the preamble to the final rule and elsewhere in the record.

Comment 10: Commenter 19214 supports the proposed beyond-the-floor limit for existing EGUs because of the limited data available.

Response to Comment 10: The EPA appreciates the commenter's support.

Comment 11: Several commenters (19536, 19537, 19538) state that the EPA did not adequately justify why it did not evaluate a beyond-the-floor Hg MACT limit for new sources in the <8,300 Btu/lb subcategory. The commenters state that because of the factors that the EPA applied to reflect variability of the best performing unit in the <8300 Btu/lb subcategory, the EPA's proposed MACT floor limit fails to reflect the emissions that have been demonstrated to be achievable at the best controlled similar source in this subcategory. The commenters also state that the EPA's RIA suggests that 90% Hg removal is achievable and cost effective and that such control should be readily achievable at new coal-fired EGU designed for fuel with heat value less than 8300 Btu/lb. The commenters also state that the proposed beyond-the-floor Hg MACT limit for <8,300 Btu/lb subcategory for coal-fired EGUs does not reflect the maximum degree of Hg emission reductions achievable. The commenters reference the control option for lignite burning EGUs to reach below the proposed limit, such as ACI, Hg oxidation and addition of a baghouse with use of halogenated sorbents, blending with subbituminous coal.

Response to Comment 11: The EPA believes the research cited above with regard to the use of ACI for such units supports a beyond-the-floor limit for existing sources, particularly when coupled with the facts that, based on the data available, at least five EGUs in the subcategory are meeting the limit and the cost per ton of controlling Hg to the beyond-the-floor level has been determined to be reasonable. However, we do not believe that the research can, at this time, support a beyond-the-floor limit for new sources in the subcategory. The basis for the new-source limit was an EGU with ACI and a fabric filter so the EPA does not believe at this time that further reductions are warranted. In addition, the EPA does not believe that blending of coal ranks, or fuel switching, should be a mandated compliance option at this time for units in this subcategory given the uncertainty of the costs of implementing such an

approach for all sources in the subcategory, though we believe some sources will voluntarily employ fuel blending/switching to comply with the final existing source standards.

Comment 12: Commenter 17914 states that the EPA has failed to include the cost of a baghouse in its beyond-the-floor analysis. According to the EPA, in order to comply with the proposed EGU MACT rule, units will either fuel switch to a lower Hg fuel or retrofit air pollution controls. The EPA calculated control costs on a dollar per pound of Hg removed basis and determined the average cost of control at $22,496 /pound was acceptable for application of a beyond-the-floor Hg limit for the < 8,300 Btu/lb unit category.

The commenter's Dolet Hills unit would be considered in the < 8,300 Btu/lb unit category. This unit is approximately 719 MW, burns lignite fuel and employs an ESP and a wet scrubber as air pollution controls in series. Because of this treatment configuration, the commenter believes that this unit can meet the proposed MACT PM limits but may not meet the Hg limits. Preliminary testing on similar lignite-fired units indicates that activated carbon injection or similar Hg removal technologies may have limited effectiveness for Hg removal. Therefore, for this unit, it is likely that a baghouse and ACI will be required to meet the Hg limit. According to the EPA's $/lb analysis, no PM control costs were included because of the assumption that these controls would be required anyway to meet the PM portion of the MACT. In the case of Dolet Hills (and possibly many others in this coal subcategory), this assumption is not valid. Cleco reviewed the EPA's methodology to determine Hg removal costs and applied a financial analysis of Dolet Hills Hg cost. For add-on controls, The commenter has used the EPA's CueCost program to determine the capital and operational and maintenance (O&M) costs for the ACI, baghouse (with an air to cloth ratio of 6), and additional fans required because of the baghouse pressure drop. These costs were annualized and a $/lb cost was developed. A similar analysis was performed for a fuel switch to PRB coal and associated ACI controls. The cost estimates are included [See 17925_Table_1.doc].

Although the EPA does not mention an unacceptable cost threshold for the beyond-the-floor basis, the commenter's costs are estimated to be significantly higher than the $22,496/lb average cost estimated by the EPA. If the EPA does decide to keep the beyond-the-floor category, individual units that can demonstrate significantly higher cost of control should be allowed to be exempted from the beyond-the-floor limits.

Response to Comment 12: The cost estimates that are referenced represent what the EPA believes will be the most likely control strategy. The costs will vary at specific locations as different facilities choose different technologies and strategies for a variety of reasons. Some facilities will need to install FF in order to meet the PM emission limit. Some other facilities may choose to install FF in association with implementation of dry sorbent injection (DSI). Still other facilities may not need to install a new FF downstream of an existing ESP for Hg control, but may choose to do so in order to preserve fly ash sales from the primary PM control device. This is no different from other emission limits where the costs will vary by facility. The EPA sees no need to create exemptions from the beyond-the-floor limits and, in any case, we do not believe such exemptions are consistent with the statute. We have determined that the beyond-the-floor level of control is achievable for all sources in the subcategory and commenters have provided no data that indicate our conclusion is in error.

Comment 13: Commenter 17930 opposes the EPA's beyond-the-floor requirement for Subcategory 2 because it believes variability among mines and units will make compliance with the limit virtually impossible, making the limit unattainable and legally invalid. The commenter argues that the data used by the EPA was not indicative of long term ability to meet the EPA's beyond-the-floor Hg limit because

it is based on three samples from a single test at one unit and did not include all test data available for the unit. The commenter believes that the EPA has provided no foundation for its statements that ACI is not being fully maximized. The commenter believes that it is unprecedented and contrary to CAA section 112 for the EPA to set a beyond-the-floor limit based on what they consider to be unfounded speculation. They also believe that the benefits are not justified due to the high costs of compliance. They further note it may be possible to come close to meeting the beyond-the-floor limits when ACI is performing at peak efficiency and the lignite contains uncharacteristically low Hg, but that it is unlikely that most sources would be able to comply with the limits due to lignite variation and ACI control performance variability. The commenter recommends that the EPA keep the proposed Subcategory Hg limit of 11.

Response to Comment 13: The EPA understands that coal is a heterogeneous geologic material and that there will be variability for Hg and other HAP. In setting the emission limit floors, variability (operational, process, fuel, etc.) was accounted for using a methodology that was explained in the proposed rule preamble and in response to comments, and the approach is consistent with the methodology that was used to account for variability in emission limits for other MACT rules. Further, compliance for this rule requires the emission limit to be met as a 30-day rolling average when sources demonstrate compliance on a continuous basis, which further accounts for process operational and fuel variability. The EPA maintains that the final standards adequately account for variability.

4C02 - Beyond-the-Floor Analysis: Halogens for Hg removal

Commenters: 17914

Comment 1: Commenter 17914 states that as a supplier of activated carbon systems, as well as wet and dry FGD systems, the commenter has supplied many AQCS systems with Hg emission guarantees. The commenter also supplies a halogen addition system which has been incorporated with our activated carbon and FGD technologies to optimize the Hg control performance of the combined AQCS trains at several EGUs. The commenter agrees that the ICR database already reflects the performance enhancements associated with the use of halogen addition and that no further beyond-the-floor analysis is necessary.

Response to Comment 1: The EPA thanks the commenter for confirming that the ICR database already reflects the performance enhancements associated with the use of halogen.

4C03 - Beyond-the-Floor Analysis: Activated carbon bed for Hg removal for IGCC (syngas) units

Commenters: 17721, 17801, 17807, 18483, 19214

Comment 1: Commenter 17721 states that the EPA has not justified a beyond-the-floor limit for Hg for new IGCC units. The EPA proposed a beyond-the-floor limit for Hg of 0.0002 lb/GWh (per the revised values posted to Docket EPA-HQ-OAR-2009-0234 on May 19, 2011) for all new IGCC units regardless of coal type. The limit was set to be the same as the new source limits for coal-fired units designed for coal with a heat content of greater than 8,300 Btu/lb. The EPA's choice of the beyond-the-floor Hg limit for new IGCCs is not derived from IGCC test data from the ICR and the EPA has not provided adequate justification of its decision from a technology capability assessment.

According to the commenter, ACI for Hg treatment of coal-derived syngas is not in use in any operating IGCC plant today, nor can it be used in the same fashion as it is used at conventional coal-fired units. An additional concern of commenter is the ability to reliably and accurately measure Hg at the proposed level of 0.0002 lb/GWhr. For example, the EPA's Method 30 B was prescribed by the EPA for the ICR and as a qualifying test method for compliance testing has a MDL of 8 x 10-8 lb/MMBtu. The MDL is more than 3 times higher than the proposed limit, and there is no commercially available CEMS that have demonstrated capability at the required concentration levels. If the required sampling times exceed a 30-day compliance period, utilizing a sorbent trap for monitoring may not be a viable option either. EPRI has also determined that "[t]he method adequacy determination for new coal-fired EGUs ≥ 8,300 Btu/lb also applies to the limits for new IGCCs, where those are the same as for coal EGUs. According to EPRI, mercury cannot be measured at the limit for new IGCCs by any of the proposed methods." The commenter recommends that the EPA review and, revise its floor level for Hg for coal of >8,300 BTU/lb to be consistent.

The commenter states that because of lack of data, the EPA did not propose beyond-the-floor MACT limits for existing IGCC units. The EPA also lacks data with respect to new IGCC units, yet they proposed beyond-the-floor MACT limits for new IGCC sources. The EPA's limits for new IGCC sources are based on beliefs, predictions, projections and design target assumptions. The limits from the 2007 DOE Report referenced in the preamble are based on environmental target assumptions. These IGCC environmental targets were chosen to match EPRI design basis from their Coal Fleet for Tomorrow Initiative. EPRI notes that these were design targets and were not to be used for permitting values. The EPA has simply not justified their process for going beyond-the-floor for new IGCC units. Without sufficient justification, the EPA's actions are unsupported.

Comment 2: Commenter 17801 provides background on GE products that reduce emissions from EGUs. GE developed the IGCC process, in which an economically advantaged fuel such as coal is converted to low heating value, high-hydrogen gas for power generation using a process called gasification. IGCC is a particularly useful technology because it provides a cleaner way to utilize the abundant coal resources in the U.S. and around the world.

Gasification, as it is applied in IGCC, is a partial oxidation process whereby finely ground coal or other solid carbonaceous feedstock is injected (either dry or as a water/slurry mixture) with an oxidant (either oxygen or air) into a high pressure reactor. The partial oxidation process results in high (typically 2,400° F) temperature sufficient to convert the coal's carbon and hydrogen to gaseous components. These components further react within the reducing environment in the gasifier to produce a synthesis gas (syngas) consisting primarily of carbon monoxide (CO) and hydrogen (H_2).

Gas cleanup begins in the gasifier. Due to its high operating temperature, non-volatile metals and inorganic components are melted, the majority of which is separated from the gas and quenched to produce an inert, glass-like slag that is useful for construction and concrete aggregate. The high temperature and reducing environment also provides complete destruction of organic HAP. Subsequently, the syngas is cooled to recover sensible heat, processed through water scrubbing to remove particulate and chlorides, and passed through a carbon bed to remove Hg and other volatile metal contaminants. The syngas is then cooled further prior to scrubbing in an acid gas removal system (AGR) that removes the remaining acid gas components. A sulfur recovery unit then produces a useful commercial byproduct either as pure sulfur or sulfuric acid.

IGCC's process for removal of syngas contaminants is highly differentiated from conventional coal. It can appropriately be considered as a coal refining process. Cleanup processes are applied only on the concentrated fuel and at high pressure and concentrations. This provides favorable kinetics and mass transfer for cleaning processes at a volume that is factor of 300 or more lower than post-combustion cleanup of flue gas. This synthetic coal gas is then used as the primary fuel for advanced, clean burning and highly efficient gas turbines.

Thus, IGCC uses coal as fuel but does so in a "cleaner" way. IGCC can also be viewed as the two-stage combustion of an opportunity feedstock. In this process, the feedstock is first partially combusted in a reactor or gasifier, and then the combustion is completed in the gas turbine.

Comment 3: Commenter 17807 notes that in the proposed rule the EPA refers to existing IGCC units and sulfur-impregnated activated carbon bed as a possible beyond-the-floor technology. The commenter does not believe that sulfur impregnated activated carbon bed technology should be used as beyond-the-floor utility MACT for IGCC units because there is no detailed data to support the effectiveness of the technology. The effectiveness of this technology would be highly variable depending on fuel usage. In addition, the current or past performance of a sulfur-impregnated activated carbon bed has not been documented with any detailed data. Based on the commenter's literature review on this matter, any claim suggesting 90% Hg removal for this technology is not supported by detailed data sufficient to make such a determination. Therefore, the commenter requests that the EPA not include the sulfur-impregnated activated carbon bed technology as beyond-the-floor MACT for IGCC power plants.

Comment 4: Commenter 18483 states that when determining whether or not to establish standards "beyond the floor," the CAA requires the EPA to take into consideration "the cost of achieving such emission reductions, and any non-air quality health and environmental impacts and energy requirements." For the new source IGCC limit, the EPA decided to establish standards more stringent than the best performing source, but did not provide the public with any analysis of the factors which must be considered if the Agency elects to do so. Further, the EPA has not presented any data that the proposed limits are actually achievable. The only information that the EPA cites is a DOE projection for future IGCC emissions (excerpted below).

> "Because of advances in technology, EPA does not believe that even these permitted levels [referring to Duke Energy Edwardsport IGCC currently under construction] are representative of what a modern IGCC unit could achieve. The emissions from IGCC units are normally predicted to be similar to or lower than those from traditional pulverized coal boilers. For example, DOE projects that future IGCC units will be able to meet a...Hg emissions limit of 0.571 lb/TBtu." [76 FR 25049]

Interestingly, the proposed new source IGCC limits are as much as 500 times more stringent than the DOE projections. It seems incomprehensible that the EPA would set a limit based on this rationale. Without the proper analysis, the EPA should base the new source IGCC limits on the best performing IGCC.

Comment 5: Commenter 19214 states that IGCC facilities are capable of much lower emissions of criteria, GHG, and Hg emissions than conventional pulverized coal boiler technology. The commenter has been compiling data from IGCC permit applications they have received and present the following to the EPA in a table. The commenter believes that use of IGCC, (with carbon capture and sequestration) should be encouraged, and that MACT limits should be set that reflect the capabilities of current IGCC technology.

Response to Comments 1 - 5: As discussed elsewhere in this document, the EPA has revised its analyses for new-source MACT for IGCC units.

4C04 - Beyond-the-Floor Analysis: Activated carbon injection for Hg removal

Comment 1: Commenter 12050 states that one consequence of the various regulations at the state level is that Hg emissions control technologies such as ACI have been successfully implemented by a number of utilities across the nation. According to a 2009 study by the Government Accountability Office (GAO), these control technologies are enabling sources to obtain Hg emissions reductions as high as 99%. Moreover, reductions on the order of 90% have been achieved by plants firing different types of coal (i.e., bituminous, subbituminous, lignite) and employing a variety of configurations. Indeed, according to data supplied by utilities as part of the EPA's ICR for the rule, commercially operating plants firing each of the different types of coal have in fact applied ACI to control Hg emissions.

Response to Comment 1: The EPA agrees that ACI options and other control technologies are available for facilities burning bituminous, subbituminous, and lignite coals.

Comment 2: Seveal commenters (19536, 19537, 19538) states that, for bituminous coal-fired units with ESPs, the TOXECON configuration has been used with great success. This technology uses ACI and a downstream polishing baghouse. The E.C. Gaston Unit 3 facility is an example of an EGU that achieved high levels of Hg control with activated carbon in the TOXECON configuration. This unit is a PC boiler burning bituminous coal that is equipped with a hot-side ESP and a downstream compact hybrid particulate collector (COHPAC) fabric filter. It measured little to no Hg removal across the ESP or across the COHPAC before injection of activated carbon, but with ACI, Hg removal ranged from approximately 30 to 90 percent+ depending on the sorbent used and the injection concentration.

The use of halogenated sorbents has similarly been shown to be effective at removing Hg at both subbituminous as well as lignite-fired power plants. Testing of halogenated sorbents was conducted at the subbituminous coal-burning Holcomb Station Unit 1 in Garden City, Kansas. The halogenated sorbent injected upstream of the dry scrubbers achieved greater than 90 percent removal at an injection rate of 4.0 lb/MMacf.

As previously stated, the EPA assumed brominated activated carbon would be used in its cost analysis for the Hg MACT. Brominated Powdered Activated Carbon (B-PAC™) is a halogenated sorbent that has been tested at least at seven different power plants, including four full-scale tests. Hg removal rates ranged from 70% to 98% across a wide variety of coal and configurations and at low sorbent injection rates.

The level of Hg removal achievable with ACI is generally based on two factors: the carbon injection rate and the particulate control device(s). With respect to the ACI rate, the amount of Hg removed typically increases with an increase in the amount of activated carbon injected, up to a point. The primary impediment to higher amounts of sorbent injection are simply the costs of the sorbent. Regarding the particulate control device, Hg emissions testing experience has shown that fabric filters are more effective in removing Hg than ESPs, because the buildup of sorbent on the bags provides more avenues for Hg adsorption as the flue gas passes through the baghouse and also because baghouses provide longer gas residence times in comparison to an ESP. A lower cost option to installation of a full-scale baghouse is to install a COHPAC, which is a polishing baghouse added downstream of an existing ESP.

In projecting costs for ACI to achieve 90% control in its IPM policy case run, the EPA assumed a higher carbon injection rate for units with ESPs as compared to baghouses. Further, the EPA assumed installation of a fabric filter was required for EGUs in three scenarios: 1) EGUs with ESPs that cannot

handle the increased particulate loading from the ACI, 2) when flue gas conditioning is needed with the ESP, and 3) when PRB coals are burned.

The pollution controls needed to achieve a 90% reduction in Hg at each EGU will provide numerous benefits to public health and the environment, not only in reduced Hg and in reductions in the myriad of health and environmental impacts that Hg poses, but also in reductions of fine particulates, which adversely impact public health and cause regional haze, the reductions of metal HAP, among other pollutant reductions that a stringent MACT rule will result in. The EPA's analysis shows these extensive environmental improvements, with the EPA's projections of the net benefit of the MACT rule estimated to be $48 to $130 billion based on 2007 dollars. Those benefits strongly suggest that a beyond the floor MACT level of Hg control representing 90% removal would be appropriate, under the governing legal standard.

Response to Comment 2: The EPA is aware of the successful implementation of the TOXECON configuration, which offers several advantages for facilities that choose to implement it. Overall, we believe that there are numerous control technology/strategy options available to meet the final Hg emission limit. Several of these available control technologies were being implemented by the 2010 ICR "best performing" units for Hg emissions. The Hg emission limits that were set using that available data are projected to reduce nationwide Hg emissions from EGUs by approximately 90 percent.

4C05 - Beyond-the-Floor Analysis: Other

Commenters: 16122, 17402, 17620, 17768, 17801, 17813, 17846, 17852, 17904, 17930, 18421, 18423, 18487, 19536/19537/19538, 18023

1. Support for beyond-the-floor limits for coal-fired EGUs designed for less than 8,300 Btu/lb.

Comment 1: Commenter 17620 supports the EPA's proposed limits because they will lead to significant Hg emission reductions, but believes that many of the assumptions underlying the calculation of certain MACT floors are unsupported and/or inappropriate.

Response to Comment 1: The EPA has reviewed the calculations used to set MACT floors and believes that the emission limits are supported and appropriate.

2. Opposition to beyond-the-floor limits for new IGCC units.

Comment 2: Commenter 18023 disagrees with the EPA's decision to set a beyond-the-floor limit for new IGCC units. Commenter 18023 states that the EPA must consider the cost, health, and environmental impacts, and energy requirements before establishing any "beyond-the-floor" standards. The commenter notes that the EPA stated in the preamble to the proposed rule that the agency lacked the information upon which to base the costs and non-air quality health, environmental, and energy impacts (see 76 FR 25049). The commenter argues that the EPA's failure to conduct such a review is a violation of the CAA.

Comment 3: Commenter 17801 argues that the EPA incorrectly based the EGU MACT requirements solely on the design, operation and performance that is representative of traditional coal plants equipped with conventional air pollution control as applied to flue gas. The commenter argues that IGCC is fundamentally different from the combustion of coal in that pollutants are removed pre-combustion versus post-combustion, and requires less water, consumes fewer reagents and produces useable byproduct that avoids the large volumes of waste product compared to a traditional coal plant. The commenter claims that IGCC can achieve Hg removal efficiencies of 95% or higher, and that the CO_2 generated is in a relatively concentrated stream that could be captured and used to enhance oil production, or otherwise sequestered. The commenter believes IGCC is a better technology for coal power generation than conventional coal-fired plants; however, the EPA failed to provide the necessary technical analysis to support its beyond-the-floor evaluation for the new source MACT limits in subpart UUUUU. The commenter believes that the EPA's failure to complete the proper technical evaluation resulted in uncertainty and lack of clarity regarding IGCC operation, monitoring, testing and alternative compliance options.

Response to Comments 2 - 3: The EPA has adjusted the Hg emission limit for IGCC units in the final rule. The Hg emission limit for such units is no longer based on a beyond-the-floor analysis.

3. Support for EPA's decision not to adopt beyond-the-floor limits for all EGUs.

Comment 4: Commenter 17402 believes that the EPA has properly exercised its discretion in declining to set beyond-the-floor requirements for all EGU subcategories.

Response to Comment 4: The EPA acknowledges the comment.

Comment 5: Commenters 17402 and 17813 agree with the EPA's decision that fuel switching should not be used to set beyond the floor standards. Commenter 17402 agrees with the EPA findings that (1) the expense of requiring coal-to-gas fuel switching would be unreasonable given the limited emission reductions that would be achieve, and (2) that coal-to-gas fuel switching is infeasible. This commenter notes that the EPA's decision that coal-to-gas fuel switching is not cost effective is consistent with past EPA decisions that more stringent beyond-the-floor standards are not cost-effective when costs exceed $3,500 per ton of HAP removed.

Commenter 17402 also notes that requiring fuel switching for all EGUs would run contrary to the stated U.S. energy policy of safeguarding fuel diversity. The commenter believes that fuel diversity is crucial to electricity production because no individual fuel can provide the energy to meet all of the U.S.'s electricity needs. They further note that fuel diversity protects the economy from fuel unavailability, sudden price shocks, and changes in regulatory practices.

Commenter 17402 believes that the EPA's decision not to require coal-to-gas fuel switching is supported by case law and cites *Sierra Club v. EPA*, the D.C. Circuit in which the court upheld the EPA's refusal to require copper ore switching as a beyond-the-floor standard for primary copper smelters, in part because of the unpredictable availability of cleaner ore (*See Sierra Club v. EPA*, 353 F.3d 976, 988-89 (D.C. Cir. 2004). The commenter agrees with the EPA's conclusion that coal-to-gas fuel switching is not a viable option for all EGUs because natural gas pipelines are not available in all regions of the U.S. The commenter further notes some sources located in large metropolitan areas may have difficulty in obtaining a dependable supply of natural gas either because of inadequate infrastructure or limited supply.

Commenter 17813 notes that the San Miguel power plant in Texas does not have the infrastructure (e.g., rail line, rail unloading stations, coal transport areas) to begin burning other types of coal and that local jobs in nearby lignite mines would be lost and the local economy hurt if the EPA required fuel switching. This commenter also states that the EPA's cost estimates for facilities to switch to other coal-types is incomplete because it does not include infrastructure costs such as dust collection, conveyors, fire protection, ventilation, ESP performance and water cannons.

Commenter 17402 believes that the EPA's determination not to require fuel switching as a beyond-the-floor emission limit is supported by the significant adverse impacts on non-air quality health, environment, and energy that would result from retrofitting EGUs and constructing new natural gas pipelines.

Response to Comment 5: The EPA acknowledges comments supporting the determination not to require fuel switching as a beyond-the-floor emission limit.

Comment 6: Commenter 17402 agrees that the EPA properly rejected the option of using multiple controls (e.g., multiple scrubbers) to set beyond the floor limits. Commenter 17402 agrees with the EPA's determination multiple controls would not be cost effective. The commenter argues that where a control device achieves 98% reduction, a duplicate control would only achieve an additional reduction of around 1.5%. The commenter notes that the estimated cost of duplicate ESP could be greater than $10,000 per ton removed.

Commenter 17402 states that duplicate controls would also result in secondary energy and environmental impacts. Operating duplicate controls, this commenter notes, will require an additional 2 to 3% of plant electricity output beyond required for existing controls, which would result in increased GHG and NO_X emissions. The commenter further notes that duplicate controls would cause a number of non-air quality environmental impacts, such as increased waste generation and additional water quality impacts that result from increased mining.

Commenter 17402 states that Utility MACT floor standards already require state-of-the-art control technology and that there are no additional technologies that would allow greater emission reductions. This commenter notes that the D.C. Circuit has upheld the EPA's decision to not set beyond-the-floor emission standards where the EPA does not have sufficient data for quantification of the costs or benefits of a particular emission reduction program (see *Sierra Club v. EPA*, 167 F.3d 658, 666 (D.C. Cir. 1999) and *Sierra Club v. EPA*, 353 F.3d 976).

Response to Comment 6: The EPA acknowledges comments supporting our decision to reject the option of using multiple controls in series as a beyond-the-floor emission limit.

4. Disagreement with EPA's decision not to adopt beyond-the-floor limits for all EGUs.

Comment 7: Multiple commenters (16122, 17768, 17846, 18487, 19536, 19537, 19538) disagree with the EPA's decision to not adopt beyond-the-floor limits for all EGUs. These commenters believe the proposed EGU MACT violates the CAA by not setting beyond the MACT floor standards where they are achievable and failing to provide evidence that a more stringent standard is not achievable. Commenter 18487 urges the EPA to set floors that reflect the actual performance of the best performers in this industry, and conduct a beyond-the-floor analysis sufficient to ensure that the standards demand the maximum achievable reduction in hazardous air pollution.

Response to Comment 7: The EPA is required to establish MACT floors based on actual data and the agency considers the data it has at the time it proposes and establishes the emissions standards. The EPA is not authorized to consider costs or other factors when establishing the MACT floors which are based on the levels "achieved" by existing sources. *See* CAA section 112(d)(3). After the EPA establishes the MACT floors, we must determine whether standards beyond-the-floor are achievable taking into consideration the additional costs and non-air quality health and environmental impacts and energy requirements of further HAP emission reductions. *See* CAA section 112(d)(2). In making that determination, the agency generally considers whether the incremental reductions that may be achieved with a standard stricter than the MACT floor are reasonable in light of the statutorily mandated considerations. The EPA must also consider the controls and other practices (e.g., coal washing) that best performing sources employ to achieve HAP emission reductions to determine the additional steps that may be taken to further reduce HAP emissions.

For example, a best performing unit that employs coal washing (a common industry practice), a baghouse, and a scrubber and it is currently meeting the existing source standards may have to install ACI to achieve additional Hg reductions. The agency then determines if the costs and non-air quality health and environmental impacts and energy requirements associated with ACI are reasonable to achieve additional reductions greater than the floor limit. In the proposed rule, the EPA determined that it was not reasonable to go beyond the floor for most HAP and most subcategories because the additional reductions would be low in almost all cases because the MACT floors already achieve about 90% reductions or greater of HAP emissions. The EPA concluded that the suite of controls necessary to

achieve all the floor standards would mean that multiple controls in series was likely the only viable option to achieve additional reductions and that level of cost would not be reasonable to achieve the relatively small level of additional reductions. The commenters are correct that the EPA did not quantify the costs of taking these additional actions, but the agency explained that we could not determine how much additional HAP would be reduced based on the installation of those controls because the control efficiencies of the controls is not generally known for controls at above the MACT floor levels. The EPA does know the costs of additional controls, and also knows the best case level of additional reductions (less than 10%), and, based on these facts, it is reasonable to conclude that the additional costs and other considerations argue against establishing a beyond-the-floor standard. The EPA believes that it has fulfilled the CAA mandate with regard to its beyond-the-floor analyses as set forth in the proposed rule and explained further below in response to additional comments.

The commenters also appear to take issue with the manner in which the agency establishes the floor in this comment. The EPA explained elsewhere in this document and in the proposed rule that it is reasonable to account for variability in establishing the MACT floors because the standard is supposed to represent the level of control achieved in practice over varying operating scenarios and HAP emissions vary for any number of reasons. Commenters' assertion that the beyond-the-floor level of control for Hg should be based on the average emissions before the agency accounts for variability is not legitimate because the agency does not believe that level of control is achieved in practice as contemplated by the statute. Instead, we believe that sources would likely have to install duplicate controls for small additional reductions of Hg and other HAP. We do not believe that approach is reasonable considering the additional cost of taking such action.

Comment 8: Several commenters (19536, 19537, 19538) argue that because of the EPA's adjustments for variability, EGUs can and do achieve reductions well in excess of the MACT standards. The commenters believe that CAA requires the EPA to investigate whether methods or techniques are available to and to justify its standard by "taking into consideration" costs, reductions achieved, non-air quality environmental impacts, and energy requirements. The commenters argue that the EPA has provided no substantive discussion of those criteria to justify its standards, has failed to provide an analytic basis for its limits, and has used inconsistent and arbitrary rationales for its decisions. The commenters believe the EPA's rationale for setting beyond-the-floor Hg limits for units designed for coal of less than 8,300 Btu/lb, but not for other types of EGUs based on availability of technology and lack of data to evaluate cost effectiveness was inconsistent.

Response to Comment 8: The EPA believes its MACT floor analyses are consistent with the statutory requirements of CAA section 112 and with the Court's interpretations of the statute. We believe that we have reasonably accounted for variability in the analyses as provided by the Court's decisions. We also disagree that we have been inconsistent and arbitrary in the rationales or analyses.

Comment 9: For existing EGUs burning bituminous and subbituminous coal, Commenters 16122 and 17846 state that the EPA has not adequately supported its assertion that going beyond the MACT floor is not achievable because the EPA could not identify HAP emissions reduction approaches that could achieve greater emissions reductions of HAP than the control technology combination(s) (e.g., FF, carbon injection, scrubber, and GCP) that is expected to be used to meet the MACT floor levels of control (and that are already in use on EGUs comprising the top performing 12% of sources). Commenters 16122 and 17846 state that the EPA failed to provide any analysis of the types of controls that the top 12% of performers used during the EPA's 2010 information collection request. Without an analysis of the specific types or extent to which such Hg emission control technologies were actually

being used at the time of the ICR, these commenters believe the EPA has no basis for its assertion that further reductions are not achievable.

Response to Comment 9: The EPA has confirmed the controls in-use for the top 10 EGUs in each of the HAP groups (i.e., Hg, acid gas, PM). Confirmation of the controls in-use for these sources reaffirms the fact that the EPA cannot identify any HAP emissions reduction approaches that could achieve greater emissions reductions of HAP other than to include the control technologies necessary to comply with the MACT floor in combination (e.g., multiple FFs or scrubbers). The presentation of the types of controls that the top 12% of performers used during the EPA's 2010 ICR is included on the MACT Floor Analysis spreadsheets. Furthermore, the EPA directed sources in the ICR to conduct the HAP emissions testing during normal load conditions using the control devices as required by their title V permits so the agency believes it is reasonable to conclude that the emission controls were functioning normally. In any case, the EPA is required to base standards on the information available at the time. The EPA will never have a perfect data set and the EPA must make reasonable assumptions about the data it has when determining whether a beyond-the-floor standard is achievable consistent with CAA section 112(d)(2). Thus, the EPA has considered the data and maintains that reductions are not achievable except as otherwise indicated, which is not achievable once costs are taken into consideration.

Comment 10: Commenter 16122 states that the CAA requires the EPA to set MACT standards based on what is achievable rather than setting a standard on what has been achieved. The commenter notes that the EPA's beyond-the-floor analysis is based solely on data collected for the 2010 ICR and that much of these data represents the emissions achieved by EGUs that were unconstrained by any Hg control requirements. The commenter notes that the data ignores inexpensive modifications that operators can make to reduce mercury emissions, such as fuel blending, optimizing combustion conditions, and tweaking mercury control devices.

Commenter 17626 states that there are many ways to achieve the final standards through the use of a portfolio of air pollution control technologies. Using many of these technologies can achieve the same effect as previously noted in discussions of co-benefits. For instance dry FGD systems can achieve both very high sulfur removal and acid gas removal. Systems such as NID technology are particularly effective. Similarly, the commenter believes upgrading of existing equipment such as many ESPs with state of the art high frequency power supplies, off flow rapping, etc., can meet the standards without requiring fabric filter installations on many power plants. Consideration of wet ESP technology may also be a way to meet these requirements by addition at the back of the process train, avoiding the need to for major interruptions associated with fabric filter replacement of dry electrostatic precipitators.

Response to Comment 10: To the extent that modifications suggested by Commenter 16122 were in-place during any of the 2010 ICR testing, then the data available to the EPA include the impacts of such modifications. For example, the EPA reported in the 1998 "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress" (Utility Study) that approximately 77 percent of eastern and Midwestern coal shipments were subjected to some physical cleaning process. It is not expected that percentage will have decreased in the intervening time period and, thus, it is likely that a significant portion of the coal used by EGUs conducting testing under the 2010 ICR and using bituminous coal were using "washed" coal. Other EGUs blend coal for a variety of reasons; various blends are reflected in the data used to establish the MACT floor levels. Further, the EPA is aware that at least one EGU was employing bromine sprayed on the coal before combustion as a means of adding halogen for Hg control (EPA-HQ-OAR-2009-0234-2067). In addition, EGUs

supplying data through the 2010 ICR that are located in Connecticut (Bridgeport Station), Massachusetts (Somerset Station, Salem Harbor), New Jersey (Logan Generating Plant, Chambers Cogeneration, B.L. England, PSEG Mercer and Hudson, Deepwater), Illinois (Dallman, Havana, Hennepin, Waukegan, Will County, Joliet 9 and 29, Crawford, Meredosia, Joppa Steam, Lakeside, Duck Creek, Fisk, Newton, and Powerton), Montana (Colstrip, Hardin Generator Project), and Wisconsin (Elm Road, Pulliam, South Oak Creek, Valley, and Weston), are subject to EGU-specific Hg limitations that were likely in effect during the period of data gathering and the effect of which is reflected in the data they submitted.

In any event, commenters are incorrect to the extent it implies that the agency is required to set standards at beyond-the-floor levels of control. CAA section 112(d)(3) sets the minimum stringency level of control and the EPA may only establish more stringent beyond-the-floor standards if we determine that such level of control is "achievable" after considering costs and non-air quality health and environmental impacts. As stated above, the EPA must determine that standards are achievable based on the information the agency has when establishing the standards. The EPA does not have data or other information beyond that noted above that indicates the level of reductions that might be achieved beyond the floor based on the identified practices, but, as noted above, the EPA does not believe based on that available information that a standard that requires multiple redundant controls to achieve only marginal additional reductions are reasonable from a cost perspective. Commenters have not provided data or other information that causes us to revise this determination.

The EPA agrees with commenter 17626 that there are many ways to meet the final standards.

Comment 11: Several commenters (16122, 19536, 19537, 19538) believe that the EPA failed to consider all of the available methods for reducing emissions in its beyond-the-MACT-floor analysis. According to these commenters, section 112 makes clear that achievable emission reductions is not limited to consideration of a single control technology, but must be based on a consideration of all available control options. Commenter 16122 states that the EPA's analysis excludes all control technologies other than ACI and conventional criteria pollutant control technologies because it lacks the data to assess whether any other technology would provide additional control. This commenters submitted documents analyzing available technologies that are effective at reducing Hg emissions. By focusing only on ACI and not considering all available control methods in setting a MACT standard, the commenters believe the EPA is violating the requirements of CAA section 112(j) as well as the EPA's Trust Responsibility to tribes, and the requirements of the Environmental Justice Doctrine.

Several commenters (19536, 19537, 19538) disagree with the EPA's statements that no control technologies could be identified that could achieve greater Hg emission reductions of HAP than those control technologies expected to be used to meet the MACT floor. The commenters believe that methods exist to reduce Hg emissions below the EPA's proposed standard. The commenters believe the EPA did not adequately review ACI control systems, arguing that ACI is not a single technology, but rather a generic approach for Hg reduction in coal-plant exhaust gas streams and that different injection systems use different types and amounts of carbon (per unit of flue gas volume). The commenters note that utilities have used carbons of varying surface areas, different impregnated agents (such as bromine) to enhance Hg removal, and different injection rates. The commenters believe the EPA should have considered all such alternative design specifications for ACI systems in its analysis.

Commenters (19536, 19537, 19538) also assert that the EPA has assumed that the best controlled source of Hg could not further reduce its emissions. The commenters note that in the EPA's analysis most of the lowest Hg emitting units do not have ACI and asserts that in evaluating whether to propose a more

stringent emission rate than the MACT floor, the EPA should not assume that new units cannot lower Hg emissions any lower than the MACT floor. The EPA should perform a beyond the floor analysis, argues the commenters, to ensure that it is setting a MACT emission limit for new sources reflective of the maximum achievable reduction in Hg emissions.

Response to Comment 11: Commenters noted a number of other technologies, claiming that "all of which have been shown to be effective at reducing mercury emissions" that could be used on EGUs (e.g., coal cleaning, boiler treatment additives, fuel blending, fixed sorbent beds, treated activated carbons, halogen impregnated carbons, non-carbon sorbents, and electrocatalytic oxidation). As noted elsewhere, to the extent that any of these technologies were employed by EGUs during testing to acquire data that was submitted in response to the 2010 ICR, those data are included in the MACT floor analyses (e.g., coal cleaning, treated or impregnated carbons, boiler treatment additives; other technologies could have been in use but were not reported through the 2010 ICR). Technologies that may have been employed or that might be employed but for which the EPA has no current data have not been considered in the beyond-the-floor analyses because where the EPA has full-scale data on control technologies, it does not believe it appropriate to use data from pilot or other small-scale testing.

Comment 12: Commenter16122 states that the EPA should have considered substituting higher ranks of coal for lignite, arguing that this type of process change and material substitution is required by CAA to be part of any beyond-the-floor analysis. The commenter states further that this approach does not involve many of the complications of switching from coal to natural gas because bituminous and subbituminous coals are accessible and highly abundant, and in the design phase of new EGUs, facility developers can choose to burn bituminous or subbituminous coals without having to consider the costs associated with retrofitting their units.

Similarly, Commenters 17768 and 17852 also believe that fuel switching is an appropriate technology to consider in a beyond-the-floor analysis. Commenter 17768 notes that every fuel source has its own risks (both in terms of price and availability), and believes that the theoretical possibility of supply shortages in some parts of the country should not prevent the EPA from adopting beyond-the-floor standards based on fuel switching. This commenter suggests the EPA consider setting a standard that contains regional variations where verified and significant cost differences in different geographical areas exist.

Commenters 17768 and 18423 disagree with the EPA's cost-effectiveness analysis. Commenter 17768 states that new EGUs would not experience the same costs of fuel switching that existing EGUs face and notes that the EPA did not quantify the benefits of emission reductions from fuel switching in the RIA or C2G TSD. This commenter believes the EPA should perform further analysis of fuel switching as a beyond-the-floor regulatory option and carefully consider how fuel switching might facilitate compliance with other rules (like the Transport Rule). Commenter 17768 also believes the EPA has not adequately explained why a de facto bar on new coal-fired EGUs would be unreasonable. Commenter 18423 argues that whether or not fuel switching would effectively prohibit new coal-fired EGUs is not a valid consideration under CAA section 112 because there is no provision in section 112 that allows the agency to consider the competitive or commercial impacts of a control option on new sources burning a particular fuel. The EPA's rationale, argues the commenter, is an example of "reasoning divorced from the statutory text" (*see Massachusetts v. EPA*, 549 U.S. 497, 532 (2007)).

Commenter 18423 disagrees with the EPA's determination that fuel switching results in limited emissions reductions. The commenter notes that the EPA has concluded not to regulate gas-fired EGUs under CAA section 112. This commenter also believes that the EPA has not adequately explained why

there are uncertainties in determining the non-air quality health and environmental impacts of fuel switching.

Commenter 17852 suggests for new units the EPA require a case-by-case basis as part of the permitting requirements to assess whether natural gas is available. The commenter recommends that case-by-case consideration of alternative fuels should remain limited to types of alternative fossil fuel-fired electric generating units that generate a similar product (e.g., non-intermittent electric power) that can be generated from the same site footprint as proposed by the permit applicant. Setting a MACT floor for the regulated HAP for coal- and oil-fired units and then requiring a case-by-case review if natural gas is available, the commenter argues, is consistent with the MACT regulatory structure.

Response to Comment 12: The EPA is aware of Hg control technologies, including the various options for implementation of ACI. Units using ACI were among those that represented the best performing units and were thus accounted for in setting the limit for units burning coals >8,300 Btu/lb.

Existing EGUs designed to burn low rank coals cannot burn high rank coals without making modifications to the boiler and establishing transportation links to the sources of the higher rank coals. Such units can co-fire medium rank coals but not before combustion testing has been undertaken to establish the suitability of co-firing the medium and low rank coals. In addition, transportation links are not always currently present. In any case, some of the sources in this subcategory already blend coals and others may choose to blend coals in addition to upgrading control equipment to comply with the beyond-the-floor standard that the EPA proposed and is finalizing in this rule. Given the uncertainty surrounding the availability of alternative coals, we are unable to evaluate the costs of converting all low rank, virgin coal-fired EGUs to different coals or other fuels. Commenter has likewise provided no data or information that would allow us to adequately characterize the costs; therefore, we believe it would be unreasonable to establish a beyond-the-floor standard based on fuel switching.

Comment 13: Commenter 16122 believes the EPA failed to provide support for its decision not to set beyond-the- floor requirements for new lignite sources. The commenter argues that the EPA ignored numerous studies showing the effectiveness of a number of alternative Hg control technologies. The commenter cites an example of a study in which ACI and the use of Hg oxidizing fuel additives resulted in Hg reductions of greater than 90%. The commenter states that by not setting beyond-the- floor limits for new lignite EGUs, the EPA has created an incentive for facilities to install new EGUs that burn dirty coal. This decision, the commenter states, lacks justification and violates the CAA, the EPA's Trust Responsibility, and its obligations under the Environmental Justice Doctrine. The commenter states that if the EPA does not remove the lignite subcategory for new EGUs, then it must set beyond-the-floor requirements for new lignite units.

Response to Comment 13: As explained above, the agency must base the standards on the information the agency has available to it at the time it establishes the standards. The EPA has not identified other mechanisms to reduce Hg from this subcategory other than to require duplicate controls in series and, because the standards are already stringent, the additional Hg reductions cannot be justified based on the costs of the controls. Confirmation of the controls in-use for these sources reaffirms the fact that the EPA cannot identify any HAP emissions reduction approaches that could achieve greater emissions reductions of HAP other than to include the control technologies necessary to comply with the MACT floor in combination (e.g., multiple FFs or scrubbers). Given that the EPA has sufficient data obtained from full-scale, operating EGUs, it does not believe it appropriate to use data from pilot-

scale technologies that have not moved to full-scale, long-term operational status. Companies are free to utilize such technologies in complying with the rule.

Comment 14: Several commenters (19536, 19537, 19538) outline the EPA's proposed HCl MACT floor and technology expected to be used to achieve it. The commenters believe the HCl emission rate of 0.0001 lb/MMBtu is achievable with the expected technologies. Commenters point out that 54 of the EGUs tested in the ICR already have actual HCl emission rates in compliance with this limit and more than half of the 131 EGUs considered by the EPA as the lowest HCl emitting units are achieving greater than 99% HCl emission control, which agrees with the commenters' findings. The commenters agree that there are beyond-the-floor technologies and methodologies that can achieve greater HCl reductions than the prescribed MACT standard.

Commenters state that several owners of coal-fired EGUs have claimed that low HCl emission rates can be met continuously. An example is Longleaf Energy Associates who have obtained a permit for a 2 unit 1200 MW power plant with HCl emissions under the proposed limit. The commenters report that the plant will burn subbituminous coal, but is permitted to burn up to 100% Central Appalachian coal and each unit will have a dry scrubber and baghouse. The commenters point out that the permit imposes a limit of 10 tpy for any single HAP. The commenters claim there are numerous "synthetic minor" permits issued to coal-fired EGUs which will keep HCl emissions below 10 tpy with planned SO_2 scrubbers. Commenters point out that the HCl emission rates reflective of compliance with the permits are less than the EPA's proposed HCl emission limit, indicating that a beyond-the-floor limit are considered feasible and achievable by utility companies and state agencies. Commenters state that existing EGUs use the same technologies as new units, so they can achieve very high levels of SO_2 and HCl removal as well.

The commenters explain that for EGUs with wet scrubbers, an upgrade to a magnesium-enhanced lime scrubber process can achieve up to 99% SO_2 removal. In 2000, the commenters report, 4300 MW of older magnesium-enhanced lime wet scrubbers were converted to the improved version. Other changes to improve removal efficiencies include improving gas flow distribution through ductwork changes, improving spray level coverage, adding frothing trays, increasing liquid to gas ratio and injecting dibasic acid. In addition, dry scrubbers can be upgraded using performance additives or more reactive sorbent to improve removal efficiencies or an increase in the pulverization of the sorbent and/or a redesign of the slurry injection system or atomizer.

Commenters state that the EPA had no justification for not considering beyond-the-floor emission limits achievable through available technologies and methods, including further reductions by use of technologies used by some sources in the dataset which established MACT floor. The commenters point out that the proposed HCl emission limit is being met by all of the units that the EPA considered to be the lowest emitting 12% of coal-fired EGUs, which are equipped with a wide range of control technologies. The commenters state that the best way for the EPA to ensure that its HCl MACT limit requires continuous emission reductions is to require compliance be measured by HCl CEMs. This would ensure reductions and account for variability via an HCl limit with a long term averaging time, and allow adjustments to be made to operation of the SO_2 controls to optimize HCl removal. Commenters believe a long term average HCl limit truly reflective of the maximum degree of achievable HCl emissions measured by CEMS allows the EPA to account for expected variability in emissions although motivating EGU operators to achieve the lowest HCl levels on a continuous basis.

Response to Comment 14: The EPA does not agree that there are a wide array of available beyond-the-floor controls that can limit HAP emissions in a cost effective manner for the existing source

subcategories. Commenters' unsupported statements that alternative measures can be implemented are not sufficient to justify a beyond-the-floor standard consistent with CAA section 112(d)(3). We explain above why many of the suggested approaches are already considered in the MACT floor setting process and we need not revisit those here. We have also included in the final rule provisions for use of HCl CEMS or manual stack testing for compliance.

Comment 15: Several commenters (19536, 19537, 19538) disagree with the EPA decision to not set beyond-the floor limits for $PM_{2.5}$. The commenters believe controls capable of achieving lower PM emissions exist. The commenters cite the EPA's ETV test results and notes that some filters (e.g., Daikin's AMIREXTM, PTFE membrane filters, and W.L. Gore's L36501) achieve better control of smaller particles (and thus HAP). Commenters believe that some new EGUs are achieving substantially lower particulate emissions than those required by standards.

Response to Comment 15: The EPA believes that its decision to not set beyond-the-floor emission limits for PM is reasonable based on the available information. Although the EPA does encourage use of the best performing filters, there is simply not enough long term performance data under actual power plant conditions to justify establishing a beyond-the-floor standard based on filter efficiency.

Comment 16: Commenter 17801 discusses the advantages of various filter bags (i.e., conventional, pleated, and ePTFE membrane laminate) and their potential for achieving high removal efficiency of particulates from coal-fired plants. The commenter discusses the advantages of using a combination of ePTFE membrane and blended filter media in a high temperature pleated element and notes results of independent testing showing enhanced Hg removal effectiveness (including at elevated temperatures of 345 ^{o}F).

Response to Comment 16: The EPA believes that its decision to not set beyond-the-floor emission limits for PM is reasonable based on the available information. Although the EPA does encourage use of the best performing filters, there is simply not enough long term performance data under actual power plant conditions to justify establishing a beyond-the-floor standard based on filter efficiency.

5. The EPA should adopt a comprehensive Energy Assessment and Benchmarking Program.

Comment 17: Commenter 18421 recommends that the EPA adopt a comprehensive Energy Assessment and Benchmarking Program similar to that included in the NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, 75 FR 32006. The commenter suggests that the EPA use a four-part program consisting of the following:

- Require facilities to perform an energy assessment using EPA's ENERGY STAR facility Energy Management Assessment Matrix and then to develop an energy management program according to the ENERGY STAR Guidelines for Energy Management (75 FR 32027).
- Require facilities to implement energy efficiency measures identified in the facilities' energy assessment consistent with section 112 of the CAA.
- Establish a performance benchmarking program to ensure that available and cost effective energy savings and pollution reductions are achieved.
- Regularly evaluate the effectiveness of the energy assessment, benchmarking, and implementation program.

Commenter 18421 notes that the 2009 report "Coal-Fired Power Plant Heat Rate Reductions," by Sargent & Lundy, LLC identifies many available heat rate reduction options.

Response to Comment 17: The EPA has considered implementation of such a program as part of this rulemaking but has decided not to do so. An energy efficiency assessment and benchmarking program may be considered instead in the EPA's forthcoming CAA section 111 rulemaking for GHG emissions.

6. The EPA should adopt market-based beyond-the-floor standards.

Comment 18: Commenter 17768 recommends that the EPA create a tradable emissions permit market for HAP as part of the CAA section 112(d) beyond-the-floor standards. The commenter suggests that a market-based mechanism could consist of anything from tradable performance standards to a nationwide emissions budget with an allowance auction. The commenter considers a cap-and-trade system to be the best approach to ensure emission reduction and recommends the market design take into consideration local characteristics and concentrations of pollutants to avoid pollution hotspots. The commenter also suggests that the cap be lowered over time so as to reflect the rate of technological development.

Response to Comment 18: The EPA is unsure how we could establish a trading program as a beyond the floor alternative and we are also unable to estimate the costs of implementing such a program; therefore, we are not creating a tradable emissions permit market for HAP in this final rule.

7. Concerns with differences between MACT standards for new and existing units.

Comment 19: Commenter 17768 expresses concern that less stringent standards for existing units distort the economic incentives facing plant owners when deciding whether to modernize or replace a plant. Stricter standards for new and substantially modified plants, the commenter argues, make building a new plant or substantially modifying an old plant more expensive than otherwise would be the case, resulting in older plants operating longer than is economically efficient. The commenter recommends that the EPA consider ways in which the Utility MACT could be improved to combat grandfathering's negative impacts.

Response to Comment 19: CAA section 112(d) establishes the manner is which MACT standards must be set. Limits for existing sources are based on the top performing 12% of existing sources (or best performing 5 sources for categories and subcategories with less than 30 sources) whereas the limits for new sources are based on the best performing similar source. Although the Courts have determined that variability may be considered, because of the differences in the pool of data from which the limits are calculated, it almost invariably follows that the new-source limits will be more stringent than the existing-source limits, an outcome we believe Congress intended. That result is particularly likely here where the agency has data on a large number of EGUs. The EPA has complied with the statute in setting emission MACT limits for this rule.

8. Concerns with MACT Floor for standards for HCl.

Comment 20: Several commenters (19536, 19537, 19538) believe the EPA has not properly evaluated the MACT floor standards for HCl. The EPA took the average emission rate of the 131 lowest HCl emitting EGUs for which it had HCl emission data. The commenters are concerned that this approach may not have the lowest emitting 131 (12%) coal-fired EGUs because not all of the units included the dataset have SO_2controls. Commenters believe that this approach likely resulted in an HCl MACT floor

emission rate that is high. Commenters further note that the 0.0020 lb/MMBtu MACT floor emissions rate for existing sources is higher than the HCl rates actually emitted by any of the 131 EGUs in the EPA's dataset and that the data suggests control technologies in use by those sources can achieve greater emission reductions than the MACT floor. The commenters believe that the EPA's HCl emission data implies that EGUs may not have to install scrubbers to meet the EPA's HCl MACT floor for existing sources, and some EGUs may not have to install any SO_2 controls. Commenters argue that there are beyond the floor techniques and methodologies that must be at least considered by the EPA in setting the existing source MACT standard for HCl.

Response to Comment 20: The methodology for setting the HCl floor – and including variability attributable to operational, process, fuel and other sources of variability – are discussed in the preamble for the proposed rule and in response to comments in this final rule. That methodology is consistent with methods used in setting emission floors and accounting for variability for other CAA section 112 rules. The EPA is not setting a beyond-the-floor emission limit for HCl for all the reasons set forth in the proposed rule and in response to comments. We note that the HCl MACT floor will achieve significant reductions (nearly 98% reduction from 2009 levels when combined with the Cross State Air Pollution Rule), and that any additional reductions would be achieved at a very high incremental rate.

4D01 - Work Practice Standards: Annual performance testing

Commenters: 17628, 17691, 17715, 17716, 17729, 17758, 17775, 17820

Comment 1: Commenter 17715 states that operating limits for control equipment based on a point-in-time stack test does not recognize the inherent variability of fuel or the balancing act that plant operators perform daily to meet emission limits for, not just HAP, but all of the pollutants that are currently regulated. As currently proposed, units would be constrained by unachievable operational parameters because the set of operating limits that a unit measures during its first performance test would be its maximum operating limits. Subsequent performance tests would further ratchet down operating parameters until they are no longer achievable during a 30-day or annual averaging period.

Commenter 17820 states that any source that is able to normally operate with a margin of compliance will lose part of that margin if they conduct performance testing under normal operations, because they will establish operating limits that would require them to continue to over-control forevermore. The only way such sources could avoid surrendering whatever margin of compliance they have would be to deliberately reduce performance of their controls to attempt to generate the least stringent operating limits consistent with achievement of the applicable emission standard. This proposed approach, therefore, has the perverse result of encouraging sources to focus their attention on learning how to manipulate their operations to allow testing as close as possible to their emission limit by reducing performance of their controls.

Response to Comment 1: The EPA believes that effective monitoring is needed to ensure ongoing compliance with this rule. In order to minimize costs, we have re-examined the various proposed monitoring requirements, and significantly streamlined the basic approaches required under the final rule. In response to these comments about establishing operating limits for control equipment, the final rule does not require any control device operating parameter monitoring. The only generally applicable operating limit that will apply will be for units that opt to use a PM monitor as a parameter monitoring system (PM CPMS) for ensuring compliance with the filterable PM, total metals, or individual HAP metals limits in the final rule. In certain situations, a liquid oil-fired unit also may need to develop a site-specific monitoring plan for parameter monitoring. See further discussion of these issues in the final preamble and under Comment Code Area 5A05 of this document. If a source does not use a PM CPMS in that manner, or opt to use a PM CEMS for direct compliance with a filterable PM emission limit, then the source must test on a quarterly basis. See the final preamble and responses to stack test frequency under Comment Code Area 5A01 of this document for further discussion. For acid gas limits, a source may use an SO_2 CEMS (if the unit is equipped with an FGD), an HCl CEMS, or conduct quarterly testing. For Hg, the source will have to use an Hg CEMS (including sorbent trap option) or for LEEs, conduct annual testing.

Under the final rule, for the PM CPMS operating parameter, we clarify that the operating limit be established on a site-specific basis as the maximum hourly average raw output parameter value measured over a single test run during the performance test. For PM CPMS, the most likely raw output value will be a maximum milliamp value. Depending on the emissions limit chosen by the EGU owner or operator, the operating limit will be established during a Method 5 or 29 test demonstrating compliance with the filterable PM, individual HAP metals, or total HAP metals emissions limit. Continuous compliance will be demonstrated by using a 30-day rolling average of all valid hourly data collected during each operating day at the source. Subsequent testing may result in a lowering of this

operating limit, or it may allow for a relaxation of the limit, depending on the results obtained during performance testing based on the representative operating conditions at the source at that time.

Comment 2: According to Commenter 17715, performance testing for sources without CEMS is cumbersome and expensive. For low load units, frequent performance testing could require operation of the unit when it would not normally otherwise be operated. Testing should be performed annually for each of the stacks instead of every other month as currently proposed. Testing could not be completed at all of its units within a two-month period due to lack of test crews, unit scheduling, scheduled maintenance, and other considerations. The EPA's assertion that most units will choose to install CEMS may be faulty based on the current lack of HCl CEMS technology and the relative infancy of PM CEMS. The CEMS systems may also not be adequate to measure emissions as low as the EPA has proposed. The commenter states that the EPA should consider the frequency and types of monitoring appropriate for various subcategories, including an exemption for low capacity factor and LEEs.

Comment 3: Commenter 17716 states that for units with add-on emission controls, annual performance testing is sufficient to demonstrate proper operation of control devices.

Response to Comments 2 - 3: The EPA disagrees with the commenters' assertions that the performance testing requirements are excessive or that annual testing is adequate. As discussed in Comment Code 5A01, the EPA has established periodic emissions testing (generally on a quarterly basis) as the primary method for ensuring continuous compliance in situations where a source is not using a CEMS or the use of a PM CPMS as a parameter monitor. For low capacity and low emitting sources, the rule does provide some relief. For low capacity units, the final rule establishes a process similar to the QA operating quarter concept under 40 CFR part 75 for determining whether a test must be done in a given quarter. In addition, liquid oil-fired units with a capacity factor of less than 5% are subject only to the performance tune-up work practice standard in the final rule. For low emitting units, the LEE provisions establish reduced monitoring for Hg based on the initial demonstration, and reduced testing frequency for other pollutants after the source demonstrates over the course of 3 years in other tests that emissions of the applicable pollutant remain below 50% of the emission limit on a consistent basis.

Comment 4: Commenter 17729 states that the proposed rule specifies work practice standards in lieu of specific emission limits for organic compounds. The rule requires annual performance tests as well as 18-month burner inspections.

Response to Comment 4: The EPA has reviewed the comments on the proposed frequency of tune-ups, and made adjustments in the final rule. Under the final rule, the tune-up must be conducted at each planned major outage and in no event less frequently than every 36 months, with an exception that if the unit employs a neural-network system for combustion optimization during hours of normal unit operation, the required frequency is a minimum of once every 4 years (48 months).

Comment 5: Commenters 17628 and 17758 agree with and support the EPA's decision to set work practice standards, which require annual performance testing, to address emissions of organic HAP and dioxins.

Comment 6: Commenter 17812 states that the available sulfur to chlorine ratio is sufficient to inhibit dioxin/furan emissions. A review of the ICR for the coal-fired boilers in the Boiler MACT ICR database shows that the sulfur-to-chlorine ratio is far greater than 1:1. This is intuitive as sulfur content ranges from 0.5% to about 6% and chlorine is usually less than 1,000 ppm.

Comment 7: Commenter 17813 agrees that specific emission limits are unnecessary for organic HAP.

Response to Comments 5 - 7: The agency thanks the submitters for their comments in support of work practice standards. The EPA acknowledges these comments, and has made clarifying changes to the applicable provisions in the final rule. In Table 3, we have clarified that this refers to performance tune-ups, not tests, and the provisions of section 63.10006(r) have been corrected to refer to 63.10021(a)(16).

Comment 8: Commenter 8443 notes that a large percentage of the dioxin/furan and non-dioxin organics measurements from ICR testing were at or below the method detection limit. For those two HAP categories, the EPA should establish work practice standards instead of setting MACT limits. A work practice standard is the best way to avoid compliance issues where actual emissions at or below the detection and quantitation limits of a method.

Comment 9: Commenter 17621 states that their evaluation of the ICR test data supports the EPA's conclusion that organic HAP (including dioxin/furan/polychlorinated biphenyl, and non-dioxin organics) are predominantly below detection limits.

Commenter 17871 states that the EPA appropriately used its discretion to impose work practice standards under CAA section 112(h) for organic HAP, including emissions for dioxins and furans. Organic HAP result not from the makeup of the coal, but through highly complicated chemical reactions in the combustion process that occur with unknown frequency. *Utility Report to Congress at ES-22*. As the EPA notes, the test methods available to measure organic HAP compounds demonstrate that these emissions are at or below the detection level and therefore it is "impracticable to reliably measure emissions from these units." 76 FR 25027. Moreover, because the organic HAP emissions result from the combustion process, the EPA studies demonstrate that the best way to reduce the formation of organic HAP is through improving combustion efficiency. *See*, e.g., Miller J., Emissions of Organic Hazardous Air Pollutants from the Combustion of Pulverized Coal in a Small-Scale Combustor, Environ. Sci. Technol., 28, 1150-1158, 1994.

Response to Comments 8 - 9: The commenters essentially agree with the EPA's approach taken in the proposed rule, and the EPA continues to believe that a work practice standard approach is appropriate for organic HAP emissions from EGUs.

Comment 10: Commenter 17775 notes that during the ICR, 170 coal-fired EGUs were required to test for organic HAP emissions and possible organic surrogates such as CO and total hydrocarbons. Fifty other EGUs were required to test for dioxins. To increase the likelihood of actually measuring dioxin emissions, the EPA required these units to conduct sampling over a longer-than-normal 8-hour period. This organic and dioxin testing produced far more "non-detect" observations than actual detected values. The commenter states that this is hardly surprising because coal-fired EGUs have a strong economic incentive to operate their boilers as efficiently as possible. The high number of measurements that were below the detection limit make setting a MACT limit impossible for these HAP because, by definition, a measurement below the detection limit has greater error associated with it than the value measured. In other words, one does not even know if the substance is present. Furthermore, the commenter believes that setting an emissions limit at the detection limit would be unenforceable because the error associated with a compliance measurement would make it impossible to certify the accuracy of the measurement. The EPA could not enforce an emission limit set below the level of quantitation, which is at least three times higher than the detection limit.

Response to Comment 10: The commenter essentially agrees with the EPA's approach taken in the proposed rule, and the EPA continues to believe that a work practice standard approach is appropriate for organic HAP emissions from EGUs.

Comment 11: Commenter 17691 requests that the EPA clarify whether a source is to conduct only a work practice standard of a tune-up or both a tune-up and an annual performance test. There also appears to be a contradiction with the work practice standards listed in Table 3; the table requires an annual performance test.

Response to Comment 11: The agency has clarified Table 3 in the final rule. All affected sources must perform an initial tune-up as a work practice standard for dioxin/furans and other organic HAP, and then complete each successive tune-up within 36 months of the preceding tune-up. There is no performance testing for dioxin/furans or other organic HAP required under this rule.

4D02 - Work Practice Standards: Tune-up

Commenters: 16849, 17197, 17316, 17402, 17620, 17623, 17627, 17656, 17677, 17681, 17696, 17704, 17705, 17711, 17712, 17714, 17716, 17718, 17722, 17725, 17728, 17730, 17737, 17740, 17752, 17758, 17770, 17772, 17775, 17776, 17801, 17807, 17815, 17820, 17821, 17873, 17877, 17883, 17885, 17886, 17909, 17912, 17925, 18014, 18015, 18031, 18037, 18426, 18428, 18437, 18498, 18539, 19032, 19121, 19122, 18023

Comment 1: Numerous commenters (16849, 17197, 17316, 17402, 17623, 17627, 17656, 17677, 17696, 17704, 17712, 17714, 17716, 17718, 17725, 17728, 17730, 17740, 17752, 17758, 17770, 17772, 17775, 17776, 17807, 17815, 17820, 17821, 17873, 17877, 17885, 17886, 17902, 17925, 18015, 18037, 18426, 18437, 18498, 18539, 19032, 19121, 18023) oppose or have issues with the proposed tune-up requirements for dioxin/furan and non-dioxin/furan organic HAP control. In general, the commenters support the use of work practices but take issue with the specific requirements proposed. Specific comments are as follows:

Comment 2: Commenter 17316 states that the work practice requirements are confusing in that Table 3, which is supposed to list work practice requirements, only states that "performance tests be conducted annually," does not explicitly mention tune-ups, and a reference to "tests" in the table is confusing, as such terminology does not seem consistent with the notion of a work practice. In addition, section 63.10006(r) specifies that tune-ups be conducted no less frequently than every 18 months, which does not seem consistent with the annual frequency implied in Table 3. Further, section 63.10006(r) indicates that tune-ups be conducted in accordance with the provisions of section 63.10007; but the commenter states that they cannot find any reference to tune-ups in section 63.10007.

Commenter 18426 recommends removing the Table 3 from the rule because it does not contain any work practice standards.

Commenters 18539 and 19120 state that as currently written, the intent of the required frequency of work practice requirements is unclear. Commenters indicate that page 424 of the preamble states that work practice standards are annual. However, section 63.10006(r) indicates that each performance tune-up specified must be no more than 18 months after the previous performance tune-up. Additionally, section 63.10021(a)(16), specifies an 18-month frequency for only burner inspection, and specifies the requirement to follow manufacturer's recommendation for other practices, lending to the assumption that all other work practice requirements are on an as-needed basis.

Response to Comments 1 - 2: The EPA acknowledges these comments, and has made clarifying changes to the applicable provisions in the final rule. In Table 3, we have clarified that this refers to performance tune-ups, not tests, and have addressed the frequency requirement as discussed in response to the comments below about the appropriateness of the 18 month frequency. The provisions of section 63.10006(r) have been corrected to refer to section 63.10021(a)(16).

Comment 3: Commenter 17197 recommends adding additional compliance flexibility for EGUs with advanced boiler combustion control technology and adding an alternate surrogate CO CEMS compliance demonstration option to the work practices requirements. For units with advanced boiler combustion control technology, the commenter recommends that the rule also provide for alternate methods to demonstrate good combustion control practices. EGUs operating neural-net based advanced coordinated boiler combustion control systems that provide enhanced boiler performance although

minimizing NO_X and CO emissions should be exempt from the tune-up activities and documentation requirement. These activities are continually being performed by the neural-net system. The commenter includes specific regulatory text illustrating how they recommend the requirement be revised. Commenter 17623 also states that some of the tune-up requirements do not reflect the use of modern operational controls that keep combustion conditions within a range of parameters to meet compliance with emission requirements for NO_X and CO. The EPA should ensure that the tune-up requirements are clear and compatible with modern boiler operations.

Response to Comment 3: The EPA has decided not to include alternate work practice standards, such as a CO requirement, but has adjusted the language in the final rule to recognize the value of automated boiler optimization tools such as neural-net systems. See further detail in the response below on the timing of tune-ups required under the final rule.

Comment 4: Commenters 16849 and 18015 recommend that physical internal inspections be required during a unit's major outage schedule. In the interim, Commenter 16849 states that external inspections including review of burner reading, visual inspection of streamers in the burner flame, etc. could be performed.

Comment 5: Commenter 17316 recommends that the time between burner inspections be increased from 18 months to at least 24 months, as outages are not always scheduled annually. In addition, a provision should be added indicating that if a unit is shutdown at the time of the tune-up deadline, the facility is allowed a week from the time of the unit's next startup to perform the tune-up. Such an extension provision is included in the Boiler Major Source MACT rule.

Comment 6: Multiple commenters (17623, 17704, 17725, 18437, 19121, 19122, 18023) suggest that the required frequency for tune-ups be changed from 18 months to every 24 to 30 months because EGUs are typically on a planned boiler outage of 24 months or longer. Commenter 17623 suggests that for units that run with longer than 30-month planned outage cycles, permitting authorities should have the flexibility to allow for even longer periods between boiler tune ups. 18023 recommends extending the boiler tuning interval to 36 months.

Commenter 17902 recommends that that the requirement for an annual performance test in Table 3 be no more than every 3 years (or 5 years with real-time combustion tuning) due in part to issues related to outage planning.

Comment 7: Multiple commenters (17712, 17696, 17820, 17885, 17886, 17902, 17925, 18037, 18498, 19032) recommend that the EPA extend the interval for conducting the required performance tune-up to 36 months. Commenter 17696 states that performing a burner inspection and cleaning requires a maintenance outage of at least three to four days. Many coal-fired base load EGUs are now operating for periods of up to 36 months between scheduled maintenance outages due to use of more durable components and better control of boiler feedwater chemistry. A burner inspection every 18 months will force many EGUs to shut down every 18 months for the sole reason of performing a burner inspection. Because boiler startups and shutdowns are when components are subject to maximum thermal stresses and are most likely to fail, forced startups and shutdowns to conduct burner inspections will cause more unit downtime and additional repairs. The proposed tune-up requirement will result in reduced operating time for EGUs and lower reliability for the electrical grid in general, as well as increased EGU operating costs. For an EGU that has not made any significant changes in fuel or equipment and because the EPA

acknowledges that the significant majority of coal-fired EGUs emit organic HAP below the MDL, the requirement to perform burner inspections every 18 months is not justified.

Comment 8: Commenter 17716 states that most utilities utilize a 2-year or a 3-year cycle for major outages, particularly for large boilers. The commenter's boilers are on a 36 to 38 month cycle. Coordinating the tune-up cycle to the same cycle that each utility employs for major outages would mean that tune-ups could be completed within the duration of a planned major outage without further disrupting service.

Comment 9: Commenters 17728 and 17775 state that most EGUs do not have planned annual outages, burner inspections can take up to 30-days, and they do not stock many burner components that may need to be replaced so that parts must be special-ordered and months may be required for delivery. Commenter 17728 recommends that to avoid significant increases in the frequency of planned outages, and to keep inspection and repair frequency consistent with that for major outages, a more appropriate interval between inspections and repairs would be at least 36 months, and not 18 months.

Comment 10: Commenter 17775 states that among the companies it surveyed, the median time between major planned outages is about 36 months and only a few EGUs have outages as frequently as every 18 months. The commenter states that burner inspections at coal-fired EGUs can take up to 30-days including ten days to cool the boiler, place scaffolding in the unit and restart it and most utilities do not stock all burner components; ordering parts can require months for delivery. The EPA's premise in its proposal that burner repairs can always be completed during the same outage that a burner problem is discovered is unwarranted. The commenter cites the results of an evaluation of three different inspection and repair schedules and states that the EPA's proposed schedule would result in additional outages whereas the 36-month schedule would allow most utilities to retain their current outage schedules. The commenter submitted suggested regulatory text to address their concerns. Commenter 17772 made similar statements and adds that because burner repairs are not always needed immediately, burner parts that affect optimization of CO and NO_X must be installed within 6 months after the burner inspection and that burner parts that do not affect optimization of CO and NO_X be installed during the next scheduled outage.

Comment 11: Commenter 17681 states that there should be an exemption from the requirement for burner inspection every 18 months or boiler inspections if the unit has not run since the last inspection. There should be a minimum run time of possibly 9,000 hours or 18 months, whichever comes first.

Response to Comments 4 - 11: The EPA has reviewed the comments on the proposed frequency of tune-ups, and made adjustments in the final rule. Under the final rule, the tune-up must be conducted at each planned major outage and in no event less frequently than every 36 months, with an exception that if the unit employs a neural-network system for combustion optimization during hours of normal unit operation, the required frequency is a minimum of once every 4 years (48 months). The EPA recognizes that units which employ neural net optimization systems are continually moving through this process, and we are clarifying in the final rule that we would only require a single record of CO and NO_X information from the pre-tune up and post-tune up operating periods. For units that are operating without neural net optimization systems we are also requiring this information from pre tune up and post tune up. We have modified the rule language to require combustion tuning per manufacturer's instructions, as applicable, and otherwise in accordance with best combustion engineering practices for the specific burner type. The collection of this information is intended to assess whether or not combustion characteristics of the unit have changed as a result of the burner inspection, maintenance, and repair or

replacement. We recognize that there are economic factors present that provide good incentive for units to maintain optimal combustion as a course of normal operation, and realize that this optimization is dependant on several variables, including burner type, combustion air controls, and post-combustion NO_X control capability among others. By assessing pre-tune up and post-tune up combustion parameters we expect that units will be able to show continuing organic HAP control achieved through this work practice.

Comment 12: Commenter 17197 recommends that specific dates be replaced with time references from publication of the final rule. The commenter also asks what constitutes an acceptable or compliant burner inspection is not provided. Are online visual inspections adequate? The "clean or replace any components of the burner as necessary" provision is vague, unenforceable best practices guidance that should be dropped or at least clarified since no specificity is provided that defines allowable burner component degradation. At what point must components be cleaned or replaced? Commenter 17316 states that it would be helpful if the rule specified a compliance deadline for the initial tune-up; i.e., section 63.10005 contains a generic stipulation indicating that compliance must be demonstrated no later than 180 days after the applicable compliance deadline – it is not clear if this timeline applies to tune-ups as well as performance testing?

Commenter 17718 adds that the EPA should clarify whether the time frame to accomplish this initial performance tune-up is within 180 days after the compliance date. It may be impossible to perform the initial tune-up within the 180 day window following the compliance date due to the potential outage schedule that the unit may be following depending on when this proposed rule is finalized. It is likely that sufficient outage time will not be available within the 180-day initial compliance window to facilitate all of this work on multiple units. One year is a more workable time frame in which to accomplish this work.

Response to Comment 12: The EPA believes the general guidelines for conducting the inspection are adequate and are consistent with best engineering practice that sources would follow as part of routine, normal operating procedures. Initial compliance with work practice standards for existing units must occur within 180 days from the promulgation date as the commenter notes, and the initial compliance demonstration for the tune-up work practice standard under CAA section 63.10005(f) is subject to that timeline, however the EPA recognizes that a tune-up may take place prior to promulgation of the rule. In that case the initial compliance demonstration for the EGU is 42 months (36 months from the promulgation date plus 180 days) or, in the case of units employing neural net combustion controls, 54 months (48 months plus 180 days). If the tune-up occurs prior to the effective date, the source must maintain adequate records to show that the tune-up met the requirements of this standard.

Comment 13: Commenter 17402 requests that the time period between tune ups be no longer than 36 months with the expectation that if other factors require outages in the interim, then tune-ups would be conducted sooner. The requirement to inspect burners at least every 18 months does not allow for scheduling with major overhauls, which occur at 24 to 36 months. The proposed tune up would require an extended outage as such events involve scaffolding set up and taken down; boiler cooling; and cleaning, which varies depending on ash build up and how clean the furnaces need to be. For a dual boiler furnace, this process would take at least two weeks to be able to reach all the corners of the furnace. Burner inspection no more frequently than every 36 months is adequate if detailed data inspections are performed at that time and visual inspections using binoculars are performed during short outages in between. Burners would be inspected by scoping devices for condition, alignment and slag build up. This would occur at least every 12-18 months depending upon where the unit is in the

outage cycle. Based on visual inspections, necessary new burners can be ordered and delivered by the next planned overhaul. Because coal burners last at least 6 years, a combination of the detailed and visual inspections should ensure that the burners would be well maintained and proactively replaced when necessary. Burners are tolerant of minor burner deterioration which does not affect the quality of the operation. Therefore, a detailed annual inspection is neither necessary nor practical because burners are only one of several contributors to combustion performance monitored on a regular basis.

Response to Comment 13: The EPA generally agrees, and has adjusted the final rule to require time between tune-ups be no longer than 36 months, or 48 months in some circumstances, as noted elsewhere in this document.

Comment 14: Commenter 17656 states that the tune-up requirements are already followed by reasonably operated sources although the regulation imposes unrealistic timeframes that do not align with the maintenance schedules/manufacturer requirements for the equipment in question. Also, the regulation requires unnecessary documentation for an annual report on emission tests, inspection, repairs, adjustments, findings and corrective actions.

Response to Comment 14: The EPA generally agrees, and has adjusted the final rule as noted above. The EPA believes the minimal recordkeeping associated with this work practice standard is not unduly burdensome.

Comment 15: Commenter 17714 recommends that the work practice standards be allowed to be performed during normal planned outages, which would minimize additional boiler startups and shutdowns.

Comment 16: Commenter 17730 states that the implementation of the proposed work practice standard requirement will require the unit to be fully shut down and the schedule for shut down is substantially too frequent. Only one of commenter's five facilities follows an annual outage schedule in which the boiler tune-up could be completed. Their remaining facilities follow a two- or 3-year schedule under which this tune-up procedure could be conducted, and these outages are sometimes delayed. If the EPA must retain the work practice requirement, the boiler tune-up should be moved from the 12 - 18 month cycle to not longer than once every five years to be conducted coincident with a scheduled plant outage, as appropriate.

Comment 17: Commenter 17740 suggests revisions to the proposed work practices for organic HAP. Commenter 17740 states the proposed inspection frequency is inconsistent with common operating practices. Although smaller, shorter outages do occur more frequently, they are too short to accommodate the type of inspection required by the proposed rule. Burner inspections and repairs are much more effective when done from boiler scaffolding; the cost of constructing boiler scaffolding is on the order of $100,000 per event. The commenter was unable to ascertain whether the EPA has included outage costs and replacement power costs in the economic evaluation justifying the work practice requirement. Replacement power costs to customers can be substantial for extended outages like these and can run into millions of dollars. The commenter recommends that the EPA require inspections every 3 to 5 years.

Comment 18: Commenter 17740 states that the proposed annual, off-line tune-up is excessive and unnecessary. Many units in operation today are equipped with advanced neural networks and/or digital control systems that allow for on-line tuning to optimize the combustion process without the need for

physical burner inspections as proposed by the EPA. Although these systems do benefit from periodic off-line maintenance, the frequency of off-line maintenance should be on the order of every three to five years instead of annually. The commenter urges the EPA to change the tune-up requirements from annual off-line tune-ups to annual on-line tune-ups, with off-line tune-ups and burner inspections occurring every three to five years. Commenters 17776 and 17873 submitted similar comments.

Response to Comments 15 - 18: The EPA generally agrees and has adjusted the frequency of tune-ups as discussed above and reduced the cost of compliance burden of this rule accordingly.

Comment 19: Commenter 17752 states that the EPA should specifically recognize that burner inspections are not applicable for cyclone-fired boilers since they do not contain any of the typical burner components that are present in pulverized coal burner. Although a maintenance outage would typically be planned every 18 months, any burner inspection that needs to be accomplished from inside the boiler would typically need to occur during a major outage, about once every 36 months.

Commenters 17813 and 19120 state that the current 18 month interval between inspections is inconsistent with established utility practice and should be based on engineering experience and judgment. Commenter 17813 states that a minimum 36 month period is required.

Response to Comment 19: The EPA generally agrees with the comment and has modified the rule to state that if specific aspects of the inspection process are not applicable to a cyclone fired boiler, then only those elements of the basic procedure would be adjusted according to best combustion engineering practice for that burner type. On timing, see responses above for reduced frequency in final rule.

Comment 20: Commenter 17776 recommends that the EPA require inspection every 3 to 5 years instead of annually. Commenter 17627 recommends that burner inspection be coordinated with typical scheduled outage cycles.

Comment 21: Several commenters (17712, 17877, 17885, 19032) state work practice standards need to accommodate situations when new parts are required for burner optimization. For some small systems, such as many rural electric cooperatives, necessary parts may not be inventoried and may take several months to acquire. In other cases, there may be 50 or more burners on a single (large) unit. A thorough inspection with time to implement changes is virtually impossible during a non-major (i.e., less than 2 week) outage – and major outages may only occur once every 2 to 3 years. Further, the full cycle of inspection, procurement of equipment and labor, planning for a maintenance window, execution of repair and optimization, tuning, and performance verification will routinely require more than 18 months. To complicate matters units may be in periods of high need such as during summer or winter peaking when replacement parts become available, thus making shutdown for repair not feasible due to reliability or other paramount concerns. In such cases one commenter believes utilities should be given a reasonable time to optimize considering the electric demands on the system.

Comment 22: Commenter 17722 states that the rule is vague on the extent of the burner inspection and repair process. During a minor outage, it is unusual for personnel to physically enter the boiler because the duration of the outage is insufficient for the boiler to cool and the gas path to be cleared for safe entry. If the EPA is envisioning an annual, close-up visual inspection, this would necessitate additional days of outage which is cost-prohibitive. The EPA should clarify that the annual inspection during minor outages only needs to be a visual inspection conducted from the exterior of the boiler through existing boiler openings. Also, the EPA does not specify a repair schedule if problems are detected by the

inspection. GRE suggests that repairs be conducted as expeditiously as possible, but if boiler entry is required that the repairs be conducted during the next shutdown requiring boiler entry.

Comment 23: Commenter 17718 states that because power generation boilers operation requires continuous monitoring as described below, the commenter recommends that work practice standards are not needed for boiler tune-ups and that the EPA should remove this requirement. Because of differences in outage cycles, burner monitoring practices, use of automated feedback combustion control systems, flame pattern monitoring, and other work practices to ensure efficiency, the proposed requirement for boiler tune-up work practices is inappropriate for power generation boilers and should be removed from the proposed rule. In the alternative, the EPA should at a minimum allow sources to petition the EPA for approval of work practice standards that do not meet the specified criteria, but do meet an objective of proper boiler operation.

The commenter notes that some boilers do not have annual outages and run for 3 to 5 year periods. Some boilers operate under pressure requiring that burner monitoring be done remotely with instrumentation. Some boilers that are not pressurized have such intense flames that direct observation has to be supplemented by instrumentation. The commenter states that a power generation boiler typically has a feedback combustion control system that performs "tune-ups" continuously by monitoring temperature and residual oxygen levels and distribution in the exhaust. Additionally boiler operators continuously monitor the boiler when it is in operation. When suspicious flame patterns are observed investigations are performed. The commenter suggests that an alternative is to allow the source to petition the EPA for a work practice standard.

The commenter also states that the EPA should reconsider the time frame to accomplish the initial performance tune-up. Commenter sates that the current 180 days is insufficient and in inconsistent with typical outage schedules. As an example, longer outage times are needed to perform burner inspections and clean/repair necessary components (as described in proposed 40 CFR 63.10021(a)(16)(i)). The commenter notes that they have moved to multi-year major outage schedules and it is likely that sufficient outage time will not be available within the 180-day initial compliance window to facilitate all of this work on multiple units.

Comment 24: Commenter 17821 states that the EPA should recognize that sources subject to the requirement for a tune up every 18 months routinely operate continuously for long periods at a time and do not necessarily schedule a routine maintenance outage every 18 months. Rather they often schedule regular outages at longer intervals and then they may take what are considered "opportunity outages" when a unit is forced off line for a mechanical failure. During these periods an EGU will elect to stay off line for a longer period of time, commonly a couple of days to a week, and conduct other repairs and maintenance that require an outage to perform. Since conducting a tune-up requires inspection and maintenance of internal components, it can only be conducted during an outage. However opportunity outages are unpredictable and cannot be scheduled with certainty. Thus EGUs cannot rely on them for the performance of a tune-up inspection. Forcing a tune-up into these periods would come at a potentially significant economic loss to the owner, particularly during peak periods. To prevent this situation, the EPA should allow a source the ability to seek a waiver or extension from the local permitting Agency to allow sources to perform a tune-up on a less frequent basis that fits with the source's operations.

Comment 25: Commenter 17925 states that it may be that the work practices are not appropriate for every unit design. For instance, the listed requirements may not be applicable for a circulating fluidized

bed type boiler. Therefore, it is suggested that the owner/operator of the unit be allowed the option of having the unit's vendor document the tune up details that are appropriate for the particular unit being addressed. By allowing this flexibility, the ultimate goal of good combustion performance can be more likely achieved in every case.

Comment 26: Commenter 18426 states that the requirement to shutdown every 18 months for burner inspection is not practical, and should be required when the unit is shutdown or no more than 36 to 48 months. Also, the requirement for CO and NO_X optimization for units having no manufacturer's specifications is not enforceable. It would be more practicable to require training and operator certification, identify who is required to be trained and certificated, identify what the training will encompass, and the frequency of training. Operational manuals should also be required that cover the procedures for boiler operation including, but not limited to, startup, shutdown, and malfunction; load changes; the optimal operating conditions of the boiler; and recordkeeping and reporting requirements.

Comment 27: Commenter 18539 states the necessary frequency for inspecting the burner is specific to individual units, based on years of engineering experience and judgment, and should not be required on a specific 18-month frequency. In some cases, that will double the number of required outages, doubling costs associated with those outages.

The commenter states that the underlying assumption that the combustion equipment is not being maintained is false in that it behooves the facility to keep all combustion equipment in top operational status. The reductions in emissions and increased efficiency are the primary goals of the facility. These actions are already completed as a course of business continuously (on line and off line) and not on a set schedule. By imposing a time limit on the "official" tune ups will result in more outages, recordkeeping and reporting that will serve no benefit.

Response to Comments 20-27: The EPA has modified the rule to state that if specific aspects of the inspection process are not applicable to a given boiler type or are lacking manufacturer;s specifications, then only those elements of the basic procedure would be adjusted according to best combustion engineering practice for that burner type. Appropriate records of tune-up and combustion optimization procedures must be retained on site. On timing, see responses above for reduced frequency in final rule. The EPA does believe that a work practice standard is justified for controlling organic HAP, and thus has retained the work practice standard in the final rule.

Comment 28: Multiple commenters (17402, 17722, 17725,17730, 17737, 17740, 17752, 17772, 17775, 17820) suggest revisions to the requirements to optimize CO and NO_X emissions. Specific comments are as follows:

a. Regarding requirements for the optimization of CO and NO_X, Commenter 17775 states that a change in CO characteristics does not necessarily mean that the burners need to be adjusted or inspected; it likely means that the set point needs to be adjusted. This adjustment could be made during the periodic optimization thus potentially eliminating the necessity for a burner inspection. The commenter states that regarding the proposed requirement that the "optimization should be consistent with the manufacturer's specification", EGU operators are in the best position to determine how best to configure the burners to meet a given criterion and provides suggested regulatory text to modify the proposal requirement.

b. Commenter 17775 states that EGUs have NO_X CEMS but few have in-situ equipment to measure CO and that most utilities would hire contractors to measure CO during recalibration and adjustment of EGU components that could affect CO emissions. The most efficient manner to achieve the EPA's goal is to measure NO_X and CO at the most commonly utilized load range or near full load, whichever is the most appropriate. This is generally the load at which most burner suppliers conduct performance testing to meet guarantees. The commenter provides suggested regulatory language to this effect.

c. Commenter 17402 states that optimizing both CO and NO_X is very dependent on the boiler type and air pollution controls. Therefore, the commenter attempts to optimize combustion performance first and then reduce the NO_X using SCRs and SNCRs. The EPA should clarify that EGUs will not be held to a NO_X or CO limit based on this optimization.

d. Regarding the requirement to measure the concentration in the effluent stream of CO and NO_X in ppm, by volume, and oxygen in volume percent, before and after the adjustments are made, several commenters (17402, 17776, 17873) assume that portable CO, NO_X and O_2 monitors will meet the requirements of this section, but suggest that the EPA confirm this as a clarification.

e. Commenter 17730 states that the requirement to optimize the emissions of CO and NO_X lacks definition in the proposed rule, and needs explanation prior to the rule being finalized in order for sources to understand how best to comment. To simply state that the source needs to check the baseline emissions before and after the optimization is an inadequate definition of the requirement. The work practice standard, as currently proposed, is unenforceable and leaves the definition of the requirement to explanation in some future guidance document when the agency should appropriately address the issue in the rule. The process of optimization seeks to achieve the lowest emissions of both NO_X and CO, but there is no definition of how low these values are supposed to be or even if the values need to be lower after the optimization than before optimization. Although the proposed rule does require the source to identify the NO_X and CO emissions before and after the optimization, the emissions of these two pollutants can vary substantially, and it is conceivable that the emissions after an optimization could be higher than before. The proposed rule suggests that sources follow the manufacturer specification for NO_X and CO, but there will likely be few sources that have these specifications and where they might have the manufacturer's specifications, they are likely not applicable due to changes in the boiler configuration due to the addition of boiler components, for example, low NO_X burners. The commenter appreciates the goal of achieving good combustion efficiency to control the emissions of organic HAP, however, it seems that the emissions of organic HAP are already at an extremely low level based on the ICR test data. Given the extremely low values that were recorded during the ICR testing, the commenter requests that the EPA consider a replacement of the proposed work practice standard requirement for a boiler inspection and replacement of parts as appropriate to comply with a good practices standard.

f. Commenter 17737 states that the requirement to "optimize" NO_X and CO emissions "consistent with the manufacturer's specifications" presents some significant challenges. First, there are no "manufacturer's specifications" per se relating to boiler optimization. Boiler manufacturers will, in certain cases, offer a "vendor guarantee" to achieve some emission level, however, a "vendor guarantee" is not a "manufacturer's specification." Vendor emission guarantees are intended to demonstrate to the owner that the unit is capable of achieving a specified emission rate for a short and defined period, under specified conditions. The set points needed to achieve the guarantee emission limit cannot be sustained overall operating conditions, and vendors will not guarantee those emission levels over all operating conditions. Boiler operators are in the best position to determine parameters for optimizing operations given a continually changing set of constraints, and they should be given the discretion to set those

parameters. The EPA should also make clear in final rule that the annual optimization should in no way compromise or hinder the boiler tuning required to meet permitted emission limits. The commenter provides suggested revised wording for section 63.1002l(a)(16)(iv).

g. Commenter 17740 states the requirements to must adjust burners and optimize total emissions of CO and NO_X by being consistent with manufacturer's specifications could produce more emissions than current burner and combustion air settings developed through actual operating experience. The EPA should modify this language to allow facilities to use operational experience to adjust burners and optimize emissions rather than being restricted to manufacturer's specifications, which do not reflect changes in fuel quality and the condition of the burners at the time of the combustion tuning. Commenters 17776 and 17873 submitted similar comments.

h. Commenter 17752 states that since CO and NO_X are both dependent on excess oxygen (O_2) (and inversely related), the definition of optimum is unclear. Moreover, the commenter does not have any "manufacturer specifications" as the EPA suggests on how to conduct the optimization. Burner manufacturers typically provide one time guarantees on NO_X and CO based on one time testing. Also, the EPA should clarify that the optimization testing should only need to be performed at full load (or the predominately operated load) in order to avoid having to complete a long and complex set of tests at various load points.

i. Commenter 17752 states that the EPA appears to assume that all sources have CO monitors available, when in fact many sources do not have equipment available to measure CO emissions.

j. Commenter17627 states that combustion optimization systems should satisfy all proposed work practice standards. Commenter 17627 states that the EPA should qualify daily observations reported by plant operators as a means to track combustion conditions.

k. Commenter 17722 states that the NO_X and CO tune-ups are unnecessary. Instead, the EPA should require a written operation and maintenance plan to define efficient operation, based on best professional judgment of the operators, in consultation with burner manufacturers.

l. Commenter 17725 requests that the EPA recognize that even identical or 'twin' units have operational and performance differences that make them unique to some degree. The commenter states that plant operations staff are continuously focused on improving boiler operations and are constantly monitoring and adjusting combustion parameters to maintain and improve combustion efficiency. These efforts are often constrained by NO_X emissions limits, excess O_2, CO emission limits and other operating parameters to achieve the balance required by good operating practices and environmental constraints.

m. Commenter 17772 suggests that language in the rule should state that burner parts that effect optimization of CO and NO_X must be installed within 6 months after the burner inspection and that burner parts that do not affect optimization of CO and NO_X be installed during the next scheduled outage.

n. Commenter 17718 states that the EPA needs to clarify what constitutes optimization of controls. For example, would this require operation of all available scrubber vessels or all precipitator sections even if not needed to meet permit limits?

o. Commenter 17718 states that work practice standards for optimizing both NO_X and CO emissions appear somewhat contradictory since the actions taken to reduce one value will generally increase the other value. The proposed rule provides no guidance as to the EPA's expectations on the proper balance necessary to achieve such "optimization." At a minimum, the EPA should explain the specific testing and documentation necessary to demonstrate optimization.

p. Commenter 17820 states that to the extent the requirements to optimize CO and NO_X are retained, the requirement for burner optimization to be consistent with manufacturer's specifications should be removed. Burner manufacturers provide one-time guarantees for NO_X and sometimes CO and are usually based on a limited number of fuels, and many of these specifications were established years ago. EGU operators are in the best position to determine how best to configure burners to meet a given criterion. The EPA should allow the option for operator-defined procedures, consistent with accepted burner operating practices and current environmental permit limits/requirements, rather than sole reliance on manufacturer's specifications.

q. Commenter 17885 states that in some cases conforming burner optimization to manufacture's specifications, as proposed, may be inconsistent with best practices for a unit in question. Or such specifications may not exist. Utilities should be able to implement their own best management practices if they are demonstrated to best for the unit.

Comment 29: Regarding optimization of NO_X and CO, Commenter 17781 states that under CAA section 63.10021(a) the requirement for optimization of NO_X and CO is not understood as to the desired outcome. There is no recommendation from any vendor on how to optimize NO_X and CO, as the results go in opposite directions. Low NO_X may mean high CO, and low CO may mean high NO_X. Generally, combustion tuning involves trying to get the lowest NO_X without generating any significant CO, whatever that NO_X level might be. The commenter notes that the minimization of CO will cause other pollutants, like NO_X, to increase. In light of this general tradeoff between CO reductions and NO_X increases, the concept of optimizing the levels of these two pollutants is very subjective and open to considerable interpretation.

Comment 30: Regarding the inspection of flame patterns, Commenter 17775 states that most large utility boilers have observation ports that can, in some cases, be used to assess the quality of the flames. Some boilers do not have inspection ports, and it would be unreasonable to require such boilers to install inspection ports. Moreover, flame observations on certain boiler types such as cyclones and possibly tangential boilers would not generally be useful. The EPA seems to have recognized this by requiring that the flame pattern must be inspected "as applicable." The final rule should clarify that boilers without observation ports and boilers where observations of flames are not beneficial are exempt from the proposed section 63.10021(a)(16)(ii) requirements.

Commenter 17402 states that flame pattern is generally an unreliable and subjective indicator of combustion quality. Flame patter is also not clearly observable at high loads. Visibility is limited, and at high loads, distinct flame envelopes and flame fronts are difficult, if not impossible, to see. Although flame patterns can be better observed at lower loads, full furnace gas flow dynamics are not developed, and low load flame fronts will not mimic high load flame envelopes. Original equipment manufacturers provide little information on flame pattern adjustment. Because of activated carbon injection, unburned carbon in the ash is not a good combustion indicator. Thus, the commenter suggests that other options be substituted for flame observations, including, but not limited to, cyclone and pulverizer coal feeder loadings, pulverizer performance parameters, damper operations as a function of mill and/or cyclone

loadings, evaluating windbox pressures, assessing burner airflows and proportions and CEM information.

Commenter 17730 states that if the EPA must retain the boiler tune up work practice standard, specifically to require the optimization of the flame in the boiler, the EPA must provide more definition of what is required before the rule is finalized in order for members of the public to effectively comment. Failing to provide a definition for this requirement will lead to the issuance of staff guidance later, further perpetuating the implementation of regulation through guidance.

Commenter 17752 states that the EPA should specifically recognize that flame pattern inspections are not applicable for cyclone and tangential-fired boilers. Cyclone boilers do not exhibit measurable flame patterns because the cyclone itself is the burner and the flame is opaque. Also, in the case of a tangential boiler, the furnace is filled with a spiraling flame that covers most of the furnace and therefore the furnace is essentially the burner.

Commenter 18023 states that inspecting flame patterns in EGUs for the purpose of tuning burners is improper. EGUs can have 50 or more burners, and not all flames are visible. Observing overall flame patterns, at times, can aid performance engineers in diagnosing major burner deficiencies such as flame impingement on a water wall or flame detachment; however, inspecting flame patterns does not assist in combustion optimization. Inspecting flame patterns for the purpose of tuning burners is more appropriate for industrial boiler practices in which an observer peers through a glass at the burner and then makes changes to nearby controls to optimize the flame. EGU burners cannot feasibly be tuned in this manner. Therefore, observing overall flame patterns should be excluded from the work practice standards.

Commenter 17807 states that it is impracticable for them to inspect and adjust flame pattern and in their experience would not improve assurance of compliance.

Commenter 17820 states that the rule should clarify that boilers without observation ports are exempt from the requirement to inspect the flame pattern. It would not be reasonable to require such boilers to install inspection ports solely for purposes of this rule.

Comment 31: Regarding fuel and air flow calibration, Commenter 17775 states that air flow calibration is rarely done on most coal-fired EGUs because it is difficult. Most utilities control air flow by controlling excess O_2 because this is a more accurate measure of the combustion efficiency. In addition, excess O_2 can be more accurately measured than air flow. Instead of requiring annual calibration of air flow devices, the final rule should instead require calibration of the excess O_2 monitors which are installed in virtually all EGU flue gas ducts.

Commenter 17402 states that the requirement to inspect the system controlling air-to-fuel ratio if necessary is vague and requires clarification. The commenter uses a procedure to verify operation of the combustion system, which includes inspecting excess O_2 probes, over fire air systems software, and all associated dampers as well as continuously monitoring opacity and NO_X. The commenter states that this type of surveillance will be a more practical and effective method of ensuring good combustion performance because this evaluates the entire system in addition to the burners.

Commenter 17752 states that the EPA should remove the requirement to calibrate air flow as total air flow calibration is rarely done throughout the industry due the difficult nature and unreliable results. The

EPA should instead require calibration of excess oxygen monitors that are installed in virtually all boiler ducts since this is a more accurate measure of combustion efficiency.

Commenter 17807 states it is not practicable for them to ispect the system controlling the air-to-fuel ratio and it would not provide improved assurance of compliance beyond what practices are feasible.

Comment 32: Commenter 16849 states that there is no rationale for requiring work practice standards for control of VOCs and dioxin/furans and the ICR data does not support any control of these compounds.

Commenter 17197 states that ICR testing showed that EGU emissions are below detection levels so that no improvement can be attributed to the requirements.

Commenter 19120 questions the necessity of the specific work practice standards given the proposed general requirements and the fact that the significant majority of measured organic HAP emissions from EGUs are below the detection levels of the EPA test methods. 40 CFR 63.1000(b) requires the source to be operated and maintained in a manner consistent with good air pollution control practices for minimizing emissions, which is redundant with the proposed work practice standards under 40 CFR 63.10021(a)(16). The commenter notes the references to available manufacturer's specifications is troublesome due to the age of some affected sources, the manufacturer's specifications, although available, are out of date and inconsistent with the current control practices 'for minimizing emissions.

Commenter 17730 states that the boiler tune-up work practices should be eliminated because the data demonstrates that emission of organic compounds, D/F are extremely low. According to the commenter, the EPA's analysis shows that when the sulfur to chlorine ratio is greater than 1, the formation of the organic compounds, dioxins and furans, are inhibited. A sulfur-to-chlorine ratio greater than 1 is typical for coal-fired EGUs.

Commenter 18539 questions the need for work practice standards given the low organic HAP emissions. Section 63.10000(b) requires the source to be operated and maintained in a manner consistent with good air pollution control practices for minimizing emissions, which is redundant with the proposed work practice standards under 40 CFR 63.10021(a)(16). The general requirement to operate and maintain the source in a manner consistent with good air pollution control practices is fully sufficient to control organic HAP from affected sources by ensuring good combustion practices. The proposed work practice standards are duplicative and overly burdensome and in many cases inconsistent with current practices. Several conditions reference available manufacturer¡¦s specifications. However, due to the age of some affected sources, the manufacturer¡¦s specifications, although available, are out of date and inconsistent with the current control practices for minimizing emissions.

Comment 33: Commenter 17402 recommends that each unit prepare an organic HAP tune-up procedure to reflect unit-specific best practices for tune ups, taking into account individual boiler design and other unit-specific factors. The unit would specify in a certificate of completion that it has completed such a tune-up procedural plan and is keeping it on file at the facility. The plan would then be available at the facility for state inspection. As part of their submittal, the commenter provided suggested revisions to the regulatory text in section 63.10021(a)(16).

Comment 34: Commenter 17620 states that the EPA has sufficient CO emissions data to establish a MACT floor, as it has in other sectors including the ICI Boiler MACT, and offers no rationale for its

decision not to employ CO as a surrogate for organic HAP. Instead, the EPA has proposed a work-practice standard, a "tune up" that it acknowledges will not lead to measurable reductions in organic HAP emissions. Commenter 17620 states that the EPA has not attempted to demonstrate that its tune-up requirement will improve the performance of the sources in the category up to the level of the top performers or that a tune up really is the maximum achievable control technology.

Comment 35: Commenter 17705 states that a number of coal-fired EGUs currently have emissions limits for CO established under the best available control technology provisions of the EPA's prevention of significant deterioration (PSD) regulations. These best available control technology (BACT) limits were established based on an analysis by the permitting authority of the technologies or work practices that would result in a maximum reduction of CO from each EGU. The stringent nature of a CO BACT limit requires the EGU operator to optimize the combustion process, similar to what the EPA states would be required under the proposed work practice standard. The commenter employs CO CEMS at its facilities to track compliance with BACT limits, which allows adjustment of combustion processes to assure compliance with the established limits. The EPA should allow compliance with current CO BACT limits as an alternative work practice standard. If the EPA does not allow this alternative work practice standard, the Agency should extend the period between required boiler tune-ups to accommodate current unit outage schedules. The commenter recommends an interval of at least 40 months.

Comment 36: Commenter 17815 states that the EPA should allow utilities to document their operating practices designed to achieve all combustion goals, without imposing requirements for testing, data collection, and inspection schedules. Efficient operations is in the self interest of utilities, and they should be allowed to use documentation of the efficient operating practices they have developed over years of operating experience to meet work practice documentation requirements. A requirement for annual boiler tune up may not provide any benefit if no changes in combustion equipment have been made. Additionally, parametric tuning to improve combustion efficiency and maintain stable operating conditions in the boiler occur on virtually a continuous basis as operators monitor and control the boiler and auxiliary equipment. Similarly, outage scheduling practices are different for different companies because each company has its own outage scheduling practices. In addition, these practices are likely to be different in regulated and unregulated electric utility markets due to costs. In setting inspection requirements, the EPA must recognize differences in practices, and either extend the time between combustion equipment inspections or simply link inspections to the normal outage schedule for each company.

Comment 37: Commenter 17722 states that the tune-up requirements are vague, unnecessary and burdensome, and the EPA should eliminate them. The proposed rule does not appear to require tune-ups. Section 63.10005(f) mentions the initial compliance requirement of a tune-up, but Table 3 does not specify work practice standards; this appears to be an oversight.

Comment 38: Multiple commenters (17711, 17851, 17883, 17909, 17912 and 18014, 18031, 18037, 18428, 18498, 19121) agree that the application of a work practice standard is the most appropriate approach for regulating organic HAP, considering the measurement related issues that the EPA described in the preamble, particularly for dioxin/furan HAP. Commenter 18014 states that this approach will minimize organic HAP emissions although providing a significant cost savings to the industry.

Commenters 17758 and 19120 agree with and support the EPA's decision to set work practice standards, which require annual performance testing, to address emissions of organic HAP and dioxins.

Commenter 17851 states that the EPA should not set a dioxin/furan standard or a non-dioxin organic HAP standard. Doing so will not reduce the emissions of organic HAP.

Comment 39: Commenters 17638 and 17818 request that the EPA establish a work practice standard in lieu of emission limits for organics and dioxin/furans. Commenters disagree with some of the individual elements of the work practice standard, such as the 18-month work practice interval and the requirement to inspect flame patterns as a means of determining optimized combustion. Commenter 17818 further states that conducting burner inspections will often include a requirement to install scaffolding in the furnace, to gain access to the burners, and then removal of the scaffolding. This is a process that is both expensive and time consuming, as well as generally not required except to perform burner inspections or perform repairs. Such activities are generally not done on an annual basis, but rather are less frequently performed during periods of extended maintenance shutdown/inspection. Commenters proposed that the 18-month maximum outage interval should be extended to 24-30 months and the inspection of flame patterns for EGUs for the purpose of tuning burners is improper. EGUs can have 50 or more types of burners, and not all flames are visible. Inspecting flame patterns is more useful for industrial boiler practices in which an observer peers through a glass at the burner and then makes changes to nearby controls to optimize the flame. Commenter 17638 supports a CAM-type approach regarding the establishment of work practices, which provide for reasonable assurance of the unit operation in lieu of a "one size fits all" approach.

Several commenters (17689, 17756, 17928, 17813) state that the 18 month interval between inspections is not consistent with established utility practice regarding periodic outages for maintenance and repair. Commenters recommend a 36 month compliance period. Utilities should be able to implement their own best management practices if they are demonstrated to be best for the unit. For small systems, such as many rural electric cooperatives, many parts may not be inventoried and may take several months to acquire. To complicate matters, units may be in periods of high need, such as during summer or winter peaking when replacement parts become unavailable, thus making shutdown for repair not feasible due to reliability or other paramount concerns. In such cases, NRECA believes utilities should be given reasonable time to optimize considering the electric demands on the system.

Commenter 17756 states that the work practice standards for EGUs to address any emissions of organic HAP and dioxins do not reflect some of the practical realities of operating an EGU.

Several commenters (17761, 17767, 17795) state that the proposed work practice standards regarding organic HAP will have a detrimental impact on the outage schedules of applicable units since every unit would have to perform an onerous inspection and tune-up every 18 months. This scheduled tune-up would require additional outages in between planned major maintenance overhauls further affecting unit availability, overall system reliability, and generating costs. The EPA's ICR test data demonstrated that the majority of applicable units emitted non-detectable levels of organic HAP, even under the utility industry's existing work practice standards and maintenance outage cycles. Commenters (17761, 17795) suggest that there is no need for increased scheduled outages and inspections (every 18 months) for units already emitting non-detectable levels of these HAP and, as such, these standards should be removed from the final rule. Commenter 17767 recommends an extension beyond 18-months.

Commenter 17930 states that the EPA should allow utilities to document their own operating practices,

including testing, data collection, and inspection schedules. Each utility has developed documentation practices that best, and most efficiently, serve that particular plant and company. To require other documentation practices would be an unnecessary burden on already taxed utility operators. There are many instances where emissions are below detection levels and should not be used as a basis to establish a work-practice standard.

Several commenters (19536, 19537, 19538) state that the work practice standard should require that all EGUs install real-time software to continuously optimize boiler combustion and perform soot cleaning. These systems continuously monitor the combustion process to determine the optimal balance of fuel and air flows in the furnace to position dampers, burner tilts, overfire air and other controllable parameters at their optimal setting. These systems are already in widespread use throughout the utility industry and have the added benefit of improving efficiency, thus reducing operating costs. A boiler tune-up is not adequate to assure continuous minimization of organic HAP. The work practice standard assumes that all organic HAP are created by incomplete combustion. This assumption is incorrect, especially for dioxins which are formed after the combustion process and whose emission rate depends in part of coal chlorine content.

Response to Comments 28 - 39: The EPA recognizes the economic drivers in place that motivate operators to strive for good combustion control and although we do not wish to insist on combustion tuning that would be counter to that goal we do insist on regular combustion tuning that maintains optimal unit performance and demonstrates compliance with the work practice standard requirements in the final rule. The EPA has carefully reviewed the numerous comments on the specific requirements of the tune-up procedure. In light of these comments, we have made a number of specific changes to address what to do for repairs that may require longer term corrective actions, additional methods for evaluating combustion effectiveness, and clarification on procedures for CO and NO_X monitoring. There were specific comments that opposed the reference to manufacturer specifications, if available. The EPA has retained this language in the final rule, but notes that these apply only to the extent applicable. Specifically, if manufacturer specifications only address conditions that are no longer present given current boiler operations, then only those specifications are not applicable and other combustion engineering best practice procedures for that burner type would apply.

The EPA recognizes that units which employ neural net optimization systems are continually moving through this process, and we are clarifying in the final rule that we would only require a single record of CO and NO_X information from the pre-tune up and post-tune up operating periods. For units that are operating without neural net optimization systems we are also requiring this information from pre-tune up and post-tune up. We have modified the rule language to require combustion tuning per manufacturer's instructions, as applicable, and otherwise in accordance with best combustion engineering practices for the specific burner type. The collection of this information is intended to assess whether or not combustion characteristics of the unit have changed as a result of the burner inspection, maintenance, and repair or replacement. We realize that optimization is dependant on several variables, including burner type, combustion air controls, and post-combustion NO_X control capability among others. By assessing pre-tune up and post-tune up combustion parameters we expect that units will be able to show continuing organic HAP control achieved through this work practice.

Comment 40: Commenter 17801 states that many of the work practice standards currently defined in the proposed rule have been developed based on boiler operation and do not apply to IGCC combustion turbines. In contrast to boilers, gas turbines compress the inlet air to 15 to 30 times the ambient pressure enabling the conversion of fuel into energy within tens of milliseconds in a small volume. A turbine

extracts energy after the combustor reducing the combustor exhaust temperature by over 2000° R in modern gas turbines before the boiler (HRSG). The combustor is housed inside of a pressure vessel designed to withstand these high pressures and extremely high temperatures; therefore, frame gas turbines almost universally have fixed combustion hardware. Existing metallurgy does not allow fuel nozzles to penetrate into the flame zone at normal operating conditions. Low emissions are obtained by altering the fuel distribution to fixed fuel nozzles and addition of diluent. GE recommends that the maintenance guidelines for boilers and IGCC combustion turbines be consistent with the standard design, maintenance and operating practice of either a boiler or a combustion turbine as their design requires differences. For combustion turbines, GE recommends as a standard practice that combustor tuning be performed per the manufacturer's recommended maintenance/outage schedule in lieu of the required tune-up described in section 63.10021. The commenter also requested separate discussions in the preamble of work practices to reflect the difference in boiler and IGCC design and operation. Regarding the preamble discussion of organic HAP formation from incomplete combustion of fuel, the commenter notes that the gasification process minimizes organic HAP in the synthetic gas before it reaches the combustion turbines, which further destroys any residual organic HAP. Therefore, proper operation and maintenance of the gasification process and the combustion turbine per recommended procedures will minimize and control organic HAP emissions such as dioxins/furans. This is technically NOT the same as the work practice standards that the EPA has proposed that are more reflective of traditional coal EGUs. Parameters that are normally monitored for optimal performance of the gasification process and combustion turbine in an IGCC EGU will ensure organic HAP emissions are maintained at minimal levels.

Response to Comment 40: The EPA has modified the rule to state that if specific aspects of the inspection process are not applicable to a given boiler type, then only those elements of the basic procedure would be adjusted according to best combustion engineering practice for that burner type. This flexibility should address these concerns for IGCC units.

Comment 41: Commenter 18426 states that work practice standards are appropriate if measurement of a pollutant is technically or economically problematic, however, organic HAP can be measured from a technical and economic perspective. Therefore, a work practice standard is inappropriate for this CAA section 112(d) standard. A more appropriate approach would be to use a surrogate to demonstrate reductions in organic HAP. Continuous monitoring of CO which demonstrates good combustion practices and insures minimization of organic HAP emissions at all times would be acceptable as part of a parametric monitoring system.

The commenter states that a work practice standard with no criteria for what constitutes good combustion is unenforceable and does not serve the purpose of limiting organic HAP emissions. A tune-up is not a criterion, particularly if the tune-up is on a unit that has switched fuels. The unit will not be as efficient, and therefore, organic HAP emissions will be higher with fuels that it was not originally designed to combust.

Response to Comment 41: The EPA disagrees. Given the test results related to organic HAP during the evaluation of data for this rule, the work practice standard in the final rule is an appropriate method of ensuring that organic HAP emissions remain low and well-controlled from this source category because complete combustion inhibits the formation of organic HAP. As we indicated in the proposal preamble, it was very difficult to develop direct correlations between the average concentration of CO and the amount of organics produced during the prescribed sampling period in the Agency's Multipollutant Control Research Facility (MPCRF) (which was 4 hours for the pilot-scale tests described here). This is

especially true for low values of CO as one would expect corresponding low quantities of organics to be produced. The EPA has revised the final rule from the proposal to clarify the requirements, including fixing the erroneous references to conducting a performance test instead of the required tune-up procedures.

4D03 - Work Practice Standards: Other

Commenters: 17197, 17402, 17620, 17627, 17628, 17677, 17704, 17711, 17729, 17730, 17731, 17737, 17756, 17758, 17775, 17800, 17805, 17813, 17816, 17820, 17821, 17843, 17868, 17870, 17904, 18444, 18539, 19122, 19536/19537/19538, 18932, 18023

Comment 1: Numerous commenters (17402, 17628, 17704, 17711, 17737, 17756, 17758, 17775, 17820, 17821, 17843, 17870, 17904, 19122, 18023) agree with and support the decision to establish work practices in lieu of numerical emission limits for dioxins and furans and non-dioxin/furan organic HAP. Specific comments were as follows:

Commenter 17402 states that the EPA's rationale supporting its proposed work practice standard is sound and consistent with the legal framework under the CAA. The commenter supports the EPA's proposal to adopt work practice standards for dioxins and furans and non-dioxin/furan organic HAP and not to propose beyond-the-floor limitations for organic HAP.

Commenters 17704 and 17775 also favor work practice standards for organic HAP over numerical limits. Commenter 17775 adds that the EPA made the correct decision assuming that they are a surrogate for specific HAP emissions that have been found to pose significant risks to public health.

Commenter 17628 agrees with and supports the EPA's conclusion that the proposed work practice standards for the control of organic HAP is consistent with and supported by section 112(h) of the CAA and is the best approach for addressing this category of HAP within the EGU MACT. Commenter 17731 agrees that the CAA section 112(h) prerequisite for replacing standards with work practices has been met, thereby justifying the use of work practices.

Comment 2: Commenter 17620 states that if work practice standards are employed, they should be designed to achieve the same level of emission performance as would be achieved by implementation of an emission limitation.

Comment 3: Commenter 17677 states dioxins/furans and organic HAP emission levels are at non-detectable levels from most power plants surveyed by the EPA and the "tune-up" items proposed are fundamental requirements of power plant operations. Since the EPA information collection request yielded little to no detectable emissions of these HAP, the commenter states that emissions in this HAP group are being satisfactorily controlled with current power plant practices and that no superficial, unquantifiable, random time framed regulations are required.

Several commenters (17731, 17800, 17729, 17813) agree that the low levels of dioxins/furans/organic do not warrant work practices or any standard in the EGU MACT rule.

Commenter 17805 states that the low levels of dioxins/furans do not warrant regulation. The commenter recommends that, if the EPA decides to continue with regulating dioxins/furans, they allow EGU's to perform a one-time energy assessment as allowed under the area source boiler MACT rule.

Comment 4: Commenter 17737 agrees with the decision to implement a work practice standard, although the commenter believes the proposal is unduly complicated. Due to the low emissions of these substances, it should be sufficient to establish a work practice standards requiring no further action beyond operating in accordance with "good engineering practice", which is already a standard title V

permit condition. At a minimum, the proposed work practices require some clarification and modification.

Comment 5: Commenter 17758 states that the results of sampling for organics and dioxins during the ICR showed there were far more non-detectable observations than actual detected values. The high number of measurements at or below the detection limit makes setting a MACT limit impossible for these HAP because, by definition, a measurement at or below the detection limit has more error associated with it than the value measured. CAA section 112(h) provides discretion to the EPA to set work practice standards in lieu of emissions limits if the Administrator finds it is not feasible to prescribe or enforce an emissions standard. The high percentage of non-detectable measurement for organics and dioxins shows that it is infeasible to either prescribe or enforce emissions standards for these pollutants.

Response to Comments 1 - 5: The EPA acknowledges commenters' support of the work practice standards. However, the EPA disagrees with commenters' suggestion that a one-time energy assessment would be sufficient. EGUs are not area-source industrial boilers. We believe that the work practice standards we are finalizing are sufficient to ensure that organic HAP emission reductions are continuous and that those emission reductions are of the same magnitude as would have been achieved through an emission limit format, consistent with CAA section 112(h).

We agree with many of comments related to treatment of data reported as detection limit values in the development of MACT floors and emissions limits. The probability procedures applied in calculating the floor or an emissions limit inherently and reasonably account for emissions data variability including measurement imprecision when the database represents multiple tests from multiple emissions units for which all of the data are measured significantly above the method detection level. That is less true when the database includes emissions occurring below method detection capabilities regardless of how those data are reported. The EPA's guidance to respondents for reporting pollutant emissions used to support the data collection specified the criteria for determining test-specific method detection levels.

Those criteria insure that there is only about a 1% probability of an error in deciding that the pollutant measured at the method detection level is present when in fact it was absent.[230] Such a probability is also called a false positive or the alpha, Type I, error. This means specifically that for a normally distributed set of measurement data, 99 out of 100 single measurements will fall within ±2.54 σ of the true concentration. The anticipated range for the average of repeated measurements comes progressively closer to the true concentration. More precisely, the anticipated range varies inversely with the square root of the number of measurements. Thus, if σ is the standard deviation of anticipated single measurements, the anticipated range for 99 out of 100 future triplicate measurements will fall within ± 2.54 $\sigma/\sqrt{3}$ of the true concentration. This relationship translates to an expected measurement imprecision for an emissions value occurring at or near the method detection level of about about 40 to 50%.[231]

By assuming a similar distribution of measurements across a range of values and increasing the mean value to a representative higher value (e.g., 3 times minimum detection level), we can estimate measurement imprecision at other levels. For an assumed 3xMDL, the estimated measurement imprecision for a three test run average value would be on the order 10 to 20%. This is about the same

[230] (ReMAP): PHASE 1, Precision of Manual Stack Emission Measurements; American Society of Mechanical Engineers, Research Committee on Industrial and Municipal Waste, February 2001.
[231] Ibid.

measurement imprecision as found for Methods 23 and 29 indicated in the ASME Precision of Manual Stack Emissions Measurements[232] for the sample volumes prescribed in the final rule (e.g., 4 to 6 dscm) for multiple tests.

Analytical laboratories often report a value above the method detection limit that represents the laboratory's perceived confidence in the quality of the value. This arbitrarily adjusted value is expressed differently by various laboratories and is called limit of quantitation, practical quantitation limit, or reporting limit. In many cases, the LOQ, PQL, or RL is simply a multiplication of the method detection limit. Multipliers range from 3 to 10. Consistent with findings expressed in reports of emissions measurement imprecision and the practices of analytical laboratories, we believe that using a measurement value of 3 times a method's detection limit established in a manner that assures 99% confidence of a measurement above zero will produce a representative method reporting limit suitable for establishing regulatory floor values.

On the other hand, we agree with commenters that an emissions limit set determined from a small subset of data or data from a single source may be significantly different than the actual method detection levels achieved by the best performing units in practice. This fact, combined with the low levels of emissions measured from many of the best performing units, led the EPA to review and revise the procedure intended to account for the contribution of measurement imprecision to data variability in establishing effective emissions limits. In response to the comments and internal concerns about the quality of measurements at very low emissions limits especially for new sources, we revised the procedure for identifying a representative method detection level (RDL).

The revised procedure for determining an RDL starts with identifying all of the available reported pollutant specific method detection levels for the best performing units regardless of any subcategory (e.g., existing or new, fuel type, etc.). From that combined pool of data, we calculate the arithmetic mean value. By limiting the data set to those tests used to establish the floor or emissions limit (i.e., best performers), we believe that the result is representative of the best performing testing companies and laboratories using the most sensitive analytical procedures. We believe that the outcome should minimize the effect of a test(s) with an inordinately high method detection level (e.g., the sample volume was too small, the laboratory technique was insufficiently sensitive, or the procedure for determining the minimum value for reporting was other than the detection level). We then call the resulting mean of the method detection levels as the representative detection level (RDL) as characteristic of accepted source emissions measurement performance.

The second step in the process is to calculate three times the RDL to compare with the calculated floor or emissions limit. This step is similar to what we have used before including for the Portland cement MACT determination. We use the multiplication factor of three to approximate reduce the imprecision of the analytical method until the imprecision in the field sampling reflects the relative method precision as estimated by the ASME study that also indicates that such relative imprecision, from 10 to 20%, remains constant over the range of the method.es. For comparing to the floor, if three times the RDL were less than the calculated floor or emissions limit (e.g., calculated from the UPL), we would conclude that measurement variability was adequately addressed. The calculated floor or emissions limit would need no adjustment. If, on the other hand, the value equal to three times the RDL were greater than the UPL, we would conclude that the calculated floor or emissions limit does not account entirely for measurement variability. If indicated, we substituted the value equal to three times the RDL for the calculated floor or emissions limit which results in a concentration where the method would produce

[232] Ibid

measurement accuracy on the order of 10 to 20% similar to other EPA test methods and the results found in the ASME study.

We determined the RDL for each pollutant using data from tests of all the best performers for all of the final regulatory subcategories (i.e., pooled test data). We applied the same pollutant-specific RDL and emissions limit adjustment procedure to all subcategories for which we established emissions limits. We believe that emissions limits adjusted in this manner better ensure measurement variability is adequately addressed relative to compliance determinations than did the procedure applied for the proposal that may have been based on limited data sets. By accounting for measurement uncertainty in this manner, we also believe that the emissions testing procedures and technologies available are adequate to provide the measurement certainty sufficient for sources to demonstrate compliance at the levels of the revised emissions limits.

Comment 6: Commenter 17730 states that the EPA should not require coal-fired electric utilities to incur the cost associated with the implementation of the work practice standard for dioxin and furans based on measurements of the substance below the method detection limit. According to the commenter, the EPA's stance that detection below the method detection limit generally indicates the presence of the substance is not necessarily true. An analysis by EPRI of the ICR data showed that chemicals that were detected were affected by contamination of the sample with non-flue gas sources of the HAP. Several of the chemicals were also frequently detected in the field blanks and/or method blanks. The commenter states that the chemicals in this HAP group are ubiquitous in the environment and that the test method is so sensitive that it is very difficult to avoid contamination of the sample during sampling and analysis. The EPA should not assume that detection below the method detection limit generally indicates the presence of the substance.

Response to Comment 6: The EPA must address all HAP in this rulemaking. However, as noted elsewhere, we believe that the work practices being finalized are reasonable for this source category and are consistent with the statute. The EPA would note that other commenters have indicated that the work practices are consistent with common EGU practice so we are unclear as to how we are requiring EGUs to "incur the cost" when those costs are already being born by many EGUs. We believe that the requirement is justified to ensure that all EGUs achieve the organic HAP emissions reductions that are currently being achieved by the best performing sources in the category.

Comment 7: Several commenters (18932, 19536, 19537, 19538) disagree with the EPA's decision to not set emission limits for dioxin. Commenter 18932 states there is no factual or legal justification to support the EPA's failure to prescribe dioxin emission limits for EGUs. Based on a similar factual record, including similar monitoring and detection issues, the EPA has specified numerical dioxin limits for the smaller sources in the Major Source Boiler MACT Rule. Thus, there is no rational technical or legal basis for the EPA's failure to set dioxin limits for EGUs.

Several commenters (19536, 19537, 19538) argue that some test results below some MDLs do not address relevant statutory standards, i.e., section 112(h), and the EPA admits that dioxin and other organic emissions have been measured from EGUs so that emissions data exist. For this reason, setting work practices in lieu of emission limits is unlawful and arbitrary. The EPA does not identify any class of sources to which measurement methodology for dioxins and organic HAP is not practicable. Nor does the mere fact that some units recorded test results below the particular MDL that a unit chose show that application of measurement methodologies is impracticable even for those same units. Rather, it merely reflects the EPA's discretionary decisions not to specify a maximum MDL and to collect data in a way

that allowed some sources to return test results with extremely high MDLs. The measurement methodologies that allowed many other EGUs to use much lower MDLs are applicable to all EGUs.

Commenters (19536, 19537, 19538) argue also that not all organic emissions were below MDLs. For example, of 150 available tests, 101 test show formaldehyde above the detection limit. Thus, it is not impracticable to set a floor limit for formaldehyde. And for a significant number of units, all dioxin and furan congeners were above the MDL.

Commenters (19536, 19537, 19538) state that any imprecision associated with monitoring emissions at levels near the detection level can be addressed by statistical manipulations, adjusting the limit that accommodates any uncertainty (e.g., 50% above the detection level), or establishing monitoring protocols that reduce the uncertainty to acceptable level. The commenters find no support for the EPA's alternate triple-MDL floor in the ASME ReMAP report upon which the EPA relies.

Commenters (19536, 19537, 19538) also argue that the EPA fails to show that measurement of organic HAP would be economically impracticable.

Commenters (19536, 19537, 19538) also state that the work practices contravene section 112(h)(1) in that the EPA does not show that the work practices yield the maximum achievable degree of reduction and that at a minimum reflect the measures adopted by the EGUs with the lowest emission levels of dioxins and organic HAP. The EPA does not show that EGUs do achieve reductions in dioxins through the use of activated carbon injection and reduction in other organic HAP through the use of SCR systems.

Comment 8: Commenter 17620 does not support the use of CO as a surrogate for dioxins and furans because low CO levels do not guarantee low dioxin and furan emissions. The commenter states that the proposed tune-up does not incorporate work practices that minimize dioxin and furan emissions. The EPA should adopt numeric emission limits consistent with levels achievable through application of MACT, even if those levels are at or below the detection levels. Sources should be required to conduct a stack test, during which PM control device temperature, CO and THC levels, soot conditions and entrained PM levels can be monitored and employed thereafter in parametric monitoring. Exceedances or changes in any of the parametric monitoring conditions would trigger a new dioxin and furan compliance test.

Comment 9: Commenter 17869 states that the ICR data demonstrate no significant correlations between CO or THC and important organic HAP, so it cannot be used as a surrogate for organic HAP. However, Polycyclic Aromatic Hydrocarbons (PAHs) are the non-dioxin organic HAP of the most concern. Because of the recognized toxicity of PAHs, it would be prudent to propose, or at least to ask for comment on the possibility of, a PAH floor.

Response to Comment 7 - 9: The EPA believes that the work practices being finalized for all organic HAP are appropriate and are consistent with the statute and other NESHAP rulemaking efforts. Further, each source category is addressed individually and, although EPA strives for consistency in its approach, there are times where different approaches for different source categories are warranted.[233] The EPA does not believe that, at this time, it can specify a maximum MDL for organic HAP emissions from

[233] We would note that the EPA, as a part of the Industrial Boiler MACT reconsideration that was signed on December 2, 2011, is proposing to establish work practice standards for dioxins and furans.

EGUs as that would require specifying laboratory analysis methods which, at this time, are not universally available in the U.S. (e.g., only one or two laboratories are equipped for high-resolution mass spectroscopy analyses). Our responses to comments on use of the MDL are provided elsewhere in this document. The remaining comments are addressed elsewhere in the final rule record.

Comment 10: Some commenters support an alternate CO limit. Commenter 17197-11 recommends that the work practice standards include an alternate surrogate CO emissions limit option to demonstrate compliance for dioxin and non-dioxin/furan organic HAP, which would provide a less costly and easier to administer compliance demonstration option for EGUs that already operate CO CEMS for existing CO emission limits. The commenter suggests that a 30-day rolling average CO limit of 0.20 lb/MMBtu would provide the indication of good combustion control practices and provide EGUs important compliance demonstration flexibility.

Commenter 17868 states that they commend the EPA's use of work practices in lieu of CO limits but recommends that the rule includes an alternate surrogate CO limit for additional compliance demonstration flexibility. A surrogate CO limit (if set at a reasonable level (i.e., 0.25 lb/MBtu)) to demonstrate dioxin/furan best combustion control practices might be easier for EGUs with pre-existing CO limits.

Commenter 18444 states that the EPA should set an emission limit for CO to provide a readily measurable indicator of good combustion, which is necessary to avoid high levels of organic HAP emissions. Commenter 18444 states that it is not necessary to set a CO MACT limit that is the average of the lowest 12 percent of the test data. However, the EPA should set a CO limit that avoids poor combustion. The requirement for good combustion is not practically enforceable without setting a CO limit. Also, setting clear CO emission limits is preferable to the proposed limits for the sum of CO and NO_X emissions.

Comment 11: Commenter 17904 states that establishing a numeric CO limit as a surrogate would be unnecessary and counterproductive. First, generators have inherent incentives to operate efficiently and reduce the formation of organic HAP through proper and complete combustion. Second, such a standard could undo important progress made on NO_X reductions by utilities within the State of Texas that have complied with some of the most aggressive NO_X reduction of any state due to the inherent inverse relationship between the control of NO_X and CO.

Comment 12: Commenter 17904 states that the EPA should recognize that even identical units have operational and performance differences that make them unique to some degree. Utility boiler operators continuously focus on efficiency and are constantly monitoring and adjusting combustion parameters to maintain efficiency. These efforts are constrained by NO_X emissions limits, excess O_2, CO levels and other operating parameters to achieve the balance required by good operating practices and environmental constraints. As a result, the EPA's final work practice standard should be consistent with operations necessary to minimize NO_X emissions without undue excess CO formation (i.e., CO emissions are in compliance with existing permit limits), although also avoiding conditions that increase slag formation, that create a reducing atmosphere in the boiler that promotes boiler tube corrosion, or otherwise impede the reliable operation of the unit.

Comment 13: Commenter 18023 states that they have investigated the relationship between CO emissions and emissions of organic HAP and that their own data illustrates similar results to the EPA's pilot scale combustor in that CO does not correlate well with organics, CO emissions are highly variable

and organic HAP emission are low and generally below the detection limit. They conclude that CO is an inappropriate surrogate for organic HAP and that work practice standards in lieu of emission limits are appropriate. Commenter 17731 also supports the decision to not use CO as a surrogate for organics given the lack of a correlation with organic emissions.

Response to Comments 10 - 13: The EPA understands that emissions of most organic HAP can be minimized by maintaining good combustion conditions. Dioxin and furans are formed post-combustion and their formation is suppressed in coal combustion systems by the presence sulfur (as explained in the proposed rule preamble). A significant majority of the emissions of the organic HAP from the ICR were below the measurement detection limit. Though the EPA still believes that CO is a good indication of poor combustion conditions, and thus a good indicator of organic emissions, the data are not adequate to establish that surrogate relationship for EGUs because of the low levels of organic HAP. We continue to believe that the work practice standard that requires routine boiler/burner maintenance is the best measure for limiting emissions of the organic HAP, and it is justified consistent with CAA section 112(h).

The agency recognizes the differing combustion environment among EGU's and has adapted the language of the final rule to require combustion optimization and yet allow each EGU to optimize combustion according to best practice for the burner type. It follows that this points to minimal NO_X creation although maintaining low CO emissions and avoiding slagging and reducing atmospheric conditions within the boiler.

Comment 14: Commenter 17627 recommends that the work practice standards be conducted within 90% of the EGU's net demonstrated capacity rather than at full load as proposed. Testing at a steady state condition would be representative of the unit operating at full load.

Response to Comment 14: The EPA disagrees, finding that the range of "...within 90% of the EGU's net demonstrated capacity..." is too wide a range to conduct these measurements, though we do agree that measurements taken at steady state conditions are desirable. The final rule requires the measurements before and after the tune-up to be made while operating at full load or the predominantly operated load.

Comment 15: Commenter 17816 states that the EPA needs to clarify what constitutes optimization of controls. For example, would this require operation of all available scrubber vessels or all precipitator sections even if not needed to meet permit limits? In addition, work practice standards for optimizing both NO_X and CO emissions appear contradictory since the actions taken to reduce one pollutant will generally increase the other. At a minimum, the EPA should explain the specific testing and documentation necessary to demonstrate optimization. The EPA should, at a minimum, allow sources to petition the EPA for approval of work practice standards that do not meet the specified criteria, but do meet an objective of proper boiler operation.

Commenter 17718 requests that the EPA provide some clarifications and revisions to the work practice standards regarding the definition of "optimization of controls." For example, would this require operation of all available scrubber vessels or all precipitator sections even if not needed to meet permit limits? At a minimum, the EPA should explain the specific testing and documentation necessary to demonstrate optimization. Of further note, the required frequency for boiler tune ups does not reflect standard industry operational practices. It is not unusual for facilities to have scheduled major outages (i.e., outages of sufficient length to conduct a "boiler tune-up") at a frequency of every 3 to 4 years.

Consequently, the required boiler tune-up frequency should be no less than every 4 years to reflect common industry operational practices.

Response to Comment 15: There is no requirement in the tune-up provisions to optimize controls. Optimization of combustion to minimize CO and NO_X needs to account for the relationship of the two pollutants using good combustion engineering practices, and also includes avoiding combustion issues such as excessive slagging.

Comment 16: Commenter 17820 agrees with the work practices but states that the proposed requirements are far more rigorous than the procedures established under previous NESHAP related to the allowable time between periodic inspections, the time required to repair burners, observation of flames and optimization of CO and NO_X.

Response to Comment 16: The time periods have been adjusted based on the comments received and a number of other changes have been made to this requirement so that it reflects good operating and engineering practices for performance tuning an affected unit.

Comment 17: Commenter 17821 states that the EPA needs to clarify work practice standards for PM and all pre-combustion pollutant removal processes used by IGCC units. As written and without clarification on what is a control device for an IGCC unit, the EPA's proposed work practice standards cannot be performed for an IGCC unit. The commenter agrees that numerical limits for organics should not be set for IGCC units. Other parameters normally monitored for optimal performance of the gasification process and combustion turbine in an IGCC EGU will ensure organic HAP emissions are kept at minimal levels.

Response to Comment 17: The EPA believes that the changes to the work practice standard and the elimination of operating parameter limits and differences in the schedule for conducting performance tests based on the presence or absence of controls, addresses these IGCC-based concerns.

4E01 - Alternative Limits: Total non-Hg HAP metals (alternative to PM)

Commenters: 17316, 17386, 17402, 17620, 17621, 17716, 17718, 17722, 17725, 17729, 17737, 17747, 17775, 17781, 17796, 17798, 17869, 17870, 17881, 17912, 18014, 18034, 18500, 18023

1. Support total non-Hg HAP metals limit.

Comment 1: Commenter 17725 supports the total metals emissions limit of 0.00003 lb/MMBtu. Commenter recommends the proposals by commenter 17808 to revise the total metals emission rate based on either: (a) the determination of the top 12 percent performers based on the entire database of oil-fired units affected by the rule, or (b) the subcategorization of oil-fired units based on either distillate oil firing or residual oil firing. Commenter also states that the two factors that support the revision of the total metals limit include: (1) the limited sample of stack testing emissions data for oil-fired EGUs, and (2) the limited compliance options for No. 6 oil fired EGUs, including those that already have controls.

Comment 2: Commenter 17402 supports the EPA's decision to include a total metals standard as an alternative compliance option for the emissions standards for non-Hg metallic HAP. The commenter states that the flexibility in compliance options should help to reduce the overall cost of the rule without affecting emissions. Commenter 17648 also supports the EPA's decision to incorporate flexibility in the rule by allowing coal-fired EGUs to meet emission limits for total non-Hg metallic HAP or for individual non-Hg metallic HAP, rather than the PM limit.

Comment 3: Commenter 17747 supports the EPA for proposing either a total non-Hg metals or individual metal emissions limits as an alternative to using PM CEMS on coal-fired EGUs.

Response to Comments 1-3: The EPA appreciates the support of the commenters. We would note, however, that the non-Hg metallic HAP limits are not an alternative to using PM CEMS/CPMS which are a compliance method, not an alternative format for the standard. As noted elsewhere, we are requiring the use of PM CPMS in the final rule unless a source elects to test on a quarterly basis. An EGU owner or operator also may elect to use a PM CEMS for direct compliance with the filterable PM emission limit. Our approach at final is the same as was proposed; that is we are using 12% of the available data rather than 12% of the population for liquid oil-fired EGUs and we have not subcategorized distillate vs. residual oil. However, as noted elsewhere in this document we are establishing a limited-use liquid oil-fired EGU subcategory and establishing filterable PM emission limits.

2. Support PM limit as alternative to non-Hg HAP metals limit

Comment 4: Commenters 17737 and 18023 support the EPA's use of PM as a surrogate for non-Hg HAP metals.

Response to Comment 4: The EPA appreciates the support of the commenters. We would note, however, that the non-Hg metallic HAP limits are not an alternative to using PM CEMS/CPMS which are a compliance method, not an alternative format for the standard. As noted elsewhere, we are requiring the use of PM CPMS in the final rule unless a source elects to test on a quarterly basis. The source also can elect to use a PM CEMS for direct compliance with the filterable PM emission limit.

Comment 5: Commenter 17820 asks that if a total PM limit is retained, a source's filterable PM operating limit could be determined by subtracting the condensable PM measured during the stack performance test from the total PM limit as an alternative to the proposed approach. This would allow the operator with good control to use the operating margin available in the PM control process and would still insure compliance with the total PM limit. This alternative, however, would still remain problematic due to the bias and uncertainty issues associated with Method 202, which is used to measure condensables.

Response to Comment 5: As noted elsewhere in this document, the EPA is finalizing a filterable PM alternative.

3. Support PM limit as alternative to non-Hg HAP metals limit for oil-fired EGUs.

Comment 6: Commenter 17316 suggests that a total particulate limit should be established for oil-fired EGUs to serve as a surrogate (alternative) to the non-Hg HAP metals emission limits, in the same manner as is done for coal-fired EGUs. Coal-fired units, as well as solid oil-derived fuel EGUs, are allowed to meet either: (a) a total particulate emission limit or, (b) a non-Hg HAP metals emission limit. However the rule does not provide oil-fired EGUs a similar option to satisfy a total particulate limit as an alternative to satisfying a non-hg HAP metals limit. Performance testing for particulates is much less costly than for the extensive list of metals covered by this MACT rule, therefore it is expected this would be the preferred option for many sites. In addition, a PM limit would allow on-going compliance to be monitored by a PM CEMs rather than having to adhere to the very onerous HAP metal performance testing/fuel analysis schedule imposed by the rule. A total particulate limit comparable to the one imposed on coal-fired EGUs would seem appropriate: 0.030 lb/MMBtu.

Comment 7: Commenter 17870 states that the proposed rule for oil-fired EGUs is not reflective of the subcategory and not reasonably achievable. The commenter recommends the EPA reconsider the decision to use a PM limit for liquid oil-fired EGUs to control total HAP metals for liquid oil-fired EGUs. The commenter cites errors and missing data in the ICR database, notably several data errors and missing test results in the spreadsheet summarizing the EPA MACT floor analysis for oil-fired EGUs including, incorrect fuel designations.

Comment 8: Commenter 17621 states that PM emission has better prediction properties than HAP trace metal emissions for all non-Hg HAP metals. The correlations of individual and total non-Hg metals with PM for oil-fired EGUs are statistically significant to the 95% level, similar to the PM correlations for coal-fired EGUs.

Comment 9: Commenter 17796 states that this question should be answered based upon EGUs having particulate control vs. EGUs which do not have particulate control. All utility owners of liquid-fired fuel EGUs should be able to demonstrate initial and continuous compliance based upon fuel sampling. EGUs which have particulate control should receive the same compliance options as a coal-fired boiler. Liquid fuel owners with EGUs utilizing particulate control which are required to stack test for particulates based upon other regulatory commitments should be able to use this PM data to demonstrate compliance and record the control device parameters to establish continuous monitoring permit conditions in lieu of monthly fuel sampling.

Comment 10: Commenter 17808 requests that in light of the various data corrections that they included in their submittal, the EPA consider setting a PM limit for liquid oil-fired EGUs to control total HAP

metals. The commenter submitted information that shows that units equipped with ESPs for PM control generally have the lowest reported total HAP Metals emission rates, which suggests that a PM limit would be a reasonable surrogate for total HAP Metals for oil-fired EGUs. Liquid oil-fired EGUs would have the option of complying with a PM limit, a total HAP metals limit, or individual HAP metal limits.

Comment 11: Commenter 17796 responds to the EPA's request for comment on whether the EPA should set a separate standard for Hg if the EPA requires end of stack testing for a total metals limit. The commenter states that the emissions of fuel oil Hg as well as all HAP metals will be based upon the purchased oil. If a stack testing option is inserted into the proposed rule allowing for oil-fired units to be granted the same surrogate compliance demonstration as solid fuel for total PM, facility owners should be required to demonstrate compliance.

Comment 12: Because an analysis of the ICR data indicates a correlation between PM and metals for oil units, Commenter 17820 requests that the EPA extend to oil units the option to use filterable PM as a surrogate for metals and to allow compliance demonstrations through the use of CEMS.

Response to Comments 6-12: Based on a reassessment of the data, the EPA has established a filterable PM limit as an alternate equivalent limit for the HAP metals from liquid oil-fired EGUs. Partly based on comments received, the EPA realized that oil-fired EGUs had mischaracterized the type of oil fired during the testing which made any correlation of the data inconclusive. The EPA contacted all liquid oil-fired EGUs providing data through Part III of the 2010 ICR to confirm the type of oil used. Based on that new information, the top performing liquid oil-fired EGUs (continental) are either residual oil-fired with ESPs or distillate oil-fired. Thus, the EPA believes the filterable PM alternate limit is appropriate. Our responses to comments related to the subcategorization of distillate vs. residual oil are found elsewhere in this document.

With respect to the use of CEMS to demonstrate compliance with a filterable PM limit, we are finalizing the use of a PM monitoring approach, but generally as a CPMS to demonstrate compliance with an operating limit, not a CEMS correlated using Performance Specification 11 used to determine direct compliance with the emission limit. The final rule involves initial compliance testing using Method 5 to demonstrate compliance with the emission limit and then periodic retesting using Method 5 to reconfirm emission limit compliance and re-establish the site-specific operating limit as needed. However, in response to comments, we are providing an option for a source to use a PM CEMS as a direct method of determining compliance with the filterable PM emission limit. Please see the preamble and responses under Comment Code 5A07a for further discussion of the PM CEMS and CPMS requirements.

4. Opposition to PM as a surrogate for metal emissions.

Comment 13: Commenter 17912 opposed the non-Hg metal surrogate alternative proposal.

Comment 14: Commenter 17798 opposes the EPA approach to setting several emission requirements based on source specific test results. The commenter states that, under the NESHAP rules, the EPA proposes a "test and set" compliance requirement in addition to the primary emission limitation set forth in the rule. In this discussion, "metals" refers to non-Hg metals. Of particular concern is the requirement to test for filterable PM with the resulting demonstrated emission rate set as a source's particulate emission limitation. The source then has to demonstrate compliance with this filterable PM limit using a PM CEMS. This approach to PM as a surrogate for metal emissions is problematic for several reasons. First, the EPA set a limit, for total PM (filterable + condensable) based on metals and PM total

emissions data from the best performing 12% of sources. To meet the methodology of establishing MACT emission limits, the EPA needs to separately establish a filterable PM limit based on evaluating the PM and metals emissions data for the same set of sources. The current proposal of looking to individual sources in establishing emission limitations for continuous compliance monitoring may impose requirements more or less stringent than the 12 percent best performing sources. From this point of view, the EPA is not consistent with CAA methodologies in establishing NESHAP emission limits.

Comment 15: Commenter 18034 opposes the EPA selection of total PM as a surrogate for HAP emissions. Total PM is not a listed HAP, nor has it ever been a listed HAP. The total PM is currently regulated under 40 CFR section 108(a). Total PM is not a precursor for HAP metals. In fact, HAP metals represent a small subset of total PM and are not a precursor to PM emissions. Regulating total PM as a surrogate under 40 CFR section 112 is regulating an air pollutant listed in 40 CFR section 108(a). Although the EPA has made a general justification for using PM as a surrogate for non-Hg metal HAP, the EPA has not made any valid technical correlation between the proposed PM emission limit and the HAP in question. The EPA did not correlate filterable or total PM capture efficiency to HAP metal removal efficiencies to determine the most representative surrogate. The EPA never identified the portion of PM (either filterable or condensable) that are HAP metals. The EPA did not properly consider the incremental cost and benefits of reducing HAP metals beyond existing emission levels in justifying the proposed MACT limits. The EPA's selection of total PM as a surrogate for HAP metals, without consideration and evaluation of the composition of total particulate, including condensable particulate matter, is tantamount to regulating SO_2 emissions (or other constituents of condensable PM) under NESHAP instead of the NSPS.

Comment 16: Commenter 18023 states the EPA must provide a more reasonable surrogate for non-Hg metals, adding that unjustified concerns regarding selenium do not support using total particulate matter as a surrogate.

Commenter 17722 does not support methodology the EPA used in setting the numeric non-Hg HAP metal limits. The commenter recommends the EPA set a filterable PM limit as representative of non-Hg HAP metals based on particulate control devices such as ESPs or baghouses that are capable of 99+ percent reduction as a maximum achievable control technology.

Response to Comments 13 - 16: The EPA has revised the surrogate for non-Hg metallic HAP in the final rule to use filterable PM rather than total PM as the surrogate. The non-Hg metallic HAP are present predominantly in the filterable PM fraction – with the exception of selenium. Selenium may be present as a particulate (i.e., filterable) or as the acid gas, SeO_2 (condensable). We have revised the non-Hg metallic HAP surrogate because we are also setting emission standards the the acid gas HAP, with HCl (or alternatively SO_2) as the surrogate. SeO_2 will be captured in acid gas control equipment (e.g., scrubbers, DSI, etc.) similar to the control of its chemical analog SO_2.

Comment 17: Commenter 17881 states that as PM is being used as a surrogate for non-Hg HAP metals, those units selected for purposes of conducting the PM floor calculations should have consisted of the best performing units on a total non-Hg HAP metals basis, not a PM basis.

Response to Comment 17: The EPA has explained its rationale for the selection of EGUs to conduct testing in the proposal preamble and in the Supporting Statement for the 2010 ICR. We have also explained our basis for using PM as a surrogate for non-Hg metal HAP. We disagree with the commenter that our selection process was in error because it focused on PM.

5. Issues with data.

Comment 18: Commenter 17716 notes that 18 of the "total" metals results that the EPA included in its floor analysis for existing coal fired units were missing various components. Obviously, the EPA should have excluded these incomplete results from its total metals floor analysis in order to generate a more accurate floor level.

Response to Comment 18: This issue has been addressed in the updated floors by only including emission averages (used to calculate the total metals) from units with the full set of non-Hg metal HAP. Units providing incomplete non-Hg metal HAP sets were excluded from the total metals MACT floor analyses. In a very limited number of cases, the analytical laboratory did not provide analyses for all of the non-Hg metal HAP.

Comment 19: Commenter 17775 states that the proposed new source limit for total non-Hg metals, which includes both chromium and manganese, is 0.000040 lb/MWh or 0.040 lb/GWh. Yet, the proposed individual MACT limits for chromium and manganese are 0.020 and 0.030 lb/GWh, respectively. The total metals limit is less than the sum of the limits for chromium and manganese, which represent only two of the ten individual non-Hg HAP metals. In fact, the allowable sum for the ten individual HAP metals is 50% greater than the allowable limit for total non-Hg HAP metals.

Response to Comment 19: This issue has been addressed in the updated MACT floors.

Comment 20: Commenter 18500 states that the EPA test program at the EPA's Multipollutant Control Research Facility found that control of non-Hg metals was similar to control of bulk total PM. However, data from actual unit testing do not show such a consistent correlation, and many units were not tested for both PM and total metals to validate a correlation. The process to set a surrogate PM limit for controlling metals should determine the best-performing (lowest emission rate) units for metals. The PM data associated with the best-performing metals units should be used to set a surrogate PM limit. To validate the approach for using PM as a surrogate limit, only data from lowest metals emission rates units that have corresponding PM emissions rate information should be used.

Response to Comments 20: Actually the test program at EPA's Multipollutant Control Research Facility found that control of non-Hg metals was similar to control of filterable PM (not bulk total PM as was stated in the proposal preamble). In setting emission limits for filterable PM (and for individual metals and total metals which are an alternative emission limits), the EPA ranked the top performing units for filterable PM emissions using the available data from the 2010 ICR. Similarly, the EPA set the alternative emission limits for the individual metals and total metals using the same approach. In some cases, the EPA had emission data available for filterable PM emissions but not for every individual HAP metal (and thus not for every total metal). The EPA continues to believe that the non-Hg metals will be controlled along with the filterable PM (except for selenium, which as explained elsewhere, is controlled either as filterable PM or as an acid gas). Differences in the rank order for the best performing filterable PM, individual metals, and total metals can be affected by normal fuel composition and operational variability and in measurement uncertainities at the very low levels achieved by the very best performing units.

Comment 21: Commenter 18014 states that a number of sources appear to have failed to report emission results for all ten of the non-Hg HAP metals required under the ICR. However when the EPA calculated total non-Hg metal values, this issue was not considered, and total metals were calculated as

the sum of available results, regardless of missing metals. Eighteen of the total metal results that the EPA included in the floor analysis for existing coal fired units were missing various components. The EPA should have excluded these incomplete results from the total metal floor analysis.

Comment 22: Commenter 17881 states that the total non-Hg HAP metals emission limits are generally higher than the sum of the individual metals emission limits. Several of the units used to establish individual non-Hg HAP metals emission limits may not have been within best performing units on a total non-Hg HAP metals basis. It is entirely possible that the lowest individual metals emission rates were driven more by coal constituents than control technologies. Thus, different coal ranks may correspond to the lowest non-Hg HAP metals emission rates for certain pollutants. The EPA's approach would lead to the observed phenomenon of disagreement between the sum of the individual non-Hg HAP metals emission limits and the total non-Hg HAP metals emission limits. A more relevant approach would have been to strictly focus on the best performing units on a total non-Hg HAP metals basis. Commenter 17881 further notes that as the total metals limit is higher, there would be no reason for a facility to demonstrate compliance with the individual metals limits.

Comment 23: Commenter 17775 states that there is a mathematical error in the EPA's proposed new source MACT limits for non-Hg metals. Either the total non-Hg HAP metals limit is wrong, or the limits for the individual HAP metal are wrong. The EPA's proposed new source limit for total non-Hg metals, which includes both chromium ("Cr") and manganese ("Mn"), is 0.000040 lb/MWh or 0.040 lb/GWh. The proposed individual MACT limits for Cr and Mn are 0.020 and 0.030 lb/GWh, respectively. The total metals limit is less than the sum of the limits for Cr and Mn, which represent only two of the ten individual non-Hg HAP metals. In fact, the allowable sum for the 10 individual HAP metals is 50 percent *greater* than the allowable limit for total non-Hg HAP metals.

Response Comment 21 - 23: This issue has been addressed in the updated MACT floors.

Comment 24: Commenters 17386 and 17718 state that Table 1, which is applicable to new oil-fired EGUs, has a higher limit than the limit shown in Table 2 of the docket entry, applicable to existing oil-fired EGUs. Specifically, the Table 1 Total HAP Metals limit (for new oil-fired EGUs) is 0.00040 lb/MWh and the Table 2 Total HAP Metals limit for existing oil-fired EGUs is 0.00030 lb/MWh. It does not seem reasonable, or consistent with MACT procedures, that the Total HAP Metals Limit for new EGUs would be less stringent than the limit for existing EGUs.

Response to Comment 24: This issue has been addressed in the updated MACT floors.

6. Additional data are needed.

Comment 25: Commenter 17621 states that investigations are needed to characterize the emission variability at power plants firing different coal types—including only eastern bituminous coal compared with a PRB blend—as the trace metal emissions variability of one site likely does not represent the entire industry. The trace element concentration in the coal is an independent variable impacting trace element emissions. It is likely that additional factors impact the fate and distribution of trace elements in flue gas. Further studies are needed to gain a complete understanding of the correlation between stack metals concentrations and PM concentration in flue gas. Emissions variability related to power plant processes will differ for each HAP (or surrogate), depending on chemistry, fate in combustion, and air pollution control unit operations.

Comment 26: Commenter 17722 questions the EPA's individual non-Hg HAP metal limits as inclusive of all coals and all control configurations. In essence, the EPA has set individual non-Hg HAP metal limits that apply to all coal-fired units in the country. It is clear that there are different metal concentrations in various coal seams. Further, it is known that particulate control devices, such as ESPs and baghouses, are generally capable of 99+ percent particulate reductions. Therefore, we can expect that a specific control device operating at 99% efficiency will have different non-Hg HAP metal emission rates, proportional to the metal concentration in coal. The EPA should re-evaluate the ICR data and consider developing subcategories based upon coal non-Hg HAP metal variability.

Comment 27: Commenter 17975 states that the 0.03 lb/MMBtu PM-filterable standard identified as a "surrogate" will not assure compliance with the non-Hg metal emission limits that the EPA has proposed based on maximum available technology, because it does not take into account wide variations in the level of non-Hg metals in coal. Absent direct measurement, emissions of non-Hg metals are estimated based on the relationship between PM emission rates, the concentration of metals in the coal, and the ash content of the fuel. At a fixed PM emission rate and a given ash content, releases of non-Hg metals will more or less rise in tandem with any increase in the concentration of those metals in coal. The relationship between these factors is set forth in AP-42 factors that were developed based on extensive testing by the Electric Power Research Institute. The EPA has assigned these factors an A rating.

Response to Comment 25 - 27: Although the EPA would not disagree that additional data may be useful, the statute indicates that the EPA is to proceed with the data available to the Administrator when establishing the MACT floors. This is what the EPA has done. We have also incorporated variability based on the available data and consistent with the statute and applicable case law.

7. Miscellaneous.

Comment 28: Commenter 17869 states that the utility MACT proposal should contain incentives for options for early HAP reductions, at least for Hg.

Response to Comment 28: The commenter has not explained how the EPA could provide such incentive consistent with section 112 and we are not including incentives in the final rule.

Comment 29: Commenter 17729 states that if they wanted to comply by meeting the total non-Hg metal limit of 40 lb/TBtu, they would be required to conduct stack tests bi-monthly (6 times a year) and assure the coal supply does not change. The commenter has always burned PRB subbituminous coal from several different mines. The commenter does not have any data of the variability of the non-Hg metals content of coals from any of our current suppliers. The variability of the coal will drive the variability of the commenter's emissions. Based on one test, the commenter was within 14 lb/TBtu of the limit but has no way of knowing if a second test from a different mine would exceed the limit. If the commenter can't predict the emissions variability how can the EPA set an emission limit based on limited test data?

Response to Comment 29: The EPA has provided alternate compliance options for the non-Hg metallic HAP filterable PM limit in the final rule (e.g, total non-Hg HAP metals and individual HAP metals). Companies are free to select the compliance approach that they wish to follow. The EPA acknowledges that there may be variability in the coal constituents and, as discussed elsewhere in this document and preamble, we maintain we have adequately addressed the fuel variability in establishing the standards by using the 99% UPL.

Comment 30: Commenter 17620 states that the EPA has provided alternate limits for HAP metals other than Hg. The EPA should provide an explanation for why particulate-bound Hg is excluded. If the EPA has determined that the proposed MACT particulate limit is low enough to ensure that particulate Hg emissions would be insignificant compared to potential gaseous Hg emissions, the EPA should state this.

Response to Comment 30: The Hg limit applies to all forms of Hg (i.e., elemental, ionic/oxidized, and particulate).

4E02 - Alternative Limits: Individual HAP metals (alternative to PM)

Commenters: 17283, 17626, 17722, 17724, 17821, 17876, 17912

Comment 1: Commenter 17283 states that although the EPA's proposed alternative metal emission limits should be encouraged by the EPA, the numerical values proposed in some cases are in error and in other cases may be unreasonably low; i.e., approach ambient concentrations, or in the case of lead (Pb) is less than the NAAQS for Pb. As such, the commenter recommends that the EPA review these numerical standards and evaluate them relative to ambient air concentrations, not just the CAA MACT floor.

Commenter 17283 states that although the use of this proposed alternate emission limit should be encouraged by the EPA, the numerical values listed by the EPA (Tables 15 and 16, FR page 25059) seem unreasonably low and should be reviewed relative to ambient air concentrations in heavily industrialized urban centers. For example, the proposed Pb concentration for new coal-fired sources in excess of 8,300 BTU/ lb of 0.00090 lb/GWh is equivalent to about 0.11 µg/m3 (assumed 240 MW peak capacity and 3.1X107 scfh), which is less than the monthly average NAAQS for lead of 0.15 µg/m3. Similarly, the proposed Hg limit for new sources is on the same order of magnitude as is found in industrialized urban centers. Clearly, requiring stack emission limits to be lower than NAAQS or even ambient concentrations is unreasonable and unrealistic. As such, the Commenter requests that the EPA reconsider the level of its proposed standards and consider their reasonableness relative to ambient concentrations, not just the CAA MACT floor.

Response to Comment 1: The EPA has reexamined all of the MACT floor limits as a result of comments received and we maintain that the limits in the final rule have been developed in compliance with the statutory requirements and are appropriate. CAA section 112 requires the EPA to set technology-based MACT floors based on the data available to the Agency without consideration of the NAAQS or ambient concentrations, which is what the Agency has done.

Comment 2: Commenter 17283 states the EPA's proposal to allow facilities to meet alternate HAP metal limitations for individual metals or total HAP metal limitations is a step in the right direction and is strongly encouraged. The commenter believes that measurement of individual metals is far more meaningful with regards to the intent of the CAA Amendments than the proposed PM surrogate monitoring. Direct measurement of individual HAP metals provide the most direct and useful information to assess the impacts of all control options (contributions from all feed stocks, additives, operations, etc.) and to evaluate residual risks. The commenter feels the EPA should strongly encourage this option by allowing the use of multi-metal CEMS in place of PM and Hg CEMS. Multi-metal CEMS that can measure HAP metals including Hg are proven and commercially available. It has been operating on a hazardous waste incinerator for 7 years, demonstrated applicable to coal-fired boilers, awarded the EPA's Clean Air Excellence Award, and have performance specifications and QA procedures that are listed on the EPA's web site under "Other Test Methods 16 and 20".

Response to Comment 2: The EPA appreciates the commenter's support for the approach taken. In the final rule, facilities would be allowed to petition the Administrator under CAA section 63.8(f) of subpart A of part 63 for an alternative to use multi-metal CEMS at a specific site in lieu of required monitoring in the final rule. Also see responses to comments under Comment Code 4F01 for further discussion of relationship of PM and HAP metals. We agree with the commenter that data from multi-metal CEMS is a direct measurement of metals and not a surrogate measurement, but it is not HAP metal specific.

Comment 3: Several commenters (17626, 17876, 17912) suggest that the EPA reconsider the methodology for setting individual heavy metal standards. Setting the limits based on individual metals from individual plants to create the lowest standard creates a condition that few if any power plants will be able to achieve given variation in coal type and chemical composition, combustion technologies, and other factors. We suggest averaging the results from all of the best units to find a reasonable standard that facilities may be able to achieve. However, we also believe that a fuel associated standard would also be appropriate.

Comment 4: Commenter 17724 states that the individual HAP metal standard is nonattainable. The commenter questions whether the EPA set individual HAP metal standards based on controls that are inclusive of the metal variability existing in various coal seams. In fact, existing EGUs in North Dakota with ESP and baghouse controls in place will not be able to meet the individual proposed metal standards. This standard becomes particularly frustrating when, at this time, the commenter cannot identify additional controls or modifications that would allow these facilities to meet the proposed individual standards. They are also concerned that although North Dakota facilities will be able to meet the proposed total metal limits, the compliance will be with very little margin of error. As such, the commenter urges the EPA to re-examine both the individual and total metal standards.

Response to Comments 3 - 4: As noted elsewhere in this document, the EPA does not believe that additional subcategories are warranted. Further, the individual non-Hg metallic HAP limits are an alternate to the filterable PM and total non-Hg metal HAP limits. For the total non-Hg metal HAP limits, we did sum all of the individual non-Hg metal HAP values for a given EGU and then sorted by the total which appears to be the approach recommended by commenters. An EGU may choose to comply with any of the alternatives.

Comment 5: Commenter 17821 states that many utilities have extended the intervals between their routine scheduled outages to 24 or more months. As a result they might not have the scheduled outages available to perform these inspections. The EPA should revise section 63.10006(r) to allow a longer duration between tune-ups.

Response to Comment 5: The EPA has reviewed the comments on the proposed frequency of tune-ups, and made adjustments in the final rule. Under the final rule, the tune-up must be conducted at each planned major outage and in no event less frequently than every 36 months, with an exception that if the unit employs a neural-network system for combustion optimization during hours of normal unit operation, the required frequency is a minimum of once every 4 years (48 months).

4E03 - Alternative Limits: SO_2 (alternative to HCl)

Commenters: 16469, 17402, 17638, 17648, 17655, 17677, 17678, 17681, 17722, 17730, 17737, 17770, 17795, 17801, 17804, 17807, 17813, 17820, 17821, 17843, 17873, 17881, 17886, 17898, 17901, 17902, 17930, 18014, 18034, 18444, 18488, 18498, 18831, 19033, 19212, 19214, 19536, 19537, 19538, 18023

1. Alternative SO_2 limit requirements.

Comment 1: Commenter 17402 does not support the requirement that SO_2 controls must be operated at all times if the SO_2 surrogate is selected. The commenter states that as long as a facility complies with SO_2 emissions limits, operators should have the flexibility to operate SO_2 controls in any mode to meet the compliance limit. The commenter thus recommends that the EPA remove the continuous compliance requirements regarding SO_2 controls from the proposed rule.

Response to Comment 1: As explained in the proposal preamble and in the Supporting Statement for the 2010 ICR, the basis for the SO_2 surrogacy is the relationship between FGD systems and the removal of all acid gases, HAP included. Thus, if the FGD system is not operating or is not present, the surrogacy argument does not hold and the HCl emission limit must be complied with.

Comment 2: Several commenters (17770, 17820, 17881, 17886) request clarification as to whether DSI qualifies for use of the SO_2 surrogate. Commenter 17770 states that the EPA should clarify that units using DSI systems for HCl control can use the SO_2 emission limit as a surrogate for HCl and that CEMS would be used for quantifying SO_2 emissions. The rule is not clear in this respect.

Commenter 17881 understands that alkaline based DSI also qualifies as dry FGD such that the SO_2 surrogate could be utilized (based upon of the dry FGD technology definition at section 63.10042), but the EPA may want to clarify this point.

Comment 3: Commenter 17898 states that dry scrubbers are appropriate in those areas that are water-constrained as a result of either low rainfall or existing high consumptive use of the existing water. A dry scrubber does not have quite the same SO_2 removal capabilities as a wet scrubber but numerous state permitting authorities have found that the water usage requirements justify the use of dry scrubbers.

Comment 4: Commenter 17902 supports the use of surrogates but disagrees with the requirements that this alternate SO_2 limit can only be used if the EGU is equipped with FGD. The commenter states that SO_2 should be allowed as HCl surrogate in all cases (with or without FGD controls). If the EPA still must include FGD as a pre-requisite, then all forms of SO_2 controls should be considered including DSI.

Response to Comments 2 - 4: The EPA believes that dry scrubbers and DSI are "add-on" SO_2 controls and, therefore, qualify the EGU for the alternate equivalent SO_2 standard. However, as explained more fully in the proposal preamble, this final rule, and the Supporting Statement for the 2010 ICR, the SO_2 control device must be in use in order for the alternate standard to apply.

Comment 5: Commenters 17728 and 17775 state that, as drafted, proposed section 63.9991(a)(1)(i) limits the units that can comply with an alternative SO_2 limit to those that have "wet or dry flue gas desulfurization technology installed on the unit." This proposed language is unclear because one cannot be certain whether "dry flue gas technology" includes both dry scrubbers and DSI. Both technologies control acid gas HAP emissions. The installation of either should permit a unit the choice of using the

alternative SO_2 compliance approach. The EPA should clarify this subsection by specifying that DSI is an acceptable dry desulfurization technology.

Response to Comment 5: The EPA believes it has clarified the text and regulation to address the commenters' concerns.

Comment 6: Commenter 18023 disagrees with some of the restrictions proposed for the use of SO_2 as a surrogate. In particular, the restriction to operate the unit at normal capacity is found in the preamble but not in the rule.

Response to Comment 6: The rule language applies, not the text of the proposed rule's preamble.

Comment 7: Commenter 17737 states that the EPA should revise the alternate emission limit by making one of the following changes:

- allow sources to make a one-time demonstration that the HCl emission limit will be met even if the SO_2 emission rate is greater than 0.2 lb/MMBtu,

- establish the SO_2 limit based on a correlation between SO_2 emissions and HCl emissions, or

- establish a percent SO_2 removal limitation based on a correlation between SO_2 percent removal and HCl emissions.

Response to Comment 7: The EPA disagrees with the need for these recommended changes. The close connection between SO_2 and HCl for units equipped with FGD controls is fully described in the preamble to the proposed rule and the technical supporting materials, and the EPA does not believe any of these additional approaches is necessary, and would only unnecessarily complicate the emission standards. If a particular unit does not believe the alternative standard is appropriate for its unit and is unduly restrictive, the source can opt to meet the HCl limit instead.

Comment 8: Commenter 17795 explains that with their HCl emissions at or below the reference method detection limits, HCl monitoring is not an option. However, their 30-day emission rates for SO_2, the acid gas surrogate, would exceed the 0.2 lb/MMBtu 30 boiler operating day average. Setting chlorine fuel limits through fuel analysis for the type of fuels the commenter burns is also not a feasible and would be a detriment to state waste coal remediation activities. The commenter uses waste coal that provides the co-benefit of producing electricity with low emissions although cleaning up waste coal piles that are a major source of acid mine runoff. In cases such as this, alternative performance indicators need to be developed to demonstrate HCl compliance on a continued basis, without HCl continuous monitoring, HCl fuel analysis limits, or dry injection rate monitoring. The EPA should provide an alternative performance indicator in accordance 40 CFR 64, Compliance Assurance Monitoring, to develop a suitable SO_2 emission rate limit, which would be developed as part of the initial compliance performance testing that would then be validated with additional data.

Response to Comment 8: The EPA believes that it has provided suitable alternatives to the HCl emission limit such that any source may find an alternative that is appropriate for their site.

Comment 9: Commenter 17820 states that the requirement for performance testing for SO_2 under this option should be eliminated for sources demonstrating compliance with the SO_2 limit using CEMS. The

EPA also should clarify that the requirement to operate SO_2 controls at all times would not disqualify an EGU that experiences SO_2 control device malfunctions, or that must bypass controls during startups, shutdowns or to perform required maintenance.

Response to Comment 9: There is no performance testing for units using an SO_2 CEMS to measure compliance with the emission limit other than the the use of the CEMS as the performance test approach. The final rule also addresses the "at all times" language for operating the SO_2 controls so that it allows for these types of downtime but does not allow this option for sources that use controls intermittently or seasonally.

2. Support for SO_2 limit as alternative to HCl limit.

Comment 10: Multiple commenters (16469, 17402, 17638, 17648, 17655, 17677, 17681, 17722, 17730, 17807, 17820, 17881, 19212) generally support the EPA's use of SO_2 as a surrogate for the HCl limit.

a. Commenter 17402 agrees with EPA's use of SO_2 as a surrogate for the acid gas HAP in this specific instance only, where HCl is offered as an alternative equivalent standard and where the same FGD control technologies work to remove both SO_2 and HCl from emissions.

b. Commenter 17648 agrees with the alternative emission limits for coal-fired EGUs that have SO_2 controls installed.

c. Commenter 17655 states that for units employing FGD for SO_2 control, they agree that SO_2 monitoring is an acceptable method for demonstrating compliance with the acid gas emission standard. There would be no additional control system available for acid gas reduction. Accordingly, evidence of FGD operability for SO_2 compliance would also indicate operability for acid gas compliance.

d. Several commenters (17638, 17681, 18831) add that the EPA should clarify that the requirement that wet or dry FGD technology be operated at all times is not intended to disqualify EGUs that experience SO_2 control device malfunctions or that must turn off controls to perform maintenance. The EPA should also make clear that the existence of a bypass stack does not disqualify an EGU from complying with the SO_2 standard.

e. Commenter 17807 supports the SO_2 compliance option, they state that the HCI limit is problematic possibly due to pass-through relating to varying and higher chloride content of coals typically combusted.

Response to Comment 10: The EPA appreciates the support of the commenters. However, as noted above, if the FGD system is not operating or is not present, the source must comply with the HCl emission limit.

Comment 11: Commenter 17843 states that they qualify their support of the SO_2 surrogate for acid gases in that compliance with the SO_2 surrogate limit in the EGU MACT rule is not necessarily an adequate level of control for SO_2 for other regulatory purposes. Additional SO_2 reductions from EGUs may be necessary, for example, to achieve SO_2 and $PM_{2.5}$ NAAQS.

Response to Comment 11: Sources must comply with all applicable CAA requirements.

Comment 12: Several commenters (17678, 17801, 18023) argue that IGCC units be allowed to use SO_2 as a surrogate for acid gases**.** Commenter 17678 states that IGCC units equipped with syngas cleanup systems should also be allowed to use the alternate SO_2 limit as they are directly comparable to FGD systems in that they achieve control of acid gas HAP; however, this cleanup occurs to the fuel (pre-combustion) rather than to the flue gas (post-combustion) as is the case for FGD systems. The commenter states that syngas cleanup process will remove at least 99 percent of the chlorine and fluorine in the coal feed, based on the equipment vendor's experience with and industry standards for similar gas cleanup systems. HCI and HF are effectively removed by both the water cooling/scrubbing and acid gas removal portions of the syngas cleanup system.

Because co-control of acid gas HAP although removing sulfur compounds is inherent in syngas cleanup systems just like it is for FGD systems, the commenter does not believe that the final rule should require any technical demonstration from IGCC Units in order to make use of the SO_2 surrogate option. Such a demonstration is not required for EGUs equipped with FGD systems, and requiring a technical demonstration for IGCC Units equipped with syngas cleanup systems would impose additional burdens on both regulated entities and environmental regulatory agencies without resulting in an environmental benefit.

Commenter 18023 states that IGCC units that do not have FGD and pulverized coal units that may need to bypass controls from time to time should be allowed to use the SO_2 surrogate.

Commenter 18023 states that the EPA should determine that an IGCC unit, which includes a pre-combustion acid gas removal system, would be able to use SO_2 as an alternative surrogate for acid gases. IGCC remove sulfur and other acid gases in the synthesis gas (syngas) clean-up process prior to the combustion process. Because sulfur and chlorine are "scrubbed" from the syngas before it is burned, SO_2 should be accepted as providing an alternative limit. The EPA asserts that "no SO_2 data were provided by the two IGCC units; therefore, there is no alternative SO_2 limitation being proposed for existing IGCC units." The commenter states that they are currently constructing a state-of-the-art existing source IGCC plant. This plant will be equipped with an SO_2 CEMS. The plant is designed to remove greater than 99 percent of the sulfur from the syngas and is not expected to have any HCl emissions. Clearly, significant amounts of both SO_2 and HCl emissions will be avoided, and the same justifications for using the SO_2 alternative standard for units with an FGD should apply to IGCC.

Response to Comment 12: The EPA concurs with the commenters that IGCC units qualify for the use of SO_2 as an alternate equivalent standard if the EGU employs FGD systems to limit SO_2 emissions. As noted above, if the FGD system is not operating or is not present, the source must comply with the HCl emission limit.

Comment 13: Commenter 17881 states that the rule should allow the use of the SO_2 surrogate at a common stack shared by affected units as long as at least one of the units sharing the common exhaust stack is equipped with FGD regardless of whether all EGUs sharing the common stack are controlled with FGD. It is unlikely that the surrogate SO_2 limit could be met at a common stack shared by FGD equipped units and non-FGD equipped units unless the non-FGD equipped unit(s) fired coals with very low inherent sulfur contents. These same coals would also generally have low halogen contents.

Response to Comment 13: As noted above, if the FGD system is not operating or is not present, the source must comply with the HCl emission limit. This would apply also to common-stack units where only one unit had an FGD installed.

Comment 14: Although supporting the use of SO_2 as a surrogate for HCl and HF, Commenters 17722 and 17795 do not support the use of parametric monitoring on the scrubber in addition to the SO_2 CEMS. The EPA must clarify that either the CEMS or parametric monitoring can act as a viable continuous compliance methodology.

Response to Comment 14: The final rule clarifies that the CEMS is required only, and no operating parameter monitoring applies in this situation.

3. Opposition to SO_2 limit as alternative to HCl limit.

Comment 15: Several commenters (19536, 19537, 19538) state that the proper approach as a matter of science and law is to establish separate MACT limits for each acid gas. The experience with case-by-case MACT for this industrial category since the 2008 vacatur of the EPA's Clean Air Mercury Rule demonstrates that individual acid gas floors are eminently reasonable. There are examples of case-by-case MACT permits with separate emission limits for each acid gas. Measurement methodologies for these HAP are readily available. Thus, there are no experiential or technological limitations to the imposition of emission limitations for each acid gas HAP.

Response to Comment 15: The EPA explained its rationale for the use of surrogates for the acid gas HAP in both the proposal preamble and the Supporting Statement for the 2010 ICR. The EPA believes that SO_2 is a reasonable indicator for the reasons set forth at proposal. Further, commenter appears to imply that an alternate equivalent standard is not appropriate if the HAP can be directly monitored. We do not agree. The EPA may establish alternate equivalent standards notwithstanding the availability of monitoring methodologies for the HAP for which the alternate standard is promulgated. Reducing compliance assurance requirements is a reasonable basis for establishing alternate standards that assure compliance with the rule.

4. Stringency of SO_2 limit.

Comment 16: Several commenters (17804, 17821, 17901, 17930, 18014) find the surrogate SO_2 limit too stringent. Commenter 17804 states that most of the coal-fired boilers in their state burning coal refuse would not be able to comply with the HCl limits. These units control acid gases using combustion zone limestone injection. Reviewing the CEM data for these facilities show that the majority of them will not meet the proposed SO_2 surrogate emission limit.

Commenter 17804 adds that in addition to the units that would have trouble meeting the HCl and SO_2 limits, there is a waste coal-burning facility that operates an additional polishing unit for acid gas control that still would not meet the SO_2 limit. The commenter urges the EPA to reconsider the proposed HCl and surrogate SO_2 limits, which are not achievable for certain EGUs including units operating with acid gas controls.

Commenter 17821 agrees that HCl is effectively removed by wet FGD. Even when the SO_2 emission rate is above 0.20 lb/MMBtu as a result of burning high sulfur coal, HCl is effectively removed. As part of their comments, the commenter provided the results of several tests conducted at its coal-fired units equipped with wet FGD. The commenter recommends that EGUs also be given the option to establish their own site-specific SO_2/HCl surrogate limit based on a series of stack tests. This would provide additional compliance flexibility to sources, although reducing the overall cost of compliance with the rule.

Commenter 17901 states that the EPA fails to acknowledge that the limit set for SO_2 is based on western coal and boiler designs. As such, the acid gas limit may not be achievable for eastern utilities that burn higher sulfur bituminous coal, even with well-controlled wet FGD scrubbers. Also, according to the commenter, under the EPA's proposal, a 46% reduction in SO_2 emissions from 2010 levels are required by next year, which is an impossible timeline for power providers to meet.

Commenter 17930 states that given lignite's high ash content, the current limit would require roughly a 98% to 99% reduction in SO_2 emissions at a typical lignite unit. This simply cannot be met by lignite units. The EPA must set a higher SO_2 limit that can be met, in order to maintain SO_2 as a viable surrogate option.

Response to Comment 16: The EPA disagrees with the commenters' assertion that the acid gas HAP limits were based on a set of units that do not encompass the variety of EGUs in existence. Both eastern and western coals, lignite, and coal refuse are utilized by EGUs in the MACT floor. Thus, emissions from all of these types of units are reflected in the MACT floor analysis. If a source is unable to meet the final standards based on the controls in place, the source will have to upgrade the controls or take other measures to lower the acid gas HAP emissions. The EPA does not believe that site-specific emission limits are appropriate or consistent with the statute.

Comment 17: Commenter 18498 states that the 0.20 lb/MMBtu SO_2 limit proposed as an alternative to the HCl limit for units with SO_2 controls is inconsistent with the use of DSI as a pollution control that qualifies for the alterative SO_2 limit. Further the 0.20 lb/MMBtu alternative SO_2 limit does not adequately reflect fuel variability across top performing units. An SO_2 alternative limit based on 75% SO_2 removal efficiency or 0.50 lb/MMBtu would appropriately focus on the units with the best performing FGDs and DSI pollution control systems instead of the units that burn the lowest sulfur fuel. The commenter also request that the preamble be amended to specify that DSI will qualify for the 0.20 lb/MMBtu SO_2 alternative limit.

Response to Comment 17: The EPA agrees that DSI is an add-on control technology and, therefore, qualifies an EGU to use the SO_2 alternate compliance option. We disagree that the final limits do not adequately address variability consistent with the data available as explained elsewhere in response to comments and the proposed rule. We have provided response to comments related to a percent reduction format elsewhere in this document.

Comment 18: Commenter 17813 states that since HCl CEMS have not been demonstrated and it is doubtful that their scrubber could achieve greater than 98.1% removal rate, they suggest creating an expanded Subcategory 2 to include acid gas HAP that would provide a higher SO_2 emission rate (.6 lb/MMBtu) or a third alternative that would be based on percent SO_2 removal. They believe the EPA needs to add an alternative of an SO_2 percentage reduction compliance method and suggest a 90% removal rate. Since the acid gases are more easily removed than SO_2, the acid gas removal rate should be greater than 90%. This will allow continued operation of lignite units with a wet scrubber

Response to Comment 18: The EPA has discussed elsewhere in this document its response to comments related to a percent reduction format. We have also discussed elsewhere comments suggesting an additional subcategory based on either the sulfur or chloride content of the coal. We disagree with commenters on both issues and have declined to revise the final rule on those bases. We believe that HCl CEMS will be available by the compliance date which will address one of commenter's

concerns. Based on the data available, EPA believes that greater than 98.1% removal is possible and is being achieved on existing EGUs.

5. Justification for use of SO_2 limit.

Comment 19: Commenter 18034 states that the EPA did not provide any justification for the selection of SO_2 as a surrogate for HCl nor did they provide the correlation between HCl and SO_2 emissions. In fact, the data selected by the EPA suggest SO_2 would not be a good surrogate for HCl emissions. The EPA used the SO_2 emission rate from the Port of Stockton District Energy (listed as the 283rd best controlled HCl unit) as the surrogate for HCl control, yet the EPA did not even have a listed HCl emission rate for that unit in its spreadsheet. The EPA must provide a reasoned justification for the use of SO_2 as a surrogate and for the selection of that surrogate emission rate.

Response to Comment 19: In setting emission limits for HCl (and for SO_2 which is an alternative emission limit available to those units with operational flue gas desulfurization controls), the EPA ranked the top performing units for HCl emissions using the available data from the 2010 ICR. Similarly, the EPA set the alternative emission limit for SO_2 using the same approach. In some cases, the EPA had emission data available for SO_2 emissions but not for HCl emissions (and visa versa). This is the case for both Stanton Unit 10 and Stockton Unit 1. The EPA continues to believe that HCl and HF, due to their chemical and physical properties, will be controlled at least as well, and likely much better than, SO_2 using flue gas sulfurization technologies. Differences in the rank order for the best performing HCl and SO_2 can be affected by normal fuel composition and operational variability and in measurement uncertainties at the very low levels achieved by the very best performing units.

Comment 20: Commenter 19033 questions the relationship the EPA is assuming between SO_2 and HCl, based on section 114 test data it provided for one of its NSPS industrial boilers. The commenter supports the use of SO_2 CEMS as a surrogate for HCl emissions if there is a defined correlation between an SO_2 limit and an HCl limit. The commenter recommended specific revisions to the wording in Tables 2 and 4.

Response to Comment 20: The acid-gas HAP (HCl, HF, HCN and Cl_2) are expected to be removed using technologies that take advantage of their solubility or their acidity (or both). This will likely be done using technologies that are often used for control of SO_2 (also an acidic gas). Because it is highly likely that facilities will choose to control these acid gases by applying the same technology and the means of removal for each are similar, it is logical to select one (SO_2) as a surrogate to represent the control of the others. In this final rule, we are establishing an HCl standard that is also a surrogate for the other acid gas HAP, and an alternative equivalent SO_2 surrogate standard for all acid gas HAP, including HCl. Sources can comply with either standard.

Comment 21: Commenter 19214 believes that alternate equivalent emission standards, like the primary MACT standards, should reflect the actual capabilities of: current technology to control the emissions for which they are established. Modern SO_2 controls are capable of achieving lower emissions. The EPA should show how it derived its proposed alternate equivalent emission standards and explain how they satisfy the MACT requirements.

Response to Comment 21: The EPA has provided the MACT Floor spreadsheets showing how the proposed emission limits were derived for both HCl and SO_2. The proposed limits were based on emissions data from 12 percent of existing sources with the lowest levels of HCl and SO_2 consistent

with the CAA. The best performing sources used existing, modern SO_2 controls to achieve the low levels of the acid gases.

Comment 22: Commenter 17737 objects to 0.2 lb/MMBtu as the SO_2 emission limit. If the EPA intends to use this approach for setting the alternate limit, they first must demonstrate that the "best performing units" for control of SO_2 are precisely the same as the "best performing units" for control of HCl. The commenter states that two of their units are equipped with dry FGD and can comfortably meet the 0.002 lb/MMBtu limit for HCl but cannot consistently achieve the 0.2 lb/MMBtu SO_2 alternate emission limit.

Response to Comment 22: In this final rule, we are establishing an HCl standard that is also a surrogate for the other acid gas HAP, and an alternative equivalent SO_2 surrogate standard for all acid gas HAP, including HCl. Sources can comply with either standard. We direct the commenter to responses to other comments that address the manner in which we selected the best performing sources for the HCl standard and the alternative SO_2 standard.

Comment 23: Commenter 18444 states that compliance with the proposed HCl limit may not guarantee the best SO_2 controls. Additional SO_2 emission reductions may be needed to meet a revised fine PM health and welfare standard if the selected HCl controls do not sufficiently reduce SO_2 emissions. The EPA should encourage facilities to install the best controls as soon as possible to provide the public health benefits for all pollutants sooner. The EPA should make it clear that DSI may be a good short term HCl emission reduction measure, but over the longer term, better control of SO_2 may be required.

Comment 24: Commenter 18488 states that the proposed rule would use MACT controls to drive reductions of $PM_{2.5}$, which is a criteria pollutant. The EPA is attempting to use SO_2 as a surrogate to over-control a criteria pollutant as part of the MACT process. The Clean Air Interstate Rule (CAIR) was initially based on an assumed SO_2 control level of 95 percent. The proposed MACT rule using SO_2 as a surrogate for HCl will require SO_2 removal efficiencies at 97 percent or higher. The commenter requests that the EPA provide data demonstrating that a surrogate SO_2 for HCl emission limit that reflects 95 percent SO_2 control would not assure compliance with the HCl emission limit 0.002lb./MMBtu. If it cannot, the SO_2 surrogate limit should be amended to a level that only requires 95 percent SO_2 removal efficiency, as was envisioned in the CAIR.

Response to Comment 23 - 24: The commenters are not correct. The EPA established the standards in the final rule consistent with CAA section 112(d). Whether the final standards cause areas to achieve either the PM or SO_2 NAAQS is not a consideration in establishing standards under CAA section 112. Nor is the EPA attempting to effect reductions of either PM or SO_2 to effect compliance with another regulatory program. The EPA is establishing the final limits as a means of complying with the requirements of CAA section 112 to reduce HAP emissions. The PM and alternative SO_2 surrogate standards, along with the other standards and alternatives in the final rule, are technology based standards that lead to HAP emission reductions. The EPA provides surrogate and alternative standards, in part, to provide industry flexibility when the data demonstrate that the use of surrogate standards is appropriate and consistent with the statute. We specifically evaluated and included the alternative SO_2 standard because we believed it would be a more cost-effective standard for some EGUs because EGUs often use FGD systems to comply with applicable SO_2 limits and the EGUs almost universally have SO_2 CEMS installed so compliance assurance costs are reduced. We do not consider how the CAA section 112 standards align with existing criteria pollutant specific requirements when establishing the standards.

6. DSI.

Comment 25: Commenter 17627 believes the EPA's assumptions regarding the effectiveness and availability of control equipment to be unsupported by full-scale experience. The commenter explains that in meeting with DSI technology providers, the providers said that HCl limits cannot be met by DSI alone without overwhelming the particulate control device due to particle loading inlet increases and the solid formed by absorbing SO_2 and HCl. The technology has not been commercially demonstrated for control of a targeted pollutant.

Commenter 17813 questions the contention that DSI can achieve the reduction levels necessary to meet proposed limits when EGUs are burning high chlorine eastern bituminous coals.

Response to Comment 25: See Preamble for a discussion of DSI.

Comment 26: Commenter 17621 believes that additional data are required to evaluate the use of DSI as a control for removing HCl and HF. Based on the limited available data, there are concerns about whether EGUs firing medium- to high-chloride coals can achieve the HCl standard using DSI, and whether there would be impacts to balance-of-plant operations.

Response to Comment 26: See Preamble for a discussion of DSI.

Comment 27: Commenter 17881 states that vendors have targeted SO_2 not HCl during testing demonstrations. There are limited data on the actual performance of DSI with regard to HCl emissions.

Response to Comment 27: See Preamble for a discussion of DSI.

Comment 28: Commenter 17873 states that the EPA's removal expectation for DSI is generally higher than the commenter's experience. They claim that on average between 40 and 50% SO_2 removal would be achievable on a typical 500 MW coal unit.

Response to Comment 28: See Preamble for a discussion of DSI.

Comment 29: Commenter 17712 states that the EPA should either develop a CAA section 112(d)(4) health based standard for HCl or develop EGU subcategories based on bituminous and sub-bituminous coal use to accommodate the different emission control capabilities based on coal rank. The proposed HCl limits are based on several questionable assumptions. Available information does not support the contention that DSI technology can achieve the levels of reduction necessary on EGUs using high chlorine eastern bituminous coals to meet the proposed MACT HCl limits. The alternative control option of FGD cannot be timely installed to meet the proposed compliance deadline as the EPA admits. Also the EPA's determination that over 56 GW of needed DSI technology can be installed in time to meet the compliance deadline raised issues related to whether the installation of dry scrubbers could be accomplished in time and whether the additional demands for the dry sorbent (trona) would be available in time. The EPA takes the position that establishing a section 112(d)(4) HCl standard is inappropriate because information is not available to show acute exposures will not pose health concerns. It appears, however, from the EPA's analysis and preamble discussion that it believes that health risks due to acid gas exposures including HCl is minimal. In view of these circumstances we believe it is appropriate to at the very least establish EGU subcategories for HCl controls based on coal rank such that represent levels achievable based on DSI installation and coal rank.

Commenter 17930 states that the EPA has not demonstrated that technology currently exists in order to achieve the type of emissions reductions necessary to meet the currently proposed HCl limits, rendering them infeasible and legally unsupportable. One of the primary justifications for setting the HCl level as currently proposed is that DSI will have a removal efficiency of 90%. However, this is based on one vendor representation, with numerous caveats, during a PowerPoint presentation. These types of removal efficiencies have not been demonstrated in actual practice, and it would be a leap of faith to assume that DSI technology will be able to meet these removal efficiencies. Setting standards that could dramatically impact the cost and reliability of electricity based on this type of leap of faith is not allowed under the CAA.

According to commenter 17758, the EPA is overly optimistic about the use of DSI to control acid gases and underestimates the time needed and the cost of compliance. In addition, DSI is not a universal option for all coal units and doubts that it can allow all utility units to comply with the acid gas standard. According to commenter 17758, DSI can interfere with ACI performance for Hg control. The commenter cites two facilities, one at which Trona injection interfered with Hg control by ACI and another facility where Trona and ACI are being used effectively. The commenter states that these examples illustrate the plant-specific applicability of DSI technology.

Response to Comment 29: See Preamble for a discussion of DSI.

Comment 30: Commenter 17928 opposes DSI as it creates potentially hazardous leachate of selenium from ash. Use of Trona in DSI for compliance may have unintended consequences, relating to selenium leachate from ash and CO_2 emissions. The proposed rule assumes extensive use of Trona in DSI controls. Should high Trona injection levels be required for compliance with air emission standards, a resultant new hazardous waste stream may result and effectively limit the amount of acid gas control that can practically be achieved with that technology.

Commenter 17931 states that the use of DSI and the injection of Trona in an EGU generates increased levels of NO_X which degrades the efficacy of activated carbon used for Hg control.

Commenter 18033 states that the lack of experience with the DSI technology highlights the problem with setting emissions standards as there is insufficient data to confirm whether a unit using DSI with or without a scrubber can meet all three standards on a continuous basis without creating antagonistic impacts to the overall effectiveness of other control technologies. Many of the units within the scope of the 56 GW will not have the option to choose this compliance route because overlapping CAA rules will render that decision moot.

Response to Comment 30: See Preamble for a discussion of DSI.

Comment 31: Several commenters (17868, 18424, 18963) question the EPA's assumption that a large number of EGUs will use DSI to control acid gases. Although DSI is a lower-cost option to reduce acid gas emissions, there is nothing in the history of its usage that suggests it is capable of achieving MACT acid gas emission limits in large EGUs burning medium to high sulfur coal. DSI is not in widespread use as a basic SO_2 control system, and Commenter 18963 notes that there have been no commercially demonstrated applications of DSI for the control of HCl from coal refuse-fired CFB units. Commenter 17868 questions the EPA's assumption that the 3-year compliance schedule is achievable based on the use of DSI systems rather than FGD. Commenter 18424 also questions the EPA's projection that a large

number of EGUs will use DSI to control acid gases, and the use of these controls will increase the use of high-sulfur coals. The EPA's own consultant, Sargent and Lundy, has recommended not employing DSI on units burning coal with greater than 2.0 lb/MMBtu sulfur content. More than 80 percent of coal mined in Indiana exceeds 2.0 lb $S0_2$/MMBtu. It seems unlikely that utilities burning Indiana coal will utilize the lower cost DSI technology and will either install/upgrade scrubbers or retire coal-fired units where scrubbers are uneconomical. The commenter states that few utilities will install DSI when other regulatory requirements, such as the SO_2 emission reductions under CSAPR, are taken into account.

Response to Comment 31: See Preamble for a discussion of DSI.

4E04 - Alternative Limits: Other

Commenters: 17623, 17655, 17681, 17704, 17725, 17760, 17774, 17775, 17808, 17820, 17885, 18014, 18015, 18487, 18498, 19121

1. General support.

Comment 1: Commenter 17623 states that in the proposed rule the EPA included alternative standards for certain subcategories and emission limits. In particular, the agency established the following alternative standards: SO_2 as an alternative equivalent to HCl for all EGUs within all subcategories with add-on FGD systems; individual non-Hg metallic HAP as an alternate to total PM for all subcategories except liquid oil-fired units; total non-Hg metallic HAP as an alternate to PM for all subcategories except the liquid oil-fired subcategory; and individual metallic HAP as an alternate to total metal HAP for the liquid oil-fired subcategory. In the proposed Utility MACT the EPA has also, for the first time, set SO_2, a commonly measured criteria pollutant, as an alternative to HCl. However, state permitting has allowed the use of SO_2 as a surrogate in the HAP context. For example, Virginia has allowed SO_2 to account for acid gases in the case-by-case permitting process. Because the EPA has discretion to employ tools for flexibility such as surrogates; this discretion also would extend to setting alternatives as well.

Response to Comment 1: The EPA takes the comment to be support for the approach taken. The EPA has continued use of surrogate standards and alternative equivalent standards in the final rule where appropriate and justified.

Comment 2: Commenters 17655 and 17704 support the proposed flexible compliance mechanisms. Commenter 17665 also states that the primary option stated is actually the surrogate standard of total PM and since HAP metals are the actual parameter of concern, EGUs choosing to show compliance with individual or collective HAP metal limits should be afforded that opportunity as well.

Response to Comment 2: The EPA appreciates commenter's support for the approach of using alternatives.

Comment 3: Commenter 19121 supports the EPA in utilizing PM and SO_2 emissions monitoring as surrogates to HAP.

Response to Comment 3: The EPA appreciates commenter's support.

2. Percent reduction limits.

Comment 4: Commenter 17775 notes that in UARG's comments on the EPA's 2004 proposed MACT rule, UARG urged the EPA to provide EGUs the option of complying with either a stack limit or a percentage reduction limit. Alternative limits are a practical way to address the wide variations in the concentrations of trace HAP in coal. Providing a percentage reduction alternative would avoid inequities based on the source and type of coal burned.

Comment 5: Commenters 18014 and 17885 recommend a percent reduction limit option. Commenter 17885 recommends that a percent reduction MACT metric be considered as an alternative, and not a substitute, to some of the proposed MACT numerical limits. For example, Hg and HCl are HAP whose levels would not be meaningfully reduced by fuel pretreatment. Second, a necessary data format and

protocol could be developed for some HAP, such as Hg, that would allow an appropriate percent reduction alternative to be developed.

Commenter 18014 recommends that the EPA include percent reduction limits for fuel-related emissions (filterable PM, metals, HCl/HF) as an option in addition to the currently proposed lb/MMBtu or output standards. The EPA has allowed percent reduction options in previous rules. Although the EPA stated that it did not have "the data necessary to establish percent reduction standards" for a mine-to-stack based reduction scheme, the agency did collect sufficient fuel data to establish an on-site removal value since sources reported fuel analysis data along with the stack test results under the EGU ICR. Regarding the EPA's concern over the Brick MACT implications, the commenter states that like the lb/MMBtu limit on which it is based, the alternative percent reduction would be based on the emissions achieved in practice by the top performing sources and, therefore, is consistent with the requirement of the statute.

Comment 6: Commenter 18498 recommends that the EPA include percent reduction limits for fuel-related emissions as an option in addition to the currently proposed lb/MMBtu or output standards. The commenter provides the following recommended equation for establishing the alternative percent reduction floor value:

%R floor = (1-E floor / E fuel) X 100

where:

%Rfloor = Percent reduction floor value for fuel related pollutant

Efloor = lb/MMBtu emission floor value for pollutant

Efuel = Average lb/MMBtu fuel concentration for pollutant based on all available fuel emissions data reported by the sources in the emissions floor analysis

The commenter notes that the EPA has set percent reduction requirements previously in other rules. The EPA stated its "desire to promote, and give credit for, coal preparation practices that remove Hg and other HAP before firing" but such removal would be addressed by the lb/MMBtu or standards (as they are for in the EGU NSPS Rule). If those sources elected to use the percent reduction option based on on-site post-beneficiation fuel analysis, the percent removal values would simply be conservatively low. Although the EPA stated that it did not have "the data necessary to establish percent reduction standards" for a mine-to-stack based reduction scheme, the agency did collect sufficient fuel data to establish an on-site removal value since sources reported fuel analysis data along with the stack test results under the EGU ICR. Regarding consistency with earlier court rulings, the alternative percent reduction would be based on the emissions achieved in practice by the top performing sources and, therefore, is consistent with the requirement of the statute.

Response to Comments 4-6: As the EPA noted in the proposal, we question the availability of a percent reduction format in light of court precedent. In addition, even if we believed we could establish percent reduction-formatted emission limits, we would not because we do not have sufficient data to set such a standard and we believe compliance would be difficult to measure. The EPA is not convinced by commenters' statements and has not finalized any percent reduction format limits.

3. Mass-based limits.

Comment 7: Commenter 17681 requests that the EPA create a mass-based alternative compliance option that would allow sources the option of complying with the limits by converting the existing rate limit (pounds per million Btu) to a mass-limit (pounds per hour with an annual or 30-day averaging period), based on the unit's permitted heat input. Florida has recent positive experience in utilizing mass-based limits in permits, achieving substantial environmental benefits although lessening the burden on the source. The EPA also has extensive experience developing NESHAP compliance requirements on a mass basis, having promulgated at least six such regulations. This alternative compliance option would alleviate a material flaw in the EPA's approach. Specifically, the EPA's proposed limits were set based on stack test results, during steady-state, full load conditions over a few hours, yet the EPA is requiring compliance at all times, including startup and shutdown. The EPA's approach fails to account for known variability in control and monitoring equipment, fuel variability, and differing emissions during startup, shutdown and malfunction.

Comment 8: Commenter17402 supports the allowance of alternative formats of emission limitations either a measurement based on mass of pollutant emitted per heat energy input to the EGU or mass of pollutant emitted per megawatt- or gigawatt-hour gross output from the EGU. Both formats of limitations are consistent with how emission limitations are measured in other regulations.

Comment 9: Several commenters (17717, 17718, 17816) state that the EPA should allow sources to calculate and comply with pound per hour (lb/ hour) MACT standards determined to be equivalent to lb/MMBtu MACT standards at maximum capacity, thereby allowing sources to reduce load to lower the lb/hour emissions to comply with these MACT standards.

Comment 10: Commenter 17638 requests a mass-based alternative compliance option by converting the existing rate-limit (pounds per million Btu) to a mass-limit (pounds per hour with an annual average), based on the unit's permitted heat input. The commenter notes that Florida has recent positive experience in utilizing mass-based limits in permits, achieving substantial environmental benefits although lessening the burden on the source. The EPA also has extensive experience developing NESHAP compliance requirements on a mass basis, having promulgated at least six such regulations (40 CFR Part 63, subparts MMM, XXX, GGGGG, GGGGGG, LLLLLL, and NNNNNN). The commenter further notes that mass rate were used in the modeling supporting the rule and well as in setting the standards (using stack tests date).

Commenter 17807 states that the EPA should consider mass emission limits based on a unit's permitted heat input capacity. This option would lessen the serious concerns resulting from complying with a strict rate-limit by providing more flexibility to accommodate inherent variances in unit operations. This option provides flexibility relating to monitoring, fuel blending, and emissions during startup, shutdown, and malfunctions, and eliminates concerns in complying with rate-based limits. The EPA has developed compliance requirements on a mass basis with six other NESHAP.

Response to Comments 7 - 10: The EPA does not believe that a mass-based format is appropriate for coal- and oil-fired EGUs as it does not provide an equivalent level of emission reduction as the heat input based standard. The EPA established the limits based on stack tests and we considered variability and, for sources that demonstrate compliance on a continuous basis, we included a 30-day averaging periods to assure that small spikes in emissions would not lead to violations of the standards.

Comment 11: Commenter 17265 supports the inclusion of a mass-based alternative compliance option. Specifically, the rule should allow sources the option of complying with the limits by converting the

existing rate-limit (lb/MMBtu) to a mass-limit (lb/hr with a reasonable averaging time), based on the unit's permitted heat input. This seems to be a common-sense alternative, which would provide sources with added flexibility although causing no sacrifice to the environment. If the EPA does not include a mass-based limit, additional consideration must be provided for operations during startup and shutdown. The EPA should develop work practice standards for these non-steady-state conditions, comparable to the EPA's approach in the recent Industrial Boiler MACT.

Response to Comment 11: The EPA does not believe that a mass-based format is appropriate for coal- and oil-fired EGUs. The EPA established the limits based on stack tests and we considered variability and, for sources that demonstrate compliance on a continuous basis, we included a 30-day averaging periods to assure that small spikes in emissions would not lead to violations of the standards. In addition, as stated elsewhere, EPA is including a work practice standard to periods of startup and shutdown in the final rule.

Comment 12: Commenter 18031 states that requiring LEE units to put on expensive HCl and/or PM CEMS, or conduct very frequent stack testing, even though their annual tons of emissions of HCl and PM are relatively low, is just not cost effective or justified. The cost of stack testing on a bi-monthly basis, for example, is even more costly in Minnesota than possibly other states, due to the requirement to use an independent third party to do the testing. The commenter recommends that the EPA establish tons/year thresholds for reduced monitoring requirements of PM and HCl, as they have for Hg.

Response to Comment 12: We do not believe that a mass-based format is appropriate for coal- and oil-fired EGUS. The EPA established the limits based on stack tests but we considered variability and, for sources that demonstrate compliance on a continuous basis, we included averaging periods to assure that small spikes in emissions would not lead to violations of the standards. We also believe that mass-based emission limits could tend to be biased towards smaller or lesser used EGUs.

Comment 13: Commenter 17627 recommends that the EPA convert Tables 1 and 2 to a mass emission limit which would be equally protective of the environment and human health but easier to maintain compliance. If the limits were alternatively converted to a mass emission limit, a single facility has flexibility to over control certain EGUs to achieve the most cost-effective emission reductions to meet the total mass limit for the facility although keeping the facility running and effectively protecting the environment and human health at the lowest overall cost to customers. The commenter notes that since most HAP, particularly Hg, are considered bioaccumulative most State Health Organizations measure Hg exposure on a mass basis over an exposure period, i.e., Maine Ambient Air Guideline (MAAG) of 300 nanograms per cubic meter (ng/m3) of Hg. Since the EGU MACT rulemaking is promoted as protecting public health, the EPA should also base the standard on the pollutant mass emissions.

Response to Comment 13: We do not believe that a mass-based format is appropriate for coal- and oil-fired EGUS. The EPA established the limits based on stack tests but we considered variability and, for sources that demonstrate compliance on a continuous basis, we included averaging periods to assure that small spikes in emissions would not lead to violations of the standards.

4. Presence of chlorine in fuel oil.

Comment 14: Commenter 17725 agrees with the EPA that the presence of chlorine is not generally expected in fuel oil and that its presence is due to contamination resulting from tanker ballasting with sea water. Also, the commenter is concerned as to their ability to repeatedly comply during compliance

stack tests. In lieu of required HCl stack testing, the commenter requests that the EPA allow a work practice that limits the percent water in fuel deliveries to no more than 0.5 percent volume, based on ASTM Method D-95. The commenter analyzed fuel oil samples and found chlorides concentrations in the water fraction of approximately 20, 340, and 3,850 ppm of chlorides. The conclusion is that the chlorides in the fuel oil and therefore the HCl out the stack, is due to the chlorides in the water. The EPA should allow a compliance method based on a limit on the percent water in the fuel.

Comment 15: Commenter 17760 agrees that the chlorine is likely from tankers ballasting with sea water. The commenter recommends that the EPA establish a water content limit for fuel oil of 1.0% to control acid gases at oil-fired units.

Comment 16: Several commenters (17110, 17870, 18025) state that studies suggest that chloride in fuel oil can result from contamination during transportation and processing of crude oils. For example, chloride contamination of crude oils can occur as a result of the ballasting of tanker ships with seawater. However, the Oil Pollution Act of 1990 requires all new oil tankers to be double hulled and establishes a phase out schedule (by the middle of the decade) for existing single hulled tankers with un-segregated ballasts. Because of the role of seawater contamination in introducing contaminants into the oil, the commenters suggest that the EPA set a percent water content limit for fuel oil at a level of 1.0%, rather than setting HCl and HF emissions limits. This would encourage handling and transport practices to limit salt water contamination. The commenters recommend a standard of 1.0% water because several of the lowest HCl and HF emitting units currently require percent water (or water and sediment) specifications between 0.5% and 1.0%.

Comment 17: Commenter 17808 states that chlorides in fuel oil can result from transport of oil in cargo in older, single-hulled vessels in which the oil is loaded into the same cargo tanks in which seawater had be added as ballast for the ship. The use of older single-hulled cargo vessels is being phased out. Because of the role of sea water contamination in introducing contaminants into the oil, the commenter suggests that the EPA set a percent water content limit for fuel oil at a level of 1.0%, rather than setting HCl and HF emissions limits. This would encourage handling and transport practices to limit salt water contamination. The commenter recommends a standard of 1.0% water because several of the lowest HCl and HF emitting units currently require percent water (or water and sediment) specifications between 0.5% and 1.0%.

Comment 18: Commenter 17796 recommends EPRI as a source of information on the presence of chlorine in oil.

Response to Comments 14 - 18: The EPA appreciates the information provided by commenters and has made the suggested adjustments in the final rule. Based on data provided by commenters, the EPA is finalizing a compliance assurance option of 1.0% moisture in the liquid oil as an alternative to measuring HCl and HF emission for both liquid oil subcategories (i.e., continental and non-continental). Thus, sources will have an option for demonstrating compliance with the final rule.

5. Lack of adequate support for surrogacy approach.

Comment 19: Commenter 18487 states that the EPA has not adequately demonstrated that its use of surrogacy are supported by the data it has collected, sufficient to satisfy the legal requirements for surrogacy. The EPA has not adequately demonstrated that the three pre-conditions supporting surrogacy-based limits are met for all of the HAP that the Agency proposes to regulate through surrogate

limits. Where the use of surrogates is not supported by the record, pollutant specific emissions limits are required. The EPA has the data it needs to set pollutant-specific limits – indeed has proposed to do so in the alternative – and must do so in the final rule.

Response to Comment 19: We address the legal issues raised in this comment elsewhere in the rule record.

In the cases where we have allowed the use of an alternative measurement (i.e., filterable PM for the non-Hg metallic HAP and SO_2 or HCl for the acidic gas HAP) the EPA believes that these are technically reasonable and will result in significant and equivalent reductions although allowing for compliance options that do not unnecessarily burden the industry. The most effective controls for filterable PM are also the most effective controls for the non-Hg metallic HAP (with the exception of selenium which can be present as either a particulate or particulate-bound Se form or as the acidic gas SeO_2). The units that were selected for testing were specifically identified because the EPA believed them to be the best performing for PM. Similarly the controls that are used to reduce emissions of SO_2 (which is an acidic gas) are the same ones that are expected to be implemented for control of the acidic gas HAP (i.e., HCl, HF, etc.). As with the units selected for PM testing, the units that were chosen for acid gas testing in the 2010 ICR were selected because of the SO_2 controls. We address the legal availability of surrogate standards in response to other comments.

6. Clarification needed.

Comment 20: Commenters 17728 and 17775 note that the EPA offers inconsistent definitions of the HAP acid gases in the preamble to the proposed rule. In its discussion of possible surrogates, the EPA identifies HCl, HF, HCN, and Cl_2 as the HAP acid gases. See 76 FR 25,038. Yet, when the EPA discusses its consideration of possible 112(d)(4) standards for the acid gases, it includes SeO_2 as an acid gas. See 76 FR 25,049.

Response to Comment 20: The EPA believes it has clarified the text and regulation to address commenter's concerns.

4F01a - Format of the Standard: PM as a surrogate for non-Hg metallic HAP

Commenters: 17283, 17402, 17623, 17648, 17705, 17711, 17722, 17724, 17725, 17729, 17730, 17747, 17758, 17772, 17792, 17795, 17796, 17798, 17807, 17820, 17842, 17855, 17871, 17876, 17885, 17886, 17898, 17909, 17925, 17928, 17973, 17975, 18015, 18021, 18025, 18037, 18425, 18498, 18500, 18539, 18932, 18023

Comment 1: Several commenters (17648, 17648, 17973) state that the EPA's proposal to allow coal-fired EGUs and solid oil-derived fuel-fired units to control PM as a surrogate for non-Hg metallic HAP is reasonable and appropriate. Commenter 17711 also supports the decision to establish PM limits and not limits for PM_{10} or $PM_{2.5}$. Commenter 17711 agrees that a separate filterable $PM_{2.5}$ or condensable PM standard should not be established due to the measurement issues identified and also because control technologies installed for total PM, and also for NO_X and HCl/SO_2, will result in reductions of both direct $PM_{2.5}$ and $PM_{2.5}$ precursors.

Comment 2: Commenter 17843 states that there are readily available control technologies for reducing total PM; hence, non-Hg metal HAP, emitted by coal-fired EGUs. These technologies include ESPs and baghouses (fabric filters). The electric power sector has an established history in installing and operating these types of controls. For example, more than 300 existing coal-fired power plants are reported to have installed ESPs and/or baghouses.

Commenter 17620 states that good particulate control is a basic necessity for control of particulate HAP and it also enables more effective control of acid gas HAP and gaseous mercury where reagent injection is used. According to the commenter, it is critical that EPA proceed to adopt its proposed MACT limits on total fine particle emissions from coal and heavy oil combustion to address the many particulate HAP emitted by these sources.

Response to Comments 1 - 2: The EPA appreciates the support of commenters. As noted elsewhere, we are finalizing filterable PM as the surrogate for non-Hg HAP metals.

Comment 3: Several commenters (17283, 18425, 19536, 19537, 19538) state that PM is not an appropriate surrogate for metal emissions and does not meet the court-defined requirements of a surrogate, particularly as the EPA's proposed definition for total PM includes the condensable fraction. Commenter 17283 gives the example where limestone is blended with coal at the input of the process, which could reduce sulfur emissions but could increase Hg, arsenic, selenium, and other HAP metal emissions due to the high temperatures involved in much the same way it has in the Portland cement manufacturing process. Alternatively, use of limestone in wet scrubber solution would increase PM emissions but have minimal impact on Hg, selenium, arsenic, and other possible HAP metal emissions. The commenter states that PM is neither an appropriate nor adequate indicator to represent how this changing, complex process impacts HAP metals emissions.

Comment 4: Several commenters (19536, 19537, 19538) state that any use of PM as a surrogate for non-Hg HAP metals would, first, need to be limited to only those HAP that are consistently present in PM. Second, it would need to be based on the fine fraction of PM (PM less than 2.5 microns in diameter), where the non-Hg HAP reside. Including larger particulates disrupts the necessary relationship between the surrogate (PM) and the regulated HAP (trace metals) and allows compliance with the standard although allowing elevated metal emissions. At the very least, a lawful PM standard as

a surrogate for non-Hg metal HAP must be set based on $PM_{2.5}$ rather than total PM without regard to particle size.

Comment 5: Several commenters (18425, 19536, 19537, 19538) state that the EPA proposed a limit on total PM because the test method for measuring $PM_{2.5}$ (Method 201A) is only applicable for stack emissions without entrained water droplets, and thus $PM_{2.5}$ can't be measured at a unit with a wet scrubber. Measurement difficulties cannot justify a surrogate that does not represent the target HAP. Several commenters (19536, 19537, 19538) state that the EPA has information to propose specific HAP-based emissions limits. The EPA should require a PM surrogate based on $PM_{2.5}$ for units without wet scrubbers and PM_{10} for units with wet scrubbers. The commenters state that the EPA's Emission Measurement Center website states that when water droplets are present, Method 5 should be used instead of Method 201A, and consider the PM catch as PM_{10} emissions. Another alternative is to use Method 5 to measure filterable $PM_{2.5}$ and to use Method 202 to measure condensables (and assume that all condensables are in the 2.5 micron size or smaller, which is typically the case). Given that the EPA has acknowledged that the non-Hg metal HAP are typically in the $PM_{2.5}$ size range, any surrogate limit on particulate matter must limit $PM_{2.5}$ emissions in order to properly act as a surrogate for the MACT for non-Hg metal HAP.

Response to Comment 3 - 5: The EPA disagrees that PM is not an adequate surrogate for non-Hg metal emissions. Although the addition of limestone to coal or the use of limestone in wet scrubber solution would increase the PM loading to the emissions control devices, the PM emissions and the metals emissions following the control devices are the measured pollutant for determining compliance. Both the PM emissions and the metals emissions were concurrently measured at most of the Part III ICR tests. The addition of alkaline material (lime or limestone) did not adversely affect the ability of achieving low particulate matter emissions nor the ability of particulate to provide a reliable indicator of metals emissions control. .

Comment 6: Commenter 17283 states that legislation concerned with monitoring only PM mass concentrations fails to address the substantial differences in potential health effects linked to specific metal species and their independent variability and that a more effective approach would be to address the specific metals of concern independently, focusing control efforts on the most toxic species.

Response to Comment 6: CAA section 112(d) standards are technology based standards, not risk based standards, and the limits are established based upon the demonstrated emissions reductions of existing sources. The EPA believes it is reasonable to establish a PM surrogate standard for non-Hg metal HAP because the best PM controls provide the best controls of non-Hg metal HAP emissions. We have also established alternative individual and total metal standards so industry has flexibility in determining how to comply with the final rule. Emissions measurements of filterable particulate, total particulate, individual metals, or total metals provide comparable indications that the best control measures are installed.

Comment 7: Commenter 17283 states that because the CAA requires the EPA to set standards for existing sources based on the best performing 12 percent and to review and revise these standards every 8 years, the EPA needs to monitor for HAP metals emissions directly to better understand how the "best performers" reduce HAP metal emissions or prevent HAP metal emissions from increasing. According to the commenter, the efficacy of various HAP metal emission reduction/prevention options cannot be assessed unless each HAP metal is measured because each has unique and wide ranging chemical and physical properties dictating their presence and behavior under various conditions that will be important

if processes and/or chemistry changes through the addition of reactants to facilitate other aspects of the process such as minimization of corrosion and catalyst poisoning, enhancement of collection efficiency of other species like Hg, etc. The commenter states that failure to monitor HAP metals directly will significantly impair the EPA's ability to revise emissions standards in the future.

Response to Comment 7: We believe that the measurement and monitoring which we are requiring will provide sufficient information on individual metals emissions and control capabilities for future assessments. Although we have included the option for sources to determine compliance using filterable PM, we do not see a significant advantage for sources to select this method to demonstrate compliance over the use of total or individual metals to determine compliance. We believe there will be more than sufficient numbers of sources which will choose to measure metals emissions to support future reviews of the standard. Further, we believe that the continuous monitoring that is an option for demonstrating compliance with the filterable PM limit will effectively ensure continuous compliance with the standard and, thus, reduce total metal HAP emissions. We expect that the measurement and monitoring which permitting authorities will require of new sources will be tailored to address the increased demonstration demands for these improved emissions performance capabilities.

Comment 8: According to several commenters (17283, 19536, 19537, 19538), the DC Circuit Court laid out three criteria for the use of PM as a surrogate for non-Hg metal HAP: 1) "…HAP metals are invariably present in cement kiln PM…", 2) "…PM control technology indiscriminately captures HAP metals along with other particulates.", and 3) "…PM control is the only means by which facilities "achieve" reductions in HAP metal emissions…". Several commenters (19536, 19537, 19538) state that the EPA has not adequately demonstrated that the three pre-conditions are met for all of the HAP that the agency proposes to regulate through surrogate limits and where the use of surrogates is not supported by the record, pollutant specific emissions limits are required. Commenter 17283 states that selenium is an element that does not meet the first two criteria and the addition of a condensable fraction to the definition of PM only complicates this for other HAP metals. In regards to this third criterion, the commenter notes that the stated that "…PM might not be an appropriate surrogate for HAP metals if switching fuels would decrease HAP metal emissions without causing a corresponding reduction in total PM emissions." The commenter states that the process of energy extraction is becoming increasingly complicated and that processes such as fuel blending to minimize sulfur emission, mixing additives with the coal, adding absorbents such as powdered activated carbon, use of catalysis, processes such as soot blowing to maximize energy extraction, as well as addition of classic engineered controls such as bag houses, electrostatic precipitators, scrubbers, etc. may increase PM emissions without increasing HAP metal emissions, or increase HAP metal emissions without increasing PM, such as might be the case if trace HAP metal concentrations increase in an additive or other feed material, or where an additive is injected into the process. Direct monitoring of HAP metals is needed to determine if the HAP metals are changing. And the EPA seems to recognize this in that they are requiring frequent Reference Method 29 measurements, which, however, is costly, dangerous, creates hazardous waste and is difficult to obtain accurate and reliable results at the low concentration expected with contemporary controls. In effect, it appears that the EPA is using PM as a parameter to monitor in much the same way they use plant operating parameters in continuous parameter monitoring systems. As long as PM, fuel, and all control parameters remain relatively constant between Reference Method 29 measurements, one might be able to assume that HAP metals emissions have not changed dramatically since the last Reference Method measurement. It would be far less costly, far more informative and protective as well as more useful for plant operation if a multi-metals CEMS were used to measure HAP metals emissions directly and continuously.

Response to Comment 8: The EPA disagrees with commenter's characterization of the law and with the statement that the PM surrogate standards does not satisfy the three identified criteria. The EPA Method 29 data provide ample evidence that the non-Hg HAP metals are invariably present in the PM from coal- and oil-fired utility boilers. The initial and primary means employed by EPA Method 29 to collect the non-Hg HAP metals for subsequent analysis is with a quartz fiber filter. Although the EPA Method 29 does include impingers that are designed to improve the collection of some HAP metals which may pass through the quartz filter, a reasonable proportion of all HAP metals from uncontrolled or poorly controlled sources are retained on the filter. In addition, emissions test data from utility boilers with a wide suite of particulate, acid gas, and other controls show that the non-Hg metals emissions generally track the control efficiencies associated with PM. This provides ample evidence that HAP metals are invariably present in PM generated by utility boilers. This also provides ample evidence that PM control technology indiscriminately captures HAP metals along with other particulates. Although the EPA recognizes that energy extraction is becoming increasingly complex, the EPA can find no reliable information that identifies any control technology that is not associated with improved PM control which is significantly and consistently more effective in the control of HAP metals including selenium. At this time we do not believe that a multi-metal CEMs provides a significant advantage over equipment that have been traditionally used as PM CEMS. Multi-metal CEMS are one type of PM CEMS monitor which includes the additional capability of analyzing the filter tape for the presence of metals following the analysis of the PM deposited on the filter tape. Although a few multi-metal CEMs have been installed, the EPA is aware of almost 100 installations of PM CEMS.

Comment 9: Numerous commenters disagree with the EPA's approach to setting PM surrogate operating limits saying that the setting of unit specific limits bypassed the MACT approach required by the CAA. Specific comments are summarized below:

1. Commenters 17758 and 18023 state that the EPA's requirement of unit-specific filterable PM operating limits is inconsistent with the CAA statutory provision that a MACT standard must be the "average" of top-achieving units. Even if there were a rational basis for the EPA to use a total PM standard, the way that it has chosen to measure compliance is both unnecessarily onerous and inconsistent with the requirements of the CAA. Commenter 18500 submitted similar comments and stated that the proposed process for setting a PM limit as a surrogate for non-Hg HAP metals could result in as many as 1,091 separate operating limits for existing coal-fired units.

2. In similar comments, several commenters (17722, 17724, 17876, 18015) recommend that the EPA calculate a MACT standard for filterable PM for each subcategory of sources. Under the CAA, MACT standards must be determined based on the "average" of the best performing units. Standards cannot be unit-specific and set by a single test. This approach to setting a MACT emissions limit, even surrogate limits, would be inconsistent with the requirements of the CAA and undermine the flexibility the EPA intended to insert in the regulation. Although a well-controlled unit can achieve the total PM limit of 0.030 lb/MMBtu, the proposed rule further requires that the filterable fraction level be established as an operation limit that cannot be exceeded. The practical effect of this additional compliance requirement is that it could render the actual total PM limited stricter than the one proposed.

3. Similarly, Commenter 17772 states that it is inappropriate to adopt a process that leads to different particulate limits for similar or identical units around the country or at one facility. Such a requirement is inconsistent with the CAA requirement to establish emission standards for existing sources based on the average of the best performing 12% of sources.

4. Commenters 17792 and 18023 state that site specific filterable PM limits, in effect, create beyond-the-floor standards without considering cost, non-air quality health and environmental impacts, and energy requirements in connection with standards more stringent than the MACT floor.

5. Commenter 17886 states that the operating limit is a beyond-the-floor limit as it is not based on the average of best 12% of EGU's for existing units or the best performing unit for new units, but on the filterable PM performance of each particular unit during a short term test. This methodology is not consistent with and is much more stringent than the MACT setting requirements in the CAA. The commenter believes the use of a filterable PM as a surrogate is supported by analyses showing a good correlation between filterable PM and trace HAP metals.

6. Commenter 17798 recommends establishing a primary filterable PM limit and total PM following the MACT methodology. All sources would then comply with a single filterable PM limit using CEMS or total PM limit using stack testing.

7. Commenter 17898 states that using a stack test to set a filterable PM limit that is applicable during all operations as measured using CEMS does not appropriately account for variability or achievability. It does not account for variability throughout the entire period of compliance measurement; and, it does not account for any differences between the method used to set the limits and the method used to determine compliance with the limit. The EPA should set the filterable limit as the MACT limit, including variability, with compliance determined using the same performance test methods as used to set the limits and some other measure of particulate control device performance (e.g., bag leak detection systems) used to confirm its proper operation on a more continuous basis.

8. Commenter 17909 states that establishing an operating limit for sources using a PM monitor is inconsistent with the CAA. The methodology in effect requires unit specific emissions limits as operating limits, which are more stringent than the MACT floor without considering the required statutory factors. The commenter recommends instead a surrogate standard based on filterable PM only.

9. Commenter 17898 states that the use of PM filterable levels measured during a stack test to set a PM limit applicable during all operations as measured using CEMS does not appropriately account for variability or achievability. It does not account for variability throughout the entire period of compliance measurement; and, it does not account for any differences between the method used to set the limits and the method used to determine compliance with the limit. The more appropriate approach would be to set the filterable limit as the MACT limit so that the EPA can calculate and include variability in the MACT limit, with compliance determined using the same performance test methods as used to set the limits and some other measure of particulate control device performance (e.g., bag leak detection systems) used to confirm its proper operation on a more continuous basis.

10. Commenter 17705 does not believe that it is the agency's intent to establish a PM standard so punitive that existing sources have no ability to demonstrate compliance. The commenter states that utilities must have a common and clearly defined PM standard to facilitate planning for initial and long term compliance under CAA section 112. The current design of the PM standard makes such planning very nearly impossible because sources cannot predict the limit that will be in effect at the beginning of the regulatory period.

11. Commenter 18425 states that the EPA's proposed compliance path for measuring filterable PM through continual monitoring is problematic because it is not representative of actual non-Hg HAP

emissions. The EPA also proposes to require facilities to test for filterable PM, and the result of that test will be used to determine the operating limit. The facility then must use CEMS to demonstrate continuing compliance with that operating limit. This facility-by-facility approach is problematic and may not be consistent with the CAA because it may result in CEMS operating limits that are more or less stringent than the top 12 percent of tested sources. Furthermore, it sets the continuous emission limit based on initial compliance tests that do not account for operating variability. Sources could theoretically operate at a high emission level for the compliance tests, resulting in less stringent operating limits. Therefore, operating variability needs to be taken into account when setting the CEMS limit, or the full environmental benefits of PM reduction from that source will not be realized. The commenter suggests that the EPA establish a filterable PM limit that reflects MACT, rather than on a case-by-case approach.

12. Commenter 18425 asks that the EPA require more frequent stack tests to measure total PM. The commenter is concerned that the EPA uses filterable PM as a surrogate for total PM because CEMS cannot measure condensable PM. However, the EPA notes that metal HAP are contained primarily in condensable PM. Consequently, measuring only filterable PM will not be truly representative of non-Hg metal HAP emissions. Furthermore, the EPA requires subsequent performance tests of total PM at least every five years. Therefore, readings representative of actual non-Hg HAP emissions may only be taken every 5 years.

Response to Comment 9: CAA section 112(d) standards are technology based standards, not risk based standards, and the the limits are established based upon the demonstrated emissions reductions of existing sources. The EPA believes it is reasonable to establish a PM surrogate standard for non-Hg metal HAP because the best PM controls provide the best controls of metal emissions. We have also established alternative equivalent standards for individual and total metals so industry has flexibility in determining how to comply with the final rule. Emissions measurements of either filterable particulate, total particulate, individual metals or total metals provide comparable indications that the best control measures are installed. We can find no significant difference in the emissions that would be achieved by using any one of these emissions measurements.

The EPA re-assessed the relationships between individual metal emissions, filterable PM emissions, total PM emissions and total $PM_{2.5}$ emissions based on the test results provided through the part III information collection request. We compared the measured emissions of metals and particulate with the uncontrolled emissions estimates and found that the control of metals emissions was generally consistent with the control of PM. In addition, the EPA compared the correlations associated with non-Hg HAP metal emissions and the three forms of PM and found that no specific particulate form provided a consistently superior indicator of better metals control. Although control of filterable PM provided the best indicator of performance for some HAP metals, control of total particulate or total $PM_{2.5}$ was nearly as good an indicator. For control of other HAP metals, total PM measurement provided the best indicator of performance; although, measurement of the control of filterable particulate was nearly as good. In addition, certain data analyzed by the EPA's Office of Research and Development indicate that vapor-phase metals (selenium and arsenic) act like acid gases and are controlled to significant reduction levels using acid gas technologies (wet and dry scrubbing). Given that the rule also provides for acid gas control monitoring and the general equivalency of the different indicators, the EPA has opted to use a filterable PM limit for the PM surrogate standard in the final rule. That limit applies on a category basis, and is not established on a facility-specific basis.

In terms of the PM operating limit, it is important to note that the final rule does not establish a PM operating limit in terms of the emission limit for filterable PM. Instead, we allow sources to use a PM CPMS to assess continuous compliance with an operating limit established in conjunction with a Method 5 or Method 29 test that demonstrates compliance with the underlying non-Hg HAP metals or filterable PM limit. The operating limit can be expressed in milliamps, PM concentration, or other raw output from the PM monitoring device. This approach provides a basis for assessing the ongoing effective operation of the unit, including any associated control device, consistent with the operation during the completed performance test. The operating limit will be reestablished on an annual basis through periodic testing. See the preamble and responses to Comment Code 5A07a for further discussion. This operating limit is no different than other operating limits established routinely under the EPA's NESHAP program, and we believe it is consistent with the MACT approach specified by the CAA.

Comment 10: Commenter 18932 states that PM is not an appropriate surrogate for selenium. The commenter states that because selenium is volatile at the elevated temperature ranges in EGU flue gases, traditional particulate air pollution devices are not able to efficiently capture it. Moreover, selenium species that are not vaporized are likely to be present as particulates too fine for control by traditional ESPs or fabric filters. Hydrated lime technology is likely to have the best capability for removing selenium, but researchers have suggested novel technologies are needed to remove selenium vapor. Additionally, the design parameters of controls for other pollutants can affect the amount of selenium emitted. For instance, some wet FGD devices use forced-oxidation systems that form selenate. The EPA should tailor the final rule to limit control practices for other pollutants that will increase selenium emissions.

Comment 11: Commenters 17925 and 18932 state that PM is not an appropriate surrogate for selenium. According to the commenters, because the selenium contained in the combusted coal will both volatilize in the flue gas and partially condense into particulates, traditional particulate air pollution devices (such as ESPs or fabric filter bag houses) are not able to efficiently capture it. Also, other controls can increase selenium emissions. For instance, some wet FGD devices use forced-oxidation systems that form selenate. The EPA should tailor the final rule to limit control practices for other pollutants that will increase selenium emissions.

Response to Comments 10 - 11: The EPA agrees that selenium has unique chemical and physical properties that must be addressed. Selenium is chemically very similar to sulfur. They are both Group VIA elements and selenium sits just below sulfur on the periodic table. Selenium may be present as a particulate – usually as SeO_2 adsorbed onto a fly ash particle or as an acid-base reaction product. This is especially the case in the flue gas of units burning western subbituminous coal or lignite. The fly ashes from those fuels contain natural alkalinity in the form of non-glassy calcium oxide (CaO) and other alkaline and alkaline earth oxides. This fly ash (classified as 'Class C' fly ash) has a natural pH of 9 and higher and the natural alkalinity can effectively neutralize acid gases (such as HCl and SeO_2) prior to the primary control device. Eastern bituminous coals, by contrast, tend to produce fly ash with lower natural alkalinity. Though bituminous fly ash (classified as 'Class F' fly ash may contain calcium, it tends to be present in a glassy matrix and unavailable for acid-base neutralization reactions. As a result selenium in the flue gas of units burning subbituminous or lignite coal tends to be particulate that is easily and effectively removed in the PM control device (ESP or FF). Selenium in the flue gas of units burning eastern bituminous coal tends to be a mixture of particulate and the acid gas SeO_2 which will not be collected in the PM control device. However, the SeO_2, much like its chemical analog, can be controlled

with acid gas control technologies such as flue gas desulfurization wet or dry scrubbers or dry sorbent injection.

Comment 12: Commenter 17623 suggests that the EPA devise a process such that the PM limits as measurable by the CEMS will not be subject to change based on the results of each performance test, and a variability factor is introduced to account for the isolated stack testing conditions.

Response to Comment 12: The comment is moot because the rule no longer requires operating parameter limits for units that choose to use PM CPMS, PM CEMS, or quarterly emissions testing. For the owners or operators who choose to use PM CPMS, the agency believes the procedures used to adjust the emissions limit for variability negate the need to include an additional variability factor for individual stack tests.

Comment 13: Commenter 17729 states that the proposed rule will require EGUs using PM as a surrogate for non-Hg HAP metals to perform metals testing in addition to stack testing for total PM and establishing a filterable PM limit. Because the EPA has demonstrated the appropriateness of the use of a surrogate and selected an emission limit for that surrogate, there is no basis for also requiring the source to test for the applicable HAP.

Response to Comment 13: The comment is moot because the rule no longer requires separate non-mercury HAP metals testing for those owners or operators who choose to comply with total PM emissions limit.

Comment 14: According to Commenter 17820, section 63.1001l(d) defines the PM operating limit as "the average of the PM filterable results" for the three Method 5 performance tests runs, whereas Table 4 establishes the operating limit as PM in mg/dscm at or below the highest one-hour average measured during the most recent performance test. Both methods are problematic. No information is given to explain how the average of three Method 5 runs would be sufficient to capture variability. Further, use of the "highest one-hour" makes no sense (if referring to Method 5 data), since runs are not measured in hours but in sample volume (and runs will be more than one hour).

Response to Comment 14: The rule no longer requires a PM operating limit for those EGUs whose owners or operators choose to use PM CEMS. The rule retains a requirement for owners or operators who choose to use PM CPMS to demonstrate compliance to determine the highest one hour average value recorded during emissions testing from their PM CPMS and to use it as an operating limit. Should an owner or operator be concerned about variability, he/she could conduct testing over a number of normal operating scenarios or choose a compliance method that does not involve establishing and maintaining an operating limit.

4F01b - Format of the Standard: Use of Total PM (including condensables)

Commenters: 15678, 17197, 17283, 17383, 17386, 17402, 17621, 17623, 17626, 17627, 17628, 17638, 17712, 17714, 17716, 17718, 17724, 17725, 17728, 17730, 17731, 17736, 17737, 17740, 17747, 17752, 17754, 17756, 17758, 17770, 17772, 17775, 17800, 17804, 17805, 17807, 17808, 17812, 17816, 17817, 17820, 17821, 17838, 17843, 17846, 17855, 17870, 17876, 17881, 17885, 17904, 17912, 17914, 17930, 18014, 18015, 18428, 18437, 18443, 18498, 18500, 18539, 18831, 18963, 19032, 19114, 19536, 19537, 19538, 18023

1. Overview.

Comment 1: Many commenters (17197, 17383, 17621, 17623, 17627, 17628, 17638, 17712, 17714, 17716, 17718, 17724, 17725, 17730, 17731, 1773a6, 17737, 17740, 17747, 17752, 17754, 17756, 17758, 17772, 17775, 17800, 17805, 17807, 17812, 17816, 17817, 17820, 17821, 17855, 17870, 17876, 17881, 17885, 17904, 17912, 17914, 17930, 18014, 18015, 18034, 18428, 18437, 18443, 18498, 18500, 18539, 18831, 18963, 19032, 19114, 19536, 19537, 19538, 18023) disagree with the use of total PM as a surrogate for non-Hg HAP metals. In general, the commenters state that condensable PM does not correlate well with non-Hg metallic HAP emissions and that the Agency has not provided adequate analysis or justification for the inclusion of condensable PM as the surrogate. Given that the recent Boiler MACT approved the use of filterable PM limits, commenters agree that further justification is required for a new approach. The commenters state that the correlation between selenium and condensable PM has not been well established by the EPA so that condensable PM does not warrant inclusion in the final standard. Commenters agree that controls for acid gases would address any concerns over selenium. Commenters agree that Method 202 results are driven by non-HAP emissions and that the method is not appropriate for non-Hg metallic HAP emissions. Commenters recommend that the rule should be revised to establish a filterable PM limit as a surrogate for total non-Hg metallic HAP emissions.

Many commenters submitted substantially similar comments on the issues associated with the proposed total PM limit. A summary of the comments received grouped by subject area are listed below.

2. Inclusion of condensable PM.

Comment 2: Commenter 17740 raises the issue that the EPA has used the same argument (i.e., that the test method for measuring $PM_{2.5}$ is not applicable for units equipped with wet scrubbers) in the proposed rule (to justify the use of total PM vs. $PM_{2.5}$) that it used in the Boiler MACT rule (to justify the use of filterable PM vs. $PM_{2.5}$). The commenter states that the EPA cannot use the same justification to establish, in one place, a filterable PM standard and, in another place, a total PM standard, without further explanation.

Commenter 17740 states that there is no basis for the EPA to include condensable PM in the surrogate for non-Hg metallic HAP emissions to improve the relationship between Se and PM. The commenter states this position is supported by the analysis by EPRI, which has shown that filterable PM is correlated to emissions of particulate-phase metals (e.g., chromium) and has a weaker, although still statistically significant, correlation with metals that are appreciably volatile at stack gas temperature.

a. Correlation between selenium and condensables and non-Hg HAP metals.

Comment 3: Commenters 18500 and 18963 state that in the EPA's data, there is little information that confirms presence of gaseous phase selenium emissions. Commenter 17807 conducted analytical testing of condensable PM and found relatively low concentrations of HAP metals in the condensable fraction. The data also show no significant concentrations of selenium in the condensable portion suggesting there is no surrogate relationship between selenium and condensable PM. The commenters state that these data do not support a relationship between selenium emissions and condensable PM emissions. The commenters support a category-wide filterable PM emission limit.

Commenters 17838 and 18963 cite ICR test data from four ARIPPA coal-refuse CFB plants in western Pennsylvania that demonstrates for these plants that there are no detectable quantities of most of the individual non-Hg HAP metals in the condensable PM fraction. Moreover, to the extent that any metals are detected in the condensable PM fraction, it can be shown that either the condensable fraction comprises a relatively small portion of the total metal emissions, or, alternatively, the total metal emissions are more closely correlated to filterable PM than either condensable PM or total PM.

Several commenters (17724, 17758, 18428) state that although the EPA is attempting to improve the surrogacy relationship between selenium and a PM surrogate by proposing a limit that includes condensable PM, the commenters state that the extent to which selenium is captured in sampling apparatus for condensable PM is unknown. The commenters state that no test data are available for the exact condensable PM method that is required for compliance with the proposed MACT limits, making the merits of including condensable PM in the total PM limit difficult to assess. Commenters 17621 and 17627 state that a review of the EPA ICR data shows that selenium emissions do not have a strong correlation with condensable PM emissions. An analysis shows that filterable PM and total PM correlate equally well with non-Hg metals. Accordingly, there appears to be no scientific justification for the EPA to depart from the agency's commonly used filterable PM standard and impose a total PM requirement.

Commenter 17821's experience is that condensable PM is very strongly related to sulfur compounds in the flue gas, such as sulfuric acid. Condensable PM is therefore most strongly related to factors such as sulfur coal content, and the amount of sulfur dioxide that is converted to sulfur trioxide in the boiler or in an SCR. These factors are unrelated to selenium, and other trace HAP metals and therefore cannot be used to predict the levels of selenium and other trace metal HAP emissions. As a result, filterable PM, which is much easier to accurately measure, is the more appropriate surrogate instead of total PM.

Commenter 17752 states that the EPA has not sufficiently demonstrated a selenium correlation with condensable PM emissions, and therefore it is inappropriate to include in a total PM standard. Commenter 17752 states that few test data are available for the proposed condensable PM method making the merits of including condensable PM in the total PM limit difficult to assess.

According to Commenter 17623, the only non-Hg metal of concern in even partial vapor phase at flue gas outlet temperatures is selenium and that although it may be emitted as a vapor, more than two-thirds of selenium emissions are captured with fly ash particles. In addition, at flue gas temperatures of 240 ºF and below (any unit with a scrubber will have flue gas exhaust temperatures well below 200 ºF), at least 96% of selenium will be in the solid phase. Because selenium is the only non-Hg metallic HAP with a possibility of being a condensable particulate and the large majority is captured with fly ash particles, there is no reason to include a standard for condensable PM HAP. The EPA should use filterable-only PM as the surrogate for non-Hg metallic HAP.

Comment 4: Commenter 17881 states that only PM filterable emissions were tested at the EPA's MPCRF. The surrogacy study utilized a combined EPA Method 5/29 sampling train, with PM concentrations being evaluated based upon the front-half catch and metals concentrations based upon separate evaluations of the front-half and back-half catches. The commenter states that, thus, the EPA does not have any direct correlation data for PM total control efficiencies and non-Hg HAP metals control efficiencies. All non-Hg HAP metals testing was conducted before and after the PM controls, prior to the wet lime-based FGD scrubber available for acid gas control in the EPA's MPCRF. Thus, the EPA failed to evaluate the combined effect of PM and acid gas controls on the relationship between PM and non-Hg metal HAP emissions. The EPA's MPCRF testing, as well as the review of the ICR Part III data, indicate that low selenium removal efficiencies due to gas phase selenium emissions are generally only a concern in the absence of acid gas control devices (especially for bituminous coal-fired units equipped with ESPs). However, the EPA's own projections in regards to the impact of the proposed EGU MACT indicate that such units will be uncommon once the proposed rule is in effect. For all non-Hg metallic HAP other than selenium, the EPA's MPCRF studies clearly indicate that filterable PM (again, note that total PM was not tested) is an excellent surrogate, with a high degree of correlation between the PM filterable and non-Hg HAP metals removal efficiencies across a range of coal ranks and PM control devices.

b. Issues of using test method for PM $_{2.5}$.

Comment 5: Commenters 18014 and 18498 state that the agency's justification for using total PM instead of $PM_{2.5}$ (the test method for measuring $PM_{2.5}$ is not applicable for units equipped with wet scrubbers) does not provide sufficient grounds for the condensable PM requirement and inappropriately uses fine particulate assumptions as justification. Commenter 18014 states that filterable particulate provides for more straightforward monitoring and a better correlation with selenium than $PM_{2.5}$ or the combination of filterable and condensable PM. Commenter 17758 takes issue with the EPA's statement that that total PM is an appropriate surrogate because units that use wet scrubbers cannot use the test method for measuring filterable PM. The commenter states that although this may be true, the CAA requires that standards be set based on the "average emission limitation achieved by the best performing 12 percent of the existing sources," not on what test methods are applicable to a subset of affected units.

Comment 6: Commenters 17804 and 17846 believe that using total PM as the surrogate for non-Hg metal HAP emissions is appropriate because most, if not all, non-Hg HAP metals are entrained in the flue gas fly-ash such that effective PM controls will also effectively capture the non-Hg metal HAP constituents within the total PM. Commenter 17804 states that smaller size PM (e.g., $PM_{2.5}$) may be a better indicator due to preferential partitioning of non-Hg metal HAP in the smaller size fractions of total PM. Because test methods for $PM_{2.5}$ in flue-gas are not applicable to all exhaust stack conditions and because a PM CEMS does not account for condensable particulate matter, the commenter recommends that the EPA develop more broadly applicable $PM_{2.5}$ performance test methods that can replace total PM as the non-Hg metal HAP surrogate, to the extent feasible. According to the commenter, data collected during source testing of coal-fired EGU s in 2009 demonstrates that the condensable portion of the total particulate matter in coal-fired EGUs without wet scrubbers may account for approximately 70 percent of the total particulate emissions.

Comment 7: Commenter 17843 also supports the development of more broadly applicable $PM_{2.5}$ stack test methods that can replace total PM as the non-Hg metal HAP surrogate, to the extent feasible.

c. Acid gas controls and condensables.

Comment 8: Commenter 17772 states that the regulation of condensable PM is inappropriate and unnecessary. The commenter cites a study conducted by The Institute for Combustion Science and Environmental Technology of Western Kentucky University that supports this position. A full-scale field investigation was conducted at a coal-fired power plant equipped with SCR, ESP and FGD systems to investigate the fate of selected elements in the coal combustion process, which included testing for both filterable and condensable PM. The study concluded that "Both selenium and boron are soluble and were effectively removed from the flue gas by the FGD unit."

Multiple commenters (17197, 17716, 17725, 18014, 18498, 18500, 18023) state that controlling for acid gases will address concerns over the adequacy of filterable PM as a surrogate for selenium. Commenters note that the volatile SeO_2 component will behave similar to SO_2. According to commenter 17716, the filterable PM top performers could be coupled with an SO_2 limit as high as 0.6 lb/MMBtu and yield the same results in terms of weeding out potential high selenium emissions. The filterable PM top performer results are more tightly clustered, suggesting that filterable PM will be a better indicator. Commenter 17716 included graphs illustrating their statement as part of their submittal. Commenter 17714 states that because controls for Hg and acid gas will remove selenium, a total PM limit, which includes condensables (for selenium), is not necessary.

d. Method 202 for condensables.

Comment 9: Commenter 17758 states that there is little data on historical condensable PM emissions and there are uncertainties associated with the PM data reported in the EPA's ICR data, which suggest that some of the data are not comparable. The commenter states that the consequence is that it is uncertain what the actual emissions of filterable PM from EGUs are. Also, there are practical and analytical problems with condensable measurement methodologies.

Commenter 18498 states that because of limitations of Method 202, filterable PM should be the surrogate rather than total PM.

i. Results driven by non-HAP emissions.

Comment 10: Commenters 18014 and 18443 point out problems with Method 202 for condensable PM. Commenter 18014 states that using filterable particulate (in conjunction with SO_2 or HCl for selenium) as a surrogate for non-Hg metals from coal combustion is preferable and avoids the fundamental problem associated with using Method 202, which is that the results are overwhelmingly driven by sulfate and nitrate compounds, which have nothing to do with metal HAP emissions.

ii. Issues with method.

Comment 11: Several commenters (17724, 17758, 17876) state that on its face, the EPA's selection of total PM as a surrogate may seem reasonable as a way to address measurement and monitoring concerns related to $PM_{2.5}$. But condensable PM is equally difficult to measure and monitor and adding a condensable PM measurement to the filterable PM sampling train increases the total variability and reduces the sensitivity of the combined measurement system. Research has shown that the condensable PM measurement method may not be accurate under some flue gas conditions. The EPA's approach fails to recognize these issues.

Commenter 18014 states that Method 202 is also problematic because of its high bias tendencies, specifically SO_2 artifact formation that will make the results unreliable in conjunction with the long run times proposed under this rule.

Commenter 17930 states that at this time, it is impossible for facilities to accurately measure condensable PM. Commenter 17820 agrees that method 202 is problematic.

e. Other.

Comment 12: Commenter 17758 disagrees with the agency's inclusion of condensable PM and states that there is a great deal of uncertainty as to the data that the EPA used to establish the total PM standard, what the total PM standard actually requires, and how to demonstrate compliance.

Comment 13: Commenter 17747 that if the EPA wants to ensure selenium control, the only way is to require direct monitoring of selenium.

Comment 14: Commenter 17628 questions the appropriateness of establishing a total PM limit for PC-fired boilers based upon data from a fluidized bed combustion device when the operating characteristics of a fluidized bed boiler, such as combustion temperature and residence time, as well as fuels, are fundamentally different from pulverized coal units.

Comment 15: Commenter 17912 states that the total PM limit is problematic because historically most EGUs have little or no data on their total PM emissions.

3. Filterable PM as surrogate.

Comment 16: Commenter 17737 and most others that commented on the proposed total PM limit recommend that the agency establish a filterable PM limit based on data collected at sources representative of the range of units subject to the standard and over a sufficient period of time to address variability in operating conditions.

Comment 17 Commenter 17716 states that the EPA's grounds for using total PM are not sufficient and inappropriately uses fine particulate assumptions as justification. Filterable PM (including fine particulate) can be measured for all sources using Method 5, and is more straightforward and provides for a better correlation with selenium than total PM. To test the validity of using filterable PM as a surrogate, the commenter engaged RMB Consulting & Research, Inc. to undertake several different analyses to evaluate filterable PM versus total PM as a surrogate. The commenter included tables in their submittal summarizing the results. According to the commenter, in all cases the filterable PM provided a higher correlation with the HAP of interest as compared to the results using total PM as well as significantly lower average selenium emissions among the top filterable PM performers than if total PM is used.

Comment 18: Several commenters (18014, 18498, 18023) state the EPA's selection of total PM is not consistent with the results of ICR tests or the results of the EPA's own surrogacy study conducted at the agency's Multi-Pollutant Control Research Facility (MPCRF), which both showed that filterable PM was a better indicator of non-Hg HAP metals. Consistent with these results and the agency's decisions under previous MACT rules for coal-fired combustion sources (e.g., Industrial Boiler MACT Rule and Portland Cement MACT Rule), the EPA should use filterable particulate as a surrogate for metal HAP.

Comment 19: According to Commenter 17775, the agency's pilot test program and limited analysis does not describe or explain how it considered the potential surrogacy relationship between filterable PM and total non-Hg HAP metals, and/or the manner in which the EPA evaluated the relative accuracy of total PM as compared to filterable PM for use as a surrogate. The commenter states that the EPA's acknowledgement that fabric filters are effective for controlling non-Hg HAP metals is consistent with the determination that non-Hg HAP are more closely correlated with filterable PM and that emissions of non-Hg HAP metals will be sufficiently reduced by facilities using fabric filters, regardless of the surrogate selected for evaluating performance. This provides an additional justification for selecting the surrogate that may be utilized in a more consistent manner for continuous compliance demonstrations. The commenter states that a review of their ICR data demonstrates the absence of detectable quantities of most of the non-Hg HAP metals in the condensable PM fraction. Moreover, it can be shown that either the condensable fraction comprises a relatively small portion of the total metal emissions, or, alternatively, the total metal emissions are more closely correlated to filterable PM than either condensable PM or total PM.

The commenter recommends filterable PM as the sole emission surrogate for non-Hg HAP metals. The same filterable PM limit would then be used for demonstrating initial compliance and continuous compliance using CEMS. Compliance with the filterable PM surrogate emission limit would be demonstrated with an initial performance test, and continuous compliance would be demonstrated using CEMS. The commenter (17775) states that this approach would advance the objectives of the proposed rule because the majority of HAP emitted during combustion are contained in the filterable component. The EPA has sufficient data to establish a filterable PM emission limit for inclusion in the final Utility MACT regulation.

Comment 20: Commenter 17820 states that a filterable PM limit would reduce the need to apply operating limits to the specified unit operating parameters, most of which have little relation to PM or metals emissions, and provide the operator with the ability to optimize the unit control operation for all operating conditions.

Comment 21: Commenter 17904 states that the choice of total PM as the surrogate for non-hg HAP metals is not consistent with the CAA or with the D.C. Circuit Court's decision in *National Lime Association v. EPA*. As the Court explained, PM surrogacy for HAP is reasonable where it achieves the same level of control. The court recognized that PM controls would be the only means by which HAP emissions reductions were "achieved" by sources in the MACT Floor. In the proposed rule, the EPA has stated that "control of all non-Hg metal HAP (except Se) was consistently similar to the control of bulk total PM," because "PM control technologies are effective at reducing emissions of the non-Hg HAP that are present in the fly ash as solid particulate." In other words, filterable PM is the fraction of particulate matter which is subject to "the same level of control."

Comment 22: Commenter 18498 states that the EPA's practice of selecting the lowest available test value tends to accentuate outliers and recommends that the Agency abandon the approach. Using the average results of available Part III emissions tests and combining with the SO_2 data from acid gas floor spreadsheet, the correlation based on all data is stronger for filterable PM, although the correlation for both filterable PM and total PM tends, as expected, to decline as the PM emissions are reduced. The average selenium emissions are lower for the filterable PM top performers and still lower when the top filterable PM data are also further culled to include only SO_2 top performers. The commenter included figures that highlight how controlling for acid gases will address concerns over the adequacy of filterable PM as a surrogate for selenium since the volatile SeO_2 component will behave similar to SO_2.

In fact, the filterable PM top performers could be coupled with an SO_2 limit as high as 0.6 lb/MMBtu and still yield the same results in terms of weeding out potential high selenium emissions. The results suggest that filterable PM will be a better indicator. Much of the apparent correlation between total PM and selenium may simply be related to the relatively strong relationship between filterable PM and total PM.

a. Filterable PM and selenium.

Comment 23: Commenter 18014 performed an analysis of the average ICR test data from the EPA's floor analysis spreadsheets for coal-fired unit and found that there is a higher correlation between filterable PM and selenium and that there are significantly lower selenium emissions among the top performers for filterable PM.

Comment 24: Commenter 17904 notes that control of selenium is still highly correlated with PM controls. As the D.C. Circuit held in National Lime, if the EPA demonstrates a correlation between HAP metals and PM, it need not quantify that correlation or its variability. Accordingly, the EPA's concerns regarding the "variability in the performance of selenium control with coal rank," is misplaced. As a result, filterable PM is the reasonable surrogate for all non-Hg metallic HAP, including selenium and arsenic. This is the case for lignite specifically because the large majority of selenium entering PM control devices is in the solid phase for that fuel. In fact, the condensable portion of total PM is dominated by non-HAP constituents such as SO_3, NO_3, and NH_3 with only small amounts of any non-Hg metallic HAP likely to be captured in the condensable fraction. Consequently, the use of total PM as a surrogate for non-Hg HAP metals is likely to be overly conservative and, thus, is not a reasonable surrogate for non-Hg metallic HAP. The commenter states that the EPA's surrogacy choice would not be affected by selenium capture rates. Furthermore, compliance with a total PM limit would be notably difficult to demonstrate given the proposed requirement to comply during both startup and shutdown and the proposed averaging time of 30 boiler operating days.

b. Boiler MACT.

Comment 25: Commenters 17756 and 18023 disagree with the Agency's inclusion of condensable PM and state that the filterable PM that the EPA uses in the Industrial Boiler MACT Rule is the more appropriate standard/approach.

4. Total PM limit stringency.

Comment 26: Commenter 17626 states that the total PM limits need to be set with consideration for fuel type and technology limitations. For instance, in the case of a unit burning PRB coal with SCR and WFGD, and combining the VOCs anticipated (and experienced) from the boiler with normal ammonia slip required to meet NO_X standards, the proposed PM limit would be exceeded without inclusion of filterable PM. Therefore, the commenter urges that the EPA reconsider this limit.

Comment 27: Commenter 15678 states that considering that baghouse technology can consistently achieve filterable PM emissions below 0.01 lb/MMBtu, and that these emissions are mostly $PM_{2.5}$. The proposed emission standard of 0.03 lb/MMBtu is too high and should be reduced to be more protective of public health. The commenter also favors this emission standard over the input-based standard where compliance is based on performance tests instead of CEMS since this approach would ensure that all

EGUs meet the same emission standard regardless of fuel characteristics and the use of solid adsorbent for acid gas control.

Comment 28: Commenter 17914 states that as a leading supplier of emissions control systems to the U.S**.** EGU market, they are not aware of an AQCS technology or a practical combination of technologies that would allow an equipment supplier, such as themselves, to provide commercial guarantees on the ability to control total PM including filterable and condensable particulate to the emissions limits identified in the proposed MACT for new coal (0.050 lb/MWh).

Comment 29: Commenter 17914 states that at low total PM levels, the condensables can represent a significant fraction of the total PM. The ability to target and optimize control of the condensable fraction constituents at the proposed low emission levels has not been demonstrated. Testing at the latest generation of EGUs with current state-of-the-art AQCS has shown emissions of condensable PM are an order of magnitude higher than what would be necessary to achieve and sustain compliance with the proposed total PM limit for new coal. The use of a PM CEM to provide an indication of total PM emissions requires an assumption of a constant relationship between the filterable and condensable fractions over time, as well as variable fuel characteristics, boiler operation and emission control system performance. It is not clear if any supporting field test data is available to support this assumption. The PM limits set in the final Industrial Boiler MACT rule are based on filterable PM only. The commenter requests that the EPA consider a PM requirement based on filterable PM only.

Comment 30: Because performance testing for PM is less costly than testing for individual metals, commenter 17386 recommends a total PM emissions limit of 0.030 lb/MMBtu for oil-fired units, which is comparable to the limit set for other types of EGUs.

5. PM operating limit.

a. Representativeness of filterable PM operating limit.

Comment 31: Several commenters (17754, 17817, 18963, 19032) disagree with the agency's inclusion of condensable PM and the approach to continuous (CEMS for filterable PM based on highest initial stack test result) compliance demonstrations. The commenters state that the agency's suggested approach toward correlating total PM emissions measured during stack testing with filterable PM emissions measured through a CEMS is not justified for all sources under all operating conditions. The commenters state that the PM measured in the performance test using Method 5 will not account for the variation that will be encountered when units are monitoring using CEMS.

Commenter 17812 states that the EPA has failed to demonstrate a consistent and direct connection between total PM measured during stack testing and filterable PM monitored using a CEMS across all operating conditions for all affected sources. Non-Hg metal HAP emissions appear to be better correlated with filterable PM, and the rule should be revised to establish a filterable PM limit as a surrogate for total non-Hg HAP metals.

Comment 32: Several commenters (17775, 17747, 17838) express concern over the absence of a constant relationship between filterable to condensable PM. Commenter 17775 states that the EPA has not demonstrated a consistent and direct connection between total PM measured during stack testing and filterable PM monitored using a CEMS across all operating conditions for all affected sources. Therefore, in at least some cases, the proposed approach is likely to result in the derivation of an

inaccurate filterable PM limit and, in turn, a significant concern regarding compliance demonstration. Moreover, any compliance demonstration issue related to an inaccurate filterable PM limit would be further compounded over time, because the associated CEMS would necessarily evaluate filterable PM emissions on a continuous basis. Also, due to the lack of a direct connection in such cases between total and filterable PM, the operating limit calculated for filterable PM may actually be more stringent than the applicable PM emission standard in the rule. Commenter 17747 states that for the EPA's monitoring approach to work the ratio of filterable to condensable PM must remain constant, otherwise the PM CEMS measurement is not an indicator of total PM. Commenter 18437 states that a PM CEMS only measures filterable PM, the use of total PM as a surrogate makes continuous compliance difficult.

b. Operating limit more stringent than total PM limit.

Comment 33: Commenter 17800 states that the filterable PM operating limit will be more stringent than the proposed total PM standard. Commenters 17800 and 18443 state the continuous measurement method (PM CEMS) has no proven track record in the utility industry. Commenter 17800 states that the compliance method should be clarified and should not combine different testing and measurement components.

To support their claim that a performance test is not representative of overall operations, commenter 17770 provided CEMS data that showed that a high performing unit tested during the ICR tests will be above their operational limit 98 percent of the time.

Several commenters (17728, 17758, 17775, 17820, 17821) state that the EPA's proposed total PM limit cannot be measured directly at an EGU. Commenters state that the proposed approach, an initial compliance test for both filterable and condensable PM with continuous filterable PM measurement using PM CEMS as an ongoing "operational limit," would simply ratchet the total PM limit downward until the next compliance test is conducted five years out. The proposed total PM limit of 0.030 lb/MMBtu for existing sources would function as no limit at all. The commenters state that utilities would not know the actual total PM standard a specific unit would need to meet until the initial compliance test is conducted more than 3 years in the future (after any new PM control equipment has been designed and installed). The proposed total PM limit is not acceptable and fails to provide the regulated community with the required regulatory certainty provided by a single, known standard.

According to Commenters 17627 and 17736, a total PM standard punishes units that are well controlled (for example by fabric filters) by forcing those units to adhere to an even stricter filterable limit than less well controlled counterparts. Several commenters (17627, 17736, 17820) recommend that the operating limits should be calculated by subtracting the condensable fraction from the total PM.

Comment 34: Commenter 17855 is concerned because their waste coal power plants have a very high fraction of condensable PM emissions (90% or more of the total PM emissions in some tests) and they feel that this may unnecessarily penalize them for the emission of a substance that is not likely to contain any significant quantities of non-Hg trace metals, including selenium.

Comment 35: Commenter 18443 states that sources with wet FGD routinely emit filterable PM below the measurement range of PM CEMS**.**

c. Operating limit as surrogate for MACT total PM limit.

Comment 36: Commenter 17800 states that the EPA is redefining the MACT standard (0.03 lb/MMBtu) by requiring continuous adherence to the initial performance filterable PM limit. Commenter further states that this is directly contrary to the CAA section 112 and that sources should be required only to meet the total PM limit (0.03 lb/mmbtu) by summing the continuously measured filterable PM and the initial performance condensable PM.

d. Site-specific operating limit.

Comment 37: Several commenters (17758, 17770, 18023) disagree with the approach of each unit (for continuous compliance) having a site-specific emission limit that is different from the total PM MACT. Commenter 17758 states that the EPA's requirement of unit-specific filterable PM operating limits is inconsistent with the CAA statutory provision that a MACT standard must be the "average" of top-achieving units. Even if there were a rational basis for the EPA to use a total PM standard, the way that it has chosen to measure compliance is both unnecessarily onerous and inconsistent with the requirements of the CAA.

Comment 38: Commenter 17904 states that the proposed PM surrogate approach is problematic in that it creates unit specific standards, creates a surrogate for a surrogate because total PM cannot be monitored, penalizes more efficient units because performance testing creates even lower operating limits, and sets a beyond the floor standard without following the CAA requirements.

e. Clarification.

Comment 39: Commenter 17838 states that if the EPA does not revise the rule to establish a filterable PM emission limit, then the EPA must clarify certain provisions of the rule that establish the procedures for demonstrating continuous compliance with the total PM emission limit. Commenters 17838 and 18539 state that the rule would require a filterable PM operating limit established as the average of the PM filterable results of the three Method 5 performance test runs. However, to determine continuous compliance, the owner/operator would be required to calculate the hourly average PM concentrations on a rolling 30 boiler operating day basis. Each 30 boiler operating day average would be required to meet the PM operating limit. According to Table 4 of the proposed rule, if a source demonstrates compliance using PM CEMS, then the owner/operator must "[m]aintain the PM concentration (mg/dscm) at or below the highest one-hour average measured during the most recent performance test demonstrating compliance with the total PM emissions limitation". Therefore, section 63.10011 directs that the operating limit for PM should be based on the average of the PM filterable results of the three Method 5 performance test runs, whereas Table 4 provides that the PM limit shall be the highest 1-hour average measured during the most recent performance test. These two relevant provisions appear to reflect inconsistent analyses and compliance demonstration periods and, therefore, should be clarified in order to avoid potential confusion, misinterpretation, and/or inconsistent application of the final MACT regulation.

f. Alternative approach.

Comment 40: Commenter 17904 states that if the EPA retains the total PM limit, they should use performance testing only to establish the ratio between condensable and filterable fractions of particulate emissions from a given unit. Moreover, that ratio should be established to reflect appropriate variability in the ratio itself.

Comment 41: Commenter 18539 states that if the total PM is retained, the operating limit should be set at 150 percent of the highest value assuming that the non Hg HAP are at least 50% lower than the required values.

Comment 42: Instead of the PM surrogate requirements proposed, commenter 17870 recommends 1) PM CEMS combined with occasional stack tests to ensure condensable PM emissions remain within limits; 2) use Hg as a surrogate for selenium and, thus, filterable PM alone may be a surrogate for other HAP metals. Correlation analysis indicates that selenium emissions are in fact better-correlated to Hg and acid gas emissions than condensable PM; 3) PM CEMS combined with a separate selenium standard. Alternatively, at a minimum, the commenter recommends that the EPA base the filterable PM limit on the facility-specific ratio to the total PM standard, rather than the initial numerical performance.

Comment 43: Commenter 17904 states that if the EPA retains total PM as the surrogate for non-Hg metallic HAP, the same factors that justify separate limits for Hg for boilers designed to burn low rank fuels also justify separate limits for total PM. The commenter gives as the justification: boiler design differences; higher concentrations of ash, Hg and other metals per pound of fuel; and lower levels of chlorides and elevated levels of sulfur trioxide. The part II and III ICR data support this difference in performance between high performing lignite units and high performing higher rank fuel units. The commenter used the ICR data and estimated a limit of 0.06 lb/MMBtu**.** In addition to the total PM data, Commenter believes that the ICR data for total and individual metals also supports the propriety of establishing a separate emissions standard for lignite units.

Comment 44: Commenter 18831 states that because the limit is based on the ICR data during steady-state, full-load conditions, it does not account for emissions variability resulting from startup, shutdown, soot blowing and malfunction. The commenter recommends that the EPA either propose a separate work practice standard or exempt any operational mode not included in the establishment of the MACT floor for demonstration of compliance with the PM limit.

g. Other.

Comment 45: Commenter 18014 states that if the EPA retains the total PM limit, the agency should allow sources to use the total PM limit in place of a filterable PM limit for PS-11 purposes since this value effectively represents the highest potential FPM limit if the source could reduce the condensable emissions to zero.

6. Effects of multiple controls on compliance.

Comment 46: Commenters 17724 and 17876 state that in proposing total PM as a surrogate, the EPA fails to address the antagonistic effects that adding multiple different pollution control devices can have on an EGU's HAP emissions, which is particularly relevant to the PM limit. The addition of a scrubber or some type of sorbent injection will be necessary to control HCl emissions and adding these HCl control technologies will increase the total PM emissions of these units. Thus, the EPA, in calculating the PM MACT floor, has relied on PM emissions data that could not exist under the proposed HAP limits. The commenters state that the EPA should establish a single, category-wide filterable PM emissions standard.

7. Surrogate vs total or individual non-Hg HAP metals.

Comment 47: Commenter 17805 states that filterable PM, as opposed to total PM, would be more suitable for determining continuous compliance with non-Hg metals. Commenter 17805 also states that the MACT standard should be the average total non-Hg metal or individual metals emissions determined using the best performing 12 percent of units in a subcategory and not the total or filterable PM levels of those units. Each facility should then be allowed to correlate non-Hg metallic HAP emissions to a facility-specific filterable PM emission level that could be used as the surrogate for continuous compliance. Commenter 17805 states that the EPA should study this option further to determine if it is indeed appropriate.

Comment 48: Commenter 17283 agrees with the EPA that separate standards for filterable $PM_{2.5}$ and condensable standards would not be appropriate to demonstrate compliance with non-Hg HAP metal emission limits as neither is a surrogate for non-Hg HAP metals. The commenter states that there may be confusion by the EPA as to what is included in its "… single total PM standard…" and the various functions this single standard is to meet. For example, the EPA definition of total PM (filterable PM_{10} mass plus condensable PM mass) excludes the PM fraction greater than 10 microns (filterable fraction of Reference Method 5), which in some cases may dominate the total PM mass. From the preamble discussion, it appears to the commenter that the EPA wants this total PM standard consisting of total filterable PM as measured by Reference Method 5 plus the condensable fraction as measured by Reference Method 202 to serve as a surrogate for both HAP metals and $PM_{2.5}$.

Commenter 17283 believes that this total PM standard does not meet the needs as a surrogate for non-Hg HAP metals or a surrogate for $PM_{2.5}$. According to the commenter, total PM is inappropriate because it further dilutes any relationship between PM and HAP metals that might have existed by adding a significant amount of non-related condensable mass (such as sulfates from SO_3 and H_2SO_4, nitrates, halides, carbonaceous compounds, and ammonium salts) to the PM mass, thus causing the HAP metal surrogate indicator to vary totally independent of filterable PM mass and HAP metals. According to Commenter 17737, the use of SCR for control of NO_X can lead to the formation of condensable ammonia in the flue gas. These condensable PM emissions are not HAP, and fabric filters are not effective at controlling them. Commenter 17737 states there is no control technology specifically designed to capture all condensables, which will make it difficult to achieve the propose standard.

Commenter 17283 states that although the courts have ruled in favor of using PM as a surrogate, the ruling did not include the EPA's new total PM as a surrogate for non-Hg HAP metals. The commenter states that the total PM standard is a poor surrogate for filterable PM, which is a weak surrogate for HAP metals, particularly when considering such HAP metals as selenium.

Commenter 17283 states that the EPA's justification for this new total PM surrogate for non-Hg HAP metals is that it reflects best demonstrated technology (BDT) for all forms of PM, but it does not consider whether it represents BDT for HAP metals. As such, the commenter states that the EPA continues to ignore non-classical means for control of HAP metals such as control of HAP metals in feedstock (coal, limestone and other additives) as the courts have directed, as well as prevention of increases in PM and/or HAP metals.

Commenter 17283 recommends that the EPA not promulgate the total PM standard and further recommends that the EPA allow multi-metals CEMS as an alternative to filterable total PM as an indicator of compliance with HAP metals emission standards.

Comment 49: Commenter 17838 states it is inappropriate for the EPA to require an owner/operator of an affected EGU who elects to demonstrate compliance with total non-Hg HAP metals by using the PM surrogate, to conduct performance testing (including both initial and subsequent performance tests) for both the PM surrogate and total non-Hg HAP simultaneously. Because the EPA has already established an emission limit for a PM surrogate, which is an established compliance demonstration method under the proposed rule, there is no justifiable basis for the EPA to also require a demonstration of compliance simultaneously with either total non-Hg HAP metals or individual HAP metals.

To the extent that the EPA does not agree to revise the rule accordingly, the commenter states that the rule must nonetheless be revised to avoid additional ambiguities. Specifically, the rule lacks clarity related to the requirement to conduct periodic emissions testing for HAP metals and total PM during the same compliance period and under the same process and control device operating conditions. That is, the rule fails to clearly address a facility's compliance status if it simultaneously conducts stack testing for HAP metals and PM during the same compliance period, and demonstrates compliance with the applicable standards for one of these two pollutants.

The commenter further states that among other considerations, an affected EGU may face difficulty in demonstrating compliance with the emission limit for total non-Hg HAP because many of the individual metals are likely to be emitted at levels below the detection limits. In this case, on the source owner may estimate an emission rate for such metal(s) measured at non-detect limits for purposes of calculating and reporting total non-Hg HAP metals. This process of relying on estimated emission rates could result in a substantial over-estimation of metal emissions, and thereby inaccurately calculate an exceedance of total non-Hg HAP metals.

8. General support.

Comment 50: Commenter 17402 supports the flexibility the EPA has built into the rule by allowing both total metals and total PM as surrogates for non-Hg metallic HAP. Those surrogates are reasonable, and help to reduce the cost of compliance although maintaining the benefits of the rule. Total metals are clearly surrogates as the measure is necessarily comprised of the sum of the individual HAP. And total PM shows a stronger correlation with more metal HAP than either filterable or condensable PM alone.

Several commenters (15678, 17402, 17808) support the use of total PM as a surrogate for the non-Hg metallic HAP.

9. Other.

Comment 51: Commenter 18500 states that the preamble discussion on selenium focuses on observed selenium removal percentages, not emission rates. However, the EPA considered but dismissed setting removal percentages as a format for emissions limitations for Hg and other HAP. It is therefore inconsistent to rely solely on a removal percentage concern observed in an EPA testing facility, for deciding a mechanism for compliance, rather than analyzing actual emission rate test data from actual representative units to be regulated.

Comment 52: Commenter 18023 states that the EPA has no justification for requiring a total PM or condensable PM limit on the basis of selenium emissions. The EPA should instead consider the health-risk thresholds for selenium as justification not to establish either a total PM or condensable PM limit for non-Hg metallic HAP**.** The chronic health threshold for SeO_2 is the same as the threshold for HCl**.**

The commenter notes that the EPA's health assessment for the highest risk facilities found that HCl exposures ranged from 20 to 200 times lower than the threshold. Because selenium emissions are nearly 300 times less than HCl emissions, any emission standard for HCl will ensure that the health thresholds for selenium are not exceeded. If any selenium were present in the measured condensable fraction of total PM the amount of selenium would be only a fraction of total selenium emissions. The commenter further notes that total selenium emissions do not approach the selenium health thresholds and any selenium present in condensable PM would only represent a fraction of total selenium emissions. The commenter states that the EPA must take into account both of these health-threshold "considerations" in establishing a filterable PM emission limit for non-Hg metallic HAP**.**

Response to Comments 1-52: The The EPA has determined in the final rule to establish a filterable PM surrogate standard for non-Hg HAP metals (or, for liquid oil-fired units, HAP metals including Hg), consistent with the approach suggested by many of the commenters. CAA section 112(d) standards are technology based standards, not risk based standards, and the limits are established based upon the demonstrated emissions reductions of existing sources. The EPA believes it is reasonable to establish a PM surrogate standard for non-Hg metal HAP because the best PM controls provide the best controls of metal emissions. We have also established alternative individual and total metal standards so industry has flexibility in determining how to comply with the final rule. PM is not a valid surrogate for Hg. Emissions measurements of either filterable particulate, total particulate, individual metals or total metals provide comparable indications that the best control measures are installed. We can find no significant difference in the emissions that would be achieved by using any one of these emissions measurements.

The EPA re-assessed the relationships between individual metal emissions, filterable PM emissions, total PM emissions, and total $PM_{2.5}$ emissions based on the test results provided through the Part III ICR. We compared the measured emissions of metals and particulate with the uncontrolled emissions estimates and found that the control of metals emissions was generally consistent with the control of PM. In addition, the EPA compared the correlations associated with non-Hg HAP metal emissions and the three forms of PM and found that no specific particulate form provided a consistently superior indicator of better metals control. Although control of filterable PM provided the best indicator of performance for some HAP metals, control of total particulate or total $PM_{2.5}$ was nearly as good an indicator. For control of other HAP metals, total PM measurement provided the best indicator of performance; although, measurement of the control of filterable particulate was nearly as good. As a result, other considerations entered into our decision to select filterable over total particulate for the final emissions limit. We believe that periodic measurements of both the metals emissions and the indicator will provide assurances that reasonable emissions controls are being achieved for the HAP metals. The EPA Method 29 allows for the measurement of filterable particulate and the HAP metals. The use of total particulate would incur the cost of performing Method 29 and the cost of performing a separate combination Method 5 and Method 202. The ability to continually measure the pollutant also entered into our decision. Although we are working towards a PM CEMS/CPMS which includes the condensable fraction and performs in a wet stack, we estimate that it will be several years before a viable method will be demonstrated. PM CEMS/CPMS which include only the filterable fraction have been demonstrated at almost 100 facilities. In addition, certain data analyzed by the EPA's Office of Research and Development indicate that vapor-phase metals (e.g., selenium) are generally present as acid gases and are controlled to significant reduction levels using acid gas technologies (wet and dry scrubbing). Given that the rule also provides for acid gas control monitoring and the general equivalency of the different indicators, the EPA has opted to use a filterable PM limit for the PM emission limit in the final rule.

With respect to the operating limit using a PM CPMS under the final rule, the EPA believes that most of the comments under this comment area were focused on the perceived inappropriateness of using filterable PM operating limit data from a PM CEMS to measure compliance with a total PM limit. With the change adopted in the final rule, these comments are largely moot. For use of a PM CPMS under the final rule and the nature of the operating limit, please see the preamble and other sections of this response to comments document that discuss the PM CPMS requirements.

With respect to testing for both PM and non-Hg HAP metals if the PM surrogate is selected as the emission limit that a specific source elects to demonstrate compliance with, the final rule clarifies that only the Method 5 test is required, and not a Method 29 test. The opposite applies (Method 29, not Method 5), if the non-Hg HAP metals limit (total or individual) is elected for a given source. In general, the reportable measurement output from the PM CPMS may be expressed as milliamps, stack concentration, or other raw data signal. The operating limit is not expressed in units of the standard.

With respect to Method 202 comments, those comments are no longer applicable as the final rule does not require the use of Method 202. However, the EPA notes that the newly revised Method 202 was developed to minimize the formation of particulate from the oxidation of SO_2 to SO_3. Laboratory and field evaluations of the method reveal that the revisions were successful and that the residual formation is not quantifiable by gravimetric methods. The use of OTM-28 (essentially identical to the promulgated Method 202) for the information collection request for utility boilers show that both the emissions of inorganic condensable particulate and the organic condensable particulate emissions measured with Method 202 are as consistent as the filterable PM measurements. Although the percentage of condensable particulate matter ranges from a low of 5% of the total PM to a high over 95%, the highest percentages are typically associated with the lowest filterable PM emissions and the lowest percentages are typically associated with the highest filterable PM emissions. This is the case both when the data are not segregated by control technology and when controls are segregated by control technology (dry scrubbing with either no ammonia injection or when ammonia injection is used with either catalytic or non-catalytic reduction, ESP with either no ammonia injection or when ammonia injection is used with either catalytic or non-catalytic reduction). This variability in the percentage of particulate that is condensable does not support the conclusions reached by the commenters that Method 202 provides inconsistent results. The data measured for the ICR demonstrates that Method 202 is comparable in precision as was demonstrated for the filterable PM measurements. With respect to the conclusion of the commenters that ammonia absorbed in the impingers leads to artifact formation of ammonium sulfate or bisulfate, there is more than adequate published information that formation of ammonium sulfate or bisulfate occurs in the gaseous phase at lower temperatures in the presence of very small amounts of water vapor.[234,235,236,237,238] Although these reactions are prevented at temperatures above about 350 ºF,

[234] Determination of Method *6* Samples in the Presence of Ammonia; Foston Curtis; Source Evaluation Society Newsletter; Volume XIII; February 1988.
[235] Reactions of Sulfur Dioxide with Ammonia: Dependence on Oxygen and Nitric Oxide; Koichi Hirota, Jyrki Ma1kela, and Okihiro Tokunaga; Industrial Engineering and Chemical Research 1996, 35, 3362-3368.
[236] Reaction Behavior of Sulfur Dioxide with Ammonia; Yanxia Guo, Zhenyu Liu, Zhanggen Huang, Qingya Liu, and Shijie Guo; Industrial Engineering and Chemical Research; 2005, 44, 9989-9995.
[237] Sulfur Dioxide Reactions with Ammonia in Humid Air; Edwin M. Hartley, Jr., and Michael J. Matteson; Industrial Engineering and Chemical Fundamentals, Vol. 14, No. 1, 1975.

the reactions occur when temperatures are below this level. As a result, the formation of ammonium sulfate or bisulfate in Method 202 is not an artifact of the sampling method but the collection of PM that would occur upon the release of the flue gas to the ambient air where it is cooled and chemical reactions between the acid and basic constituents occur.

Comment 53: Several commenters disagree with the use of the average filterable PM level measured during the performance test for total PM. A summary of these comments follows:

1. Several commenters (17402, 17725, 18539) state that if the EPA uses filterable PM as a surrogate of metal HAP, the filterable PM limit should be calculated by subtracting the condensable PM from the total PM limit. According to the commenters, the proposed method of conducting a performance test for total PM and using the average of the filterable PM as the unit's operating limit is flawed in that it would punish low PM emitters, especially those with a low fraction of filterable PM. Commenter 18037 submitted similar comments. Commenter 18498 prefers that the total PM limit be replaced with a filterable PM limit. But if the total PM limit is retained, then they recommend that the filterable PM limit be determined by subtracting the condensable PM measured from the total PM.

2. Commenter 17725 recommends that the EPA base the filterable PM limit on the facility-specific ratio to the total PM standard, rather than the initial numerical measurements. For example, if a unit is tested for total PM and the testing results provide that 50% of the total PM is filterable PM, this would result in a limit of 0.015 lb/MMBtu (50 percent of the 0.030 lb/MMBtu standard). The commenter also states that if the EPA abandons total PM as the surrogate for non-Hg metal HAP emissions and adopts filterable PM as the surrogate, the filterable PM emission limitation should be established using the same methodology, including variability, that the EPA relied upon when proposing the total PM emission limitation of 0.03 lb/MMBtu. Commenter 17714 states that if the rule retains the total PM limit, the ratio of filterable PM to condensable PM be determined for each unit and use the established ratios, to scale the filterable PM limit up to the limit established in the MACT process.

3. Commenter 17795 states that units operating PM CEMS should be permitted to establish a filterable PM rate using the output of a PS-11 certified PM CEMS during the first 12 months of operation once this rule is in effect. The initial performance test would be conducted during this period. Using 12 months of operations to develop a site specific PM limit provides operators the opportunity to establish a PM limit that accounts for variations in operations.

4. Commenters 17807 and 18015 disagree with the "snapshot" approach of establishing a filterable PM limit, as available stack test data and PM CEMS data shows that compliance cannot be maintained on a continuous, 30-day rolling average basis. The established limit and the 30-day rolling average should include all data so it would allow for startup and shutdown. Commenters 17725 and 17807 request that the EPA establish a single, category-wide filterable PM emission standard of 0.03 lb/MMBtu as a surrogate for non-Hg metal HAP.

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[238] Thermodynamics of the Reaction of Ammonia and Sulfur Dioxide in the Presence of Water Vapor; Ronald Landreth, Rosa G. de Pena, and Jullan Helcklen; The Journal of Physical Chemistry, Vol. 79, No. 77. 1975.

5. Commenter 17885 states that using a performance test to demonstrate compliance followed by a site-specific operating limit is unnecessary and fails to account for differences in the emissions over a reasonable anticipated operating range of the unit.

Response to Comment 53: With the revision of the particulate matter standard that only uses the filterable portion of total particulate matter, the concerns raised by the commenters are no longer relevant. In response to the concerns raised about the change from total particulate to filterable particulate, the test methods used for total particulate matter inherently separate filterable particulate matter from the two condensable particulate matter fractions. In the development of the final standard, we only used the results from the filterable portion when both filterable and condensable tests were performed during the same test. In addition, the use of a PM CEMS in a CPMS mode impacts several of the issues raised by the commenters making those issues irrelevant.

Comment 54: Commenter 17730 states that more testing/analysis is needed to determine an appropriate level of filterable PM emissions that would serve as the surrogate, instead of using total PM as the surrogate. The manner in which the EPA has established the surrogate for the HAP metals is to establish a surrogate for a surrogate.

Comment 55: Commenter 17747 states that the EPA is using a surrogate for a surrogate. The commenter explains that PM CEMS used to monitor PM is calibrated to Method 5, which measures filterable PM. Filterable PM is a surrogate for total PM, which is a surrogate for HAP metals. According to the commenter, filterable PM is not a surrogate for condensable PM. They state that in is unclear that a surrogate for a surrogate approach is allowed under the law.

Response to Comment 54 - 55: We disagree that additional testing is needed to determine an appropriate level of filterable PM emissions that would serve as a surrogate for non-Hg metals. With over 125 tests for filterable PM, total PM and metals, the capacity of using either particulate measurement as an indicator for non-Hg metals can be evaluated. As is explained elsewhere, we have selected filterable particulate for the preferred indicator due to additional criteria related to ability to monitor emissions on a continuous basis. We also disagree with the commenters' assessment that the use of a PM CEMS calibrated by Method 5 is a surrogate of a surrogate. We are aware that condensable PM and filterable PM are different components of PM; as mentioned elsewhere, we found no significant difference in using filterable PM, rather than total PM, to assess PM, as well as HAP metals, control device effectiveness, and we found vapor phase HAP metals, which are analogous to condensable PM, were controlled effectively by existing acid gas control devices.

Comment 56: According to commenter17775, the agency's pilot test program and limited analysis does not describe or explain how it considered the potential surrogacy relationship between filterable PM and total non-Hg HAP metals, and/or the manner in which the EPA evaluated the relative accuracy of total PM as compared to filterable PM for use as a surrogate. The commenter states that the EPA's acknowledgement that fabric filters are effective for controlling non-Hg HAP metals is consistent with the determination that non-Hg HAP are more closely correlated with filterable PM and that emissions of non-Hg HAP metals will be sufficiently reduced by facilities using fabric filters, regardless of the surrogate selected for evaluating performance. This provides an additional justification for selecting the surrogate that may be utilized in a more consistent manner for continuous compliance demonstrations. The commenter states that a review of their ICR data demonstrates the absence of detectable quantities of most of the non-Hg HAP metals in the condensable PM fraction. Moreover, it can be shown that either the condensable fraction comprises a relatively small portion of the total metal emissions, or,

alternatively, the total metal emissions are more closely correlated to filterable PM than either condensable PM or total PM.

The commenter states that the EPA has not demonstrated a consistent and direct connection between total PM measured during stack testing and filterable PM monitored using a CEMS across all operating conditions for all affected sources. Therefore, in at least some cases, the proposed approach is likely to result in the derivation of an inaccurate filterable PM limit and, in turn, a significant concern regarding compliance demonstration. Moreover, any compliance demonstration issue related to an inaccurate filterable PM limit would be further compounded over time, because the associated CEMS would necessarily evaluate filterable PM emissions on a continuous basis. Also, due to the lack of a direct connection in such cases between total and filterable PM, the operating limit calculated for filterable PM may actually be more stringent than the applicable PM emission standard in the rule.

The commenter recommends filterable PM as the sole emission surrogate for non-Hg HAP metals. The same filterable PM limit would then be used for demonstrating initial compliance and continuous compliance using CEMS. Compliance with the filterable PM surrogate emission limit would be demonstrated with an initial performance test, and continuous compliance would be demonstrated using CEMS. The commenter states that this approach would advance the objectives of the proposed rule because the majority of HAP emitted during combustion are contained in the filterable component. The EPA has sufficient data to establish a filterable PM emission limit for inclusion in the final Utility MACT regulation.

Response to Comment 56: The EPA proposed total PM as the surrogate for the non-Hg metallic HAP to ensure that the measurement included both the filterable and condensable fractions of the non-Hg metals. Of primary concern was selenium which can be present in the flue gas as a particulate (i.e., filterable PM) or as SeO_2 gas (i.e., condensable PM). The other non-Hg metals are primarily (usually > 95 %) present as filterable particulate matter. The EPA has finalized the use of filterable PM as an alternate equivalent standard for the non-Hg metallic HAPs since SeO_2 is also an acidic gas that is very similar to its chemical analog, SO_2. Since the final rule also requires control of acid gas HAP (using either HCl or SO_2 as an alternate equivalent), then Se will be effectively controlled as a filterable particulate in the primary PM control device or as the condensable acid gas, SeO_2, using an acid gas control technology such as a wet scrubber, spray dryer, or dry sorbent injection.

Comment 57: Commenter 18025 recommends a change to the proposed non-Hg compliance demonstration procedures. As proposed, the requirements are unnecessarily complex and could result in identical facilities with the same total PM emissions having very different filterable PM limits. Because the condensable PM portion could vary significantly between tests, a single facility could have a variable emissions target. This method also results in ratcheting down the standard on some units. The commenter proposes the following options:

1. PM CEMS combined with occasional stack tests to ensure condensable PM emissions remain within limits.

2. Use Hg as a surrogate for selenium and, thus, filterable PM alone may be a surrogate for other HAP metals.

3. PM CEMS combined with a separate selenium standard.

Alternatively, at a minimum, the commenter recommends: 1) basing the filterable PM limit on the facility-specific ratio to the total PM standard, rather than the initial numerical performance, and 2) such a facility-specific limit remain constant for a longer period of time, such as annually, to provide a measure of regulatory certainty.

Response to Comment 57: The revisions that we have made to the final monitoring provisions provide reasonable assurances and the detailed issues raised by the commenter no longer are relevant.

Comment 58: Commenter18498 states that if the EPA retains the total PM limit, they recommend that the Agency allow sources to use the total PM limit in place of a filterable PM limit for PS-11 purposes (since this value effectively represents the highest potential filterable PM limit if the source could reduce the condensable emissions to zero).

Response to Comment 58: The revisions that we have made to the final monitoring provisions make the issues raised by the commenter no longer relevant.

Comment 59: Commenter 18498 states that the filterable PM limit must be maintained until the next periodic stack test, and non-compliance would result if this limit is exceeded, even if exceedance of the filterable limit did not in fact generate an exceedance of the total PM limit. It is likely for well controlled units that the filterable PM operating limits will be set well below the detection limits of PM CEMS. This is particularly likely for units with wet FGDs. In such cases, EGUs could not clearly determine compliance with their filterable limits established during performance testing and could not demonstrate continuous compliance with rule.

Response to Comment 59: With the revision of the monitoring provisions to use a single filterable PM emissions level as the alternate equivalent standard for compliance with the non mercury metals emissions, the use of PM CEMS in a CPMS mode the issues raised by the commenter are no longer relevant.

Comment 60: Commenter 17795 states that the EPA OTM27/OTM28 data from the ICR should be removed from the MACT floor population and total PM should be recalculated using only the modified Method 5 (M5)/OTM28 data. This reference method combination is the only reliable means for assessing total PM in both saturated and dry stacks.

The commenter states that results from modified M5 and OTM27 are not comparable for developing a FPM fraction MACT floor value. The EPA incorrectly assumes results from OTM27/OTM28 and modified M5/OTM28 are similar measurements and yield a valid standard; however these methods are substantially different due to the fundamental principles of isokinetic sampling.

The commenter notes that it is true both methods will yield a filterable PM result, but the substantial differences between the two methods are highlighted below:

The commenter states that test method OTM-027 separates particulate based upon aerodynamic diameter in an in-stack cyclone. To achieve proper cut size near 2.5 microns, the sample gas flows through the cyclone at a constant rate throughout the test run. Isokinetic sampling conditions are compromised although traversing the stack cross sectional area due to the constant sampling velocity. The test method's isokinetic tolerance of (±20 percent) is twice that of Method 5 (± 10 percent). The OTM-027 samples were collected as two separate fractions, <2.5 microns and >2.5 microns. The total

filterable particulate reported from the summation of the two size fractions has an unknown bias when compared to the results of Method 5 samples due to the relaxed isokinetic allowable tolerances associated with OTM-027. Condensable particulate via OTM-028, measured behind the OTM-027 cyclone, is influenced greatly by the filtration temperature of the OTM-027 cyclone, which is directly correlated to stack temperature. Whereas saturated stack test results obtained from modified M5 samples were filtered at an elevated temperature, similar to Method 5B, at 320 OF, which will yield a different condensable particulate fraction than what would be collected testing dry stacks with filter temperatures held at the flue gas temperature.

The commenter notes that, also, a large portion of the MACT floor population that conducted OTM-27 will not be able to demonstrate compliance with the proposed MACT standards in their current baghouse or ESP only control device configuration. Even if the EPA chooses to retain results for OTM-27, units in the floor that have no controls beyond FF or ESP should be removed as they are not representative of what those units will emit to meet the Hg and the acid gas standards imposed by this rule. The EPA should not seek to establish limits that the floor units may not be able to achieve in the future.

Response to Comment 60: The agency's decision to use filterable particulate at 320 ºF as an alternate equivalent standard for non-Hg metals emissions diminish the relevance of the issues raised by the commenters. We disagree with the commenters that OTM-27 cannot provide comparable measurements with EPA Method 5. With respect to the measurement of filterable particulate, when proper isokinetics are maintained and the filter temperatures are within the same range, the only difference between OTM-27 (now Method 201A) and Method 5 is that the particulate is divided into two fractions. In the assessment of the test data collected for the ICR, EPA was aware of the potential issues associated with potential differences in the way testers might perform OTM-27. In addition to requesting the collection of PM with OTM-27 we required filterable particulate testing with either Method 5, Method 29 (at 320 ºF) or Method 26A. We were also aware of the influence of filtration temperature to the amount of material collected on the filter verses in the impinge portion. In the proposed total PM emissions limits we used only tests which provided reliable measurements of total particulate.

Comment 61: Commenter 17842 urges the EPA to evaluate whether a "total" PM limit is "reasonable", when a less-restrictive and more cost-effective "filterable" PM limit has been determined to sufficiently reduce HAP metals by the Boiler MACT rule.

Commenter 17928 agrees with the use of the Boiler MACT filterable PM limit as the surrogate for non-Hg metals. The commenter has concerns about the stringency of the standard imposed by using PM (filterable $PM_{2.5}$ plus condensable) as a surrogate for these HAP as proposed by the EPA. Including condensable PM also raises concerns about the efficacy of the monitoring technologies. The commenter has concerns with establishing an enforceable filterable PM limit during the initial total PM test.

Response to Comment 61: The EPA reassessed the use of total PM, filterable PM and total $PM_{2.5}$ as surrogated for non mercury metal HAP emissions and found that all were nearly equally effective. As a result, the EPA based our decision to use filterable particulate matter as a surrogate since there were potential continuous monitoring advantages associated with the use of this surrogate. We do not agree that there are significant cost advantages of using filterable particulate over total particulate as the additional cost of measuring condensable particulate with filterable particulate is minimal. The EPA does agree that the inability to continuously monitor total particulate is a concern.

Comment 62: Commenters 17855 and 17925 state that the surrogate for non-Hg HAP metals should be filterable PM rather than total PM because the majority of these HAP are found on solid rather than condensable particles and the fact that the emissions of these HAP correlate better with solid PM rather than condensable PM or total PM. In addition, the use of filterable PM as the surrogate eliminates the use of different and potentially uncorrelated surrogates for demonstrating initial compliance and continuous compliance.

Response to Comment 62: As mentioned in an earlier response, the EPA proposed total PM as the surrogate for the non-Hg metallic HAP to ensure that the measurement included both the filterable and condensable fractions of the non-Hg metals. Of primary concern was selenium which can be present in the flue gas as a particulate (i.e., filterable PM) or as SeO_2 gas (i.e., condensable PM). The other non-Hg metals are primarily (usually > 95 %) present as filterable particulate matter. The EPA has finalized the use of filterable PM as an alternate equivalent standard for the non-Hg metallic HAPs since SeO_2 is also an acidic gas that is very similar to its chemical analog, SO_2. Since the final rule also requires control of acid gas HAP (using either HCl or SO_2 as an alternate equivalent), then Se will be effectively controlled as a filterable particulate in the primary PM control device or as the condensable acid gas, SeO_2, using an acid gas control technology such as a wet scrubber, spray dryer, or dry sorbent injection.

Comment 63: Commenter 17871 states that the EPA's choice of a total PM standard as the surrogate for non-Hg metallic HAP is flawed. The PM surrogate standard should be in filterable form to reflect available monitoring and compliance options. Additionally, the lack of emissions data and associated compliance and monitoring for the condensable fraction of total PM weighs in favor of the issuance of work practice standards under CAA section 112(h) to control emissions of trace metal HAP in condensable PM.

The commenter explains that, first, metallic HAP in the condensable fraction of total PM are de minimis in nature and are extremely difficult to measure. Second, there is little data demonstrating how available technology controls trace metals, such as arsenic and selenium, in the condensable fraction. Finally, the methodology proposed by the EPA to monitor compliance with emission standards for these trace metals produces extremely uncertain results. Even the results of emission testing under EPA's ICR, which required Method 29 for testing of all non-Hg metallic HAP, did not differentiate between condensable and filterable PM and Method 202 has been shown to have a false positive bias when used on sources with SO_2 and ammonia in the flue gas, such as coal-fired boilers. Because of the limited data from existing plants and limitations associated with Method 202, equipment vendors have not provided guarantees for stringent condensable PM emission limits.

The commenter notes that, moreover, stack test results from coal-fired units suggest that the FGD control, coupled with a fabric filter baghouse, will effectively capture more than 98 percent of the selenium in flue gas.

The commenter states that the EPA should use filterable PM as a surrogate for non-Hg metallic HAP and impose work practice standards under CAA section 112(h) for metallic HAP such as arsenic and selenium as the agency has proposed for dioxins and furans.

Response to Comment 63: The EPA disagrees on the need for a work practice for control of trace metal emissions. The EPA proposed the use of total PM as the surrogate for the non-Hg metallic HAP to ensure that the measurement included both the filterable and condensable fractions of the non-Hg metals. Of primary concern was selenium which can be present in the flue gas as a particulate (i.e.,

filterable PM) or as SeO_2 gas (i.e., condensable PM). The other non-Hg metals are primarily (usually > 95 %) present as filterable particulate matter. The EPA has finalized the use of filterable PM as an alternate equivalent standard for the non-Hg metallic HAPs since SeO_2 is also an acidic gas that is very similar to its chemical analog, SO_2. Since the final rule also requires control of acid gas HAP (using either HCl or SO_2 as an alternate equivalent), then Se will be effectively controlled as a filterable particulate in the primary PM control device or as the condensable acid gas, SeO_2, using an acid gas control technology such as a wet scrubber, spray dryer, or dry sorbent injection. The EPA explained the use of PM as an indicator in the proposal and again in response to several other commenters.

Comment 64: Commenter 18425 suggests that the EPA clarify the use of PM as a surrogate possibly including a $PM_{2.5}$ standard.

Response to Comment 64: The EPA did not include $PM_{2.5}$ as a standard since this provided no significant advantage as an indicator for non mercury metals over total PM or filterable PM. In addition, the measurement and monitoring of $PM_{2.5}$ in a wet stack is not developed and may require several years of research to identify the measurement technology and several additional years to verify the long term viability of the monitoring methodologies.

4F02 - Format of the Standard: HCl as a surrogate for acid gases

Commenters: 15678, 17402, 17621, 17648, 17716, 17725, 17728, 17754, 17758, 17775, 17808, 17843, 17846, 17881, 17886, 17904, 18025, 18498, 19536, 19537, 19538, 18932, 18023

Comment 1: Several commenters (15678, 17648, 17716, 17758, 17775) state that they support the use of HCl and SO_2 as surrogates for acid gas HAP. Commenter 17716 adds that both surrogates provide an excellent correlation with the acid gases given that any control technology (e.g., wet FGD or sorbent injection) for HCl or SO_2 will capture all other acid gases, and therefore, each serves as an excellent indicator of control for all acid gases. Commenter 17758 adds that the EPA proposes an alternate surrogate of SO_2 if a unit is using a CEMS to demonstrate compliance with SO_2 limits. The commenter supports the proposed surrogate and alternative for acid gas emissions since utilities already monitor SO_2 emissions continuously under the Acid Rain Program, and the control technology that removes SO_2 also is effective at removing acid gas emissions.

Comment 2: Multiple commenters (17402, 17725, 17808, 17846, 17886, 17904, 18498, 18023) support the use of HCl as a surrogate for acid gases.

Commenter 17402 believes it is a better surrogate than SO_2 because it is an acid gas HAP and that it is also reasonable under relevant case law.

Commenter 17808 adds that it will reduce monitoring costs.

Commenter 17886 supports HCl as a surrogate and the option of meeting an alternative SO_2 limit if the unit uses a CEMS to demonstrate compliance with SO_2 limits.

Commenter 17904 adds that the EPA should maintain HCl as the primary surrogate and clarify in the final rule that the SO_2 limit is an alternate, optional compliance limit to avoid confusion or argument that SO_2 is required to be used as the surrogate over HCl in any case.

Commenter 18498 supports the use of both HCl and SO_2 as surrogates for acid gas HAP. Both will provide an excellent correlation with the acid gases since any control technology (e.g., wet FGD or sorbent injection) for HCl or SO_2 will indiscriminately capture the other acid gases. None of the control options would capture one acid gas but not the others so a reasonable correlation would be expected.

Comment 3: Commenter 17843 states that units equipped with wet or dry scrubbers for SO_2 control will also control HCl. For units that are unscrubbed, other options such as DSI and fabric filters are relatively inexpensive and simpler to install than scrubbers.

Response to Comments 1 - 3: The EPA appreciates the support of commenters.

Comment 4: Several commenters (17836, 19536, 19537, 19538) state that HCl is not an appropriate surrogate for HCN. Commenter 17836 states that the bottom line is technology to achieve reductions of HCl emissions will not invariably capture HCN. Sorbent injection control is the only technology that even claims to be able to remove HCN, and even then, the typical reagent used in sorbent injection is not as effective against HCN as it is for HCl/HF.

One commenter states that in order to use a surrogate pollutant in MACT standard setting, the agency must meet three preconditions.

The first precondition according to the commenter is that the EPA must show that the HAP in question is "invariably present" in the surrogate pollutant. The commenter contends this precondition is not met by the EPA's proposed use of HCl and SO_2 as surrogates for the acid gases emitted by coal- and oil-fired EGUs. The commenter states that the EPA did not provide any analysis of or discussion as to whether HF, Cl_2, HCN, or SeO_2 are invariably present in HCl or whether these HAP and HCl are invariably present in SO_2. They are not, according to commenter.

According to the commenter the second precondition for the use of a surrogate pollutant in MACT standard setting is that control of the surrogate must "indiscriminately capture" the air toxic along with the surrogate. The commenter states that the two test runs the EPA cites as proof of capture fail to provide sufficient basis for the EPA's broad claim that the HCl and SO_2 control technologies indiscriminately capture all the acid gas HAP emitted by solid fuel-fired EGUs. The EPA would need to collect more data from full-scale units showing more consistent correlations to support such conclusions. The commenter maintains that the EPA's testing and other test data indicate that SO_2 controls do not achieve high levels of removal of these acid gas HAP concurrently (even for HF and HCl, let alone HCN). According to commenter, lowering HCl emissions is not indiscriminately linked to lowered chlorine (Cl_2) emissions. For chlorine, the EPA only collected a limited amount of data. Commenter's analysis of the 2010 ICR data found that Cl_2 emissions increased with decreasing HCl. Far from showing that controlling SO_2 always indiscriminately also controls the acid gas HCN, the EPA did not provide any data on control of HCN across a wet scrubber. Commenter believes that the EPA collected sufficient data on HCN emissions in its 2010 ICR, to set an HCN-specific MACT standard, and should do so, as it does not appear that the EPA has evaluated whether HCN is controlled across SO_2 control equipment at all, much less justified an SO_2-HCN surrogacy relationship. The commenter asserts that the EPA did not do any evaluation of the relationship between acid gas removal and the use of a dry scrubber or any other SO_2 control technologies. Commenter argues that those alternative SO_2 control mechanisms may have poor, or no significant, effect on acid gas emissions.

The commenter states that the third precondition for the use of a surrogate pollutant is that control of the surrogate must be the "only means by which facilities achieve reductions" in the air toxic in question. The commenter believes the data collected by the EPA, and the manner in which acid gases are formed, suggest that SO_2 controls alone are not the only reason for low acid gas emissions. For example, according to commenter the Cl_2 levels in coal are a factor that can account for lower HCl emissions, independent of the SO_2 removal efficiency of any SO_2 controls. Although SO_2 controls can affect HCl emissions, the commenter asserts that a review of the ICR data collected by the EPA shows that SO_2 controls are not the "only means" by which lower acid gas emissions are achieved – those units burning the lowest Cl_2 coal (typically subbituminous, western bituminous, and lignite) can have lower HCl emissions than units burning higher Cl_2 coal without SO_2 controls. In addition, the commenter maintains that there are other options for removing HCl that may not remove all acid gases (especially HCN). As an example, commenter states that chloride prescrubbers can remove HCl and likely also HF, but weaker acids like HCN would not likely be removed by such a prescrubber. Commenter indicates that where HCN has been removed in other instances, reagents that are used include sodium hydroxide, which are general not used to control other pollutants from coal-fired units.

The commenter does not believe that the EPA has justified its use of HCl as a surrogate for all or any of the acid gases but itself. Nor has the EPA justified the use of SO_2 as a surrogate for all or any of the acid gases. The EPA should therefore impose separate MACT limits for HCl, HF, HCN, Cl_2 and SeO_3.

The commenter also states that a scrubber is operated to primarily remove SO_2 emissions, with the amount of reagent needed to meet SO_2 emission limits dependent on the uncontrolled SO_2 emissions coming into the scrubber, and HCl removal is similarly based on the stoichiometric ratio of reagent to chlorine. However, the commenter believes there is no correlation between sulfur content of the coal and chlorine levels in the coal. Because there is no correlation between sulfur content and chlorine content of coal, the commenter states that a scrubber operated to achieve certain levels of SO_2 may not be optimized for HCl removal. If the scrubber is operated to achieve SO_2 removal and the sulfur content of the coal stays the same but the chlorine content increases, the commenter maintains that the HCl emissions could increase in proportion to the increase in chlorine emissions. The commenter argues that SO_2 control is accordingly not the only factor affecting HCl emissions. Options for removing individual acid gases vary, and they do not remove the other acid gases. Commenter believes that even in instances where gases might appear to be similar (such as HCl and HF, for example), actual removal is a complex function of operating conditions including reagent used, pH, temperature, ratio of reagent to gas flows, concentrations of these gases in the exhaust, manner in which the reagent is mixed, and the presence of other competing gases. Correlated removal is not the norm according to the commenter and this is clearly shown in the poor correlations of emissions of these gases described earlier using the EPA's own data.

The commenter further argues that in order to justify using SO_2 as a surrogate for all acid gases the EPA would first have to determine the MACT floor dataset for the particular HAP and then determine the appropriate SO_2 limit to impose. Commenter believes that the EPA has provided absolutely no justification to use SO_2 as a surrogate for HCN or SeO_2. An initial review of the data collected by the EPA indicates some relationship between SO_2 removal and HF removal; however, in order to properly establish an SO_2-based HF limit, commenter states that the EPA would need to truncate its dataset to reflect the lowest HF emitting units. SO_2's relationship to HCl differs (if if exists at all) from its relationship to other acid gases. In order to justify using SO_2 as a surrogate for all acid gases, therefore, the commenter maintains that the EPA would first have to determine the MACT floor dataset for the particular HAP and then determine the appropriate SO_2 limit to impose.

Comment 5: Commenter 18932 states that technology to achieve reductions of HCl emissions will not invariably capture HCN. A recent engineering study recommended different technological control scenarios to utilities as compliance options for the EGU MACT rule. The study looked at several different boiler designs and ranked potential technological control upgrades based on cost, maturity, and ability to regulate multiple HAP. It is likely that EGUs with fabric filters or ESPs and FGDs of any type will not increase their technological controls in order to remove HCl. And EGUs that need to improve technology will pick FGD options other than a sorbent injection control. Meanwhile, sorbent injection control is the only technology that even claims to be able to remove HCN, and even then, the typical reagent used in sorbent injection is not as effective against HCN as it is for HCl/HF.

Response to Comments 4 - 5: The EPA does not believe that the results of HCN testing from the 2010 ICR were consistently reliable. The EPA conditional test method 033 (CTM-033) provided inaccurate results if the tester did not apply some method changes. In particular, maintaining a pH of 12 or greater is critical to HCN sample collection. For the very long test runs necessary for the low concentrations we expected, testers found that maintaining the high pH was problematic (high CO_2 concentrations depleted

the alkaline solutions prematurely). Dropping pH or high sample vacuums resulting form sludges forming in the impingers required some testers to stop runs before meeting the minimum sample volume and some ignored the drop in pH. Some testers adjusted the method but others did not. Overall, the data we collected during the ICR testing are suspect and thus were not used to set a HCN emission standard. However, we do believe that acid gas controls represent the best control technology for HCN. We are not aware of any "HCN specific" control technologies that have been applied at coal- or oil-fired electric generating units. We believe that HCN will be best controlled due to its solubility (in a wet scrubber) or due to its acidity (although it is a weak acid). For this reason, the EPA feels that it is reasonable to include HCN with the acidic gases and assume that it is best controlled using installed acid gas control technology.

The commenter asserts that the EPA must comply with a specific three-part test for surrogacy that the D.C. Circuit applied when evaluating whether PM was a valid surrogate for non-Hg metal HAP in another CAA section 112 standard. *See Sierra Club v. EPA*, 353 F.3d 976, 984 (D.C. Cir 2004) ("this court established a three-part analysis for determining whether the use of PM as a surrogate for HAP is reasonable..."). The EPA maintains that the only standard from that case that expressly applies to EPA's establishment of a surrogate standard for acid gas HAP is that the surrogate be reasonable. We maintain that HCl and, alternatively, SO_2 are reasonable surrogates for all acid gas HAP when the unit is using a flue gas desulfurization technology to comply with the surrogate standard.

The EPA believes that the control of the surrogate (in this case HCl) also indiscriminately captures the air toxic along with the surrogate. The EPA believes that, based on the known chemical and physical properties of the compounds, typical flue gas desulfurization systems (e.g., wet scrubbers, dry scrubbers, dry alkaline sorbent injection) will effectively reduce the emissions of the acidic gas HAP. The emissions of all of the acid gas HAP will be reduced due to their solubility or their acidity (or both).

Comment 6: Commenter 17754 states that reducing HCl in the manner required by the proposed rule would likely result in an increase in Hg emissions from coal refuse-fired CBF units. Further, the proposed HCl emission limit fails to take into account other unique characteristics of coal refuse-fired CFB units, including but not limited to, the difficulties associated with using add-on, back end DSI to control HCl emissions from these units, as well as these units' relatively smaller size (as compared to traditional coal-fired EGUs).

Response to Comment 6: The EPA disagrees with commenter. At least two CFB units are among the MACT floor pools for both HCl and Hg, indicating that compliance with both limits is possible. Further, we are aware of at least two CFB EGUs that are using add-on polishing technologies for acid gas control, indicating that further control is possible if needed.

Comment 7: Commenter 17621 states that their evaluation indicated no significant differences between distillate and residual oil in the emission of acid gases (HCl and HF).

Response to Comment 7: As noted elsewhere in this document, the EPA is not subcategorizing distillate vs. residual oil in the final rule.

Comment 8: Commenter 18023 states that the requirements to use the alternative emission limit are not sufficiently clear, especially those that apply to the use of SO_2.

Response to Comment 8: The final rule has significantly simplified the rule text on how to qualify for alternative limits, and what testing and monitoring applies when they are used. For SO_2, a source must use a flue gas desulfurization control device to qualify for the alternate SO_2 limit, and then must use an SO_2 CEMS, generally meeting part 75 requirements, to serve as the compliance test method, using a 30-day rolling average.

Comment 9: Commenter 17754 suggests, to the extent that the EPA does not agree to revise the HCl emission limit for existing EGUs consistent with the rate that appropriately prevents associated health impacts for this pollutant, that the proposed emission limit for HCl be revised to be consistent with the EPA's comparable rulemaking efforts for the same pollutant and similar source types. Specifically, the EPA could justifiably impose an HCl emission rate through the Utility MACT equivalent to the corresponding limit for HCl for existing coal-fired CFB boilers established in the EPA's Boiler MACT – i.e., 0.035 lb/MMBtu. The HCl emission limit imposed through the EPA's Boiler MACT is based on an accurate emission limit-setting process and, therefore, is appropriate for application to combustion units employing CFB technology. The emission limit for CFB boilers under the Boiler MACT is also appropriate for application to the commenter's CFB units subject to the Utility MACT, because such units are comparable to industrial boilers in terms of combustion technology and heat input capacity. Therefore, revising the emission limit for HCl under the proposed rule in this way would ensure consistent regulation of affected combustion sources subject to emission restrictions both as EGUs and under the Boiler MACT.

Additionally, the proposed HCl emission limit for existing coal-fired EGUs should be revised consistent with an appropriate health-based analysis for this pollutant. The proposed HCl limit instead was derived based on a flawed emission limit-setting process that only evaluated emission rates achieved by individual sources on a pollutant-specific basis, without consideration of whether the same affected EGU could simultaneously satisfy all of the proposed emission limits that would apply to that unit under the proposed rule

Response to Comment 9: The EPA has addressed comments related to the risk posed by HAP emissions from coal- and oil-fired EGUs elsewhere in this document. The final HCl emission limits for this rule were based on data obtained from EGUs that will be subject to this rule, and, thus, the MACT floor analysis is consistent with the statutory direction. The EPA believes that its EGU analyses also are an "accurate emission limit-setting process" consistent with the statute. We have discussed elsewhere in this document our rationale for not subcategorizing FBC/CFB EGUs in the final rule.The Agency disagrees with commenter that the final limits are infeasible and legally unsupportable and we have identified sources that are complying with the standards in the final rule.

We address the comments relating to section 112(d)(4) and data distribution in response to other comments in this RTC document and in the preamble to the final rule.

4F03 - Format of the Standard: Mercury (Hg)

Commenters: 17402, 17620, 17737, 17804, 17843, 18444

Comment 1: Commenter 17402 supports the EPA's Hg standard of 1.2 lb/TBtu or 0.013 lb/GWhr and believes the level is achievable as proposed. Given the inherent variability involved in many aspects of EGU operation, particularly day-to-day variability in total fuel-born Hg input in each unit, variability of sampling and analysis methods, and variability due to site-specific differences among best performing units, the EPA's inclusion of a statistical formula to correct for that variability is necessary and appropriate. The commenter states that their experience indicates that Hg removal percentages above 90 percent are feasible with a variety of configurations. As a result of its experience with implementing the state standards, the commenter states that they are among the most experienced power producers in the country with respect to ACI. Based on its experience, commenter believes that the Hg standard as revised in the May 18, 2011 MACT Floor Analysis is reasonable and achievable.

Response to Comment 1: The EPA appreciates commenter's support for the final Hg standards.

Comment 2: Commenters 17620 and 17804 state that in discussion of the three forms of Hg the EPA observes that particulate-bound Hg emissions can comprise 2 to 5% of the total Hg emissions from a source. The commenter states that it is unclear from the form of the Hg emissions limit and the compliance methodology whether the EPA intends that the Hg limitations include total Hg or only vapor-phase Hg. The limits are listed for "mercury."

Response to Comment 2: The EPA believes that the standard as proposed clearly applies to "total" mercury as the regulated pollutant.

Comment 3: Commenter 17737 urges the EPA to allow in its final rule the option of either a numerical standard or a percent reduction standard as a means of complying with the MACT standard for Hg.

Comment 4: Commenter 18015 recommends a percent removal Hg MACT standard. According to the commenter, the EPA's concern that the percent reduction format will not have the desired effect of promoting and giving credit for pre-combustion Hg removal technologies is unfounded. If sources conclude that it is in their best interest to use such technologies, they will adopt them regardless of whether the standard is input or output-based. For example, if a source determines that as a result of unit type or coal rank, it is unable to rely solely on post-combustion emission controls to comply with the standard, it will implement those coal preparation practices necessary to comply. The EPA's desire to promote coal preparation practices to remove Hg ignores the fact that such practices (e.g., coal washing) have the potential to create unintended environmental problems, including those involving waste.

Regarding the EPA's concern over tracking, the commenter states that such extensive tracking would simply not be required if a percent removal standard were to be adopted. Rather, if no coal preparation practices are used by the source, all it needs do is measure the Hg content of the coal at a point just prior to it entering the plant. The rule as proposed by the EPA would already impose fuel sampling requirements on sources. Accordingly, sources would have to do no more tracking than would already be required under the rule. As for those sources that choose to adopt pre-combustion Hg removal technologies, all that would be required is that these sources measure the Hg content of the coal at a point just upstream of the process.

The commenter also disagrees that the agency does not have the necessary data. As part of EPA's 1999 ICR, the agency collected coal data from all of the operating units involved in the request. In addition, as part of its 2010 ICR, the agency collected additional coal sampling data. The commenter disagrees that a percent reduction standard will reduce flexibility or require controls any more than input or output-based limits. Nothing in the CAA precludes percent removal standards for the MACT floor units. Also, dissimilar coals, which result in disparate physical properties of the flue gas, create significant differences in the efficiency of Hg removal required and the feasibility of removing Hg from the flue gas to a specified level. This inability to control Hg emissions equally from all types of coals warrants inclusion of a percent removal standard in the final rule. As a result of proceedings initiated for purposes of implementing CAMR, a significant number of states put in place state-specific Hg regulations, which include a percent removal standard. Considerable expenditures have been made by utilities for purposes of complying with the EPA's published rules, such as CAMR. Now that the rules have changed, these utilities are being punished for attempting to comply with the state Hg rules that went into effect prior to and in contemplation of CAMR. Furthermore, some utilities, like APS, have entered into long-term coal contracts that limit their ability to switch to a different coal source. Good faith expectations by sources that they would be required to comply with a percent reduction standard further justifies adoption of such a standard by the EPA in the final EGU MACT rule. Accordingly, the commenter recommends that the final rule allow compliance based on either a numerical emission limit or a minimum of 91% removal of Hg from coal, consistent with the EPA's stated policy goal to reduce EGU Hg emissions.

Comment 5: Commenters 17689 and 17712 support a percent reduction MACT metric as an alternative, and not a substitute, to some of the proposed MACT numerical limits. For example, Hg and HCl are HAP whose levels would not be meaningfully reduced by fuel pretreatment. A necessary data format and protocol could be developed for some HAP, such as Hg, that would allow an appropriate percent reduction alternative to be developed. A percent reduction MACT could specify the level or reduction but would not dictate any specific control or methodology and would address EPA concerns over consistency with the Brick MACT court ruling.

Commenter 17725 agrees with the EPA that a Hg percent reduction limit alone would not provide adequate flexibility. The commenter states that credit for coal preparation practices that remove Hg and other HAP before firing would be addressed by the lb/MMBtu standards (as they are in the EGU NSPS Rule). If those sources elected to use the percent reduction option based on on-site post-beneficiation fuel analysis, the percent removal values would simply be conservatively low. Although the EPA stated that it did not have "the data necessary to establish percent reduction standards" for a mine-to-stack based reduction scheme, the agency did collect sufficient fuel data to establish an on-site removal value since sources reported fuel analysis data along with the stack test results under the EGU ICR. An alternative percent reduction based on the emissions achieved in practice by the top performing sources would also be consistent with the requirement of the statute.

Response to Comments 3 - 5: The EPA disagrees with the commenters' suggestions that a percent reduction standard should be included in the final rule. The EPA notes that the inability to account for Hg removed from the coal prior to combustion was not the only reason provided for not using a percent reduction format. As noted in the proposal preamble (76 FR 25040), we did consider using a percent reduction format for Hg. We determined not to propose a percent reduction standard for several reasons. The percent reduction format for Hg and other HAP emissions would not have addressed the EPA's desire to promote, and give credit for, coal preparation practices that remove Hg and other HAP before firing. Also, to account for the coal preparation practices, sources would be required to track the HAP concentrations in coal from the mine to the stack, and not just before and after the control device(s), and

such an approach would be difficult to implement and enforce. In addition, we do not have the data necessary to establish percent reduction standards for HAP at this time. Depending on what was considered to be the "inlet" and the degree to which precombustion removal of HAP was desired to be included in the calculation, the EPA would need the HAP content of the coal as it left the mine face, as it entered the coal preparation facility, as it left the coal preparation facility, as it entered the EGU, as it entered the control devices, and as it left the stack to be able to establish percent reduction standards. The EPA believes, however, that an emission rate format allows for, and promotes, the use of precombustion HAP removal processes because such practices will help sources assure they will comply with the proposed standard. Furthermore, a percent reduction requirement would limit the flexibility of the regulated community by requiring the use of a control device. In addition, as discussed in the Portland Cement NESHAP (75 FR 55,002; September 9, 2010), the EPA believes that a percent reduction format negates the contribution of HAP inputs to EGU performance and, thus, may be inconsistent with the D.C. Circuit's rulings as restated in *Brick MACT* (479 F.3d at 880) that say, in effect, that it is the emissions achieved in practice (*i.e.,* emissions to the atmosphere) that matter, not how one achieves those emissions. The 2010 ICR data confirm the point relating to plant inputs likely playing a role in emissions in that they indicate that some EGUs are achieving lower Hg emissions to the atmosphere at a lower Hg percent reduction (e.g., 75 to 85%) than are other EGUs with higher percent reductions (e.g., 90% or greater). For all of these reasons, we proposed to establish numerical emission standards for Hg HAP emissions from EGUs and we are finalizing numerical emission standards.

Comment 6: Commenter 18444 recommends a Hg minimization provision similar to their rules which require that sources examine duct optimization of Hg controls for up to a year and use a reasonable amount of carbon to minimize Hg if carbon injection is used.

Response to Comment 6: The EPA is required to establish standards pursuant to CAA section 112(d) and we do not believe that test programs such as that noted by the commenter would be consistent with the statutory language. The EPA expects that such test programs to establish the conditions under which compliance would be achieved as noted by the commenter would be undertaken before the compliance date in determining what method of control a given EGU would be using for compliance with the final rule.

Comment 7: Commenter 17843 states that a number of states with large coal-fired power plants have already adopted stringent Hg control requirements that are, in most cases, more stringent than those of the proposed Hg standards. Some provisions of the states' rules have now been in effect for several years, and compliance data indicate that the affected units are achieving the required Hg reductions. The commenter's submittal included attachments summarizing the state mercury rules and the controls installed or planned at coal power plants in the commenter's region to comply with the state rules. The commenter provided examples of states that have successfully implemented Hg limits for coal power plants.

Coal-fired EGUs in Connecticut had to achieve by July 1, 2008 a Hg emissions limit of 0.6 lb/TBtu or a rate equivalent to a 90% reduction from measured inlet conditions. Of the three affected Connecticut units, the Bridgeport unit installed ACI with a pulse-jet fabric filter baghouse; the AES Thames units are CFB boilers with dry limestone injection and fabric filtration to control sulfur and met the state limits without installing Hg-specific controls. Quarterly stack testing of the three affected units in Connecticut indicated that they achieved the state's Hg requirements.

In 2001, Massachusetts as part of a multi-pollutant approach established annual Hg emission caps for coal-fired power plants at the then-current level of emissions. To reduce Hg emissions, in 2004, Massachusetts revised its Hg emission limits in two phases. Phase 1 required a 85% reduction or an emission rate of 0.0075 lb/GWh by 2008; Phase 2 requires a 95% reduction or an emission rate of 0.0025 lb/GWh by October 1, 2012. The rule allows averaging between units at the same power plant. Of the eight EGUs subject to Phase 1, one unit has shut down, three units did not need to install Hg controls to comply and have announced they will shut down, and one unit installed SCR, a dry scrubber and a fabric filter. At another facility, one unit installed SCR, DSI, spray dryer absorption, and a fabric filter; another installed DSI-SDA-FF; a third unit installed SCR and has DSI-DS-FF under construction. Compliance reports submitted in January 2011 show Hg compliance for 2010 at all operating units.

New Hampshire requires an 80% reduction in coal-fired power plant Hg emissions through installation of wet FGD at the one facility by July 1, 2013.

New Jersey requires coal-fired units of any size in the state to achieve a Hg control efficiency of 90% or an emission limit of 3.00 mg/MWh by December 2007. They also provides for a multi-pollutant approach to reduce NO_X, SO_2, and fine particulates that can extend a unit's Hg compliance deadline to December 2012 if approximately 50% of a company's coal-fired capacity in the state meets the Hg limits by the 2007 deadline. Ten units were covered by New Jersey's Hg rule at the time it was adopted in 2004. Coal units are using ACI to meet the rule requirements, and stack testing indicates the applicable limits are being met.

In 2007, New York established Hg emission limits for coal-fired EGUs that incorporates a Phase I facility-wide emission cap in the years 2010-2014 and establishes a unit-based emission limit for each applicable unit beginning in 2015. Starting in 2015, a facility-wide Hg emission limit of 0.6 lb/TBtu will apply. Phase I limits have been met with sulfur reduction technologies that have co-benefits in reducing Hg. No facilities are yet using ACI until they need to meet the more stringent 0.6 lb/TBtu Hg limit in 2015 on a daily average. EGUs with NO_X and SO_2 control are achieving Hg emission rates in the 0.6 lb/TBtu range and will use ACI to achieve consistent emission levels. Currently, all operating coal-fired EGUs in New York State are meeting the Phase I facility-wide caps.

The commenter's assessment of power plant control technologies identified a number of control options that directly targeted Hg for control or had the co-benefit of reducing Hg when targeting other air pollutants. ACI can be installed to directly target Hg, although the following options reduce Hg as a co-benefit: combustion controls, SCR, ESPs, baghouses, dry and wet scrubbers, and DSI.

Response to Comment 7: The EPA appreciates the information provided by commenter. However, the EPA notes that many of the state programs noted by commenter have an "either/or" format for their Hg standards. That is, an EGU can either meet an emission limit (e.g., lb/TBtu) or achieve a percent reduction.The commenter did not note which form of the standard the EGUs were meeting. As noted elsewhere in this document, the EPA does not believe that a percent reduction format is appropriate for the final rule.

Comment 8: Commenter 18039 believes that EPA's use of a 5% threshold for Hg is too high, as even units emitting a small amount of mercury can contribute to formation or exacerbation of mercury deposition hot spots. Units that install Hg CEMS and sorbent trap monitoring systems will have data

available to optimize their operational procedures to minimize mercury emissions. Therefore, the commenter encourages the EPA to require all coal-fired units to install Hg CEMS or sorbent traps.

Response to Comment 8: The final rule requires the use of Hg CEMs, sorbent traps, or periodic stack testing.

4F04 - Format of the Standard: Other

Commenters: 16122, 16513, 17383, 17402, 17620, 17623, 17689, 17691, 17705, 17712, 17716, 17717, 17718, 17725, 17801, 17812, 17813, 17816, 17820, 17821, 17846, 17869, 18039, 18421, 18426, 18428, 18434, 18439, 6637, 19536, 19537, 19538, 18023

Comment 1: Commenters 16122 and 19686 state that the EPA should require that all EGUs (not just new units) meet an output-based rather than an input-based standard for emissions. Commenter note that in the GAO Mercury Report, an output-based standard (i.e., one based on the amount of electricity produced) would result in less Hg emitted nationwide than an input-based standard (i.e., one based on the plant's heat input). This is because an output-based standard will create a significant incentive for EGUs to improve their efficiency as a strategy to meet MACT standards.

In addition to the GAO report, commenters note that the EPA itself has recognized the importance of utilizing an output-based standard. For example, during the April 20, 2011 tribal consultation on NSPS for Greenhouse Gases, Gina McCarthy, Assistant Administrator for EPA's air office, agreed that an output-based MACT standard provides co-benefits by reducing not only air toxics, but also CO_2 and criteria pollutants (e.g., SO_2 and NO_X).

Several commenters (16513, 18421, 18434, 18439) also support the use of output-based standards where feasible.

Commenter 18434 adds that net-output based standards create incentives for even greater efficiency and would encourage facilities to minimize parasitic energy demands from pollution control equipment. Commenter recognizes the potential "monitoring difficulties" associated with tracking on-site energy use but believe that such difficulties should not be insurmountable. As such commenter supports the use of net output-based standards in both the NSPS and NESHAP.

Comment 2: Commenters 17718 and 17816 recommend output standards based upon gross output. Otherwise generating units with substantial parasitic load needed to run emission control equipment would be unduly penalized. Gross output is the best parameter for output-based standards because it is the best representation of unit performance. Any standards adopted in this rulemaking should be tailored toward HAP emissions, rather than considerations such as energy efficiency which fall outside the scope of section 112.

Commenter 17821 prefers the use of a gross basis and states that for the EPA to implement a net output-based standard, there are many issues that it must first resolve, including:

- shared services, such as fuel handling, administrative buildings, coal cleaning, gypsum production;
- winter heating requirements and other energy consuming devices necessary for plant operation;
- multiple boilers and/or turbines that operate in common systems;
- shared auxiliary loads including power consumption during shutdown periods;

•use of pollution controls such as FGD, and SCR which significantly increase auxiliary power needs; and

•mechanical draft cooling towers to avoid thermal discharges into waterways, but which require the use of large fans and pumps which consume additional power.

Commenter 17821 states that net output-based standards encourages increased operation, since high load EGUs that run at high capacity factors can meet a net output-based standard more easily than can a cycling or peaking. Gross output based standards are also the simplest to measure and apply.

Commenter 17846 states that the EPA should require that all EGUs (not just new units) meet an output-based rather than an input-based standard for emissions. As noted in the GAO Mercury Report, an output-based standard (i.e., one based on the amount of electricity produced) would result in less Hg emitted nationwide than an input-based standard (i.e., one based on the plant's heat input). This is because an output-based standard will create a significant incentive for EGUs to improve their efficiency as a strategy to meet MACT standards.

Commenter 18039 states that for each pair of output- and input-based standards, there is an energy conversion efficiency (i.e., heat rate) at which the standards are equivalent. Facilities that are more efficient than this heat rate can more easily comply with the output-based standard, and facilities less efficient can more easily comply with the input-based standard. The result is that for some MACT pollutants, all facilities will likely choose to comply with the output-based standard, and for other pollutants, all facilities will likely choose to comply with the input-based standard. It is not reasonable or appropriate that facilities can pick a weaker standard to comply with, simply by choosing an output- vs. input-based standard. The EPA's approach to developing the MACT standards negates the main benefit of output-based standards, i.e., encouraging facilities to increase efficiency. The commenter encourages the EPA to adopt correctly-calculated output-based standards, and not allow facilities to comply with an input-based standard. Providing incentives to optimize efficiency will have economic, health and environmental benefits.

Response to Comments 1 - 2: The EPA is finalizing input-based emission limits with alternative gross output-based emission limits for existing sources. The EPA is finalizing only gross output-based emission limits for new sources.

Comment 3: Commenters 17623 and 18428 state that in the proposed Utility MACT, the EPA's use of surrogates demonstrates the Agency's recognition that emissions testing can cover multiple pollutants simultaneously and that surrogates help eliminate costly and redundant testing. As a result, the commenter supports the EPA's use of surrogates in the proposed Utility MACT.

Commenter 17705 supports the EPA's use of surrogates, including PM for non-Hg metallic HAP and SO_2 for acid gas HAP, in this rule because surrogates provide sources with flexibility to comply with the numeric limit that is best suited to its operations and emissions profile.

Response to Comment 3: The EPA acknowledges the support of the commenters.

Comment 4: Commenter 17716 states that existing unit output standards in the proposed rule rely on incorrect heat rate assumptions. Commenter states that output based ("lb/MWh") standards for existing units erroneously rely on incorrect assumptions for gross unit heat rate ("GHR"). The emissions floor

calculation determines GHR based on the "maximum heat input capacity" and "gross (summer) generating capacity" as reported in Part I of the ICR for the individual boilers and uses this value to convert reported emissions on the basis of heat input ('lb/MMBtu') to unit output ('lb/MWh'). Due to reporting inconsistencies, these values are not necessarily equivalent to the "design gross heat rate", as the EPA assumed in the data conversion procedure. For example purposes, the attached Table shows 12 coal-fired units from the EPA's Hg floor analysis sheet with calculated heat rates of less than 7,000 Btu/kWh, efficiencies that would be completely impossible for these units.

Table 12. Example Heat Rate Values from EPA's Hg Floor Analysis Spreadsheet

Plant	Unit	Boiler Type	Capacity (MW)	Max Heat Input (MMBtu/hr)	Heat Rate (Btu/kWh)
Cedar Bay	CBA1	Fluidized bed	280	1063	3800
Cedar Bay	CBB1	Fluidized bed	280	1063	3800
Cedar Bay	CBC1	Fluidized bed	280	1063	3800
AES Hawaii	002	Fluidized bed	203	944	4650
Chambers	1	Wall-fired	285	1387	4870
Chambers	2	Wall-fired	285	1387	4870
AES Hawaii	001	Fluidized bed	203	1021	5030
Hopewell	1 & 2	Stoker - spreader	136	855	6290
Scrubgrass	1	Fluidized bed	194	1250	6440
Southampton	1 & 2	Stoker - spreader	136	889	6540
Armstrong	2	Wall-fired	183	1204	6580
Armstrong	1	Wall-fired	184	1250	6790

To demonstrate that this error resulted in output standards that are fundamentally flawed and inconsistent with the equivalent input standards, the attached Table 6 shows the average heat rate from comparing the lb/MMBtu and output based standards for existing units.

Table 6. Equivalent Heat Rate Values for Existing Unit Standards (Btu/kWh)

	Mercury	Total PM	TSM	Individual Metals	HCl	SO2
Coal fired unit >= 8,300 Btu/lb	8,000	10,000	10,000	10,000	10,000	10,000
Coal fired unit < 8,300 Btu/lb	10,000	10,000	10,000	10,000	10,000	10,000
Solid oil-derived fuel-fired unit	10,000	10,000	20,000	17,500	10,000	12,500
Liquid oil-fired unit	14,000	NA	10,000	15,000	10,000	NA
IGCC	10,000	6,000	10,000	10,000	6,000	NA

As shown in the table above, the following subcategories have GHR values that are unrealistically high or low based on the expected boiler performance for the category:

1. Mercury Standard for 'Coal-Fired Unit >= 8,300 Btu/lb' Subcategory

2. Total and Individual Metals Standards for 'Solid Oil-Derived Fuel Fired Unit' Subcategory
3. Mercury and Individual Metals Standards for 'Liquid Oil-Fired Unit' Subcategory
4. Total PM and HCl Standards for IGCC Subcategory

To rectify this problem, the commenter suggests that the EPA should recalculate the ICR data on an output basis using a tiered approach depending on data availability. They suggest that, in most cases, the EPA should be able to convert measured emissions directly to units of 'lb/MWh' based on the reported stack flows and gross generation at the time of the stack test. Alternatively, a representative GHR value could be derived based on the most recent stack test that was conducted under representative operating conditions for which the necessary data is available (e.g., gross generation, stack flow, CO_2/O_2). This value could then be applied to the calculated input-based emissions value ('lb/MMBtu'). Further, the commenter notes that although design GHR data is available in the Part II ICR database, these values should be not be used without further review because of the potential for reporting inconsistencies. The commenter states that a brief review of the Part II ICR database shows significant gaps in the data plus reporting in some cases on the basis of thermal efficiency rather than overall cycle efficiency.

Response to Comment 4: The gross unit heat rates for these and additional EGUs have been reviewed and corrected. There were 59 boilers that had heat input and generation data, which were originally incorrectly entered by companies responding to the utility ICR, but the data have been corrected. All documentation of these changes is in the docket.

Comment 5: Commenter 6637 notes that the EPA's Mercury and Non-Mercury Metals and Potential Surrogates Group included Hg and ten other metals, filterable PM, condensable PM, and $PM_{2.5}$.

The most significant issues for Hg measurements were related to the uncertain accuracy of measurements made at the low end of the working range of one of the test methods, EPA Method 30B. Although the method contains procedures to ensure that sufficient Hg is collected to provide accurate quantitation, the ICR test reports rarely documented that those procedures were followed. In some samples, too little Hg was collected, causing the results to fail method quality control criteria. The reported values for these low-emitting units may have been too low to have been accurately quantified, and in some cases were below the detection limit of the method. According to ICR instructions, values below detection limits should have been reported at the detection limit. Thus, the impact of the low Hg capture and incorrect reporting of the detection status of the measurement would be to produce an overall low bias in the ICR data.

For non-Hg metals, the most significant quality issues all resulted in reported concentrations that were biased high in some samples, including: (1) elevated manganese due to contamination from back-flow of the permanganate impinger used for Hg sampling, (2) extremely high reported values of chromium, manganese and nickel, suspected to be contamination from metal components of the stack or the sampling equipment and (3) high recoveries of laboratory control spikes, especially for selenium. These issues were noted in a low percentage of the tests reviewed by the commenter, but due to the magnitude of the positive bias, the outlier results could impact statistical estimates of emissions from the ICR data. For all non-Hg metals, the commenter notes that procedures for blank correction were inconsistent among the different ICR respondents and laboratories. This inconsistency increases the uncertainty of emission estimates for metals, particularly for units with lower emissions.

For the particulate measurements included in the metals HAP group, the most significant quality issue identified was the use of varying filter temperatures to measure filterable PM. The EPA intended for all

out-of-stack filterable PM measurements to be made at 320±25°F; however, this guidance was not clearly conveyed to all ICR participants. As a result, the correct filter temperature was used at most, but not all, power plant units equipped with wet FGD systems (wet stacks), but at far fewer of the units without those pollution controls (dry stacks). About 75% of the tests reviewed by the commenter were conducted at dry stacks measured filterable PM at 248°F, the standard filter temperature for a combined PM/metals sampling train. The concern with inconsistent filter temperatures is that sulfuric acid can condense on the filter at the lower temperature. There could also be other relatively volatile species desorbed from the filter at the higher temperature. Changing the filter temperature changes the proportion of total PM captured in the front versus the back half of a particulate train, and consequently weakens the correlation between filterable PM and metals emissions. The magnitude of the change in filterable PM between the two filter temperatures is likely to be specific to a particular fuel and power plant configuration; it could be significant for some coal-fired units that emit significant levels of SO_3.

For condensable particulate, the commenter noted that the amount of particulate measured in the solvent blanks was frequently close to or equal to that in the sample. Since the test method limits blank correction to an amount that is often exceeded in the blanks, the ICR test results for this parameter are likely biased high in many cases. Additionally, the blank correction procedure varied among the ICR respondents, increasing the overall uncertainty of the ICR data. Another factor increasing the uncertainty of the condensable particulate results is the longer than normal sampling duration. Past research done by the commenter has identified both positive and negative biases for this test method; it is unknown which would predominate in a 4-hour stack test.

Response to Comment 5: We recognize that about 20 of the over 220 source tests reported below detection level values for mercury by Method 30B. We also noted that the detection levels of those tests spanned from 0.01 μg (10^{-8} lb/MMBtu) to 9 μg (10^{-6} lb/MMBtu). Another 37 tests did not include any flag but 24 had blank entries for the mass or values below 0.1 μg. There was at least one test which identified data below 10^{-8} lb/MMBtu and indicated that the measurement was above detection levels. Several other tests had measureable data below 10-6 lb/MMBtu. Although this reflects poorly on the test companies which conducted the tests, we do not believe these adversely affected the selection of the best performing source nor the best performing 12% of the sources when combined with our treatment of below detection data and the final selection of the numerical limit.

For the non-Hg metals, the high values for manganese, chromium, nickel and selenium also reflect poorly on the test companies which conducted the tests. As with the mercury tests we believe that these high values did not adversely affect our selection of the best performing source or the best performing 12% of the sources nor the determination of the numerical limit.

Likewise, although the use of lower filter temperatures than we required were used, we do not believe that this significantly affected the selection of the best performing source or the selection of the best performing 12% of the sources. As indicated by the commenter, this would allow SO_3 and other semivolatile particulate to be collected as filterable PM when at the higher temperature it would be collected in the impinges as either organic or inorganic condensable PM. The sources where the source tester used the lower filter temperature would tend to have higher particulate and as a result decrease the likelihood that these sources would be selected as the best performing or in the best performing 12% of sources. We do not believe that this minor shifting of the units with a full suite of emissions controls and the broader range of emissions controls have a significant adverse impact on the resulting emissions limits.

Because the agency is now using filterable particulate for the alternate equivalent standard for non-Hg HAP metals and for the NSPS PM indicator the comments on condensable PM are moot. We recognize that several source testers have had issues with high blanks. As we indicated in the proposal and promulgation documentation supporting the revised Method 202, the improved performance of this method makes it imperative that source testers use properly prepared glassware, scrupulous field techniques and consistent and precise laboratory finishes. The high blank values reveal that some testers need improvement in one or more of these areas. The significantly lower amounts of condensable particulate matter collected by this improved method also make the proper performance of the method imperative to achieve consistent, reliable and accurate measurements.

Comment 6: Commenter 6637 notes that the EPA's Non-dioxin/furan Organics and Potential Surrogates Group included speciated VOCs and semivolatile organic compounds (SVOCs) and the potential surrogates total hydrocarbons (THC), methane, CO, and formaldehyde.

The commenter states all THC measurements and some methane measurements were conducted using a direct-reading test method; and that the measured values for these samples were frequently near the zero gas response of the instrument and the span of the instrument was often set significantly higher than the measured values. These findings indicated that the results of these tests were highly inaccurate. The ICR required all direct interface measurements to be reported as above detection limit; therefore, there is a risk of misinterpreting the results of these tests as being representative of stack emissions rather than fluctuations around the instrument baseline.

For formaldehyde, multiple test methods were used. The most significant quality issue was associated with measurements made by EPA Method 0011, the most commonly used method in the ICR tests reviewed by the commenter. Most of the reported values obtained with this method were close to concentrations in the blanks. Contamination of the field blank was more common for Method 0011 than the other test methods. Results of another test method, EPA Method 320, had elevated detection limits due to poor sensitivity of the method for formaldehyde. For both of these test methods, the result of these two quality issues was a high bias in the emissions estimates. In an interim ICR database published by the EPA, these two methods were used in 48% and 13% of the formaldehyde tests, respectively. Thus, there is a significant impact that needs to be taken into account when evaluating the potential correlation between formaldehyde and organic HAP.

A preliminary review of the CO data in the EPA's database indicated some potential quality problems with the results. The commenter did not have access to the calibration quality control results needed to evaluate the CO results directly; however, information included in the EPA's ICR reporting template indicated that up to a quarter of test runs from coal-fired units failed to register reasonable proportions of other gases (e.g., O_2, CO_2) by the instrumental method and therefore may not have measured CO accurately.

Most of the reported volatile and semivolatile compounds appeared to be below detection limits, although the large number of missing or erroneous detection flags made this difficult to evaluate. Of those that were detected, some were solvents used in field sampling of other HAP and likely originated from cross-contamination of the samples. Others have been reported in the literature as breakdown products of the sorbents used in sample collection. A careful evaluation of field blanks and the technical literature will be needed to differentiate between actual emissions and these other sources of organic compounds.

Comment 7: Commenter 6637 states that in reference to the EPA's Dioxins/Furans/PCBs surrogate group that the chemicals in this HAP group are ubiquitous in the environment and the test method is so sensitive that it is very difficult to avoid contamination of the sample during sampling and analysis. For this reason, the primary quality issue for these measurements is how to determine the true concentration in stack samples when the same species are detected in method and field blanks. The commenter's ICR reviews frequently noted amounts of target species in the blanks that would cause a significant positive bias to the sample concentration. Another significant issue affecting this group was the high percentage of values that were below detection limit; inconsistent assignment of detection flags increased the uncertainty of the overall data collection.

Response to Comments 6 - 7: We proposed a work practice standard for organic HAP, and have finalized this general approach in the rule. The EPA did not believe that the test data supported establishing a numerical emission limit for this pollutant group.

Comment 8: Commenter 17383 states that although they question the need to regulate HCl, they believe the proposed HCl or SO_2 emission limits are attainable. They agree that SO_2 can act as a surrogate for HCl and they agree that the emission rates, as proposed, are reflective of MACT with appropriate and reliable monitoring technologies.

Response to Comment 8: The EPA acknowledges the support of the commenter.

Comment 9: Commenter 17620 states that opportunities for improvement in the heat rate of existing EGUs are relatively small. In addition, many efficiency improvement options, such as soot removal, are not permanent and require ongoing maintenance to sustain improved performance.

Response to Comment 9: The EPA understands that opportunities for improvement in the heat rate of existing EGUs will vary from unit to unit, with some units being able to realize significant improvements while others have little opportunity to improve the heat rate. However, while the EPA certainly encourages efficiency improvements and understands that pollutant reductions can be achieved through efficiency improvements, the rules finalized in this action do not require heat rate improvements.

Comment 10: Commenter 17691 requests clarification on the method of converting input-based emission limitations to output energy-based emission limitations. The commenter considers that a constant conversion factor will reduce the effectiveness of the emission limit, rather than producing noticeable improvements in electric generation efficiency. The commenter recommends developing a formula to determine output energy-based emission limits based on unit specific conditions.

Response to Comment 10: Compliance with output-based emission limits in the final rule is to be accomplished through data gathering specific to the format rather than be converting input-based data. In this manner, the specific efficiency of the unit will be accounted for.

Comment 11: Commenter 17801 recommends that the rule be revised to consider the impact that carbon capture will have on the ability of new EGUs to meet the proposed MACT and NSPS standards for HAP and criteria emissions. The primary effect of carbon capture will be the lowering of net output and the inability of EGUs – both new and existing – to meet net output standards (vs. gross output). Without considering carbon capture and providing clarity on how permitting will accommodate these changes, this rule, as proposed, could serve as a disincentive for carbon capture.

Response to Comment 11: The EPA does not typically include anticipated or potential regulatory action when modeling expected sector response to a proposed or final rule. Further, the EPA cannot, at this time, anticipate how a greenhouse gas rule would be structured for new or existing sources. In the the final rule, output-based standards are all based on gross output (rather than net).

Comment 12: Commenter 17816 recommends that standards be based on annual averages consistent with other EPA rulemakings for EGU's (i.e., Acid Rain Program). The EPA has not demonstrated why a 30-day average would be more protective for human health than an annual period, particularly for Hg emissions. As mass emissions is the key issue for these HAP, use of an arbitrary and short averaging period (i.e., 30-day rolling average) does not allow enough operational flexibility to address process issues or startup and shutdown events that may impact compliance.

Commenter 17816 states that the data used to establish the standards was solely determined by full load steady-state testing taken at a single point in time and did not encompass the full range of operating conditions including changes in operating variables (i.e., pulverizers taken out of service, fuel variability causing changes in control equipment operations, etc.) that a unit experiences in the normal course of operation. The EPA can alleviate some of the effect of variability on unit emissions that was not accounted for in the 2010 ICR testing by allowing annual averaging, although still achieving the same emission reductions.

Response to Comment 12: We have addressed similar comments elsewhere in this document, including averaging time, variability, and startup and shutdown. We have also discussed elsewhere why we do not believe that a mass-based format is appropriate for this rulemaking.

Comment 13: Commenter 17775 notes that the EPA proposes to exercise its discretion under CAA section 112(q)(3) and not set MACT limits for radionuclide emissions from EGUs. 76 FR 25,024. Commenter supports the EPA's decision.

Comment 14: Commenter 17820 supports the EPA's decision to leave in place its earlier decisions made in 1984 and in 1989 not to set MACT limits for radionuclides. The EPA's decision is fully supported by the existing record, which includes extensive sampling and analysis of emissions from coal- and oil-fired units from the 1980's. Accordingly, the EPA did not require testing for emissions of radionuclides in the ICR conducted in advance of this rulemaking.

Response to Comments 13 - 14: The EPA acknowledges the commenters' support.

Comment 15: Commenter 17821 recommends that the EPA should clarify that NESHAP surrogates will qualify as the "same pollutant" or "stream of pollutants" for purposes of CAA section 112(i)(6). Portions of the preamble to the proposed rule indicate that the EPA is regulating some of the same pollutants under CAA section 112 that it regulates under other portions of the CAA. As such, the commenter requests that the EPA clarify that all pollutant surrogates constitute the "same pollutant," or "stream of pollutants," under CAA section 112(i)(6).

Since the EPA has proposed emissions standards for PM and SO_2 under other portions of the CAA (and for which many utilities have installed BACT or achieved lowest achievable emission rate (LAER)), the EPA should include an explanation in the final rule that these HAP surrogates qualify as the "same pollutant" or "stream of pollutants" under CAA section 112(i)(6) and avoid regulatory ambiguity. This clarification is warranted because utilities that have installed BACT controls eligible for this extension

will need adequate time to assess the performance of the pollution control systems, determine whether those BACT controls will be adequate to meet MACT standards, and then implement any changes necessary to assure compliance with MACT. However, because even with this clarification so few utilities will likely be able to utilize the compliance extension provided in section 112(i)(6) in any meaningful way as a result of the timing issue, the EPA should still provide an industry-wide extension to the 3-year compliance deadline pursuant to its authority under other sections of section 112(i).

Response to Comment 15: The EPA has implemented the provisions of section 112(i)(6) in the Part 63 general provisions at 40 C.F.R. 63.6(i)(2)(ii), (5) and (6)(ii). Sources that have installed BACT or LAER technology for SO_2 and/or PM may qualify for a compliance extension. Consistent with 40 C.F.R. 63.6(i)(5), sources that meet this requirement must submit a request for a compliance extension, included all required information, to the Administrator no later that 120 days after the promulgation date of this standard.

Comment 16: Commenter 17821 states that the EPA's assumption that 5% of station power is used internally is incorrect. The commenter's experience is that approximately 7% to 8% of a conventional coal fired station's power is required to run auxiliary equipment. The commenter believes that this is a more representative value across the industry considering that units will be generally operating with SCR, FGD, and particulate controls, all of which require auxiliary power. The commenter's operating experience is that the amount of auxiliary power used by an IGCC unit is considerably higher than the EPA's estimate. If carbon capture systems are installed in the future, the amount of auxiliary power will dramatically increase.

Response to Comment 16: Although the EPA recognizes the potential for future rules to require additional control devices that may increase the internal use of station power, the EPA believes its assumptions concerning average station power use for this rule are correct

Comment 17: Commenter 18039 states that the EPA has not specified any calibration procedure, frequency or accuracy level required of electrical meters used to report electricity fed into the electric grid. It appears that the EPA is presuming that gross electric meters are used for billing, allowing other parties to specify calibration procedures. In proposing gross output-based MACT and NSPS standards and not proposing calibration procedures, the EPA seems to have assumed that gross output meters are universally used in billing transactions, when some power plants use net output meters as their billing meters. It is inappropriate to base MACT and NSPS compliance determinations for large power plants on non-billing meters that are not calibrated following a specified procedure, frequency and accuracy level.

Response to Comment 17: The specifications for reporting hourly gross output are consistent with the Acid Rain Program reporting requirements.

Comment 18: Commenter 18039 states the EPA currently requires reporting of hourly gross output to ECMPS (for purpose of determining load for missing data procedures). Since the EPA will need to amend the reporting requirements under 40 CFR part 75 to incorporate reporting of MACT data, the EPA should require MACT facilities that currently report gross output or steam load to switch to net output. Under 40 CFR 75.53(g)(1)(vii)(F), units are already required to report "when the maximum hourly gross load, boundaries of the range of operation, …change and are updated" and to modify their data collection accordingly; this same process would apply to switching to reporting net output.

The commenter reviewed and approved net output monitoring plans for NO_X Budget facilities under the NO_X SIP Call, finding that most facilities' and units' determination of net output was straightforward, but that a small subset of facilities faced facility-specific issues complicating determination of net output. For complicated situations, the standard 40 CFR part 75 monitoring petition process could be used to work through complex situations. Certainly, new units should be required to use net output, because they can easily design and install systems to report net output.

Response to Comment 18: As noted elsewhere in this document, the EPA is finalizing gross output as the format of the output-based limits.

Comment 19: Commenter 18426 states that links and relationships need to be established between each surrogate and its respective group of HAP. Each surrogate emission limit needs to satisfy the legal standard for using a surrogate pollutant for a group of HAP. SO_2 does not meet the criteria for surrogacy because acid gas HAP are not invariably present in the surrogate pollutant of SO_2 and control of SO_2 is not the only means by which facilities achieve reductions in emissions of acid gas HAP. PM does meet the criteria to be a surrogate for non-Hg metallic HAP. Since metals preferentially partition and are of concern in the fine fraction, selecting a surrogate that does not reflect the concentration of the fine fraction nor have a health-based standard does not appear appropriate. Filterable PM as a surrogate for total PM as listed in the proposed rule does not work because emissions of the condensable PM portion are influenced by fuel characteristics as opposed to proper operation of a control device. The type and amount of metallic HAP in fuels such as coal and oil can be highly variable, and, therefore, not extremely predictable. For this reason, alternative individual non-Hg metallic HAP emission limits may not be used by sources subject to this regulation and this alternative should be removed. We recommend that the standard only take the form of PM_{10} or $PM_{2.5}$ to appropriately limit emissions of non-Hg metallic HAP.

Response to Comment 19: We address elsewhere the legal requirements for establishing surrogate standards consistent with the statute and applicable case law. We have also responded to similar comments elsewhere in this document related to our choice of surrogates and their support. We believe the surrogate standards established in the final rule are reasonable and consistent with the statute.

The EPA maintains that the only standard that expressly applies to the EPA's establishment of a surrogate standard is that the surrogate be reasonable. We maintain that HCl is a reasonable surrogate for all acid gas HAP and, alternatively, SO_2 is a reasonable surrogate for all acid gas HAP when the unit is using a flue gas desulfurization technology to comply with the surrogate standard. We also believe that filterable PM is an adequate surrogate for the non-Hg metallic HAP – with the exception of selenium. Selenium may be present as filterable particulate or as the acid gas SeO_2, which will be controlled along with the other acid gas HAP (HCl, HF, etc.).

Comment 20: Commenter 18428 agrees with the EPA's decision on the use of work practice standards for organics and dioxins. In addition, the commenter concurs with the EPA's decision to allow plant-wide emissions averaging. The commenter encourages the Agency to maximize the flexibilities authorized in the CAA in order to achieve the emission reductions in the most cost effective manner.

Response to Comment 20: The EPA acknowledges the support of the commenter.

Comment 21: Several commenters (19536, 19537, 19538) do not support use of PM surrogate. The commenters state that the total PM surrogate does not permit or support future residual risk standard

setting because the risk and technology review (RTR) will require direct monitoring of each non-Hg metallic HAP to determine health risks. Residual risks cannot be estimated from surrogates.

Response to Comment 21: As explained elsewhere in response to comments on this issue, the EPA maintains that PM is a valid surrogate for non-mercury metallic HAP. We do not agree that the commenter's concern undermines our authority to establish PM as a surrogate. We believe we will have sufficient data upon which to evaluate the risk remaining after implementation of the final rule consistent with section 112(f). In any case, the agency is authorized pursuant to section 114 to collect any information necessary to evaluate HAP emissions from EGUs if we determine additional data is necessary when we conduct the CAA section 112(f) review.

Comment 22: Commenter 18023 states that the EPA should, at a minimum, explain how the MACT floor analysis translates into the HF emission limit provided. The commenter also notes that the EPA has the ability to establish an HBEL for acid gases, even for oil-fired units, under CAA section 112(d)(4). As discussed elsewhere, the EPA should exercise its discretion to set an acid gas HBEL for both coal- and oil-fired units.

Response to Comment 22: The HF analyses were conducted no differently than analyses for other HAP and are detailed on the MACT floor spreadsheets in the docket. The EPA has responded to comments related to the use of HBELs elsewhere in this document.

4G01 - ICR: Data corrections

Commenters: 17621, 17622, 17627, 17718, 17730, 17756, 17857, 18025

Comment 1: Commenter 17621 states that heat rates were calculated incorrectly for 53 EGUs listed in the MACT floor spreadsheets. These errors resulted in emissions on a lb/MWh basis that are two to six times too low. EGUs affected by this error include several identified as lowest emitting in the MACT floor spreadsheets. As part of their submittal, the commenter provided a more detailed discussion and list in an appendix to their submittal.

Response to Comment 1: The errors noted by commenter have been corrected in the final spreadsheets. Some of the "errors" noted were a result of companies providing erroneous data through the 2010 ICR (e.g., failing to apportion MWe to each of the boilers using a common generator). The gross unit heat rates for EGUs noted by the commenter and additional EGUs have been reviewed and corrected. There were 59 boilers that had heat input and generation data, which was originally incorrectly entered by companies, that has been corrected. All documentation of these changes is in the docket.

Comment 2: Commenter 17621 states that EPRI identified errors in Part II and Part III ICR data, some of which impact the calculation of MACT floors. As part of their submittal, the commenter provided a more detailed discussion and list in an appendix to their submittal.

Comment 3: Commenter 17730 did not provide any corrected data. They point out that there were errors in some of the data and analyses.

Commenter 17877 states that the schedule for the 2010 ICR was so compressed that it compromised the agency's ability to perform QA/QC, and as a result the industry had a contractor perform as much of the QA/QC as possible. The commenter adds that the contractor has identified many significant errors which make it difficult to comment on the proposal because correcting for the errors will likely change the MACT floor and a source cannot accurately ascertain what is being proposed that must be complied with.

Response to Comments 2 - 3: The EPA has provided quality control checks on data in the EGU data bases and made corrections where possible. The EPA has documented checks on the data input to the data bases by the companies. There were many instances of follow-up with the companies to question and confirm data entries. In addition, there were many instances where companies sent their corrected data on their initiative. We note that it was the responder's responsibility to provide accurate data and to certify that such had been done. The Supporting Statement to the 2010 ICR identifies as a Respondent activity the "…review [of] stack sampling data for accuracy and completeness…" Morever, the cover letter for each ICR told EGU owners or operators that "…it is highly advisable for each facility…to devise a [specific] Quality Assurance Test Plan…to verify that the quality assurance protocols as contained in the various test methods are met…" Finally, those EGU owners or operators who conducted stack testing for Phase III (but not Hg test data using Method 30B), were required to complete electonrically a test report signature page certifying "…the statements and information in is test report are true, accurate, and complete…based on information and belief formed after reasonable inquiry…"

Comment 4: Commenter 17627 explains that the information for the W.H. Sammis Consent Decree is incorrect as the chart does not list the NO_X and SO_2 tons cap for the entire plant. The commenter states that the NO_X rate requirement for the SCRs installed on W.H. Sammis 6 and 7 is 0.10 lb/MMBtu and the

Eastlake Unit 5 must meet an 11,000 ton NO_X reduction based on the 2003 NO_X rate as a baseline. The commenter also notes that RE Burger Units 4 & 5 have been permanently disabled as of December 31, 2010.

Response to Comment 4: The RE Burger (ORIS code 2864) unit 5 has been excluded from further MACT floor outputs, as it has been permanently retired.

Comment 5: Commenter 17627 states that FE's Mitchell power station in Pennsylvania is incorrectly listed as burning No. 6 residual oil, and in fact burned No. 2 distillate fuel oil for the ICR test.

Response to Comment 5: Mitchell's fuel sheet has been corrected to reflect the firing of No. 2 distillate fuel oil instead of No. 6 residual fuel oil.

Comment 6: Commenter 17718 states that in data supplied by Louisville Gas and Electric Company and Kentucky Utilities Company, in response to the EPA's 2010 ICR, Ghent Unit 4's (ORIS 1356) acid gas test data was duplicated and renamed/assigned as a test for Green River Unit 4 (ORIS 1357). This duplication is identified as "Submittal ID" 165611 for "Facility ID" 1357 in the EPA's databases. Green River Unit 4 performed dioxin/furan testing (Submittal ID 1768), not acid gas testing. The "MACT Floor Analysis-Coal HG-Revised" spreadsheet posted on the EPA's website is one specific location at which this duplication is apparent. The errant data associated with Green River Unit 4 is used in the HF floor analysis within that spreadsheet. The EPA should remove the erroneously duplicated data from its databases and evaluate the potential impact the data's removal could have on determination of the proposed emission limits.

Response to Comment 6: The submittal ID 165611 associated with the Green River unit 4 has been deleted. The Ghent ERT acid gas results appear solely for the Ghent facility, although the Green River facility only displays dioxin/furan test results.

Comment 7: Commenter 17756 states that the file "MACT Floor Analysis-Coal acid gas" dated 3/16/11 incorrectly indicates that KCP&L's Montrose Generating Station (ORIS code 2080) has already installed DSI. The commenter states that they correctly responded in the MACT ICR that the units did not have DSI.

Response to Comment 7: This discrepancy has been corrected.

Comment 8: Several commenters (17808, 17870, 18025) state that the following data errors and missing test results have been identified in the spreadsheet summarizing EPA's MACT floor analysis for oil-fired EGUs:

- EPA's spreadsheet entitled "floor_analysis_oil_031611.xlsx" lists Mitchell Power Station Units 001 and 003 as combusting "No.6 Fuel Oil (residual or bunker C)". This information is incorrect based a review of the facility's test reports contained in the docket. The Mitchell units burn distillate fuel oil.

- The test reports for the Suwannee River Power Plant indicate that Units 2 and 3 were combusting "Distillate Fuel Oil (Grades 1 and 2)" during ICR testing. However, based on a call to the plant operator, we have determined that both units were combusting residual fuel oil.

• Based on discussions with industry colleagues, we would also highlight that Middletown Unit 2 and Norwalk Power Unit 2 both have ESPs installed. The EPA's spreadsheet (floor_analysis_oil_031611.xlsx) only lists the NO_X controls installed at the units.

• Turkey Point 2 tested for total HAP metals as part of the ICR; however, the unit does not appear in the EPA's oil floor analysis spreadsheet.

• Emissions test reports from the Puerto Rico Electric Power Authority (8 units) were not included in the MACT floor analysis because of a late submission. We recommend that the EPA include these additional data points in its MACT floor analysis.

• At least two units (Eagle Valley 1 and 2) in the MACT floor for total HAP metals do not appear to report cobalt emissions. As a result, their total HAP metal emission rates appear artificially low. Additionally, six units from the Puerto Rico Electric Power Authority did not appear to report cobalt emissions. This omission identifies potentially inconsistencies in the metals testing and development of the proposed standards.

• Similarly, Harding Street 9 has a zero value for one beryllium test run, which appears to be averaged in as zero rather than dropped or substituted with the detection limit value.

• Finally, in separate comments, NRG has submitted corrected HAP metals emissions data for Norwalk Unit 2, Montville Unit 5, and Middletown Unit 2. The errors overstated the units' HAP metals emission rates.

The current proposed standard (0.000030 lb/MMBtu), was calculated based on seven units, most of which were burning distillate fuel oil during ICR testing. Apart from the two Port Everglades units, all of the units that established the MACT floor for total HAP metals were combusting distillate fuel oil. In some cases, these units were burning low sulfur distillate fuel oil. Eagle Valley, for example, specifies low sulfur (0.05 percent) distillate fuel oil and most shipments received by the facility contain less than 0.03 percent sulfur. Also, the ESPs at the Port Everglades facility were recently installed (construction was completed in 2006). However, nine units with ESPs and five units that were combusting as much as 75 percent natural gas during ICR testing report emission rates above the EPA's proposed standard.

Commenter recommends that the EPA post a revised spreadsheet on the Utility Toxics Rule website, reflecting the corrections above and any further corrections identified by other commenters.

Response to Comment 8: The concerns raised by the commenters have been addressed such that the correct responses appear in the data base. The issues regarding the fuel oil firing have been addressed. The correct emission control devices are associated with the appropriate boilers. All data received and applicable to the rule have been used. To calculate total metals, the EPA only summed the metals for boilers which provided emissions data for all 10 metals. For a limited number of data submittals, the laboratories had not analyzed for all of the HAP metals; these data were not included in the total HAP metals analyses. All runs equal to or less than 0 were excluded from the test average.

Comment 9: Commenter 17637 is concerned the MACT floor calculations are not accurate. The purpose of the MACT floor calculations is to issue standards that are reasonable and effective. Any errors in (ICR) data collection or MACT floor selection results in a MACT Floor that does not provide a level playing field across the source category.

Response to Comment 9: As noted elsewhere in this document, we believe that all data are now correct. We have reassessed our MACT floor analyses and believe them to be consistent and correct.

4G02 - ICR: New data submissions

No comments were received on this topic.

4G03 - ICR: Data handling

Commenters: 17628, 17715, 17718, 17803, 17813, 17820, 18039, 19654

Comment 1: According to commenter 17628, the 0.050 lb/MWH limit is based on a computational error. In deriving the limit, the EPA mistakenly assumed that each AES unit has a capacity of 180 MW when, in fact, the capacity of the two-unit plant is a total of 180 MW. The commenter states that the EPA must revise the limit and when other coal-fired total particulate emission test results from the ICR data base are evaluated, the total particulate emission standard would be very close, to Plant Washington's current limit of 0.018 lb/MMBTU, or 0.16 lb/ MWH.

Response to Comment 1: The EPA has reviewed and corrected the unit heat rate for this boiler. We would note, however, that the error resulted, in part, from submitter's failure to accurately apportion the MW for the common generator to the separate boilers, providing instead the total MW to each boiler.

Comment 2: Commenter 17715 states that the proposed rule does not address the handling of negative values. The commenter recommends that negative values be rounded to zero and use an associated code to indicate the change. This is similar to how part 75 handles negative data. If instrument drift and allowable calibration error tolerances are included, it is possible to be within the analysis tolerance and read a legitimate negative value.

Response to Comment 2: The agency reviewed the commenter's concern but disagrees with the suggestion to provide instructions on how to handle negative values in the rule. We are unaware of any manual method which provides a means for negative values, and we are unaware of any reputable and knowledgeable emissions testing contractor who would report negative particulate emissions.

Comment 3: Commenter 17803 states that although they agree that raw data from units co-firing oil and natural gas should not be used to set the floor for the liquid oil subcategory, the EPA's failure to utilize an adjusted form of the data is inconsistent with CAA section 112. The CAA requires the EPA to establish standards for existing units based on the average emissions achieved by the best performing 12% of sources for which the Administrator has emissions information. The data collected by co-fired sources was made available to the EPA and the EPA should have adjusted and used the data to develop the proposed standards and the EPA has not offered any justification for its failure to do so.

Commenter 17803 recommends that the EPA revise the MACT floor for existing oil-fired units by using data from units that co-fired oil and gas during ICR testing adjusted to exclude the contributions from gas firing. Owners and operators of co-fired units understood that the EPA would adjust the data to reflect operations on oil only and use the data in setting the standards. It appears that the EPA disregarded this data in its analysis.

Commenter 17739 states that the Indiantown Cogeneration, Unit 1 (docket EPA-HQ-OAR-2009-0234-0754) co-fired natural gas during all Hg sampling tests. The EPA excluded data from three companies required to conduct testing on oil-fired units that also co-fired gas "because their emissions are not representative of EGUs firing 100 percent fuel oil." The commenter states that the EPA must therefore exclude these data from the Hg floor for the same reasons.

Response to Comment 3: The EPA does not believe its handling of such data is inconsistent with CAA section 112. The EPA has made some adjustments as noted by commenter in the final rule. The EPA did

this by confirming with all companies operating oil-fired EGUs and providing Part III 2010 ICR testing data which fuel(s) they combusted during their ICR stack testing. As part of the floor calculations, all oil-fired EGUs that co-fired less than or equal to10 percent natural gas (by heat content) had their data included in the floor calculations. However, EGUs that co-fired greater than 10 percent natural gas (by heat content) had their data excluded from the floor calculations. Prior to their stack testing efforts, the EPA was contacted by several companies that had oil-fired EGUs that co-fired natural gas and oil. These companies explained that, due to contracts, they could not stop co-firing to perform 100 percent fuel oil-fired stack testing. The EPA agreed to let those companies test under their "normal operation" even if that operation included co-firing oil with natural gas. We also indicated that the EPA would try to utilize the data if possible. However, the EPA did not realize that the percent natural gas fraction would be as large as it was in some cases and after reviewing the test data we concluded that it is not possible to utilize most of these data. As to the commenter's suggestion to exclude the contributions from natural gas firing, EPA believes it is not possible to separate post-combustion HAP emissions and attribute them to separate fuels (i.e., apportion the data to the oil fraction versus the natural gas fraction). The EPA believes that including such co-firing data in the MACT floor analyses would result in a skewed emission limit that oil-fired EGUs without access to natural gas would be unable to meet. Therefore, the EPA had to disregard these selected co-fired derived data from EGUs exceeding the 10 percent threshold mentioned above from the data used to analyze HAP floor emissions and to develop the final oil-fired EGU limits.

Comment 4: According to commenter 17820, gross unit heat rates (GHR) were calculated incorrectly for 53 EGUs. This resulted in proposed output-based standards for existing units that are two to six times too low. In the emissions floor calculation, the EPA determines GHR based on the "maximum heat input capacity" and "gross (summer) generating capacity" and uses this value to convert reported emissions on the basis of heat input (lb/MMBtu) to unit output (lb/MWh). Due to reporting inconsistencies, these values are not necessarily equivalent to the "design gross heat rate", which the EPA assumed in the data conversion procedure. Significant problems were especially observed with units that share common stacks. The commenter recommends that the EPA recalculate the data by converting measured emissions directly to units of lb/MWh based on the reported stack flows and gross generation at the time of the stack test.

Response to Comment 4: The gross unit heat rates for these and additional EGUs have been reviewed and corrected. There were 59 boilers that had heat input and generation data, which was originally incorrectly entered by companies, that has been corrected.

Comment 5: Commenter 17718 requests that the EPA explain its methodology for converting emission limits from units of "lb/TBtu" to units of "lb/GWH." For the emission limits found in Tables 1 and 2 of the proposed rule, it appears that a unit heat rate of 10 million Btu per megawatt (MMBtu/MW) was used to convert the limits units of measure from "lb/TBtu" to "lb/GWH" for all emissions but Hg. For Hg, it appears that the EPA used a unit heat rate of 8.8 MMBtu/MW. It appears that a unit specific heat rate would be the proper way to convert the limit and it is unclear why a different heat rate would be used for different standards.

Response to Comment 5: The EPA used unit-specific heat rates to convert between the input- (lb/MMBtu) and output- (lb/MWh) based emission factors. Each unit's heat rate was calculated by dividing their maximum heat input by the gross summer generating capacity.

Comment 6: Commenter 19654 states that appendix A to subpart UUUUU-Hg Monitoring Provisions, section 6.2.1.2 uses a rounded units conversion factor 6.24 x 10^-11 for the Method 19 emission rates calculations, that appears in Equation A-2 as 6.236 x 10^-11 and questions if thee is a reason that the Method 19 calculations should not use the 6.236 factor.

Response to Comment 6: Given that agency policy is to round terminal calculations to the number of significant figures of the emissions limit, that the value used by the commenter is used in an intermediate calculation, and that the rule's Hg emissions limit contains two significant figures, one may use either the value contained in appendix A or in equation A-2 of the proposed rule; however, based on this comment, equation A-2 in the final rule has been revised to include only two significant figures.

4G04 - ICR: Other

Commenters: 17621, 17770, 17796, 17808, 19114, 6637

Comment 1: Commenter 17621 states that the two EGUs that complied with the limits for all HAP were not typical of U.S. power generating units.

Response to Comment 1: As noted elsewhere in this document, the EPA has reassessed the data used in the MACT floor analyses partly based on comments received and believes that the limits in the final rule comply with the statutory requirements and recent Court decisions. As a result of the reassessment, different EGUs are the basis for the new-source limits than at proposal and the EPA believes these EGUs to be typical of new U.S. power generation.

Comment 2: Commenter 17621 states that some of the ICR organics HAP that were detected in emission tests were affected by contamination of the sample with non-flue gas sources of HAP. Several of the chemicals noted by the EPA as frequently detected in the ICR data (benzene and formaldehyde) were also frequently detected in the field blanks and/or method blanks and are known contaminants or breakdown products of the sorbent used in sample collection.

Response to Comment 2: The EPA proposed and is finalizing a work practice standard for regulating organic HAP.

Comment 3: Commenter 17770 requests that the EPA correct the information on their Oak Creek Power Plant and Valley Power Plant and remove these two plants from the EPA's list of predicted 2015 retirements.

Response to Comment 3: Contrary to commenter's statement, the EPA does not assume that the units referenced by the commenter will retire in 2015. The EPA's IPM modeling represents a national perspective of least-cost electricity dispatch throughout the modeled regions to meet electricity demand, in both base case projections as well as projections with policy constraints (such as the proposed MATS emission rate limitations). The EPA is not making any determination of future unit-level compliance based on these modeling projections; individual unit owners will make their own economic determination of how they wish to comply with the regulation. Unit owners and operators should consider compliance options with the proposed emission rate standards and are advised to weigh the economic merit of each compliance option to minimize costs although achieving compliance in the future.

The EPA's IPM modeling relies on assumptions regarding future electricity demand and available generating capacity in each modeled region. The parsed file disaggregates model results to a unit level and does not necessarily capture all of the relevant unit-level details that a unit owner may account for in the future when determining compliance planning and economic operations. IPM projections represent a least-cost system-wide pattern of generation allowing the Agency to determine the overall cost impacts of a potential regulation. In the future, the decision to continue operation with emissions controls, or to cease operation, will be made by each facility according to that owner's determination of economic operation potential.

Comment 4: Commenter 17770 states that the EPA incorrectly identified their Oak Creek and Pleasant Prairie plants as needing to install baghouses.

Response to Comment 4: Per commenter's request, and with information supplied by the commenter regarding current PM control performance and controls currently under construction, the EPA does not assume in final modeling that a fabric filter retrofit is necessary for these units to meet the final PM standard.

Comment 5: Commenter 17808 supplied corrected data for oil-fired units. They stated that of the seven units used to calculate the MACT floor, five burned distillate oil. Nine units with ESPs and five units that were combusting up to 75% natural gas report emissions above the proposed total HAP metals standard. The commenter recommends that the EPA post a revised spreadsheet on the Utility MACT website.

Response to Comment 5: As noted elsewhere in this document, the EPA has reassessed the data used in the MACT floor analyses partly based on comments received.

Comment 6: Commenter 6637 states that there were three revisions of the ERT in an effort to correct and improve the reporting of stack test data. The commenter states that the use of multiple emission spreadsheet versions for reporting the ICR data led to significant issues for both data consistency and data retrieval. According to the commenter, the following were issues resulting from the version changes and technical issues remaining in the May 25 version:

1. In the initial emission spreadsheet each run was entered in a separate column; whereas in the revised spreadsheets, each run is entered in a separate row. This created major difficulties in designing an automated data retrieval tool that could handle both configurations.

2. The original spreadsheet did not include fields for the O_2/CO_2 concentrations measured in conjunction with each run. In the original spreadsheet, it was unclear how the reported data in the O_2/CO_2 spreadsheet correlated to the runs for each analyte.

3. The initial spreadsheet did not have a specific place to indicate whether a run value was above or below detection limit; it was to be entered into the "Other Supporting Information" column. There was not a practical way to associate a specific run value with its associated detection flag.

4. The first two versions of the emission spreadsheet listed incorrect units for VOC and SVOC emissions: ppmvd @ 7% O_2 rather than the ICR-required units of µg/dscm @ 7% O_2. In some cases, the respondents changed the headers to the correct units. In other cases, ICR data were reported in µg/dscm but the column header of ppmvd was retained. Use of the values and units as reported could result in biased results.

5. The dropdown lists for the VOC and SVOC compounds do not match the analytes requested by the EPA on the FAQ page, which may have resulted in inconsistent reporting of speciated organics.

6. The spreadsheet asks for units of flow that are not standard in the testing industry and may have led to data entry errors.

Response to Comment 6: There were numerous requests from the 2010 ICR recipients to clarify the EPA's test plan (listed in the ICR) and to fix some programming elements in the ERT. These requests were addressed in the 2010 ICR effort's website in the "Frequently Asked Questions" web pages. The EPA sought this input in order to improve the early versions of the spreadsheets (which were

downloadable) and the ERT program to make it possible to gather accurate information. Through these actions, the EPA made every effort to aid in the gathering of accurate data.

Comment 7: Commenter 17770 states that both the Oak Creek and Pleasant Prairie plants have ESPs to control PM emissions. At Pleasant Prairie, the ESP is followed by a WFGD system and previous tests have shown that these units will be capable of meeting the proposed total PM emission limit. At Oak Creek, a WFGD system is currently being installed and will be operational by the end of 2012. Commenter anticipates that Oak Creek will meet the proposed total PM emission limits at that time. Commenter requests that the EPA revise this document and remove these two plants from the EPA's projection of fabric filter baghouse installations.

Response to Comment 7: Per commenter's request, and with information supplied by the commenter regarding current PM control performance and controls currently under construction, the EPA does not assume in final modeling that a fabric filter retrofit is necessary for these units to meet the final PM standard.

Comment 8: Commenter 19114 states that a number of factors influence the potential emissions from coal-based generating units. All of the data collected through the ICR issued to support the proposed rule was collected during stable full-load operations. Many of the constituents are inherently variable within coals commonly used at the same unit. Under the proposed rule, an operator is likely to be in the unenviable position of testing below a limit one time and then testing above the limit the next without knowing what actions to take to change the emission rate.

Response to Comment 8: The EPA believes that use of the 99% UPL and, for sources that demonstrate compliance on a continuous basis, the 30-day rolling average adequately addresses the variability concerns noted by commenter.

4G05 - ICR: Data quality and data errors

Commenters: 10821, 12991, 17621, 17622, 17711, 17714, 17716, 17725, 17735, 17736, 17739, 17740, 17761, 17770, 17772, 17775, 17781, 17807, 17808, 17812, 17820, 17868, 17871, 17877, 17912, 17914, 18014, 18033, 18034, 18414, 18437, 18498, 6637, 18023

1. Use of Part II data.

Comment 1: According to Commenters 17716 and 18414, Part II test data should have been used in limited circumstances. The commenters state that the test data collected by sources required to perform testing under Part III of the information collection request along with the historic test data previously collected under Part II of that same information collection request should not be treated equally. The commenters state that Part III data was developed using much longer sampling times and greater sampling volumes to allow for more accurate information than would be collected under normal testing. The Part II data used differing sample volumes or times and, perhaps, following different procedures or conditions. Part II data may be useful when the number of units or test data in the category is small because including these data can provide additional information about the variability of the source(s) in question. But for existing coal-fired units involving a large number of units, the Part III data is adequate to address variability concerns. Using the Part II data would also defeat the purpose of longer measuring time and greater sample volumes that were required for the Part III information collection request.

Comment 2: Commenter 17621 states that the Part II ICR data consisted of historical tests performed by power plants over the previous 5 years prior to the ICR, for various purposes. These data may not be representative of the population of U.S. power plants, as the EPA made no attempt to ensure that the numbers of tests reported for each HAP were in proportion to the frequency of occurrence of various categories of power plant in the entire U.S. fleet.

The commenter states that the Part III ICR data came from facilities that were required to perform stack tests in response to the ICR. These EGUs were selected by the EPA as potentially best performing units in each family of HAP and are, therefore, not representative of the current population of U.S. coal-fired power plants.

The commenter notes that the ICR also was sent to a random 50 EGUs selected by the EPA as representative of U.S. coal-fired power plants not selected in Part III of the ICR.

The commenter further states that the three categories of data were pooled to select ‘best-performing’ units. The pooled data are likely not representative of all U.S. power plants. The EPA’s selection approach complicates efforts to determine the need for and value of subcategorizing sources, i.e., by coal rank, coal chloride concentration, etc. The selection process also makes it difficult for the Agency and EPRI to calculate representative values for HAP emissions across the industry, which can be accomplished only through an assessment of a broader and more representative population of existing units.

Response to Comments 1 - 2: The EPA’s rationale for its selection of units to test is explained in the proposal preamble and in the Supporting Statements for the 2010 ICR. As explained in these documents, the EPA targeted best performing EGUs for non-Hg metallic HAP, acid-gas HAP, and organic HAP so as to be able to use the maximum amount of the data possible when establishing MACT floor limits. In addition, the EPA required all coal- and oil-fired EGUs to provide all available data gathered over the

past 5 years and, thus, the EPA had information and data on the industry as a whole. The EPA did not expect, and in fact did not receive, much HAP emissions date under Part II of the ICR because most EGUs are not subject to HAP emission limits. We did receive some HAP data, however, and we used it in establishing the standards to the extent it was in the appropriate format or could be converted to the proper format, and it was not otherwise inappropriate to use the data (e.g., the data was generated before a new pollution control device was installed). Therefore, the EPA believes that the data made available to it is representative of the industry and that the data are sufficient to assess the appropriateness of any subcategories. Furthermore, boilers of all types burning coals of all ranks were represented among the best performing sources so the commenters' concern that the EPA somehow failed to adequately characterize the category is unfounded.

2. Noise level, experience, issues with measurement methods.

Comment 3: Commenter 17622 states that the Hg, HCl and total PM limitations for new units may be at levels that approach the "noise" of practical measurement methods. For this reason, the commenter urges the EPA to verify that the reported performance for the best performing unit that is the basis of the limit is correct. The commenter states that a thorough re-examination of the test reports and procedures should be performed and urges the EPA to validate the ICR test data using the ASME program ReMap and ASME's19.1 Test Uncertainty. The commenter recommends re-testing of these units under the same conditions to verify that the emissions results are repeatable and sustainable over an operating period that includes periods of start-up and shutdown.

Commenter 17622 adds that although Hg measurement methods have been developed rapidly over the past decade, there is insufficient experience measuring Hg in flue gas at concentrations equivalent to the proposed new unit limits to understand the detection limitations and quantitative accuracy at such low Hg concentrations for either of the two continuous methods – sorbent traps or continuous analyzers. Without better information on the limitations of these measurement methods at such low Hg concentrations, it is difficult to have confidence in measurements taken at these low concentrations.

Commenter 17621 states that it is important to note that there are also uncertainties associated with measurement of filterable PM. The temperature of the particulate filter has a significant impact on the test results. Since many of the Part III ICR tests on dry stacks were conducted at the lower temperature due to lack of clarity on the ICR testing requirements (EPRI, 2010), some of the ICR data are biased high. The type of filter used also affects the results: In EPRI's study 6 out of 7 samples collected with a glass fiber filter had higher filterable PM loading than a sample collected simultaneously with a quartz fiber filter: the increase in filterable PM on the glass fiber filter ranged from 3 to 124%.

Commenter 17621 states it is difficult to evaluate the adequacy of Method 29 to measure total metals or total non-Hg metals at the proposed alternative limits, as the limits are not calculated from the individual metals tests but are the result of a separate statistical calculation on total metals reported for each EGU. The approach used by EPRI was to compare the proposed MACT limits with the sum of the lowest MDLs from the EPRI review multiplied by 10 (2.5 lb/TBtu). However, that approach may be too optimistic as to the method's capability to measure at the limit, as the MDLs do not reflect the actual performance of the method on stack samples.

Commenter 17621 summarized their method adequacy determination for coal-fired EGUs in a table in their submittal. Method 29 is not sensitive enough to quantify five of the HAP metals (antimony, arsenic, beryllium, cadmium, and Hg) at the MACT limits for future coal-fired EGUs, and may not be

sensitive enough for four other metals (cobalt, lead, manganese, and nickel). The sensitivity of Method 29 is adequate to quantify total non-Hg metals at the proposed alternative limit for existing and future coal-fired EGUs.

Commenter 17621 notes that the method adequacy determination for new coal-fired EGUs ≥ 8,300 Btu/lb also applies to the limits for new IGCCs, where those are the same as for coal EGUs. Hg cannot be measured at the limit for new IGCCs (0.00001 lb/GWh) by any of the proposed methods.

Commenter 17621 summarized their method adequacy determination for liquid oil-fired EGUs in a table as part of their submittal.

Commenter 17621 states that Method 29 was determined not to be sensitive enough to accurately measure beryllium and Hg at the proposed alternative individual metal MACT limits for existing liquid oil-fired EGUs. Method 29 is not sensitive enough to accurately measure five of the HAP metals (arsenic, beryllium, cadmium, Hg, and selenium) at the proposed alternative MACT limits for future liquid oil-fired EGUs. The sensitivity of Method 29 is adequate to quantify total non-Hg metals at the total metals limits for both existing and future liquid oil-fired EGUs.

As a final observation, the commenter notes that the EPA stated that Method 29 should not be used in the ICR Part III for stacks with Hg emissions under 1 μg/dscm (approximately 0.9 lb/TBtu for coal units and 0.7 lb/TBtu for oil units). However, 31 percent of the coal-fired EGU test runs and 100 percent of the liquid oil-fired EGU test runs measured with Method 29 had emissions values below those levels and by the EPA's definition should be considered inaccurate. Therefore, the EPA should consider whether omitting those test results from their evaluation would improve the accuracy of the MACT floor determination. Additionally, according to this guidance, Method 29 should not be used for compliance with the proposed MACT floor for existing units of 1.2 lb/TBtu, as that value is fairly close to the level at which EPA states the method is not applicable.

Commenter 17621 reviewed methods sensitivity for HCl, HF, and SO_2 only. Method CTM-033 for HCN, which was included in this HAP test group for the ICR, had extremely poor performance, including elevated detection limits and blank contamination. In addition, the inability of most testers to maintain the required basic pH in the CTM-033 impingers led the commenter to conclude that the ICR data for HCN are biased low.

Response to Comment 3: Given that the agency used a procedure that compared the UPL to 3 times the RDL to account for variability and method detection levels when setting emissions limits, the agency believes all emissions limits can be measured accurately using existing methods. As EGU owners or operators collected the data and certified its accuracy and completeness, the agency has no reason to refute the reported results; moreover, if an owner or operator had a problem, the agency expects he or she would have contacted the agency for guidance, as did some owners or operators, or would have conducted additional emissions testing using appropriate techniques. Regarding suggested Method 29 insensitivity for individual metals at an EGU, the owner or operator could choose alternative means of compliance, including a total metals limit. Regarding suggested Method 29 insensitivity for individual metals at an EGU, the owner or operator could choose alternative means of compliance, including a total metals limit or a particulate matter limit. Regarding the commenter's suggestion that IGCC Hg emissions are below the emissions limit, because the commenter need only show that the emissions limit was met, an emissions test using the required volume and resulting in non-detection of mercury emissions will meet the emissions limit. With respect to the commenter's view that Hg data below one

microgram per cubic meter collected using Method 29 should be excluded from floor setting, the agency disagrees. As mentioned earlier, the agency's use of a procedure to account for variability and method detection levels when setting emissions limits ensures the Hg data below one microgram per cubic meter can be used to establish an emissions limit. Moreover, as the rule allows sorbent trap measurement and emissions testing as alternatives to the use of Hg CEMS, an EGU owner or operator has a variety of means to demonstrate compliance with the mercury emissions limit. Finally, the agency agrees with the commenter with respect to the HCN data, and the rule contains no separate HCN emissions limit. Moreover, the agency believes the acid gas control technology used to meet the HCl and HF emissions limits will serve to control HCN emissions.

3. Data accuracy/errors (detection limits, heat rates, adherence to sampling requirements) failure to do QA, missing data, incompleteness and inconsistency of ICR data.

Comment 4: Commenter 17648 states that although the EPA has made some errors in arithmetic and data transcription, it either has already corrected them or can do so in response to comments in promulgating the final rule, without the need for re-publication of the rule.

Response to Comment 4: The EPA acknowledges the commenter's statement.

Comment 5: Commenter 17675 notes that the proposed Hg limits in the MACT floor were incorrectly calculated in the background documents for the proposal and an inappropriately low Hg standard is reflected in the proposal. The EPA was made aware of this error by UARG in May 2011 and the EPA must address the necessary corrections to the proposed emission limits in the final standards.

Response to Comment 5: The EPA has reassessed the emissions test data and made any necessary corrections in the final data set. We then reassessed the MACT floor analyses for all HAP and believe that the emission limits in the final rule are consistent with the statutory mandate.

Comment 6: Commenter 12991 states that there are problems of incompleteness and inconsistency with some of the utility MACT ICR data. According to the commenter, coal Hg content is not reported for about 40 percent of the 339 units although the commenter was able to identify Hg content from files in the docket or estimate it based on county-origin of the coal shipped to the plant during 2009 (EIA-923 data) and the county average Hg content of the coal from the 1999 ICR data. According to the commenter, one-third of the ICR Part II Btu/lb, S and Ash values are reported on a moist rather than dry basis and the Part III coal analyses are internally inconsistent. The commenter provides information showing that 42% of the Part III data failed the Mott Spooner test (compares the measured heating value with the theoretical heating value); a 5 to 10% failure rate was expected. According to the commenter, such errors may be significant where F factors are used to determine stack emission rates. The commenter states that there are also inconsistencies in trace metal and Hg contents between Part II and Part III data. The commenter also states that there are other less easily observed limitations.

Numerous commenters (17621, 17637, 17714, 17725, 17736, 17739, 17761, 17775, 17807, 17868, 17871, 17912, 17914, 18014, 18033, 18034, 18437, 18498 and others) express concern over the accuracy of data in the database and the resulting MACT floor calculations. Specifically, comments were received stating that:

1. Errors were identified in the EPA database (e.g., measurements below detection limits, inaccurate heat rates, failure to adhere to sampling requirements) that indicate the EPA did not conduct an adequate quality control review of the data as promised.

2. At least ten units (25%) in the EPA's "corrected" 40 unit mercury floor fail basic QA/QC checks and should be deleted from the floor database.

3. Submitted Hg data from 98 plants have simply been ignored in all emission evaluations without explanation.

4. A conversion error that made the emissions of 20 of the 40 the units in the original Hg floor 1,000 times too low. According to the commenters, the existence of a clear and relatively obvious error such as this appears not to be isolated, but rather systemic. The commenters state that the EPA was made aware of potential data problems during interAgency reviews. The commenters state that the EPA should take additional time to correct the errors.

5. Files that have not been made available on the rulemaking docket.

6. Commenter 10821 states that for the units designed to bum coal with heat values of less than <8,300 Btu/lb (known as Subcategory 2), the EPA stated that there were fewer than 30 units in the subcategory and set the floor based on the top-two EGUs. The EPA has inappropriately excluded at least 4 sources from this subcategory, likely pushing the number over 30. Regardless of whether there are less or more than 30 units in this subcategory, the EPA should still have relied on at least 5 units to set the MACT floor as required by CAA section 112(d)(3).

7. Commenter 17621 states that heat rates are incorrect for 53 EGUs listed in the MACT floor spreadsheets. In these cases, the gross capacity in megawatts (electric) (MWe) for the entire facility was entered into the Part II report rather than an allocated capacity for each boiler. This error produces heat rates that are not realistic for fossil fuel-fired power plants. Due to the impact on emissions, units with this problem are prevalent among the "lowest emitting plants" sorted by lb/MWh. The impacted units were used as the basis for several future plant limits for coal (PM, total metals, antimony, and beryllium).

8. Commenter 17621 states that results of ICR Part III tests from nine liquid-oil fired EGUs are missing from the MACT floor calculations. Commenter 17621 adds that these problems make it very difficult to comment on the substance of the proposal, because correcting these errors will likely change the MACT floors. Commenter 17621 includes a more detailed discussion and a list of errors identified in an appendix to their submittal.

9. Commenter 17621 states that for the new EGU limits, where the UPL is calculated from as few as three test runs conducted at a single facility by a single laboratory, it is incumbent on the EPA to verify that those reported values are free of errors, analyzed according to standard laboratory procedures, and reported in accordance with the ICR requirements.

10. Commenter 17714 states that they found errors in the EPA's calculations used to establish the proposed Hg limit and is concerned that there may be additional errors in the data and calculations and urges the EPA to carefully examine the supporting data and calculations and make necessary corrections

prior to finalizing the limits. Any resulting changes to the limits should undergo an additional notice and comment period to allow affected parties to comment.

11. Commenter 17739 states that assessing the EPA's MACT floor calculations was difficult and largely stem from the EPA's actual, but unexplained, manipulation of the data, which are inconsistent with CAA section 307(d)(3), which requires the EPA to set forth in its proposal "the methodology used in obtaining the data and in analyzing the data."

12. Commenter 17775 states that the EPA published a proposed rule that was not thoroughly reviewed for errors that would have been evident had the EPA allowed itself sufficient time to produce a scientifically sound rule. The EPA's serious conversion error should have led the agency to amend its proposed rule through some form of Federal Register notice. As a result, commenters are left uncertain whether they should comment on the Hg limits published in the Federal Register on May 3, 2011 or the revised Hg standards found in Assistant Administrator McCarthy's May 18 letter and in the rulemaking docket.

13. According to commenter 17716, the heat rates calculated by the EPA of less than 7000 Btu/kWh represent efficiencies that would be impossible for these units to achieve.

14. Commenter 17735 believes the agency made a computational error in converting the AES Hawaii Unit 1 total PM results from input units to output-based units and mistakenly assumed that both AES units have a capacity of 180 MW; the capacity of the two-unit plant is 180 MW. According to the commenter, this error is easily verified in the EPA's spreadsheet because it shows Unit 1 has a heat rate of 5.03 MMBtu/MWh, but the correct value is exactly twice that or 10.06 MMBtu/MWh and when the corrected heat rate (or conversion error) is incorporated into the three individual total PM runs, a repeat of the EPA's UPL calculation yields a calculated PM value of 0.10 lb/MWh. Even as unrepresentative as AES Unit 1 may be for the purpose of determining MACT, the commenter states that it does not appear to support an emission limit of 0.05 lb/MWh. The commenter requests that the EPA revisit the MACT determinations to ensure that these computational errors are corrected prior to the final rule.

The commenter also states that this unit is not representative because it burns Indonesian coal; its generating capacity is nominally 180 MW, but the emissions source identified, in reality, is only half that, and it also burns old tires, used motor oil, and carbon from the State's Board of Water Supply filters; performance data for the unit do not appear to be representative of what the unit will regularly achieve in practice. Therefore, the EPA's PM standard is not representative of what is achievable in practice.

15. Commenter 17761 states that the EPA utilized the wrong units of measure for Walter Scott Unit 4 PM testing conducted in August 2007 and submitted as part of the ICR. In this case, the actual PM test result was 0.008 lb/MMBtu; however the EPA included the value in its database as 0.008 lb/hr, which produces an extremely unrealistic emission rate of 1x10-6 lb/MMBtu.

16. Commenter 6637 reviewed stack test reports for about half of the generating units included in the ICR and inspected an interim database of ICR test data published by the EPA to determine if the same quality issues were present. Areas assessed included calculations and reporting, detection limits, sampling quality control, and laboratory quality control. According to the commenter, a common issue that affected all of the test methods was that utilities provided insufficient information to determine if measurements were within a concentration range at which they could be accurately detected and

quantified. Other problems included calculation and data entry errors. The commenter also assessed the quality of data produced by many of the individual test methods and notes specific quality issues with the tests for hydrogen cyanide, formaldehyde, filterable and condensable particulate, and several metals. The non-dioxin/furan organics and the dioxin/furan/PCB organics groups had a high percentage of measurements below detection limits, and were impacted by non-sample-related sources of the target chemicals. For each quality issue, the commenter stated the likely impact on the accuracy of the overall ICR database, and where possible, suggested approaches that could be used to screen out problem measurements and improve the overall data quality. In their submittal, the commenter provides a substantial amount of additional and detailed information for each of the areas they reviewed.

According to the commenter, their reviews of the Part III ICR test results identified quality issues that have the potential to interfere with the usability of the data. The commenter states that the issues identified can be separated into two groups: those that can be addressed by identifying and screening out poor quality data, and those that affect such a high proportion of the results that a more general solution will be needed. In the first category are individual method-related issues such as elevated detection limits for HCN and failures of method quality control criteria for Hg. These issues can be remedied by using information contained in the EPA reporting templates to identify and screen out affected values. The second category includes identification of appropriate detection and quantitation limits for each parameter. Commenter states that to overcome the problem, a possible short-term approach is to identify the range of method detection limits in a cross-section of the ICR test data, and calculate from those values the upper bound detection limits that could be achieved by most laboratories. Provisional quantitation limits could then be established as a multiplier of these detection limits. However, this approach is not a good solution in the long term for establishing quantitation limits for compliance test methods. Rather, the limits should be determined in the field using parallel sampling trains to determine measurement variability over a range of actual stack gas concentrations and conditions.

The following table lists the areas in which the commenter identified data quality issues. See the original comment submittal for a detailed discussion of each area listed below.

Data Quality Issue	Page in .pdf comment letter
Reporting Template Version Issues	31
Reporting Detection Limits	39
Data Entry and Calculation Errors	43
Incomplete Quality Control Reporting	43
Low Sample/Blank Ratios	43
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Acid Gases Method 26A Data Quality	45
Hydrogen Cyanide by EPA Method CTM-033 Data Quality	46
Acid Gases and HCN by EPA Method 320 Method 320 Data Quality	47
Method 29 Metals Data Quality	50
Metals Method 29 and 5 Filterable PM Data Quality	52
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PM 2.5 OTM-27 Data Quality	54
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Formaldehyde Method 0011 Data Quality	59

Formaldehyde by EPA Method 320	60
THC Method 25A Data Quality	60
Methane Method 18 Data Quality	61
CO Method 10 Data Quality	62
VOC Method 0031/8260B Data Quality	63
SVOC Method 0010/8270D Data Quality	64
PCDDs/PCDFsMethod 23 Data Quality	67
PCBs by EPA Methods 23/1668 Method 23/1668B Data Quality	68

17. Commenter 17621 states that they identified many confirmed or suspected errors in individual EGU emissions values that could potentially impact MACT floor calculations and identified their criteria for identifying errors and the types of QA checks that the EPA should perform to identify and correct errors.

Commenter 17621 listed eight liquid oil-fired EGUs in the EPA's Part III database for which test results were missing. Results for these should be added and UPL calculations revised.

18. Commenter 17711 states that the EPA should perform a data quality review to ensure emission rates were correctly calculated and input into the ERT and EPA MACT floor calculations. The EPA should also ensure that non-detect data were correctly reported (e.g., non-detect fractions of Hg were not reported as zero). The commenter recommends that the EPA review the data to ensure that (1) where method quantitation limits are known, data below method quantitation limits are properly identified and treated as less than values, and (2) where method detection and quantitation limits are not known, studies are carried out expeditiously so that all the data below method quantitation limits are treated appropriately. Commenter recommends that no numerical emission standard for a pollutant be set below the measurement ability of the reference test method, i.e., its quantitation limit.

19. Commenter 17725 states that their review of the data shows that there still may be problems with the emissions data and some of the data conversion procedures used by the EPA in the floor analysis. Commenter is concerned because the EPA seems to have done little to check these results or its calculations. For example, a number of sources appear to have failed to report emission results for all ten of the non-Hg HAP metals required under the ICR. However, when it calculated total non-Hg metal values, the EPA appears to have ignored this issue and just summed the results regardless of whether they represented a complete total. Eighteen of the total metals results that the EPA included in its floor analysis for existing coal-fired units were missing various components. Obviously, the EPA should have excluded these incomplete results from its total metals floor analysis.

20. Commenters 17725 and 18498 state that due to reporting inconsistencies, output based standards for existing units are flawed based on incorrect assumptions for GHR. The commenter provides tables illustrating the problems. According to the commenters, the following subcategories suggest GHR values that are unrealistically high or low based on expected boiler performance: Mercury Standard for Coal-Fired Unit ≥ 8,300 Btu/lb Subcategory; Total and Individual Metals Standards for Solid Oil-Derived Fuel Fired Units; Mercury and Individual Metals Standards for Liquid Oil-Fired Units; Total PM and HCl Standards for IGCC Units. Commenters recommend recalculating the ICR data on an output basis using a tiered approach depending on data availability and suggests alternative approaches.

21. Commenter 17736 states that the EPA's data collection was incomplete resulting in fundamental flaws and irrational determinations in the proposed rule. Additional errors include heat rate errors at

different units- R.E. Burger Units 5 and 6 in Ohio are among those misrepresented - resulting in overly stringent emissions limits.

According to the commenter, scrubber installation estimates are inconsistent. The EPA assumed 36 months in this rulemaking, but 27 months in the proposed Transport Rule. These inconsistencies raise concerns as to whether the EPA has information sufficient to rationally consider installation timelines. The EPA also failed to account for the time needed to permit prior to construction. Therefore, the commenter suggests that the EPA expand the quantity and quality of the data reviewed in order to facilitate a more realistic consideration of the cost, development timeline, and performance of emission control systems for the final rule.

22. Commenter 17739 states that the EPA is subject to the specific data quality obligations under the Information Quality Act (IQA), and the EPA's IQA Guidelines entitled "Guidelines for Ensuring and Maximizing Data Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency (Oct. 2002)." Since the MACT proposal meets the definition of "influential information" it is "subject to a higher degree of quality (for example, transparency about data and methods) than [other] information. . . .," The EPA IQA Guidelines state that the EPA will ensure the data it uses are, "as a matter of substance," "accurate, reliable, and unbiased." In order to meet these requirements, the EPA must undertake reasonable and competent efforts to conduct a QA/QC analysis of its rulemaking data. Failure to adhere to the most basic elements of its own practices and procedures governing data quality would simply be arbitrary.

23. Commenter 17739 states that it must not be the sole or principal responsibility of outside parties to find and correct errors in the EPA data, particularly when it is clear that some serious errors can be and were introduced by the EPA itself. If the EPA has found and corrected any errors, it is not reflected in the docket, which appears to document only a single instance (EPA-HQ-OAR-2009-0234-3024) in which the EPA attempted to reconcile discrepancies between Part II and Part III data. The EPA should either add to the docket any documentation of inquiries it made to reconcile potential data quality errors and how they were resolved, or acknowledge that no such corrections were made. Nor is it incumbent upon the commenter to determine why certain data were excluded from the EPA's analyses. Commenter asserts that it is incumbent upon the EPA to evaluate those data and explain why they were not used, and to do similar analyses and provide explanation if data were excluded for the other HAP and HAP surrogates.

24. Commenter 17740 states that the proposed rule suggests that the EPA made a number of errors in developing the proposed MACT standards. For example, the proposed emissions standard for total HAP metals for new liquid oil-fired units appears to be less stringent than the proposed emissions standard for total HAP metals for existing liquid oil-fired units. Such a result should not be possible.

25. Commenter 17770 refers to comments submitted by RMB on the total PM limit.

26. Commenter 17772 states that ten out ten best performers fail the new facility Hg standard of 0.000010 lb/GWh as published. It appears that a decimal point got moved in the process of publishing the standard and other errors may also exist in establishing that standard. Also, the best performing unit used to set the new and existing facility standards for arsenic and lead, as well as the existing standard for manganese for units that burn coal greater than 8,300 Btu/lb actually burns lignite.

27. Commenter 17812 states that D/F sampling and analytical methods offer unique challenges. The commenter described the D/F data reported for one unit where every congener in each test run was either reported as non-detect of a value flagged with a "J" qualifier. Some were labeled "EMPC." Both flags indicate a high degree of uncertainty with the data at such low levels found in coal-fired boiler stacks. Some D/F congeners were also detected in the field blank indicating background levels of D/F casting further doubt and uncertainty on the reported analyte concentrations.

28. Commenter 17820 states that detailed review of the EPA risk assessment performed by EPRI indicates significant technical issues that raise serious question about whether HAP emissions from coal-fired power plants pose such risk. The commenter noted that EPRI identified several errors in unit stack parameters.

29. Commenter 17871 states that heat rate errors exist in MACT calculations for all HAP groupings for IGCC, liquid oil and petroleum coke units. In addition, transcription errors, data assignment errors and a lack of outlier quality control are all present in the spreadsheets used by the EPA to calculate the MACT floors.

30. Commenter 17877 endorses EPRI's technical review of the ICR data and encourages the EPA to consider its findings and take the time to re-propose the limits.

31. Commenter 17912 states that despite the admitted errors in certain floor calculations, the EPA has refused to withdraw the proposal and make the corrections. This deprives stakeholders of the opportunity to comment on the corrected provisions as required by the Administrative Procedures Act and the CAA.

32. Commenter 17914 listed their major concerns with the ICR data used by the EPA. In several instances, the data used to set the proposed floor limits are reported as being below the detection limit. Standard practice in science and engineering is to not use data below detection limits. These values should not be used in the calculation of the floor limits.

The commenter is concerned about the validity of the data submitted to the EPA and the number of errors that may be present based on their initial review. These concerns include the following examples: there were more than 150 duplicate Submittal ID numbers; there were different Facility ID numbers associated with a single facility; data was entered in numerous tables in text fields; field test reports are not available to review data submitted for two of the three "Top Performer" plants; there are many cases of multiple boilers providing flue gas to a common stack being treated as individual sources.

33. Commenter 18014 states that the output based standards for existing units are based on incorrect assumptions for GHR. In the emissions floor calculation, the EPA determines GHR based on the "maximum heat input capacity" and "gross (summer) generating capacity" as reported in Part I of the ICR for the individual boilers and uses this value to convert reported emissions on the basis of heat input to unit output. Due to reporting inconsistencies, these values are not necessarily equivalent to the "design gross heat rate", which the EPA assumed in the data conversion procedure. These issues resulted in several output standards that are fundamentally flawed and inconsistent with the equivalent input standards.

The commenter recommends that the ICR data be recalculated on an output basis using a tiered approach depending on data availability. In most cases, measured emissions can be converted directly to

output units based on the stack flows and gross generation at the time of the stack test. Alternatively, a representative GHR value could be derived based on the most recent stack test conducted under representative conditions for which the necessary data are available (e.g., gross generation, stack flow, CO_2/O_2). This value could then be applied to the calculated input-based emissions value. Although design GHR data is available in the Part II ICR database, this value is not recommended to be used without further review because of the potential for reporting inconsistencies.

34. Commenter 18034 states that there is a discrepancy in the Sandow Unit 5B data used to determine the existing unit MACT floor.

35. Commenter 18034 states the proposed new unit limit for SO_2 for pet-coke EGUs is based on the unit at5Hanford (ORIS code 10373), which is five to ten times smaller than a typical new pet-coke EGU and only slightly larger than the 25 MW threshold for applicability to the Utility NESHAP rule. The commenter questions the representativeness of the emissions from a 27 MW unit compared to units of 150 MW to more than 300 MW. Furthermore, the EPA's MACT analysis for acid gas limits for pet-coke units is counter-intuitive and contrary to the EPA's claims supporting the SO_2 surrogacy. AES Deepwater (ORIS code 10670) is used to set the new unit HCl MACT floor. AES Deepwater HCl emissions are almost 30 times lower than the Hanford unit used to set the SO_2 new unit MACT floor. However, the SO_2 emissions from AES Deepwater are almost 30 times higher than Hanford's SO_2 emissions despite the fact that AES Deepwater is equipped with wet FGD and Hanford has no SO_2 controls installed. These facts indicate that other factors are affecting the acid gas emissions from pet-coke units that the EPA has not considered. In addition, the EPA is using a unit that is not equipped with FGD to set the SO_2 surrogate limit which is contrary to the proposed rule requirement that a unit must be equipped with FGD to qualify for the SO_2 surrogate limit.

According to the commenter, the EPA is arbitrarily accepting the mathematical results of the MACT floor analyses without questioning whether the results make sense. Sound science must be applied when establishing emission limits and is critical when evaluating a very small population of units such as the pet-coke EGUs.

36. Commenter 17881 states that as part of their participation in the CAA section 114 2010 ICR, the commenter was granted approval by the EPA to test at the combined stack of Units 1 and 2 with both units in operation, as testing only one unit is not possible due to the stack configuration. The commenter states that the information for the JH Campbell site is correct, with the exception of the table fuels_boiler_information, for submittal ID 2241. The commenter believes the boiler_ID should be JHC2-conf.

Response to Comment 6, items 1-36: These errors have been corrected in the final database.

Although the EPA relies on the primary oversight of testing quality by the source and their test contractor, we recognize that the data quality objectives of the source and test contractor may not be consistent with the uses which we intend. For the test data which were provided in the Phase II ICR, we recognized that the data were collected for several different purposes including but not limited to compliance assessment, CAM monitoring development testing and engineering assessment. For the test data which was conducted as a result of the Phase III ICR, we developed specific guidelines for the conduct of the tests that would result in the delivery of data that provided more beneficial information than we would otherwise be able to obtain. As a result, we specified test methods, test durations, and analytical techniquesthat expanded the information on HAP pollutant emissions normally obtained,

improved the analytical detection levels and improved the consistency of measurements between sources. As evidenced by several commenters, we provided additional support to sources and their contractors as they identified issues that challenged to performance of these tests. Upon receiving many of the test reports we also identified situations where the respondent did not follow the guidelines that we provided in the ICR and/or did not perform the emissions test as described in the published method. We also identified that in some instances source testers appeared to be highly cognizant of the importance of this data to the source and the agency and performed the testing as the method and our guidelines indicated and provided the documentation to support their work. In reviewing both of the data sets, we assessed the limitations that existed in using the data for selecting the best performing source or the best performing 12% of the sources and for calculating the numerical limits associated with these two categories. We used some existing procedures for accommodating data limitations based upon the development of other NSPS, NESHAP and MACT emissions standards. Where there were situations where existing procedures were not sufficient or acceptable we made adjustments to the existing procedures, developed alternate procedures or excluded the data. We are confident that we have properly assessed the limitations that exist in the data supplied to us by the utility industry, developed procedures which address the limitations and have used the data to establish emissions limitations that are representative of the best performing source and the average of the best performing 12 percent of the sources.

Comment 6 (cont.):

37. Commenter 17739 states that the EPA made the following errors:

- For AES Hawaii Units A & B (ORIS 10673), the sampling reports (docket EPA-HQ-OAR-2009-0234-0204 and EPA-HQOAR- 2009-0234-020) the emission measurements for AES Hawaii A &B are all marked as "BDL." For both units, all three sampling runs failed the data QA/QC check known as "Paired Trap Agreement." The unspiked trap failed the "Breakthrough Limit" check in all three sampling runs.

- For Northampton Generating Unit 1 (ORIS 50888), it is not possible to assess the quality of the Part III emissions measurement data because the docket entry (EPA-HQ-OAR-2009-0234-2462) contains no QA/QC information; all QA/QC entries are marked as "n/a".

- For AES Warrior Run Unit 1 (ORIS 10678), all three Hg sampling measurements for this unit (EPA-HQ-OAR-2009-0234-2699) failed the Volume Difference, Breakthrough Limit and Paired Trap Agreement QA/QC criteria.

- For Cedar Bay Units CBB1, CBA1 and CBC1, the method 30B sampling volumes are listed in the QA/QC data as greater than 200 dscm. These are impossibly high volumes, suggesting a possible error in the sampling method or an error in reporting the data.

- For Wisconsin Electric Valley Units 1,2 3, and 4, the sampling data in the docket (EPA-HQ-OAR-2009-0234-1354, -1355, 1356 and 1357, respectively) reveal negative values for the mercury mass in the second sorbent tubes for Units 1, 3 and 4. For Unit 4, all six of the sorbent tubes are reported to contain negative masses. These values make it impossible to conduct a meaningful breakthrough test, and call into question the values reported for the first sample tubes.

Response to Comment 6, item 37: The EPA has conducted a review of the commenter's cited data and has made the following decisions on the validity of g these data.

The EPA has decided to continue to use the AES Hawaii Units A & B (ORIS 10673) Hg emissions data obtained by the Method 30B under Part III of the ICR. The data did not fail the "Paired Trap Agreement" criterion. The "Paired Trap Agreement" criterion is as follows: ≤10 percent RD mass for Hg concentrations > 1 µg/dscm, or ≤ 20 percent RD mass for Hg concentrations or < 0.2 µg/dscm absolute difference for Hg concentrations ≤ 1µg/dscm. Although the facility reported a "paired trap agreement" of 65, 56, and 100 percent for the 3 test runs, they also reported the absolute differences, which are 0.04, 0.04 and 0.01 µg/dscm; these absolute values meet the criterion. The test did fail the breakthrough limit for the unspiked traps for each test run, but not for the paired spiked traps. Failure of the breakthrough limit for the unspiked traps resulted because the limit is expressed as a percentage of the captured emissions; the emissions and the resulting mass collected on the trap are very low. The breakthrough limit was easily met for the spiked pair indicating that breakthrough was not a problem. Furthermore, the test met the measured spike recovery and the paired trap agreement criteria. This is a performance-based method and a longer sampling time would have increased the measurable quantity on the unspiked trap so that all the performance criteria could be met. Although the test did not meet the breakthrough limit for the unspiked traps, the other QA/QC results indicate the results are valid. Although these data do not meet all the Method 30B criteria, we believe they are of adequate quality to be included in the MACT floor. They could likely have met the criteria if they tested for a longer time, and they will need to do that when determining compliance.

The EPA has decided to continue to use the Northampton Generating Unit 1 (ORIS 50888) Hg emissions data obtained by the Method 30B under Part III of the ICR. The facility submitted these data and certified the results and therefore EPA believes that these data should be included in the Hg MACT floor data set. To determine the impact on the Hg floor, EPA removed the Northampton data and substituted the next unit in the 47-unit Hg MACT floor. This resulted in no change for the >8,300 Btu lb/MMBtu (Subcategory 1) Hg floor. Since there is no impact for dropping these results and using the next facility on the list, removing the data is a moot point. Finally, even though the QA/QC data are not present, the facility states in their emissions test report that they followed the method and met its requirements. This company will need to show their QA/QC data when they determine compliance under the rule.

The EPA has decided to continue to use the AES Warrior Run Unit 1 (ORIS 10678) Hg emissions data obtained by the Method 30B under Part III of the ICR. The tests did not fail the "volume difference" criterion; the results in the spreadsheet were incorrectly calculated (multiplier of 1000 was used instead of 100 to convert fraction to percent). The tests did not fail the paired trap agreement criterion. As indicated for the AES Hawaii unit, the criterion is < 0.2 µg/dscm absolute difference for Hg concentrations ≤ 1 µg/dscm. All three test runs have reported concentrations of < 1 µg/dscm and met the criterion. For two of the runs the unspiked traps failed the breakthrough criterion based on a percentage of the mass collected, but breakthrough obviously was not a problem as demonstrated by the breakthrough limit calculation for the spiked traps (collected concurrently).Although these data do not meet all the Method 30B criteria, we believe they are of adequate quality to be included in the MACT floor. They could likely have met the criteria if they tested for a longer time, and they will need to do that when determining compliance.

The EPA has decided to continue to use the Cedar Bay Units CBB1, CBA1 and CBC1, Hg emissions data obtained by the Method 30B under Part III of the ICR. The error cited by the commenter is simply

in the units listed in the heading for the sample volume. The heading indicates "dscm," but the facility obviously reported the volume as liters and should have changed the heading. The reported concentration in µg/dscm (i.e., µg/L) is not correct as the equation should not have divided by 1000. Regardless, the reported lb/MMBtu presented in this data form is a direct entry and is not directly calculated from the data in the QA/QC section of the spreadsheet. The reported lb/MMBtu is the value used for the ICR data base and subsequent floor calculations. Using the volume reported as liters, the calculated concentrations (µg/dscm) are consistent with the reported concentrations for other units with similar emissions rates, lb/MMBtu. Since the error is simply in the units in the heading used for the sample volume, EPA has decided to use these emissions data.

The EPA has decided to use some of the Wisconsin Electric Valley Unit's 1, 2, 3, and 4's Hg emissions data obtained by the Method 30B under Part III of the ICR and to not use other of the data submitted. The data from the 1st unit tested, Unit 2, will not be included based upon the improper default value used as well as the small sample volumes and high calibration levels. Even though the results from the proper estimated values are similar and consistent with the other units tested, they are not estimates of sufficient confidence to be included. The other three units' data, while not perfect, are of sufficient quality to use with confidence. After the first tests on Unit 2, the testers made adjustments to the test approach, including further lowering their calibration curve, decreasing the trap spike quantity, and increasing the sample volume. The commenter's basis for invalidating the data is based on negative values being reported for the 2nd, breakthrough section. However, for all cases, the negative values were treated as zeroes, which is not disallowed by the Method. Since these negative values are very small, and are treated as zeroes in all calculations, the resulting data are indeed valid.

Comment 6 (cont.):

38. Commenter 17739 states that the EPA made the following errors: In a spreadsheet entitled "List of facility/unit Hg stack emission averages from the EGU MACT ICR Parts II and Part III" posted to the docket on 6/30/2011, the AES Somerset Unit 001 (a 681 MW unit, with a listed heat input of 6,280 MMBtu/hr) is shown as having a mercury emission rate of 0.132 lb/MMBtu. If this is true, the AES Somerset unit must emit approximately 3000 ton of mercury per year, which is clearly impossible. Similarly, the revised mercury MACT floor spreadsheet posted to the docket on 5/18/2011 reports a mercury content of 65.5 lb/MMBtu for the coal refuse used by the Ebensburg Power Company (one of EPA's top 40 plants). If this were true, the Ebensburg fuel would contain about 33% mercury by weight.

Response to Comment 6, item 38: These errors have been corrected these data in the final database.

Comment 7: Commenter 17739 states that the EPA handling of the PM data is confusing, because the EPA appears to have ignored much of the data it presented in the MACT floor spreadsheet, and did not ensure that its synthetic "Total PM" values represent any real emission level. The commenter states: Although not explained in the tables or the MACT Floor memo by RTI, it appears that the EPA calculated total particulate by adding the lowest value found in the first of the five columns of filterable particulate data and the lowest value found in the four columns of condensable particulate data, then comparing that sum to the value obtained by summing the filterable and condensable data from the Part II columns (which we assume are the minimum Part II values if other Part II data were available to EPA for these units in Part II). The EPA then chose the lower of these two synthetic "Total Particulate" values from either Part II or Part III for use in ranking the units, and calculating the MACT floor average. As discussed above, the EPA also used only these minima value in calculating the UPL, thus ignoring all other Part II and Part III data. The following needs to be explained by the EPA:

1. The first two columns of filterable particulate data have identical headings. How do they differ and why did the EPA choose to show them separately?

2. The fifth column of filterable particulate data ("Filterable Particulate _OTM_27/28_ERT") was never used in determining the total particulate values or in the UPL calculation. What reason does the EPA have for ignoring these data?

3. The middle column of the Part II data ("PM (Filterable and Condensable) – Part II") also was ignored in the MACT floor calculation. What reason does the EPA have for ignoring these data?

4. The "Total PM" value that the EPA used in the MACT floor calculation is a synthetic value, being the sum of lowest individual measurements of filterable and condensable particulate for each unit obtained in Part III of the information collection request or the lowest value similarly obtained in Part II. It is possible, therefore, that these paired filterable and condensable measurements from either were not done simultaneously and might represent emissions at different periods of time. If so, the synthetic "Total PM" value will of necessity be erroneously low. It would also be unlawful to use in the floor calculation, as the combined value was never actually "achieved." Did the EPA ensure that only simultaneous emission measurements were used to calculate total PM. The EPA also needs to describe the quality control procedures employed to ensure this result.

Response to Comment 7: The EPA has explained in detail in docket item EPA-HQ-OAR-2009-0234-13056 how the total PM values were calculated for the proposed rule. As noted elsewhere in this document, the EPA is now finalizing a filterable PM surrogate standard for non-Hg metallic HAP.

The EPA recognizes that the lack of documentation associated with the spreadsheet made reconstructing this data by commenters difficult and confusing. Although it may appear that the lowest Total PM data was selected, this is primarily due to the preferential selection of data collected under the Part III ICR rather than selection of data collected under Part II. The EPA recognizes that filterable particulate testing with Method 29 revealed that some potential high biases may be associated with EPA Method 5 or 17 due to the use of glass fiber filters that do not meet Method 5 or Method 17 filter selection specifications. The EPA also recognizes essentially all of the Part II condensable data were poorly documented and likely used one of the procedures allowed by the 1990 promulgated Method 202 that produce the more biased results. Because the Agency has choosen to use filterable particulate as the surrogate for non-mercury metal HAP emissions, these comments are moot.

4. NEEDS data base.

Comment 8: Commenter 17843 states that states have previously submitted data updates to the EPA for the NEEDS database in response to a Notice of Data Availability (NODA) for the proposed Transport Rule (75 FR 53613-53615). These state-supplied updates, however, do not appear to have been incorporated into this rulemaking. The NESCAUM states would like to work with the appropriate EPA staff to ensure that inclusion of submitted state data reflecting the most current information on emission sources are incorporated into the NEEDS database on a more expedited basis.

Response to Comment 8: With regard to source specific comments at the model input stage (i.e., NEEDS), the EPA did make source-specific updates to its IPM model. These comments were generally pointing out a discrepancy between a commenters understanding of a unit's current configuration, and how the units configuration is depicted in the EPA's National Electric Energy Data System (NEEDS)

database. NEEDS is meant to reflect the current configuration (or configuration as of December 31, 2011) of the U.S. Power Sector and is the primary input for unit level data in the IPM v.4.10 modeling. Since NEEDS is an approximate snap shot of the power sector, the EPA was sensitive to comments that suggested this depiction was not consistent with the current configuration as observed by the commenter. The EPA reviewed NEEDS in light of these comments and made updates accordingly. Note that only those updates that would impact the modeling results for affected units, such as existence of pollution controls, were implemented. Updates that are expected to have minimal or no impacts on the modeling results, such as scrubber online years prior to 2015, were not incorporated into the final modeling for this rule. Overall, any limited differences in projected impacts that might result from implementation of any NEEDS-based comments that were not incorporated would not materially change the overall impacts of the final rule that the EPA is estimating, nor would they fundamentally change the requirements of the rule. The EPA projections of the power sector impacts are intended to be a reflection of possible compliance using specific tools, assumptions, and methodologies that the agency believes to reflect the best and most current information related to the power sector. It is not intended to reflect actual compliance decisions, since those will be made individually be the affected industry based on what makes most sense using existing technologies or other, more cost-effective strategies.

The EPA thanks commenters for providing this information, and the EPA intends to incorporate this new information in subsequent updates of the modeling.

Comment 9: Commenter 16513 states that the EPA failed to incorporate its comments on the EPA base case and NEEDS database and that the EPA should incorporate all of the changes made by states to the base case and NEEDS or explain why they were not.

Commenter 17627 states that the data in the NEEDS database is not correct and, thus, the IPM model output is also incorrect, which directly impacts the proposed EGU MACT rule. The commenter requests that the EPA correct the database and provides the corrections that should be made.

Response to Comment 9: With regard to source specific comments at the model input stage (i.e., NEEDS), the EPA did make source-specific updates to its IPM model. These comments were generally pointing out a discrepancy between a commenters understanding of a unit's current configuration, and how the units configuration is depicted in the EPA's NEEDS database. NEEDS is meant to reflect the current configuration (or configuration as of December 31, 2011) of the U.S. Power Sector and is the primary input for unit level data in the IPM v.4.10 modeling. Since NEEDS is an approximate snap shot of the power sector, the EPA was sensitive to comments that suggested this depiction was not consistent with the current configuration as observed by the commenter. The EPA reviewed NEEDS in light of these comments and made updates accordingly. Note that only those updates that would impact the modeling results for affected units, such as existence of pollution controls, were implemented. Updates that are expected to have minimal or no impacts on the modeling results, such as scrubber online years prior to 2015, were not incorporated into the final modeling for this rule. Overall, any limited differences in projected impacts that might result from implementation of any NEEDS-based comments that were not incorporated would not materially change the overall impacts of the final rule that the EPA is estimating, nor would they fundamentally change the requirements of the rule. The EPA projections of the power sector impacts are intended to be a reflection of possible compliance using specific tools, assumptions, and methodologies that the agency believes to reflect the best and most current information related to the power sector. It is not intended to reflect actual compliance decisions, since those will be made individually be the affected industry based on what makes most sense using existing technologies or other, more cost-effective strategies.

The EPA thanks commenters for providing this information, and the EPA intends to incorporate this new information in subsequent updates of the modeling.

Comment 10: Commenter 17857 states that the following errors were found in the EPA's NEEDSv41O_PTox file database:

• The Alloy Steam Station (ORIS ID 50012) is not an electric generating unit, it is a coal-fired boiler at an industrial facility that produced electricity for use in-house, not for distribution on the grid and should not be included as an electric generating unit for the purposes of this rule. The Alloy Steam Station BLR4 shut down as of 10/26/2007.

• Mount Storm (ORIS 3954) Unit JF1 is a 215.3 MMBtu/hr combustion turbine emergency generator that was installed in 1967 and does not produce electricity for sale, and should not be included as an electric generating unit for the purposes of this rule.

Column X - Scrubber Online Year:

• The scrubbers on Ft. Martin (ORIS 3943) Units 1 and 2 did not come online in 2006, they came online 10/3112009 and 8/26/2009, respectively.

• John E. Amos (ORIS 3935) Units 2 and 3 are equipped with wet scrubbers which came online 11/11/2010 and 2/1/2009, respectively. These scrubbers are required by paragraph 87 of the federal AEP Consent Decree (Civil Action No. C2-99-1182).

Column Y - Scrubber_Efficiency:

• The NEEDS database indicates that the John E. Amos (ORIS 3935) Units 2 and 3 scrubbers have a 50 percent control efficiency, the correct scrubber efficiency is 95 percent.

Column AD - PM Controls:

• The NEEDS database indicates that Longview (ORIS 56671) has ESPC+B for PM control, Longview is not equipped with an ESP, it is equipped only with a baghouse (B).

Column AI - SO2 Permit Rate (lb/MMBtu):

• The SO_2 Permit Rate for Longview (ORIS 56671) is given as 3.1 lb/MMBtu, however the correct permit rate is 0.095 lb/MMBtu on a calendar year average basis (Section 5.1.3 of permit R14-0024D).

• The SO_2 Permit Rate for the Big Sandy Peaker Plant (ORIS 55284) is given as 2.7 lb/MMBtu, however the correct SO_2 Permit Rate is 0.00227 lb/MMBtu for each of the 12 turbines, with two (2) turbines feeding each of the six (6) generators (Permit R30-09900080-2009).

• The SO_2 Permit Rate for Pleasants Energy LLC (ORIS 55349) is given as 2.7 lb/MMBtu, however the correct SO_2 Permit Rate is 0.00159lb/MMBtu for each of the two (2) turbines (Permit R30-073-00022-2009).

• The SO_2 Permit Rate for Ceredo Generating Station (ORIS 55276) is given as 2.7 lb/MMBtu, however the correct SO_2 Permit Rate is 0.004121b/MMBtu for each of the six (6) turbines (Permit R30-09900081-2008).

• The SO_2 Permit Rate for Kanawha River (ORIS 3936) is given as 1.75 Ib/MMBtu, however the correct SO_2 Permit Rate is 1.6 Ib/MMBtu, as specified in 45CSR10, section 3.2.b.

Columns AJ, AK, Al and AM - Uncontrolled NO_X Base Rate (lb/MMBtu); Controlled NO_X Base Rate (lb/MMBtu); Uncontrolled NO_X Policy Rate (lb.MMBtu); and Controlled NO_X Policy Rate (lb/MMBtu):

• The permitted NO_X rate for Longview (ORIS 56671) is 0.0650 Ib/MMBtu (Section 5.1.2 of permit R14-0024D).

• The permitted NO_X rate for Big Sandy Peaker Plant (ORIS 55284) is 0.1038 Ib/MMBtu for each of the 12 turbines, with two (2) turbines feeding each of the six generators.

• The permitted NO_X rate for Pleasants Energy LLC (55349) is 0.04137Ib/MMBtu for each of the two (2) turbines.

• The permitted NO_X rate for Ceredo Generating Station (ORIS 55276) is 0.03292 lb/MMBtu for each of the six turbines.

Column AN - HG EMF Inputs:

• John E. Amos (ORIS 3935) Units 1 and 2 should include wet scrubbers, in addition to the Cold-side ESP + SCR.

• Fort Martin Power Station (ORIS 3943) Units 1 and 2 should include wet scrubbers in addition to Cold-side ESP + SNCR.

• Harrison Power Station (ORIS 3944) Units 1, 2 and 3 should include wet scrubbers in addition to Cold-side ESP + SCR.

• Longview (ORIS 56671) is equipped with a Fabric Filter + SCR + Wet Scrubber, but does not include a Cold-side ESP.

Columns AO, AP, and AQ - Controlled Hg EMF for BIT, Controlled Hg EMF for SUB and Controlled Hg EMF for LIG:

• Longview (ORIS 56671) has a permit limit (Section 5.1.9 of Perm it R14-0024D) for Hg of 0.01461blhr (3 hr averaging time), and 0.0638 tpy (12 month rolling average). Longview has a permitted maximum hourly heat input of 6.114 MMBtu (Section 5.1.1), which equates to a Hg permit limit of 0.00239 lb/MMBtu.

• The controlled Hg EMFs for John E. Amos (ORIS 3935) Units 1, 2 and 3, Fort Martin Power Station (ORIS 3943) Units 1 and 2, and Harrison Power Station (ORIS 3944) Units 1, 2 and 3 should reflect the fact that they are all equipped with wet scrubbers.

Response to Comment 10: With regard to source specific comments at the model input stage (i.e., NEEDS), the EPA did make source-specific updates to its IPM model. These comments were generally pointing out a discrepancy between a commenters understanding of a unit's current configuration, and how the units configuration is depicted in the EPA's NEEDS database. NEEDS is meant to reflect the current configuration (or configuration as of December 31, 2011) of the U.S. Power Sector and is the primary input for unit level data in the IPM v.4.10 modeling. Since NEEDS is an approximate snap shot of the power sector, the EPA was sensitive to comments that suggested this depiction was not consistent with the current configuration as observed by the commenter. The EPA reviewed NEEDS in light of these comments and made updates accordingly. Note that only those updates that would impact the modeling results for affected units, such as existence of pollution controls, were implemented. Updates that are expected to have minimal or no impacts on the modeling results, such as scrubber online years prior to 2015, were not incorporated into the final modeling for this rule. Overall, any limited differences in projected impacts that might result from implementation of any NEEDS-based comments that were not incorporated would not materially change the overall impacts of the final rule that the EPA is estimating, nor would they fundamentally change the requirements of the rule. The EPA projections of the power sector impacts are intended to be a reflection of possible compliance using specific tools, assumptions, and methodologies that the agency believes to reflect the best and most current information related to the power sector. It is not intended to reflect actual compliance decisions, since those will be made individually be the affected industry based on what makes most sense using existing technologies or other, more cost-effective strategies.

The EPA thanks commenters for providing this information, and The EPA intends to incorporate this new information in subsequent updates of the modeling.