STANDARD FORM 83-I SUPPORTING STATEMENT FOR OMB REVIEW OF ICR No. _____:

INFORMATION COLLECTION REQUEST FOR ELECTRIC UTILITY STEAM GENERATING UNIT MERCURY EMISSIONS INFORMATION COLLECTION EFFORT

Emission Standards Division
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PART A OF THE SUPPORTING STATEMENT FOR OMB FORM 83-I

ELECTRIC UTILITY STEAM GENERATING UNIT
MERCURY EMISSIONS INFORMATION COLLECTION EFFORT
INFORMATION COLLECTION REQUEST

1. Identification of the Information Collection

(a) Title of the Information Collection

"Electric Utility Steam Generating Unit Mercury Emissions Information Collection Effort." The Environmental Protection Agency (EPA) tracking number for this information collection request (ICR) is EPA ICR No. 1858.01. This is a new ICR.

(b) Short Characterization

This information collection is being conducted by EPA's Office of Air and Radiation (OAR) to assist the Administrator of EPA in determining, as required by section 112(n)(1)(A) of the Clean Air Act, as amended (the Act), whether it is appropriate and necessary to regulate emissions of hazardous air pollutants (HAPs) by electric utility steam generating units under section 112. In the event that the Administrator determines that regulation of such units under section 112 is appropriate and necessary, the information being collected might also be used in developing an applicable emission standard. The information would also be made available to the public.

There will be three components to the information collection. Information necessary to identify all coal-fired units is publicly available for facilities owned and operated by publicly-owned utility companies, Federal power agencies, rural electric cooperatives, and investor-owned utility generating companies. However, similar information is not publicly available for nonutility generators qualifying under the Public Utility Regulatory Policies Act (PURPA). Such units include, but may not be limited to, independent power producers (IPPs), qualifying facilities, and cogenerators. To obtain the information necessary to identify all coal-fired electric utility steam generating units in this sector for the same time period, and to confirm information from the other sector, for both the coal sampling and analysis (second component) and for selection of units for speciated stack sampling (third component), the Agency will in the first component of the information collection solicit from all coal-fired electric utility steam generating units, under

authority of section 114 of the Act, information relating to the type of coal used, the method of firing the coal, the method of sulfur dioxide (SO_2) control, and the method of particulate matter (i.e., electrostatic precipitator [ESP]) control.

The second component consists of acquiring accurate information on the amount of mercury contained in the as-fired coal used by each electric utility steam generating unit (as defined in section 112(a)(8) of the Act, but generally those with a capacity greater than 25 megawatts electric [MWe]), as well as accurate information on the total amount of coal burned by each such unit. The information will be obtained by requiring, through the issuance of a letter pursuant to the authority of section 114 of the Act, the owner/operator of each such unit to provide the results of analyses performed, in accordance with a demonstrably acceptable protocol, to determine the mercury content of the coal to be fired in that unit and to submit the results of those analyses to EPA's OAR, Office of Air Quality Planning and Standards, Emission Standards Division (ESD). The letter will also require each owner/operator to submit data on the total amount of coal received. This approach is based on available knowledge that such data are available from the information used to verify compliance with the coal delivery contract; that samples taken to ensure this compliance are taken by the supplier after any coal cleaning or by the electric utility steam generating unit at point of receipt; and that no further cleaning of the coal is undertaken prior to the coal being fired to the boiler. Thus, "as-shipped" or "as-received" coals are equivalent to "as-fired" coals and mercury analyses from such samples would be representative of the mercury entering the boiler.

The third component consists of requiring, again through the issuance of a letter pursuant to the authority of section 114 of the Act, the owners/operators of a limited number of coal-fired electric utility steam generating units selected at random from 45 categories to conduct, sometime during a 1-year period, in accordance with an EPA-approved protocol, simultaneous before and after control device stack testing. The testing is to consist of three runs at each sampling location, and is to be in accordance with a specified mercury speciation method. The owner/operator of each selected electric utility steam generating unit will also be required to collect and analyze, in accordance with an acceptable procedure, three coal samples from the coal fed to the pulverizer

during each stack test. The results of the stack tests and the coal analyses will again be required to be submitted to the ESD.

The EPA estimates the cost, annualized over the nominal 1-year period being approved for the ICR, of the information verification component of the information collection to be $58,310; the cost of the mercury content and coal use data component to be $13,411,332; and the cost of the stack testing and coal sampling component to be $3,337,154, for a total cost of $16,806,796.

The owner/operator of each coal-fired electric utility steam generating unit required to report the results of analyses of coal samples will be required to keep records: i) documenting that each coal sample analyzed was a sample taken for contract verification purposes; ii) establishing proper chain of custody for each coal sample; iii) describing the quality assurance/quality control (QA/QC) procedures followed in preparing each coal sample for analysis and performing the required analysis; iv) setting forth the results of the analysis performed on each coal sample; and, v) documenting the volume of coal received that is represented by each sample.

The owner/operator of each coal-fired electric utility steam generating unit required to conduct stack testing and concurrent coal sampling and analysis will be required to keep records: i) documenting that coal samples taken during each stack test run were obtained in accordance with an approved sampling protocol; ii) establishing proper chain of custody for each coal sample; iii) describing the QA/OC procedures followed in preparing each coal sample for analysis and performing the required analysis; iv) setting forth the results of the analyses performed on each coal sample; v) documenting that each stack test was conducted in accordance with an approved testing protocol; and, vi) setting forth the results of each stack test.

All records required under the proposed information collection must be retained for 3 years.

2. Need for and Use of the Collection

(a) Need/Authority for the Collection

Section 112(n)(1)(A) of the Act requires the EPA to perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units of HAPs after imposition of the requirements of the Act and to prepare a Report

to Congress containing the results of the study. The Agency is to proceed with rulemaking activities under section 112 to control HAP emissions from electric utility steam generating units if EPA finds such regulation is appropriate and necessary after considering the results of the study. The study has been completed and the Final Report to Congress was issued on February 24, 1998.

In the Final Report to Congress, the EPA stated that mercury is the HAP of greatest potential concern for coal-fired electric utility steam generating units and that additional research and monitoring are merited. The EPA also listed a number of research needs related to such mercury emissions. These include obtaining additional data on mercury emissions (e.g., how much is emitted from each unit; how much is divalent vs. elemental mercury; and how do factors such as control device, fuel type, and plant configuration affect emissions and speciation).

As indicated above, in addition to requiring the Administrator to perform a study of the hazards to public health reasonably anticipated to occur as a result of HAP emissions by electric utility steam generating units after imposition of the requirements of the Act and to report the results of that study to Congress, section 112(n)(1)(A) further requires the Administrator to regulate electric utility steam generating units under section 112 of the Act if the Administrator finds that such regulation is appropriate and necessary after "considering the results of the study." The Administrator interprets the quoted language as indicating that the results of the study are to play a principle, but not exclusive, role in informing the Administrator's decision as to whether it is appropriate and necessary to regulate electric utility steam generating units under section 112. The Administrator believes that in addition to considering the results of the study, she may consider any other available information in making her decision. The Administrator also believes that she is authorized to collect and evaluate any additional information which may be necessary to make an informed decision.

After carefully considering the Final Report to Congress, the Administrator has concluded that obtaining additional information which may be helpful to inform this decision, as well as possible subsequent decisions, is appropriate. In the Final Report to Congress the EPA stated that at this time, the available information, on balance, indicates that electric utility steam generating unit mercury emissions are of sufficient potential concern for public health to merit

further research and monitoring. The EPA acknowledged that there are substantial uncertainties that make it difficult to assess electric utility steam generating unit mercury emissions and controls, and that further research and/or evaluation would be needed to reduce those uncertainties. The EPA believes that among those uncertainties are: i) the actual cumulative amount of mercury being emitted by all electric utility steam generating units, individually and collectively, on an annual basis; ii) the speciation of the mercury which is being emitted; and iii) the effectiveness of various control technologies in reducing the volume of each form of mercury which is emitted (including how factors such as control device, fuel type, and plant configuration affect emissions and speciation).

To address the question of the cumulative amount of mercury actually being emitted by all electric utility steam generating units on an annual basis, the EPA believes that it is necessary to require the owners/operators of all such units to provide information on the mercury content of the coal received for each unit, as well as the amount of coal received for each unit. The EPA can then apply appropriate correction factors to this data to calculate the amount of mercury emitted on an annual basis by each unit. Thus, the mercury emission data collection effort includes a requirement for all coal-fired electric utility steam generating units as defined in section 112(a)(8) of the Act to provide analyses of the mercury content of the coal which they receive and report the results of that analysis together with the volume of coal received. Section 112(a)(8) of the Act defines electric utility steam generating unit as follows:

> The term "electric utility steam generating unit" means any fossil fuel fired combustion unit of more than 25 megawatts that serves a generator that produces electricity for sale. 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 utility steam generating unit.

When preparing the Final Report to Congress, the Agency had available mercury emission data from a number of utility boilers. These data included measurements of the mercury emitted during various stages of the process (e.g., exiting the boiler, exiting the various control devices). Research conducted during the period between the acquisition of these data and the release of the report has highlighted the importance of the specific valence state (i.e., species) of the emitted

mercury on the ability of a particular control device to remove mercury from the exhaust gas stream. During the same time period, advances have been made in emission testing methodologies that more accurately differentiate among the various species of mercury that may be emitted from an electric utility steam generating unit. The mercury emission data gathering effort, therefore, includes provisions for acquiring additional speciated emission data so that the correlation between mercury in the coal, the species of mercury formed, and the mercury removal performance of various control devices may be further evaluated.

The information will be collected under authority of section 114 of the Act. Section 114(a) states, in pertinent part:

> For the purpose...(iii) carrying out any provision of this Chapter...(1) the Administrator may require any person who owns or operates any emission source...to-...(D) sample such emissions (in accordance with such procedures or methods, at such locations, at such intervals, during such periods and in such manner as the Administrator shall prescribe); (E) keep records on control equipment parameters, production variables or other indirect data when direct monitoring of emissions is impractical...(G) provide such other information as the Administrator may reasonably require...

Section 114 is set forth in its entirety in Attachment 1.

(b) *Use/Users of the Data*

The data collected pursuant to the mercury emissions collection effort, along with other information, will be used by the Agency in evaluating whether regulation of electric utility steam generating units under section 112 of the Act is appropriate and necessary. Specifically, the data will respond in part to the research need noted above, providing the Agency with updated information on the amount, speciation, and controllability of mercury emitted from electric utility steam generating units. The data will be added to the existing database and will be used to further evaluate the emission of mercury by electric utility steam generating units. The data will assist the Agency and others in evaluating potential mercury control technologies as the effectiveness of control depends on the amount and species of mercury emitted. The mercury emissions data from each plant and the additional speciation and control effectiveness data will also allow the Agency to conduct further emission modeling, as appropriate, to better evaluate the extent of local mercury deposition versus long-range transport. In the event that the Administrator determines that it is appropriate and necessary to regulate electric utility steam generating unit HAP

emissions under section 112, the data may be used in the development of an applicable emission standard(s).

3. Nonduplication, Consultations, and Other Collection Criteria

(a) Nonduplication

The EPA recognizes that some of the information requested in Part I of the mercury emission data gathering effort (e.g., amount of coal fired per year) may already be included in the submittals being made by individual publicly-owned utilities, Federal power agencies, rural electric cooperatives, and investor-owned utilities pursuant to various requirements of the Department of Energy/Energy Information Administration (DOE/EIA) (e.g., Form 423, Form 767). Electric utility steam generating unit owners/operators falling in this category are given the option of submitting already available information if that information suits the needs of, and is of sufficient quality for, this data gathering effort. While nonutility generators may also report this information to the EIA, it is not made publicly available. Other information requested pursuant to the mercury emissions data gathering effort (e.g., mercury and chlorine content of coal received; speciation of mercury emissions; effectiveness of various control devices at removing mercury) is not believed to be available from other sources.

As none of the information on nonutility generators is made publicly available, the Agency has no information on these units. Even for publicly-owned utilities, etc., much of the information available from the EIA may be a year or more old by the time it is made publicly available. One of the issues raised on the Final Report to Congress was that the most current information about the industry had not been utilized by the Agency. Part I will assure that the Agency has the most current information from both sectors of the utility industry and will allow the Agency to perform its analyses on an equal-time basis.

Other organizations (e.g., EPRI, DOE, U.S. Geological Survey) may also have programs underway that could result in information similar to that being requested under Parts II and III of this data gathering effort. However, the Agency believes that the current information collection effort is not duplicative of these programs. Based on industry comments, much of the coal data indicated as being available in lieu of the Part II effort does not represent “as-shipped” coals (i.e., it is mine or seam data as opposed to cleaned-coal data). This is more of the same type of data

that the Agency used in the Final Report to Congress. At that time, significant comments were made in opposition to the use of "raw" coal data with an applied coal-cleaning factor rather than the use of cleaned-coal data. To preclude future questions as to the validity of the data, the Agency believes that use of current, cleaned-coal data is appropriate and non-duplicative of existing data. In addition, use of the cleaned-coal data in conjunction with newer seam data will allow for better future projections of mercury emissions even as coal purchasing practices change.

With regard to emission data being available in lieu of the Part III effort, available information is that these data only reflect emission tests at coal-fired units equipped with wet scrubbers; dry scrubbers, non-scrubbed, fluidized bed combustion (FBC), and coal gasification units are not covered. It is currently believed that the information being gathered by these organizations on wet-scrubbed units is being collected in such a manner that it would be of similar quality as that that would be collected by the Agency and, thus, will be used in lieu of any additional Agency effort on this type of unit, if once evaluated the information is found to be complete and equivalent. Data gathered on non-wet scrubbed units under this information collection effort is not believed to be duplicative.

The EPA expects that the information requested as part of this effort will only be required for one year. The Agency will shortly propose a regulation to lower the Emergency Planning and Community Right-to-Know Act (EPCRA) section 313 activity thresholds for reporting releases of certain toxic chemicals, including mercury and mercury compounds, to the Toxic Release Inventory (TRI). The EPA plans to begin collecting information on mercury emissions from electric utility steam generating units under the new threshold in the year 2000.

Under EPCRA section 313, facilities are not required to monitor their emissions to report to TRI, but may use readily available data (including monitoring data) collected pursuant to other provisions of law. This ICR is authorized by section 114 of the Clean Air Act, which allows EPA to require electric utility steam generating unit owners and operators to perform analyses that they may not currently perform and, therefore, that would allow emissions estimates that may be more precise than those that would otherwise be provided under EPCRA section 313. Facilities that have emissions information gathered through actual emissions monitoring or testing would be required to use the results of such monitoring or testing in compiling their reports under EPCRA

section 313. Other facilities would be required to apply the results of the stack testing performed under this ICR (i.e., the publicly available data and the emissions factors developed from those data) to estimates of the mercury content of coal when reporting mercury releases to the TRI.

A final decision has not yet been made as to the new threshold for mercury under EPCRA section 313. If, after providing an opportunity for notice and comment, the EPA decides on a threshold for mercury that omits a significant portion of coal-fired power plants, the EPA may require that information be submitted under section 114 of the Clean Air Act for additional years. Also, if for any reason, information collection on mercury emissions under the new lower threshold for mercury is delayed beyond the year 2000, the EPA may require the coal sampling, but not the stack testing beyond one year.

(b) Public Notice Required Prior to ICR Submission to OMB

This ICR was submitted for public review as required by the Paperwork Reduction Act of 1995 (PRA) and the subsequent rule issued by the Office of Management and Budget (OMB) on August 29, 1995 (60 FR 44978). The Federal Register notice required under 5 CFR 1320.8(d), soliciting comments on this collection of information, was published on April 9, 1998 (63 FR 17406) (see Attachment 2); over 120 comments were received. A summary of comments received and EPA's responses to those comments is presented in Attachment 3.

(c) Consultations

Significant input and information was received from the affected industry, State and local governments, environmental groups, the public, and other Federal agencies during development of the Final Report to Congress. The comments received were reviewed and utilized in the development of the Final Report to Congress. The public comments are located in the docket for the study (Docket A-92-55).

A public meeting was held on May 21, 1998 to discuss the proposed mercury emission data gathering effort. At the public meeting, the industry, other potentially interested Federal agencies, the environmental community, and the general public were afforded an opportunity to comment on the proposed mercury emissions data gathering effort. This opportunity was in addition to that provided by the Federal Register notice concerning the availability of the ICR for public review and comment.

(d) *Effects of Less Frequent Collection*

A systematic sampling approach will be utilized to collect a statistically representative fraction of the coal received by each facility over the course of a year. For the first calendar quarter of data gathering, each facility should report the total amount of coal received and the mercury content of the coal along with any other analyzed information for every sixth shipment; however, each facility is required to take a minimum of three shipments per month in order to maintain good statistical practices. There are two exceptions where "shipments" will not apply in maintaining these three analysis per month. If a facility such as a mine-mouth operation does not receive "shipments" of coal, a random sample from the coal supply can be taken approximately every ten days in order to meet the required three analyses per month. A facility that receives less than 18 shipments of coal in any given month should report the analyzed information for 3 randomly selected shipments received, spaced approximately equally across the month.

After the first calendar quarter of data gathering, the frequency of the analyses would depend on the variability of the mercury content found during the previous quarter (i.e., three months); the total amount of coal received would continue to be reported. Details regarding the analytical frequency requirements for coal are in Part B of this supporting statement. Since the amount of coal burned at any given facility is largely based on the size of the facility and the total megawatt output, collection of data representative of the coal received will allow a true correlation to be drawn on the mercury content of the coal burned. Any less frequent collection could potentially still be an undue burden on smaller facilities while under sampling the larger facilities. An unrepresentative collection of data from less frequent collection could cause an unnecessary determination to regulate.

The EPA is requiring utilities to submit information that will allow it to calculate the quantity and species of mercury emissions for every power plant of 25 MWe or greater. The EPA is interested in collecting information based on a universal sample for a number of reasons. Universal data will provide a definitive inventory of mercury emissions from this sector. The utilities have always questioned EPA's estimates of mercury emissions from this sector including the estimate in the Mercury and Utility Reports to Congress. The mercury emissions data that are

collected in this plant-by-plant accounting of mercury emissions using data provided by the plants will be the most authoritative inventory to date.

The universal sample will allow the Agency to account for coal variability. The mercury content of coal may be highly variable such that shifts in the coal burned at any one plant may cause significant changes in emissions. Plant-by-plant information will allow EPA to examine that effect. The EPRI, in its "Mercury in the Environment Research Update" (December 1997), indicated that the mercury content of the fuels burned by individual facilities needs to be better quantified across fuel supply sources.

Because of the coal-purchasing practices employed by the industry, it would be very difficult, if not impossible, to design a statistical sampling approach that would provide equivalent information to that obtained under the proposed effort (i.e., every plant provides analyses). Individual companies (plants) may buy under long-term coal contracts where they obtain coal from a limited number of suppliers (and mines) for a number of years. However, they may also buy off the spot market and receive coal from a large number of different suppliers (and mines) (one company commented that they may have as many as 200 vendor contracts in six States at any given time). It is not known to what extent either practice dominates in the industry (and it may change as long-term contracts expire). It is possible that a statistical approach could miss the spot-market buyers and, thus, weaken the analyses.

Universal data also will improve the understanding of mercury transport. The data from each plant will allow EPA and other researchers to develop information nationally on the spatial relationship between coal-fired power plants and mercury-contaminated waters. These data would be important in helping to determine the extent to which the emissions contribute to a global pool and the extent to which they are deposited locally or regionally. It will allow the EPA to refine transport modeling with real world observations

The universal data will allow the EPA to develop an accurate estimate of the costs of implementing control strategies. Because the nature of emissions vary from plant to plant, effective control technologies may vary as well. The plant by plant data will be key to developing accurate estimates of costs.

Some States are moving toward requiring utilities within their jurisdiction to report mercury-in-coal values and mercury emissions to the atmosphere. During the public comment period on the draft ICR, the State of Michigan indicated that it was considering an effort similar to what the Agency had proposed. In a 1993 report, Governor John Engler's Michigan Environmental Science Board recommended "...that the Michigan Public Service commission...be directed to require utilities to perform testing on their facilities to determine the amounts and the forms of mercury in their emissions so that they are in a position to determine which emission control technologies are most appropriate for their specific facilities and in a position to accurately assess their contributions to the total mercury emission inventory." The Agency's effort would make the information gathering uniform and nationwide and would assist those States undertaking such an effort. In addition, other States are concerned about the impact on their air quality due to long-range transport and the potential increased use of coal-fired plants that may result from industry restructuring. This effort would provide information to those States and their citizens.

There is a good deal of mercury research being conducted by interested parties around the country that is trying to identify the sources of mercury contamination in various water bodies. The plant-by-plant data that this effort will gather will be valuable to researchers around the country interested in learning more about the sources of contamination to local water bodies.

In order to maximize the benefit of the stack testing component of the information collected regarding the effectiveness of mechanical SO_2 and ESP control devices on the removal of each species of mercury (i.e., ionic and elemental), a classical experimental design for a 5x3x3 factorial design will be implemented for this study. Good statistical practice indicates that a minimum of three replicate samples should be taken in order for any basic statistical calculations to be made within any one category. A 5x3x3 factorial design will generate 45 specific categories. A maximum of 3 units (one unit per any given plant) will be selected for each category (assuming some categories may have less than 3 units); therefore, a maximum total of 135 units (i.e., 45 x 3 = 135) will be tested. Three test runs will be conducted at each unit for both the inlet and outlet of the operation. The maximum number of runs that will be made is 810 (i.e., 135 x 3 x 3 = 810). Although the categories with the higher number of units within them will have more uncertainty associated with the average and variability, this classical experimental

design is technically sound in its approach and efficiently utilizes a minimal amount of information without over burdening by testing all units.

(e) *General Guidelines*

This ICR adheres to the guidelines for Federal data requestors, as provided at 5 CFR 1320.6.

(f) *Confidentiality*

(i) *Confidentiality*. Respondents will be required to respond under the authority of section 114 of the Act. If a respondent believes that disclosure of certain information requested would compromise a trade secret, it should be clearly identified as such and will be treated as confidential until and unless it is determined in accordance with established EPA procedure as set forth in 40 CFR Part 2 not to be entitled to confidential treatment. All information submitted to the Agency for which a claim of confidentiality is made will be safeguarded according to the Agency policies set forth in Title 40, Chapter 1, Part 2, Subpart B -- Confidentiality of Business Information (see 40 CFR 2; 41 FR 36902, September 1, 1976; amended by 43 FR 39999, September 28, 1978; 43 FR 42251, September 28, 1978; 44 FR 17674, March 23, 1979). Any information subsequently determined to constitute a trade secret will be protected under 18 U.S.C. 1905. If no claim of confidentiality accompanies the information when it is received by the EPA, it may be made available to the public without further notice (40 CFR 2.203, September 1, 1976). Because section 114(c) of the Act exempts emission data from claims of confidentiality, the emission data provided may be made available to the public. Therefore, emissions data should not be marked confidential. A definition of what the EPA considers emissions data is provided in 40 CFR 2.301(a)(2)(i).

(ii) *Sensitive questions*. This section is not applicable because this ICR does not involve matters of a sensitive nature.

4. The Respondents and the Information Requested

(a) *Respondents/SIC Codes*

Respondents affected by this action are owners/operators of coal-fired electric utility steam generating units as defined by section 112(a)(8) of the Act. For the purposes of this information collection, “coal” includes anthracite, bituminous, subbituminous, lignite, and waste

coals (generally termed culm and gob). The standard industrial classification (SIC) code for the respondent class is 4911.

(b) *Information Requested*

(i) *Data items, including recordkeeping requirements*. The proposed mercury emissions data gathering effort has three components: i) identification of nonutility generators meeting the definition of electric utility steam generator under section 112(a)(8) of the Act and confirmation of certain information from all units; ii) analyses of as-fired coal; and iii) mercury speciation stack testing. The first component would apply to all coal-fired electric utility steam generating units, including all nonutility generators identified as utilizing combustion. The second component would apply to the owners/operators of all coal-fired electric utility steam generating units meeting the section 112(a)(8) definition. The third component would apply to a limited number of entities within specified subsets. Attachment 4 presents a copy of the questionnaire that would be mailed to each owner/operator.

The first component, identification of nonutility generators meeting the section 112(a)(8) definition and confirmation of information from all units, would require each electric utility steam generating unit, including nonutility generators, to provide information to the Agency that would allow identification of coal-fired units for the second component and information such that the units could be categorized for selection for the third component. This information is not currently publicly available for nonutility units.

The second component, analyses of as-received coal, would require the owner/operator of each facility at which a coal-fired electric utility steam generating unit is located to provide analyses of the mercury content of the coals fired on a calendar-year basis. The frequency of the analyses would depend on the variability around the mean of the mercury content of the coals fired; the sampling schedule is explained in Part B of this ICR but would begin with a frequency of sampling every sixth shipment.

Coal samples collected for contract verification purposes that represent “as-received,” (and, as noted earlier, also represent “as-shipped” and “as-fired”) coal would be analyzed. The owner/operator would also be required to document and provide the amount and type of each coal received for each unit and identify the source of each coal (i.e., State, county, seam, etc.), to

the extent such source information is available. Each owner/operator would be required to provide analyses, according to the frequency schedule explained in Part B, of the Btu, sulfur, moisture, and ash contents of each coal sample analyzed and provide analyses for mercury and chlorine content. To be accepted, all analyses must be shown to be: i) traceable from the supplier to the unit; ii) representative of as-received or as-fired coal used during the period in question (i.e., cleaned rather than raw coal and no further cleaning performed after receipt of the coal); and iii) obtained using standardized sampling and analytical procedures following appropriate QA/QC procedures. Analysis of composited samples is acceptable as long as the composited samples are identifiable to the shipment(s) they represent. Reports of all analyses would be due to the EPA 45 days after the close of the preceding quarter.

The third component, stack testing for mercury speciation, would require triplicate simultaneous before and after control device stack sampling with a specified mercury speciation method at each location. This sampling would be done on one occasion during a 1-year period. During the stack testing, collection and analyses of three as-fired coal samples taken at intervals throughout the testing period would be required. The results of each series of stack tests and coal sample analyses would be required to be reported to the EPA by using a specified standardized electronic format within 45 days of the date of testing. Specified QA/QC procedures would be required for each part of the mercury emissions data collection effort.

The Agency requires that for all environmental data operations (EDOs) a Quality Assurance Project Plan (QAPP) be written to document the type and quality of data needs for environmental decisions. An EDO is any work performed to obtain, use, or report information pertaining to environmental processes and conditions. For the purposes of the stack testing requirement, a generic QAPP will be sent with the section 114 letter requesting a particular unit to be tested. Any modifications and plant-specific material that need to be added to this QAPP for any given facility should be sent to the EPA for approval.

Although a separate QAPP for the coal sampling effort should be established, due to the options each facility has been given to collect mercury-in-coal information and the various techniques any given laboratory could use in analyzing a coal sample for mercury, a generic QAPP would be impossible to develop. In lieu of requiring individual QAPPs to be developed,

each laboratory conducting an analysis for mercury in coal will first be required to analyze a National Institutes of Standards and Technology (NIST) standard reference material (SRM) to within ± 15 percent of the true value and report these results.

(ii) *Respondent activities*. The activities a respondent must undertake to fulfill the requirements of the information collection are presented in Table 1. These include: i) read instructions; ii) provide source information; iii) secure stack test contractor and review proposal (if one of the units selected); iv) conduct coal sampling (if one of the units selected for stack testing); v) conduct coal analyses; vi) conduct stack testing (if one of the units selected); vii) monitor stack testing (if one of the units selected); viii) process, compile, and review coal sampling data for accuracy, completeness, and adjustment of frequency of collection; ix) review stack sampling data for accuracy and completeness (if one of the units selected); x) submit coal sampling data; and xi) submit stack sampling data (if one of the units selected).

5. The Information Collected--Agency Activities, Collection Methodology, and Information Management

(a) *Agency Activities*

A list of activities required of the EPA is provided in Table 2. These include: i) develop questionnaire; ii) review and analyze Part I responses; iii) develop generic QAPP; iv) determine sites to be emission tested; v) review and comment on stack sampling test plans and QAPPs); vi) answer respondent questions; vii) audit stack tests; viii) review coal analysis data for accuracy, completeness, and adjustment of frequency of collection; ix) review stack sampling data for accuracy and completeness; x) analyze coal sampling data; xi) analyze stack sampling data; and xii) analyze requests for confidentiality.

(b) *Collection Methodology and Management*

In collecting and analyzing the information associated with this ICR, the EPA will use personal computers and applicable database software. The EPA will ensure the accuracy and completeness of the collected information by reviewing each submittal. The information collected pursuant to the mercury emissions data gathering effort will be maintained in a computerized database. To better facilitate uniformity in the format of the reports that are received, and, thus,

increase the ease of database entry, standardized reporting forms will be developed and distributed.

(c) Small Entity Flexibility

All respondents required to comply with the mercury emissions data gathering effort will be subject to the same requirements. The EPA expects that a portion of the respondents could be small governmental jurisdictions; however, any individual small entity would be expected to receive only one section 114 letter so their response burden will be minimized.

(d) Collection Schedule

The EPA anticipates issuing the first section 114 letters by November 15, 1998. These section 114 letters would require the owner/operator of each coal-fired electric utility steam generating unit meeting the section 112(a)(8) definition to: i) begin the required coal sampling and analysis by January 1, 1999; ii) submit the first quarterly report on the results of the coal sampling and analysis by May 15, 1999; iii) complete all required coal sampling and analysis by December 31, 1999; and, iv) submit a final report on the results of the required coal sampling and analysis by February 15, 2000. The second section 114 letter will require the owner/operator of each of the selected coal-fired electric utility steam generating units to: i) submit to EPA for approval a stack testing and coal sampling and analysis protocol, together with any additions and modifications to the QAPP and a schedule for completing the required stack testing and coal sampling and analysis, by April 15, 1999; ii) commence stack testing, including concurrent coal sampling and analysis, by the date specified in the EPA approved facility-specific schedule; and iii) complete stack testing and concurrent coal sampling and analysis by May 31, 2000.

6. Estimating the Burden and Cost of the Collection

(a) Estimating Respondent Burden

The average annual burden estimate for reporting and recordkeeping requirements are presented in Table 1 for all recipients. These numbers were derived from estimates based on the EPA's experience with other emission test programs and other information collections. These estimates represent the average annual burden that will be incurred by the recipients over the nominal 1-year period approved for an ICR.

(b) *Estimating Respondent Costs*

Table 2 presents estimated costs for the required recordkeeping and reporting activities. Hourly wage and salary values are based on those posted on the Bureau of Labor Statistics (BLS) Internet website as of March 1998. Those values are $20.01 for technical personnel, $24.15 for management personnel, and $11.37 for clerical personnel. These values were adjusted with the average fringe benefit rate of 140 percent taken from the BLS average for similar sources and an assumed overhead and profit rate of 167 percent to obtain a "loaded" wage rate (BLS wages and salaries value x 1.40 x 1.67 = loaded wage rate). Contractor burden for coal analyses and stack sampling have been estimated based on nominal charges of $110 and $80 per hour, respectively.

(c) *Estimating Agency Burden and Cost*

The costs the Federal Government would incur are presented in Table 4. Labor rates and associated costs are based on the estimated hourly rates of $40.33 for technical personnel (GS-12, step 5); $66.66 for management personnel (GS-15, step 5); and $22.73 for clerical personnel (GS-7, step 5). These values represent the inclusion of a 1.6 multiplier so as to include overhead costs.

(d) *Estimating the Respondent Universe and Total Burden and Costs*

The potential respondent universe consists of coal-fired utility facilities. There are 1,038 coal-fired publicly-owned utilities, Federal power agencies, rural electric cooperatives, and investor-owned utilities located at 414 facilities (or sites). For the purposes of estimating burden, all units believed to utilize combustion and greater than 20 MWe identified on the publicly available list of nonutility generators (703 nonutility generators located at 686 facilities) would be required to complete Part I of the information collection to confirm how many are coal fired and otherwise meet the section 112(a)(8) definition of electric utility steam generating unit (fuel use by nonutility generators is not publicly available information). As it is the facility that has information on the individual boilers, there would be a total of 1,100 respondents for Part I. For the purposes of estimating burden for Parts II and III of the information collection effort, one-half of the 703 nonutility generators (352 units located at 352 facilities) are assumed to be coal-fired. Again, as it is the facility, rather than the individual boiler unit, that "buys" the coal, there would be a total of 766 respondents for Part II. Part III would have 135 (nominal) respondents.

(e) *Bottom Line Burden Hours and Costs Tables*

(i) *Respondent tally*. The bottom line industry burden hours and costs, presented in Tables 1 and 2, are calculated by summing the person-hours column and by summing the cost column.

The annual burden and cost to the industry is 186,127 hours and $16,806,796.

The average annual base reporting and recordkeeping burden and cost to the industry for this information collection for facilities subject to the first component of the mercury emissions data gathering effort is 1,266 hours and $58,310 (see Tables 1 and 2). The average annual base reporting and recordkeeping burden and cost to the industry for this information collection for facilities having units subject to the second component of the mercury emissions data gathering effort is 140,345 hours and $13,411,332 (see Tables 5 and 6). The average annual base reporting and recordkeeping burden and cost to the industry for this information collection for units subject to the third component of the mercury emissions data gathering effort is 44,517 hours and $3,337,154 (see Tables 7 and 8).

(ii) *Agency tally*. The bottom line Agency burden and cost, presented in Tables 3 and 4, is calculated in the same manner as the industry burden and cost. The estimated annual burden and cost are 77,852 hours and $3,114,752.

(iii) *The complex collection*. This ICR is a simple collection; therefore this section does not apply.

(iv) *Variations in the annual bottom line*. This section does not apply as this is a one-time collection.

(f) *Reasons for Change in Burden*

This is the initial estimation of burden for this information collection; therefore, this section does not apply.

(g) *Burden Statement*

Tables 1 and 2 present the annual respondent burden for those electric utility steam generating units required to comply with the first component of the mercury emissions data gathering effort, submission of unit information. Tables 5 and 6 present the annual respondent burden for those electric utility steam generating units required to comply with the second

component of the mercury emissions data gathering effort, analyses of as-received coal. Tables 7 and 8 present the average annual respondent burden for those electric utility steam generating units required to comply with the third component of the mercury emissions data gathering effort, mercury speciation stack testing. The total annual reporting and recordkeeping burden for the first component of the mercury emissions data gathering effort is estimated to be 1,266 hours and $58,310 (1.2 hour and $53 per respondent for 1,100 respondents). The total annual reporting and recordkeeping burden for the second component of the mercury emissions data gathering effort is estimated to be 140,345 hours and $13,411,332 (183 hours and $17,508 per respondent for 766 respondents). The total annual reporting and recordkeeping burden for the third component of the mercury emissions data gathering effort is estimated to be 44,517 hours and $3,337,154 (594 hours and $44,495 per respondent for 75 respondents).

The burden estimates for Part III incorporate the assumption that those wet scrubber units already tested by the DOE and EPRI will submit reports of those tests in lieu of the Agency requiring additional tests to be conducted. In addition, it is expected that certain of the 45 categories noted in Part B of this ICR will have zero population. Thus, 75, rather than 135, units are estimated to conduct stack testing.

This ICR does not include any requirements that would cause the respondents to incur either capital or start-up costs. The EPA has assumed that all respondents will contract (i.e., purchase services/operation and maintenance costs) for the coal analyses and for the stack testing. These costs are $11,972,042 for the coal analyses and $3,001,500 for the stack testing.

These burden estimates are annual values based on a nominal 1-year approval period. Estimates for completing Parts I and II are annual values based on the fact that the Agency may continue this effort beyond one year. Estimates for completing Part III are one-time estimates annualized over the nominal 1-year period.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to

comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information that is sent to ten or more persons unless it displays a currently valid OMB control number. The OMB control numbers for EPA's approved information collection requests are listed in 40 CFR Part 9 and 48 CFR Chapter 15.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Office of Policy Planning and Evaluation, Regulatory Information Division, U.S. Environmental Protection Agency (2137); 401 M Street SW; Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street NW; Washington, DC 20503; marked "Attention: Desk Officer for the EPA." Include the EPA ICR number in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after [Insert date of publication in the Federal Register], a comment to OMB is best assured of having its full effect if OMB receives it by [Insert date 30 days after publication in the Federal Register].

PART B OF THE SUPPORTING STATEMENT FOR OMB FORM 83-I

ELECTRIC UTILITY STEAM GENERATING UNIT
MERCURY EMISSIONS INFORMATION COLLECTION EFFORT
INFORMATION COLLECTION REQUEST

1. Respondent Universe

In 1994, the number of coal-fired facilities owned and operated by publicly-owned utility companies, Federal power agencies, rural electric cooperatives, and investor-owned utility generating companies comprised 1,038 units (boilers) greater than 25 MWe, according to the database used for the utility toxics study, Steam: Its Generation and Use (Babcock and Wilcox), and the Department of Energy (DOE)/Energy Information Administration (EIA) database. Information available from 1996 DOE/EIA databases, including the Clean Coal Technology List, indicated some updates that needed to be made to the information provided in the 1994 database. All decisions regarding the stratification of the data employed in this study were based on the aforementioned databases, corrected to the extent possible using the 1996 databases and comments received. Final stratification and unit selection for stack testing will be based on the information requested in the first component of the information collection.

Due to the lack of publicly available, Federal-level reporting requirements for nonutility generators analogous to that available for the units noted above, only a limited amount of information encompassing all types of nonutility generators (e.g., cogenerators, IPPs, and industrial facilities meeting the section 112(a)(8) definition) is currently available. The limited publicly available information obtained by the Office of Air and Radiation's (OAR's) Acid Rain Division (ARD) indicated that potentially 703 nonutility generators exist. Although it is anticipated that not all of these units are coal-fired facilities, all 703 were used for preliminary considerations regarding the number of units required to complete Part I. Information from these facilities will be requested for stratification and sampling purposes. For the purposes of estimating the number of units for the second and third components, it has been assumed that one-half of these units (352 units) are coal fired.

2. Analytical Coal Sampling Requirements

Although a systematic sampling approach will be utilized to collect a statistically representative fraction of the coal received by each facility over the course of a year, a record of the total amount of coal received and location(s) from which each shipment is received should still be maintained. Each facility should report the amount of coal received on a per shipment basis. In addition, for every sixth shipment, the mercury and chlorine content of the coal, and any other available analyzed information, should be reported. However, each facility is required to obtain a minimum of three analyses per month in order to maintain good statistical practices. There are two exceptions where "shipments" will not apply in maintaining these three analyses per month. If a facility such as a mine-mouth operation does not receive "shipments" of coal, analyses of the coal supply should be made approximately every ten days in order to meet the required three analyses per month. A facility that receives less than 18 shipments of coal in any given month should report the analyzed information for 3 shipments received that are spaced approximately equally across the month.

At the end of the first quarter (i.e., three months), an evaluation is required to determine whether or not a 90 percent confidence interval about the mean amount of mercury content from the coal is within $\pm$ 10 percent. The calculation is as follows:

$$P[\overline{X} - t_{.05}(\frac{s}{\sqrt{n}}) < \mu < \overline{X} + t_{.05}(\frac{s}{\sqrt{n}})] = .90$$

$$LCL_{.05} = \overline{X} - t_{.05}(\frac{s}{\sqrt{n}})$$

$$UCL_{.05} = \overline{X} + t_{.05}(\frac{s}{\sqrt{n}})$$

$$Target: \quad LCL_{.05} \geq .9\overline{X} \; with \; UCL_{.95} \leq .1\overline{X}$$

If the evaluation meets this target, continue analysis for every sixth shipment with a minimum of three reports per month. If the evaluation is outside the target, start reporting every third shipment, while maintaining a minimum of three analyses per month.

This evaluation should be repeated every quarter (i.e., every three months) for the duration of one year. The following table indicates how to proceed based on the potential outcomes of the quarterly evaluations.

IF	THEN
Two quarterly evaluations back-to-back (i.e., total over a 6-month period) meet target...	...analyses can be relaxed to every twelfth shipment.
The evaluation results fail to meet the target in any quarter...	...analyses must increase to every shipment, if current analyses are being made for every third shipment; ... OR
	...to every third shipment, if current analyses are being made for every sixth shipment; ... OR
	...to every sixth shipment, if current analyses are being made for every twelfth shipment.
Analyses for every shipment or every third shipment and a quarterly evaluation meets the target...	...analyses can be relaxed back to every third shipment, if analyzing every shipment, ... OR
	...analyses can be relaxed back to every sixth shipment, if analyzing every third shipment.

There should never be fewer than three reports per month (i.e., minimum total reports for the year should be 36) for each facility nor should a facility ever sample less frequently than every twelfth shipment. Sufficient data were unavailable to determine whether or not a $\pm$ 10 percent of a 90 percent confidence interval about the mean amount of mercury contained within the coal was attainable. If data become available before reporting begins on January 1, 1999 that indicates this percentage should be higher or lower, proper adjustments will be made.

3. Respondent Universe Stratification for Stack Sampling

Although the actual variables that affect mercury speciation are still being determined in on-going research efforts, three variables that appear to have an effect are the method of mechanical sulfur dioxide (SO_2) control (i.e., does not include use of coal blending or low sulfur

coals), coal source, and method of electrostatic precipitator (ESP) control. For the purposes of grouping the coal-fired electric utility steam generating units into categories, these three variables were used so that a representative sample of coal-fired units can be selected for testing. For both categories of electric utility steam generating units, the method of SO_2 control is defined as either a dry-scrubber (of any type/model), wet-scrubber (of any type/model), fluidized bed combustion (FBC; any type), coal gasification (any type; termed "coal gas"), or no mechanical control at all (termed "no scrubber"). The method of ESP control is defined as cold side (of any type/model), hot side (of any type/model), or other control (including fabric filter, multiclone, cyclone, particulate scrubber, or a combination control). Coal source is defined as bituminous (including anthracite and the waste coals culm and gob), subbituminous, or lignite.

According to Babcock and Wilcox, lignite is the lowest rank coal, is relatively soft, and brown to black in color.[1] The volatile content is high and, therefore, lignite ignites easily. Subbituminous coals are black, having little of the plant-like texture and none of the brown color associated with the lower rank lignite coal. Subbituminous coals generally have less ash and are cleaner burning than lignite coals. Bituminous coal is the rank most commonly burned in electric utility boilers and appears black with banded layers of glossy and dull black. The volatile content is lower than that of subbituminous and lignite coals. Anthracite, which is the highest rank of coal, is shiny black, hard, and brittle, with little appearance of layering. Anthracite has a low volatile content which makes it a slow burning fuel but one that burns with a hot, clean flame. For the purposes of grouping, anthracite coal was combined with bituminous coal because of the limited use of anthracite coal in coal-fired electric utility steam generating units.

The 45 defined categories that each coal-fired steam generating unit would fall into are shown in the following table. Although exact units for each of these categories cannot be provided until proper information is collected, it is anticipated that some categories will not have any units.

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[1] Steam: Its Generation and Use. Edited by S.C. Stultz and J.B. Kitto. 40th Edition. The Babcock & Wilcox Company, Barberton, Ohio. 1992.

Table 9 presents the list of electric utility steam generating units placed in their respective categories, based on available information (as of 1996). Table 10 presents the population of assumed coal-fired nonutility units larger than 20 MWe (as of 1996). These two tables do not

Category	Scrubber type/Coal source/ESP type
1	Dry Scrubber/Bituminous Coal/Cold side ESP
2	Dry Scrubber/Bituminous Coal/Hot side ESP
3	Dry Scrubber/Bituminous Coal/Other ESP
4	Dry Scrubber/Lignite Coal/Cold side ESP
5	Dry Scrubber/Lignite Coal/Hot side ESP
6	Dry Scrubber/Lignite Coal/Other ESP
7	Dry Scrubber/Subbituminous Coal/Cold side ESP
8	Dry Scrubber/Subbituminous Coal/Hot side ESP
9	Dry Scrubber/Subbituminous Coal/Other ESP
10	No Scrubber/Bituminous Coal/Cold side ESP
11	No Scrubber/Bituminous Coal/Hot side ESP
12	No Scrubber/Bituminous Coal/Other ESP
13	No Scrubber/Lignite Coal/Cold side ESP
14	No Scrubber/Lignite Coal/Hot side ESP
15	No Scrubber/Lignite Coal/Other ESP
16	No Scrubber/Subbituminous Coal/Cold side ESP
17	No Scrubber/Subbituminous Coal/Hot side ESP
18	No Scrubber/Subbituminous Coal/Other ESP
19	Wet Scrubber/Bituminous Coal/Cold side ESP
20	Wet Scrubber/Bituminous Coal/Hot side ESP
21	Wet Scrubber/Bituminous Coal/Other ESP
22	Wet Scrubber/Lignite Coal/Cold side ESP
23	Wet Scrubber/Lignite Coal/Hot side ESP
24	Wet Scrubber/Lignite Coal/Other ESP
25	Wet Scrubber/Subbituminous Coal/Cold side ESP
26	Wet Scrubber/Subbituminous Coal/Hot side ESP
27	Wet Scrubber/Subbituminous Coal/Other ESP
28	Fluidized Bed Combustion/Bituminous Coal/Cold side ESP
29	Fluidized Bed Combustion/Bituminous Coal/Hot side ESP
30	Fluidized Bed Combustion/Bituminous Coal/Other ESP
31	Fluidized Bed Combustion/Lignite Coal/Cold side ESP
32	Fluidized Bed Combustion/Lignite Coal/Hot side ESP
33	Fluidized Bed Combustion/Lignite Coal/Other ESP
34	Fluidized Bed Combustion/Subbituminous Coal/Cold side ESP
35	Fluidized Bed Combustion/Subbituminous Coal/Hot side ESP
36	Fluidized Bed Combustion/Subbituminous Coal/Other ESP
37	Coal Gas/Bituminous Coal/Cold side ESP
38	Coal Gas/Bituminous Coal/Hot side ESP
39	Coal Gas/Bituminous Coal/Other ESP
40	Coal Gas/Lignite Coal/Cold side ESP

41	Coal Gas/Lignite Coal/Hot side ESP
42	Coal Gas/Lignite Coal/Other ESP
43	Coal Gas/Subbituminous Coal/Cold side ESP
44	Coal Gas/Subbituminous Coal/Hot side ESP
45	Coal Gas/Subbituminous Coal/Other ESP

break down each unit into their appropriate ESP control category because adequate information was unavailable.

4. Experimental Design for Stack Testing

A factorial experiment is an experiment which consists of all possible combinations of the levels of several factors. These experiments are of great value in exploratory work where little is known concerning the optimum levels of the factors, or even which ones are important. The scope of an experiment, or the population concerning which inferences can be made, can often be increased by the use of a factorial experiment.

In order to maximize the benefit of the information collected regarding the effectiveness of mechanical SO_2 and ESP control devices on the removal of each species of mercury (i.e., ionic mercury and elemental mercury), a classical experimental design for a 5x3x3 factorial design will be implemented for this study. Good statistical practice indicates that a minimum of three replicate samples should be taken in order for any basic statistical calculations to be made within any one category. A 5x3x3 factorial design will generate 45 specific categories. A maximum of 3 units (one unit per any given plant) will be selected for each category (assuming some categories may have less than 3 units); therefore, a maximum total of 135 units (i.e., 45 x 3 = 135) will be tested. Three test runs will be conducted at each unit for both the inlet and outlet of the operation. The maximum number of runs that will be made is 810 (i.e., 135 x 3 x 2 = 810). Although the categories with the higher number of units within them will have more uncertainty associated with the average and variability, this classical experimental design is technically sound in its approach.

Since DOE and the Electric Power Research Institute (EPRI) have already collected data associated with the various combinations of wet scrubbers, coal type, and ESP control, these categories will not be retested under this ICR, assuming this data is equivalent to the study design outlined here. Data from these sources, however, will be taken wherever the existing information is deficient. The total number of samples could potentially be reduced by 20 percent (i.e., 27 units

out of 135 total units = 20 percent), although available information must first be evaluated for its completeness and equivalence. Any other stack testing information that becomes available and is equivalent to the study design outlined here will also be evaluated. If it is found to be complete and equivalent, it may be used to reduce the testing burden of another unit or added to the total database.

By using a balanced design, the data can easily be used to determine the main effects and interactions occurring among these factors, which may be an indicator for the focus of any future efforts. This information will also be appropriate to characterize up to 135 emission factors based upon mechanical SO_2 control, coal type, and ESP control.

5. Respondent Sample Collection for Stack Testing

A random selection process will be used to determine which units are required to participate in this testing program. If possible, once a unit from a particular plant (site) has been selected, no other unit(s) at that plant (site) will be chosen for that particular category (i.e., some plants have units with different methods of SO_2 control, that burn coal from different sources, and have units with different methods of ESP control). This will provide more information from a larger number of plants given all plant operations are not the same due to differing environmental conditions (e.g., weather), equipment, and load (e.g., amount of coal burned per unit of time). Each plant (site) will also have a different mix of coal, since most plants obtain coal from multiple sources (i.e., different States and/or different seams of coal), and testing at multiple plants (sites) will provide additional information on the variability of emissions across the mix of coals.

6. Emission Factors

Specific source measurements can determine the actual pollutant contribution from a given source, under the conditions existing at the time of the test. When emission measurements are not available, emissions can be estimated using emission factors. An emission factor is a ratio that relates the quantity of a pollutant released to the atmosphere to the activity level associated with the release of that pollutant. The primary reference for emission factors is Compilation of Air Pollutant Emission Factors, commonly known as "AP-42." An example emission factor for coal-fired utility boilers is the one found for nitrogen oxides (NO_x) in table 1.1-3 of AP-42 for a pulverized coal, dry bottom wall-fired utility size boiler, 21.7 lbs NO_x/ton. This means that for

every ton of coal burned, 21.7 pounds of NO_x (as NO_2) are emitted into the atmosphere. Knowing the amount of fuel burned, this emission factor can be used to estimate the NO_x emissions. In most cases, emission factors are expressed simply as a single number, with the underlying assumption that a linear relationship exists between emissions and the specified activity level over the probable range of application. The maximum number of emission factors for this study will be 135 (i.e., 45 for ionic mercury + 45 for elemental mercury + 45 for total mercury = 135 total emission factors).

(a) *Developing Emission Factors*

In developing emission factors, the procedures in the document entitled "Procedures for Preparing Emission Factor Documents," EPA-454/R-95-015, are used. The general procedures can be summarized as follows.

1. Source test results are reviewed for quality. Data outliers are closely reviewed to evaluate the appropriateness of inclusion or exclusion of the data from the resulting emission factor.
2. Engineering judgement is used to group the emission data into various subpopulations of source types (e.g., all pulverized coal wall-fired dry bottom utility boilers may be grouped within the same subpopulation).
3. The results are typically averaged to determine an emission rate relative to a particular activity or other process variable (e.g., the amount of coal burned or the amount of sulfur in the fuel, respectively). An example of the latter case is the SO_2 factor for pulverized coal-fired boilers, which is 38(S) lbs SO_2 per ton of coal burned (where 38 is multiplied by S, the percent sulfur in the coal).
4. The factor undergoes technical review by experts.

(b) *Calculating Emissions using Emission Factors*

In order to calculate emissions using emission factors, various inputs to the estimation algorithm are required:

1. Activity information for the process as specified by the relevant emission factor;
2. Emission factors to translate activity information into uncontrolled or controlled emission estimates; and

3. Capture and control device efficiencies to provide the basis for estimation of emissions to the atmosphere after passage through the control device(s) if using an uncontrolled emission factor ("Controlled" emission factors already take this into account).

The basic emission estimation algorithm for an uncontrolled emission factor is:

$$E = A * EF * (1 - ER/100)$$

where:

E = emission estimate for source (at the process level)

A = activity level (e.g., tons of coal burned)

EF = "uncontrolled" emission factor (e.g., lb pollutant emitted/tons of coal burned)

ER = overall emission reduction efficiency, expressed in percent; equal to the capture device efficiency multiplied by the control device efficiency.

If a controlled emission factor is being used, the emission factor already incorporates the control system effectiveness term (1 - ER/100); therefore, the form of the algorithm is:

$$E = A * EF$$

where:

E = emission estimate for source (at the process level)

A = activity level (e.g., tons of coal burned)

EF = controlled emission factor (e.g., lb pollutant emitted/tons of coal burned)

The accuracy of the emission estimate is equally dependent upon the relative accuracy of each of these individual components. Errors introduced into any one of these components will affect the final emission estimate.

(c) *Role of Throughput in Emission Factor Estimates*

The activity level (also referred to as throughput rate) is the second component of an estimate developed using an emission factor. For fuel-burning equipment, activity data are generally reported as fuel consumption rates (e.g., tons of coal burned). The optimum activity data are hourly values, although in some cases only shift, daily, weekly, or even monthly data are available. If hourly values are not known, the hourly average value can be calculated from the actual operating schedule. Alternatively, source activity data may be obtained from published

sources such as government statistical documents and databases (e.g., EIA fuel consumption reports, industry trade publications, and commercially published business directories and journals).

In many instances, conversion factors must be applied to convert reported consumption or production values into units that correspond to the emission factor throughput units. For example, an emission factor for coal consumption may be given in pounds of pollutant emitted per million British thermal units (MMBtu) while the activity data are available only in tons of coal per hour. In order to estimate emissions, a conversion factor is needed. The heating value of the fuel in MMBtu per ton provides the necessary conversion. In this case, the emission equation would be:

$$E = A * EF * C$$

where:

E	=	emission estimate in lbs/hr
A	=	activity level = fuel consumption in tons/hr
EF	=	emission factor in lbs/MMBtu
C	=	conversion factor = heating value in MMBtu/tons

If the emission factor or activity data involved electrical power output or steam generation, an additional correction factor (i.e., the fractional efficiency of the fuel burning equipment) must be applied to account for conversion of heat input to power output (electrical) or steam production (thermal).

7. Reconciliation of Experimental Design

(a) *Calculation of Main Effects and Interactions*

The complete mathematical description for any observation is as follows:

$$Y_{ijkl} = \mu + D_i + "_j + \$_k + (_l + ("\$)_{jk} + ("()_{jl} + (\$()_{kl} + ("\$()_{jkl} + ,_{ijkl}$$

Since an application of this experiment for the three main factors have fixed levels, the distinction of the main model for this experiment is that for the fixed model. In a fixed model, the levels for each factor do not vary. An anomaly to this particular experiment is that factors within this main breakdown of fixed factors are random. Many sets of data present a mixture of these two classes

of problems (i.e., fixed effects and random effects), therefore creating a mixed model. The obvious difference between a fixed effect and a random effect is that random effects vary with selection. The fixed effects and random effects for this experiment are identified in the table below.

Source	Effect
Mechanical SO_2 Control	Fixed
Coal Type	Fixed
ESP Control	Fixed
Plant Tested	Random
Inlet/Outlet Sample Locations	Fixed
Test Conducted	Random

Calculations specific for a fixed model and a mixed model of the expected values of mean squares for factorial experiments can be found in many applied statistics texts. A common, highly regarded reference can be found on page 356 of Robert G. D. Steel's and James H. Torrie's book titled Principles and Procedures of Statistics: A Biometrical Approach.

Due to the expected collapse of some of the categories (because of no units in the category), final models cannot be presented until proper information to classify each facility is collected as described in Part A of this ICR.

(b) *Correlation Between Coal Sampling and Mercury Speciation*

The analysis of covariance is concerned with two or more measured variables where any measurable independent variable is not at predetermined levels as in a factorial experiment. Although the main effects and interactions of our experimental design were analyzed through a classical factorial experiment, the relationship between these factors and the amount of mercury found in the coal can be represented through linear covariance. One of the most important uses of covariance analysis is to assist in the interpretation of data, especially with regard to the nature of treatment effects. Covariance as a means of controlling error and adjusting treatment means is intended for use primarily when the independent variable measures environmental effects and is not influenced by treatments. If it is influenced, however, the interpretation of the data is changed. Covariance must be used with caution, but is highly effective when applied properly.

An analysis of covariance is flexible enough to allow conclusions to be drawn regarding an individual independent variable (e.g., mercury or chlorine) or a combination of independent variables (e.g., mercury and chlorine). The results from this analysis will be factored into the aforementioned emission factor equations to create factors for mercury speciation as it relates to as-fired coal. In the aforementioned text by Steel and Torrie, Chapter 17 (pages 401-437) presents a complete discussion on these uses of the analysis of covariance with respective assumptions and formulas that are required for proper application.

8. Response Rates

Since the information will be requested pursuant to the authority of section 114 of the Act, EPA expects that all respondents requested to submit information will do so.

TABLE 1. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN HOUR ESTIMATE - TOTAL[2]

Collection activities	Burden hours[3]							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical hours	Management hours	Clerical hours	Total
1. Read instructions.	0.5	1	0.5	1,100	550	28	55	633
2. Complete and submit Part I.	0.5	1	0.5	1,100	550	28	55	633
3. Secure emission test contractor/review proposal.	40	1	40	83[4]	3,320	166	332	3,818
4. Coal sampling with stack testing.[5]	0.5	3	1.5	75	113	6	11	129
5. Conduct coal analyses.	0.79	156[6]	123.32	766	94,463	4,723	9,446	108,632
6. Coal analyses with stack sampling.	0.79	3	2.37	75	178	9	18	205
7. Conduct stack testing.	435	1	435	75	32,625	1,631	3,263	37,519
8. Monitor stack testing.	24	1	24	75	1,800	90	180	2,070
9. Process/compile/review coal sampling data for accuracy/completeness/ adjustment of collection frequency.	8	4	32	766	24,512	1,226	2,451	28,189
10. Review stack sampling data for accuracy and completeness.	8	1	8	75	600	30	60	690
11. Submit coal analysis data.	1	4	4	766	3,064	153	306	3,524
12. Submit stack sampling data.	1	1	1	75	75	4	8	86
TOTAL			672.19		161,849	8,092	16,185	186,127

2 On a per year basis based on a nominal 1-year approval period.
3 Management hours are assumed to be 5 percent of technical hours; clerical hours are assumed to be 10 percent of technical hours.
4 Assume that 10 percent need to be done twice.
5 Each facility doing stack sampling will be required to acquire and analyze one additional composite sample for each run of the stack testing period.
6 Assume three mercury analyses per week.

TABLE 2. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN COST ESTIMATE - TOTAL

Collection activities	Cost							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical, at $47.45[7]	Management, at $57.27[8]	Clerical, at $26.96	Total
1. Read instructions.	0.5	1	0.5	1,100	$26,098	$1,575	$1,483	$29,155
2. Complete and submit Part I.	0.5	1	0.5	1,100	$26,098	$1,575	$1,483	$29,155
3. Secure emission test contractor/review proposal.	40	1	40	83	$157,534	$9,507	$8,951	$175,992
4. Coal sampling with stack testing.[8]	0.5	3	1.5	75	$5,338	$322	$303	$5,964
5. Conduct coal analyses.	0.79	156	123.32	766	$10,390,906[9]	$519,545	$1,039,091	$11,949,542
6. Coal analyses with stack sampling.	0.79	3	2.37	75	$19,565	$978	$1,957	$22,500
7. Conduct stack testing.	435	1	435	75	$2,610,000[10]	$130,500	$261,000	$3,001,500
8. Supervise stack testing.	24	1	24	75	$85,410	$5,154	$4,853	$95,417
9. Process/compile/review coal sampling data for accuracy/completeness/ adjustment of collection frequency.	8	4	32	766	$1,163,094	$70,190	$66,084	$1,299,369
10. Review emission stack data for accuracy and completeness.	8	1	8	75	$28,470	$1,718	$1,618	$31,806
11. Submit coal analysis data.	1	4	4	766	$145,387	$8,774	$8,261	$162,421
12. Submit stack sampling data.	1	1	1	75	$3,559	$215	$202	$3,976
TOTAL			672.19					$16,806,796

[7] Technical from Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 16, Special industries (public utilities); **http://stats.bls.gov/news.release.ecec.t16.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

[8] Management and clerical from Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 11, Civilian workers by occupational and industry group; **http://stats.bls.gov/news.release/ecec.t02.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

[8] Each facility doing stack sampling will be required to acquire and analyze one additional sample for each run of the stack testing period.

[9] Coal analyses assumed contracted at a flat rate of $100 per sample for mercury and chlorine; corresponding hours have been estimated.

[10] Emission testing assumed contracted at a flat rate of $40,000 per sampling event (three sample runs per event); corresponding hours have been estimated.

TABLE 3. ELECTRIC UTILITY STEAM GENERATING ICR EPA BURDEN HOUR ESTIMATE

Collection activities	**Burden hours**[11]							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical hours	Management hours	Clerical hours	Total
1. Develop questionnaire.	80	1	80	1	80	4	8	92
2. Review and analyze Part I responses.	1	1	1	1,100	1,100	55	110	1,265
3. Determine sites to be emission tested.	8	1	8	1	8	0	1	9
4. Develop generic QAPP.	40	1	40	1	40	2	4	46
5. Review and comment on emission sampling test plans.	4	1	4	83[12]	332	17	33	382
6. Answer respondent questions.	0.25	1	0.25	110[13]	28	1	3	32
7. Audit stack tests.	40	1	40	5	200	10	20	230
8. Review coal analysis data for accuracy/completeness/adjustment of collection frequency.	8	1	8	1,100	8,800	440	880	10,120
9. Review stack data for accuracy and completeness.	16	1	16	75	1,200	60	120	1,380
10. Analyze coal analysis data.	12	4	48	1,100	52,800	2,640	5,280	60,720
11. Analyze stack sampling data.	40	1	40	75	3,000	150	300	3,450
12. Analyze requests for confidentiality.	1	1	1	110[14]	110	6	11	127
TOTAL			286.25		67,698	3,385	6,770	77,852

[11] Management hours are assumed to be 5 percent of technical hours; clerical hours are assumed to be 10 percent of technical hours.

[12] Assume that 10 percent need to be done twice.

[13] 10 percent of respondents are assumed to have one question.

[14] 10 percent of respondents are assumed to claim information to be confidential.

TABLE 4. ELECTRIC UTILITY STEAM GENERATING ICR EPA BURDEN COST ESTIMATE

Collection activities	**Cost**[15]							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical, at $40.33	Management, at $66.66	Clerical, at $22.73	Total
1. Develop questionnaire.	80	1	80	1	$3,226	$267	$182	$3,675
2. Review and analyze Part I responses.	1	1	1	1,100	$44,363	$3,666	$2,500	$50,530
3. Determine sites to be emission tested.	8	1	8	1	$323	$27	$18	$367
4. Develop generic QAPP.	40	1	40	1	$1,613	$133	$91	$1,837
5. Review and comment on emission sampling test plans.	4	1	4	83	$13,390	$1,107	$755	$15,251
6. Answer respondent questions.	0.25	1	0.25	110	$1,109	$92	$63	$1,263
7. Audit stack tests.	40	1	40	5	$13,066[16]	$667	$455	$14,187
8. Review coal analysis data for accuracy/completeness/adjustment of collection frequency.	8	1	8	1,100	$354,904	$29,330	$20,002	$404,237
9. Review stack data for accuracy and completeness.	16	1	16	75	$48,396	$4,000	$2,728	$55,123
10. Analyze coal sampling data.	12	4	48	1,100	$2,129,424	$175,982	$120,014	$2,425,421
11. Analyze stack sampling data.	40	1	40	75	$120,990	$9,999	$6,819	$137,808
12. Analyze requests for confidentiality.	1	1	1	110	$4,436	$367	$250	$5,053
TOTAL			286.25					$3,114,752

[15] Technical assumed at GS-12, Step 5; Management assumed at GS-15, Step 5; Clerical assumed at GS-7, Step 5; values have been adjusted by a factor of 1.6 to account for overhead expenses (loaded rate).

[16] Includes $1,000 per audit for other direct costs.

TABLE 5. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN HOUR ESTIMATE - MERCURY CONTENT AND COAL USE DATA COMPONENT

Collection activities	**Burden hours**[17]							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical hours	Management hours	Clerical hours	Total
1. Read instructions.	0	1	0	766	0	0	0	0
2. Conduct coal analyses.	0.79	156	123.32	766	94,463	4,723	9,446	108,632
3. Process/compile/review coal sampling data for accuracy/completeness/ adjustment of collection frequency.	8	4	32	766	24,512	1,226	2,451	28,189
4. Submit coal analysis data.	1	4	4	766	3,064	153	306	3,524
TOTAL			159.32		122,039	6,102	12,204	140,345

[17] Management hours are assumed to be 5 percent of technical hours; clerical hours are assumed to be 10 percent of technical hours.

TABLE 6. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN COST ESTIMATE - MERCURY CONTENT AND COAL USE DATA COMPONENT

Collection activities	Cost							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical, at $47.45[18]	Management, at $57.27[19]	Clerical, at $26.96[20]	Total
1. Read instructions.	0	1	0	766	$0	$0	$0	$0
2. Conduct coal analyses.	0.79	156	123.32	766	$10,390,906[21]	$519,545	$1,039,091	$11,949,542
3. Process/compile/review coal sampling data for accuracy/completeness/ adjustment of collection frequency.	8	4	32	766	$1,163,094	$70,190	$66,084	$1,299,369
4. Submit coal analysis data.	1	4	4	766	$145,387	$8,774	$8,261	$162,421
TOTAL			159.32					$13,411,332

18 From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 16, Special Industries (public utilities); http://stats.bls.gov/news.release.ecce.t16.htm;wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

19 From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 11, Civilian workers by occupational and industry group; **http://stats.bls.gov/news.release/ecec.t11.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

20 From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 11, Civilian workers by occupational and industry group; http://stats.bls.gov/news.release/ecec.t11.htm; wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

21 Coal analyses are assumed to be contracted at a flat rate of $100 per sample for mercury and chlorine; corresponding hours have been estimated.

TABLE 7. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN HOUR ESTIMATE - STACK TESTING AND COAL SAMPLING COMPONENT

Collection activities	**Burden hours**[22]							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical hours	Management hours	Clerical hours	Total
1. Read instructions.	0	1	0	75	0	0	0	0
2. Secure stack test contractor/review proposal.	40	1	40	83[23]	3,320	166	332	3,818
3. Conduct coal sampling.	0.5	3	1.5	75	113	6	11	129
4. Conduct coal analyses.	0.79	3	2.37	75	178	9	18	205
5. Conduct stack testing.	435	1	435	75	32,625	1,631	3,263	37,519
6. Supervise stack testing.	24	1	24	75	1,800	90	180	2,070
7. Review stack sampling data for accuracy and completeness.	8	1	8	75	600	30	60	690
8. Submit stack sampling data.	1	1	1	75	75	4	8	86
TOTAL			511.87		38,710	1,936	3,871	44,517

[22] Management hours are assumed to be 5 percent of technical hours; clerical hours are assumed to be 10 percent of technical hours.

[23] Assume that 10 percent need to be done twice.

TABLE 8. ELECTRIC UTILITY STEAM GENERATING ICR RESPONDENT BURDEN COST ESTIMATE - STACK TESTING AND COAL SAMPLING COMPONENT

Collection activities	Cost							
	Technical hours per occurrence	Occurrences per respondent	Technical hours per respondent	Respondents	Technical, at $47.45[24]	Management, at $57.27[25]	Clerical, at $26.96[26]	
1. Read instructions.	0	1	0	75	$0	$0	$0	$0
2. Secure stack test contractor/review proposal.	40	1	40	83	$157,534	$9,507	$8,951	$175,992
3. Conduct coal sampling.	0.5	3	1.5	75	$5,338	$322	$303	$5,964
4. Conduct coal analyses.	0.79	3	2.37	75	$19,565[27]	$978	$1,957	$22,500
5. Conduct stack testing.	435	1	435	75	$2,610,000[28]	$130,500	$261,000	$3,001,500
6. Supervise stack testing.	24	1	24	75	$85,410	$5,154	$4,853	$95,417
7. Review stack sampling data for accuracy and completeness.	8	1	8	75	$28,470	$1,718	$1,618	$31,806
8. Submit stack sampling data.	1	1	1	75	$3,559	$215	$202	$3,976
TOTAL			511.87					$3,337,154

[24] From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 16, Special Industries (public utilities); **http://stats.bls.gov/news.release.ecce.t16.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

[25] From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 11, Civilian workers by occupational and industry group; **http://stats.bls.gov/news.release/ecec.t11.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

[26] From Bureau of Labor Statistics, March 1998 Employment Cost Trends, Table 11, Civilian workers by occupational and industry group; **http://stats.bls.gov/news.release/ecec.t11.htm;** wage and salaries value multiplied by average fringe rate (1.40) and assumed overhead and profit rate (1.67) to obtain loaded rate.

[27] Coal analyses are assumed to be contracted at a flat rate of $100 per sample for mercury and chlorine; corresponding hours have been estimated.

[28] Emission testing is assumed to be contracted at a flat rate of $40,000 per sampling event (three sample runs per event); corresponding hours have been estimated.