UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Response to Significant Public Comments Received in Response to:

Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units from the Section 112(c) List: Reconsideration (70 FR 62200; October 28, 2005)

and

Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Reconsideration (70 FR 62213; October 28, 2005)

May 31, 2006

Response to Significant Public Comments Received in Response to:

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and

Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Reconsideration (70 FR 62213; October 28, 2005)

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Sector Policies and Programs Division
Research Triangle Park, North Carolina 27711

May 2006

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List of Acronyms

Activated Carbon Injection	ACI
Best Demonstrated Technology	BDT
Clean Air Act	CAA
Clean Air Interstate Rule	CAIR
Clean Air Mercury Rule	CAMR
Community Multiscale Air Quality Model	CMAQ
Department of Energy	DOE
Electric Generating Unit	EGU or Utility Unit
Electric Utility Steam Generating Unit	EUSGU
Electrostatic Precipitators	ESP
Energy Information Administration	EIA
Fabric Filter	FF
Federal Register	FR
Fine Particulates	$PM_{2.5}$
Flue Gas Desulfurization	FGD
Grams per Day	g/day
Hazard Index	HI
Hazard Quotient	HQ
Hazardous Air Pollutant	HAP
Index of Daily Intake	IDI
Integrated Planning Model	IPM
Intelligence Quotient	IQ
Maximum Achievable Control Technology	MACT
Mercury	Hg
Methylmercury	MeHg
Municipal Waste Combustor	MWC
National Ambient Air Quality Standard	NAAQS
National Lake Fish Tissue Survey	NLFTS
National Listing of Fish Advisories	NLFA
Notice of Data Availability	NODA
Notice of Proposed Rulemaking	NPR
Pounds per Megawatt-hour	lb/MWh
Pounds per Million British Thermal Units	lb/MMBtu
Pounds per Trillion British Thermal Units	lb/TBtu; lb/10^{12} Btu
Reference Dose	RfD
Regulatory Impact Analysis	RIA
Section	§
Selective Catalytic Reduction	SCR
Supplemental Notice of Proposed Rulemaking	SNPR
Technical Support Document	TSD

Introduction

On March 15, 2005, the U.S. Environmental Protection Agency (EPA or Agency) signed a final action that revised the Agency's December 2000 finding made pursuant to Clean Air Act (CAA or the Act) §112(n)(1)(a), and based on that revision, removed coal- and oil-fired electric utility steam generating units (Utility Units, EUSGU, EGU, or power plants) from the CAA §112(c) source category list. The final Section 112(n) Revision Rule was published on March 29, 2005 (70 FR 15994). Also on March 15, 2005, EPA signed the final Clean Air Mercury Rule (CAMR) and established standards of performance for mercury (Hg) for new and existing coal-fired Utility Units under CAA §111. CAMR was published on May 18, 2005 (70 FR 28606).

Following promulgation of the Section 112(n) Revision Rule, the Administrator received two petitions, filed pursuant to CAA §307(d)(7)(b), requesting reconsideration of many aspects of the final Section 112(n) Revision Rule.[1] Following promulgation of CAMR, the Administrator received four petitions for reconsideration pursuant to CAA §307(d)(7)(b).[2]

CAA §307(d)(7)(B) strictly limits petitions for reconsideration both in time and in scope.[3] Specifically, it provides that EPA shall convene a proceeding to reconsider a rule if a person raising an objection can demonstrate (1) that it was impracticable to raise the objection during the comment period, or that the grounds for such objection arose after the comment period but within the time specified for judicial review (i.e., within 60 days after publication of the final rulemaking notice in the Federal Register); and (2) that the objection is of central

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[1] One petition was submitted by 14 States: New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin (State petitioners). The other petition was submitted by five environmental groups and four Indian Tribes: The Natural Resources Defense Council (NRDC), the Clean Air Task Force (CATF), the Ohio Environmental Council, the U.S. Public Interest Research Group (USPIRG), the Natural Resources Council of Maine; the Aroostook Band of Micmacs, the Houlton Band of Maliseet Indians, the Penobscot Indian Nation, and the Passamaquoddy Tribe of Maine (Indian Township and Pleasant Point) (Environmental petitioners).

[2] One petition was submitted by 14 States: New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin (State petitioners). The second petition was submitted by five environmental groups: the Natural Resources Defense Council (NRDC), the Clean Air Task Force (CATF), the Ohio Environmental Council, the U.S. Public Interest Research Group (USPIRG), and the Natural Resources Council of Maine. The third petition was submitted by the Jamestown Board of Public Utilities. The fourth petition was submitted by the Integrated Waste Service Association (IWSA).

[3] CAA §307(d)(7)(B), 42 U.S.C. 7607(d)(7)(B), provides:

> Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b) of this section). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months.

relevance to the outcome of the rule.

On October 28, 2005 (70 FR 62200; 70 FR 62213), EPA granted the petitions for reconsideration of the Section 112(n) Revision Rule and CAMR with respect to certain issues, and those issues are specifically identified in the October 2005 reconsideration notices. The public comment period for both rules remained open from October 28, 2005 to December 19, 2005. EPA held a public hearing on November 17, 2006. Over 300 unique public comments were received during the public comment period from stakeholders and the public. All of the comments that were submitted during the public comment period are contained in public docket EPA-HQ-OAR-2002-0056, accessible through www.regulations.gov.[4] Responses to all significant comments received on the issues re-opened for reconsideration are provided in Sections 1 and 2 of this document.

In the October 2005 reconsideration notices, EPA explained that it would not respond to any comments received addressing any aspect of the final Section 112(n) Revision Rule and CAMR that was not the subject of reconsideration (70 FR 62200, 70 FR 62213). Notwithstanding this statement, EPA received several comments concerning issues that were not re-opened during reconsideration. In Section 3, we briefly identify those comments and reiterate that we are not responding to those comments as part of these reconsideration actions.

In Section 4 of this document, we identify the issues for which we are denying reconsideration. As explained in Section 4, we denied reconsideration of various issues because the Petitioners failed to meet the procedural predicate for reconsideration set forth in CAA §307(d)(7)(B) and/or the issues are not "of central relevance" to the outcome of the rulemaking, both of which are necessary condition precedents for granting reconsideration.

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[4] In this document, docket entries may be designated by "OAR-2002-0056-xxxx" (the format of the old E-Docket system) or by "EPA-HQ-OAR-2002-0056-xxxx" (the format of the new Federal Docket Management System [FDMS]).

Table 1. List of Commenters on the Notice of Reconsideration of the Section 112(n) Revision Rule and CAMR; public docket EPA-HQ-OAR-2002-0056[5]

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6270	Petition to reconsider the §112 revision submitted by Natural Resources Defense Council (NRDC), Clean Air Task Force (CATF), Ohio Environmental Council, United States Public Interest Research Group (USPIRG), Natural Resources Council of Maine, Aroostook Band of Micmacs, Houlton Band of Maliseet Indians, Penobscot Indian Nation, and Passamaquoddy Tribe of Maine
EPA-HQ-OAR-2002-0056-6276	Petition to reconsider CAMR submitted by Natural Resources Defense Council (NRDC), Clean Air Task Force (CATF), Ohio Environmental Council, United States Public Interest Research Group (USPIRG), and Natural Resources Council of Maine
EPA-HQ-OAR-2002-0056-6277	Attachments to petition to reconsider CAMR submitted by Natural Resources Defense Council (NRDC), Clean Air Task Force (CATF), Ohio Environmental Council, United States Public Interest Research Group (USPIRG), and Natural Resources Council of Maine
EPA-HQ-OAR-2002-0056-6280	Petition to reconsider the §112 revision submitted by the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin
EPA-HQ-OAR-2002-0056-6281	EPA response to petitions to reconsider §112 revision
EPA-HQ-OAR-2002-0056-6282	Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin
EPA-HQ-OAR-2002-0056-6283	Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the Integrated Waste Service Association (IWSA)
EPA-HQ-OAR-2002-0056-6284	Petition to reconsider the Clean Air Mercury Rule (CAMR) submitted by the Jamestown Board of Public Utilities (JBPU)
EPA-HQ-OAR-2002-0056-6291	Attachments to Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont and Wisconsin
EPA-HQ-OAR-2002-0056-6292	Attachments to Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont and Wisconsin
EPA-HQ-OAR-2002-0056-6293	Attachments to Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont and Wisconsin
EPA-HQ-OAR-2002-0056-6294	Attachments to Petition to reconsider the Clean Air Mercury Rule (CAMR) received from the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont and Wisconsin
EPA-HQ-OAR-2002-0056-6368	J. Pitts – Private Citizen
EPA-HQ-OAR-2002-0056-6369	G. Glenn, et al. – Private Citizens

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[5] In the new FDMS, comment attachments may be provided with a "*.x" entry number to associate them with the base comment (e.g., comment has docket number EPA-HQ-OAR-2002-0056-yyyy"; attachments will have docket numbers EPA-HQ-OAR-2002-0056-yyyy.1, -yyyy.2, etc.). Attachments to comments presented in this table are not listed individually but, rather, are incorporated by reference with the base comment.

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6370	T. R. Flores – Private Citizen
EPA-HQ-OAR-2002-0056-6371	T. Smith – Private Citizen
EPA-HQ-OAR-2002-0056-6372	B. Ross – Private Citizen
EPA-HQ-OAR-2002-0056-6373	Jerry Hirshfeld, Davis Christensen, and Creighton Hardin – Idaho Chapter, American Academy of Pediatrics
EPA-HQ-OAR-2002-0056-6375	J. C. Anderson – Private Citizen
EPA-HQ-OAR-2002-0056-6376	L. Flournoy – Private Citizen
EPA-HQ-OAR-2002-0056-6377	E. Smith – Private Citizen
EPA-HQ-OAR-2002-0056-6378	J. Kirkpatrick – Private Citizen
EPA-HQ-OAR-2002-0056-6379	J. M. Remmen – Private Citizen
EPA-HQ-OAR-2002-0056-6381	S. Porter – Private Citizen
EPA-HQ-OAR-2002-0056-6382	M. Reeser – Private Citizen
EPA-HQ-OAR-2002-0056-6383	T. Smith – Private Citizen
EPA-HQ-OAR-2002-0056-6384	G. Ragain – Private Citizen
EPA-HQ-OAR-2002-0056-6385	L. Bunting – Private Citizen
EPA-HQ-OAR-2002-0056-6386	S. W. Hanson – Private Citizen
EPA-HQ-OAR-2002-0056-6387	A. Marsh – Private Citizen
EPA-HQ-OAR-2002-0056-6388	D. and C. Brock – Private Citizens
EPA-HQ-OAR-2002-0056-6389	D. M. Dean – Private Citizen
EPA-HQ-OAR-2002-0056-6390	D. Pennell – Private Citizen
EPA-HQ-OAR-2002-0056-6391	J. and J. Forbes – Private Citizens
EPA-HQ-OAR-2002-0056-6392	J. Orr – Private Citizen
EPA-HQ-OAR-2002-0056-6393	J. Stalley – Private Citizen
EPA-HQ-OAR-2002-0056-6394	R. Leforgee – Private Citizen
EPA-HQ-OAR-2002-0056-6396	Eddie Terrill, President of STAPPA and John A. Paul, President of ALAPCO
EPA-HQ-OAR-2002-0056-6397	Eddie Terrill, President of STAPPA and John A. Paul, President of ALAPCO
EPA-HQ-OAR-2002-0056-6400	B. Burnham – Private Citizen
EPA-HQ-OAR-2002-0056-6401	H. Beer-Lickley – Private Citizen
EPA-HQ-OAR-2002-0056-6405	Anonymous Public Comment
EPA-HQ-OAR-2002-0056-6406	M. Holman – Private Citizen
EPA-HQ-OAR-2002-0056-6407	S. Howard – Private Citizen
EPA-HQ-OAR-2002-0056-6413	R. Dixon – Private Citizen
EPA-HQ-OAR-2002-0056-6414	S. Howard and B. Swanson – Private Citizens
EPA-HQ-OAR-2002-0056-6415	W. and A. Skeem – Private Citizens
EPA-HQ-OAR-2002-0056-6416	C. Schiaffo – Private Citizen
EPA-HQ-OAR-2002-0056-6417	Ted Michaels, President, Integrated Waste Services Association (IWSA)
EPA-HQ-OAR-2002-0056-6418	Anonymous Public Comment
EPA-HQ-OAR-2002-0056-6419	Steven E. Yates, Air Compliance Manager, Connecticut Resources Recovery Authority
EPA-HQ-OAR-2002-0056-6420	A. Kelley – Private Citizen
EPA-HQ-OAR-2002-0056-6421	D. E. D’Ambra – Private Citizen
EPA-HQ-OAR-2002-0056-6422	D. L. Elgan – Private Citizen
EPA-HQ-OAR-2002-0056-6423	F. and T. Hinman – Private Citizens
EPA-HQ-OAR-2002-0056-6424	M. Snow – Private Citizen

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6425	R. McNeil – Private Citizen
EPA-HQ-OAR-2002-0056-6426	Margaret Janes – Senior Policy Analyst, Appalachian Center for the Economy and the Environment
EPA-HQ-OAR-2002-0056-6427	R. Dixon – Private Citizen
EPA-HQ-OAR-2002-0056-6428	Robin B. Davidov – Executive Director, Northeast Maryland Waste Disposal Authority
EPA-HQ-OAR-2002-0056-6429	L. and S. Fritzler – Private Citizens
EPA-HQ-OAR-2002-0056-6430	R. S. Fisher and D. C. Fisher – Private Citizens
EPA-HQ-OAR-2002-0056-6431	R. Linsenberg – Private Citizen
EPA-HQ-OAR-2002-0056-6432	(Duplicate) R. Linsenberg – Private Citizen
EPA-HQ-OAR-2002-0056-6433	William A. Ehrman – Executive Director, York County Solid Waste and Refuse Authority
EPA-HQ-OAR-2002-0056-6434	K. Burgess – Private Citizen
EPA-HQ-OAR-2002-0056-6435	D. Burgess – Private Citizen
EPA-HQ-OAR-2002-0056-6451	Claudia Braun – Private Citizen
EPA-HQ-OAR-2002-0056-6452	Mark Sugden – Private Citizen
EPA-HQ-OAR-2002-0056-6453	Glen Buckendorf – Private Citizen
EPA-HQ-OAR-2002-0056-6454	Lori Buttars – Private Citizen
EPA-HQ-OAR-2002-0056-6455	Sherry Evasic – Blue Heron Environmental Network, Inc.
EPA-HQ-OAR-2002-0056-6456	Duplicate of 6454
EPA-HQ-OAR-2002-0056-6457	Cindy Bloom – Private Citizen
EPA-HQ-OAR-2002-0056-6458	Paul Wilson – Olmsted County (MN) Board of Commissioners
EPA-HQ-OAR-2002-0056-6459	Bill Wemhoff - The National Rural Electric Cooperative Association (NRECA)
EPA-HQ-OAR-2002-0056-6460	James Brooks – Maine Department of Environmental Quality/Bureau of Air Quality
EPA-HQ-OAR-2002-0056-6461	Harold Frank – Dairyland Power Cooperative
EPA-HQ-OAR-2002-0056-6462	Caroline Choi – Progress Energy
EPA-HQ-OAR-2002-0056-6463	Shannon O’Toole – Private Citizen
EPA-HQ-OAR-2002-0056-6464	Mark and Rhonda Holmstead – Private Citizens
EPA-HQ-OAR-2002-0056-6465	Nedra and Roy Hubert – Private Citizens
EPA-HQ-OAR-2002-0056-6466	Patsy Banning – Private Citizen
EPA-HQ-OAR-2002-0056-6467	Mike Mikesell – Private Citizen
EPA-HQ-OAR-2002-0056-6468	Cheri Condie – Private Citizen
EPA-HQ-OAR-2002-0056-6469	Jan Ganguet – Private Citizen
EPA-HQ-OAR-2002-0056-6470	Ted and Vernita Talbott – Private Citizens
EPA-HQ-OAR-2002-0056-6471	Williams M. Bumpers, et al. – Class of ‘85 Regulatory Response Group
EPA-HQ-OAR-2002-0056-6472	Bradley Campbell – New Jersey Department of Environmental Protection
EPA-HQ-OAR-2002-0056-6473	Cover page for 6471
EPA-HQ-OAR-2002-0056-6474	Michael Rossler – Edison Electric Institute (EEI)
EPA-HQ-OAR-2002-0056-6475	Lee B. Zeugin, et al., Hunton and Williams, LLP – Utility Air Regulatory Group (UARG)
EPA-HQ-OAR-2002-0056-6476	Lee B. Zeugin, et al., Hunton and Williams, LLP – Utility Air Regulatory Group (UARG)
EPA-HQ-OAR-2002-0056-6477	Bill Edmonds – WEST Associates
EPA-HQ-OAR-2002-0056-6478	Bill Grantham – National Tribal Air Association (NTAA)/National Tribal Environmental Council (NTEC)

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6479	Attorneys General and Assistant Attorneys General of the States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin
EPA-HQ-OAR-2002-0056-6480	Rob Kost – Private Citizen
EPA-HQ-OAR-2002-0056-6481	Ann Berwick – The Clean Energy Group (CEG)
EPA-HQ-OAR-2002-0056-6482	Mark Schwirtz – Arizona Electric Power Cooperative
EPA-HQ-OAR-2002-0056-6483	Mark Daily – Idaho Aquaculture Association, Inc.
EPA-HQ-OAR-2002-0056-6484	Neil Woodworth – The Adirondack Mountain Club
EPA-HQ-OAR-2002-0056-6485	Missing online
EPA-HQ-OAR-2002-0056-6486	Lon Bouknight – Edison International
EPA-HQ-OAR-2002-0056-6487	Henrik Wessel – Golden Valley Electric Association (GVEA)
EPA-HQ-OAR-2002-0056-6488	Bill Boycott – Agrium U.S., Inc.
EPA-HQ-OAR-2002-0056-6489	John Stowell – Cinergy Corporation
EPA-HQ-OAR-2002-0056-6490	Jeffrey Underhill – State of New Hampshire Department of Environmental Services
EPA-HQ-OAR-2002-0056-6491	Southern Company
EPA-HQ-OAR-2002-0056-6492	Duplicate of 6491
EPA-HQ-OAR-2002-0056-6493	Duplicate of 6474
EPA-HQ-OAR-2002-0056-6494	Anonymous Public Comment
EPA-HQ-OAR-2002-0056-6495	Gary Slagel – American Coal For Balanced Mercury Regulations (ACBMR)
EPA-HQ-OAR-2002-0056-6496	Cover page for 6476
EPA-HQ-OAR-2002-0056-6497	Leonard Levin and Janice Yager – Electric Power Research Institute (EPRI)
EPA-HQ-OAR-2002-0056-6498	Phil Katzen, et al., Faegre and Benson, LLP – for the National Congress of the American Indian
EPA-HQ-OAR-2002-0056-6499	Shawn Glacken – TXU Power
EPA-HQ-OAR-2002-0056-6500	Duplicate of 6562
EPA-HQ-OAR-2002-0056-6501	Charles Knauss, Swidler Berlin LLP – Counsel for Producers of Electric Reliability
EPA-HQ-OAR-2002-0056-6502	Bartley Coiley – Usibelli Coal Mine, Inc.
EPA-HQ-OAR-2002-0056-6503	Steve Jaques – Missouri Department of Natural Resources
EPA-HQ-OAR-2002-0056-6504	John Stowell – Cinergy Corporation
EPA-HQ-OAR-2002-0056-6505	Ron Miller – Alaska Industrial Development and Export Authority/Alaska Energy Authority
EPA-HQ-OAR-2002-0056-6506	Eddie Terrill – STAPPA, and John Paul – ALAPCO
EPA-HQ-OAR-2002-0056-6507	C.V. Mathai – Arizona Public Service Company
EPA-HQ-OAR-2002-0056-6508	Dennis and Elizabeth Kost – Private Citizens
EPA-HQ-OAR-2002-0056-6509	Michael Cashin – Minnesota Power
EPA-HQ-OAR-2002-0056-6510	John Harja – State of Utah/Resource Development Coordinating Committee/Public Lands Section
EPA-HQ-OAR-2002-0056-6511	Deb Arnason – Private Citizen
EPA-HQ-OAR-2002-0056-6512	Julianne Ramaker – Private Citizen
EPA-HQ-OAR-2002-0056-6513	Bryan Brendle – National Association of Manufacturers (NAM)
EPA-HQ-OAR-2002-0056-6514	Gary Hermes – Private Citizen
EPA-HQ-OAR-2002-0056-6515	Virginia LoCastro – Private Citizen
EPA-HQ-OAR-2002-0056-6516	Paul Rizzo – Private Citizen

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EPA-HQ-OAR-2002-0056-6517	Wendy Jaquet – Minority Leader, State of Idaho House of Representatives
EPA-HQ-OAR-2002-0056-6518	Mack Waldrip – Private Citizen
EPA-HQ-OAR-2002-0056-6519	Marianna Edgerton – Private Citizen
EPA-HQ-OAR-2002-0056-6520	Benjamin Riley – Private Citizen
EPA-HQ-OAR-2002-0056-6521	Thomas Owens – Private Citizen
EPA-HQ-OAR-2002-0056-6522	Sylvia Dill – Private Citizen
EPA-HQ-OAR-2002-0056-6523	Katherine Russell – Private Citizen
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EPA-HQ-OAR-2002-0056-6525	Mary Clagett Smith – Private Citizen
EPA-HQ-OAR-2002-0056-6526	Pamela Gray – Private Citizen
EPA-HQ-OAR-2002-0056-6527	Susan Stanford – Private Citizen
EPA-HQ-OAR-2002-0056-6528	William Ray – Private Citizen
EPA-HQ-OAR-2002-0056-6529	Billie Ramsey and David Martin – ARIPPA
EPA-HQ-OAR-2002-0056-6530	Ralph Tyler – City of Baltimore (MD) Solicitor
EPA-HQ-OAR-2002-0056-6531	Ed Fulginiti – 60 Plus Association
EPA-HQ-OAR-2002-0056-6532	John Wetzel – Association of American Railroads
EPA-HQ-OAR-2002-0056-6533	Comment was inadvertently added to this docket.
EPA-HQ-OAR-2002-0056-6534	Alfred McGlinsky – Private Citizen
EPA-HQ-OAR-2002-0056-6535	Angela Paige – Private Citizen
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EPA-HQ-OAR-2002-0056-6537	Peter Lambert – Private Citizen
EPA-HQ-OAR-2002-0056-6538	Mark Jacobs – Private Citizen
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EPA-HQ-OAR-2002-0056-6540	Richard Miller – Private Citizen
EPA-HQ-OAR-2002-0056-6541	Susan Daniel – Private Citizen
EPA-HQ-OAR-2002-0056-6542	Jane Cunningham – Private Citizen
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EPA-HQ-OAR-2002-0056-6551	Kim Kilchenstein – Private Citizen
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EPA-HQ-OAR-2002-0056-6553	Carol Dickason – Private Citizen
EPA-HQ-OAR-2002-0056-6554	Peggy Schramm – Private Citizen
EPA-HQ-OAR-2002-0056-6555	Laurie Wakefield – Private Citizen
EPA-HQ-OAR-2002-0056-6556	Dennis Blocker – Private Citizen
EPA-HQ-OAR-2002-0056-6557	Michael J. Nasi, Lloyd Gosselink Blevins Rochelle & Townsend, P.C. – Gulf Coast Lignite Coalition
EPA-HQ-OAR-2002-0056-6558	Barbara Walz – Tri-State Generation and Transmission Association, Inc.
EPA-HQ-OAR-2002-0056-6559	Greg Schaefer – Arch Coal, Inc.

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EPA-HQ-OAR-2002-0056-6560	Stephen Smith – Texas Mining and Reclamation Association
EPA-HQ-OAR-2002-0056-6561	Nina Schoch – Wildlife Conservation Society
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EPA-HQ-OAR-2002-0056-6565	Gerald Miller – Private Citizen
EPA-HQ-OAR-2002-0056-6566	Ann Lewandowski – Private Citizen
EPA-HQ-OAR-2002-0056-6567	Robert and Gail Stagman – Private Citizens
EPA-HQ-OAR-2002-0056-6568	Joel Jacobs – Private Citizen
EPA-HQ-OAR-2002-0056-6569	Christina Hansen – Private Citizen
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EPA-HQ-OAR-2002-0056-6571	Matt Wold – Private Citizen
EPA-HQ-OAR-2002-0056-6572	Prentise Wylie – Private Citizen
EPA-HQ-OAR-2002-0056-6573	Jeremy Fryberger – Private Citizen
EPA-HQ-OAR-2002-0056-6574	James Parker – Compliance Services, PPL
EPA-HQ-OAR-2002-0056-6575	James Hammitt – Harvard Center for Risk Analysis
EPA-HQ-OAR-2002-0056-6576	William Steele – Private Citizen
EPA-HQ-OAR-2002-0056-6577	Kathleen A. McGinty – Pennsylvania Department of Environmental Protection
EPA-HQ-OAR-2002-0056-6578	Craig McCollum – Alaska Power Association
EPA-HQ-OAR-2002-0056-6579	Martin Bauer – State of Idaho, Department of Environmental Quality, Air Quality Division
EPA-HQ-OAR-2002-0056-6580	Tanja Shonkwiler, Duncan, Weinberg, Genzer & Pembroke, P.C. – Jamestown Board of Public Utilities (JBPU)
EPA-HQ-OAR-2002-0056-6581	Bronwen Turner – Westmoreland Coal
EPA-HQ-OAR-2002-0056-6582	John Persell – Minnesota Chippewa Tribe
EPA-HQ-OAR-2002-0056-6583	Peter J. DeFoe – Fond du Lac Band of Lake Superior Chippewa
EPA-HQ-OAR-2002-0056-6584	Bruce Alexander – Exelon Corporation
EPA-HQ-OAR-2002-0056-6585	Brandy Toft – Leech Lake Band of Ojibwe
EPA-HQ-OAR-2002-0056-6586	Dennis Welch – American Electric Power
EPA-HQ-OAR-2002-0056-6587	Kathleen Burns – Science Corps
EPA-HQ-OAR-2002-0056-6588	John Hoeven – Governor, State of North Dakota
EPA-HQ-OAR-2002-0056-6589	Matt Riel – AES Hawaii, Inc.
EPA-HQ-OAR-2002-0056-6590	Gary Slagel – American Coal for Balanced Mercury Regulations (ACBMR)
EPA-HQ-OAR-2002-0056-6591	Duplicate of 6488
EPA-HQ-OAR-2002-0056-6592	John C. O’Conner – Farm Management, Inc.
EPA-HQ-OAR-2002-0056-6593	Nathaniel Matter – Private Citizen
EPA-HQ-OAR-2002-0056-6594	Lia Huber – Private Citizen
EPA-HQ-OAR-2002-0056-6595	Jay Leutze – Private Citizen
EPA-HQ-OAR-2002-0056-6596	Susan Kepner – Private Citizen
EPA-HQ-OAR-2002-0056-6597	Ann Alexander – Office of Attorney General Lisa Madigan, State of Illinois
EPA-HQ-OAR-2002-0056-6598	A.A. Linero – Private Citizen
EPA-HQ-OAR-2002-0056-6599	Dennis James – North American Coal Corporation
EPA-HQ-OAR-2002-0056-6600	David Hand – Private Citizen

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6601	Connie Mulligan – Department of Anthropology, University of Florida
EPA-HQ-OAR-2002-0056-6602	Marie Valleroy – Private Citizen
EPA-HQ-OAR-2002-0056-6603	Barbara Francisco – Private Citizen
EPA-HQ-OAR-2002-0056-6604	Mike Weber – Private Citizen
EPA-HQ-OAR-2002-0056-6605	Anonymous Public Comment
EPA-HQ-OAR-2002-0056-6606	Tina Arnold – Private Citizen
EPA-HQ-OAR-2002-0056-6607	James Maier – Private Citizen
EPA-HQ-OAR-2002-0056-6608	Ingrid McClellan – Private Citizen
EPA-HQ-OAR-2002-0056-6609	Duplicate of 6575
EPA-HQ-OAR-2002-0056-6610	Citizens of Magic Valley, Twin Falls, Idaho
EPA-HQ-OAR-2002-0056-6611	Paul Reynolds – Hoosier Energy Rural Electric Cooperative, Inc.
EPA-HQ-OAR-2002-0056-6612	Steven Chester – Michigan Department of Environmental Quality
EPA-HQ-OAR-2002-0056-6613	Kenneth A. Reich, Wolf, Block, Schorr and Solis-Cohen, LLP – Southern Montana Electric Generation and Transmission Cooperative Inc.
EPA-HQ-OAR-2002-0056-6614	Mike Robertson – Minnesota Chamber of Commerce
EPA-HQ-OAR-2002-0056-6615	Duplicate of 6479
EPA-HQ-OAR-2002-0056-6616	Duplicate of 6577
EPA-HQ-OAR-2002-0056-6617	Kyle Kinner – Physicians for Social Responsibility
EPA-HQ-OAR-2002-0056-6618	Kerry Canfield – Private Citizen
EPA-HQ-OAR-2002-0056-6619	Duplicate of 6577
EPA-HQ-OAR-2002-0056-6620	Glenn Shankle – Texas Commission on Environmental Quality
EPA-HQ-OAR-2002-0056-6621	Theresa Pugh, American Public Power Association (APPA)
EPA-HQ-OAR-2002-0056-6622	Thomas Howard – SAPPI/S.D. Warren Company-Westbrook Mill
EPA-HQ-OAR-2002-0056-6623	Duplicate of 6612
EPA-HQ-OAR-2002-0056-6624	Duplicate of 6487
EPA-HQ-OAR-2002-0056-6625	Pamela Faggert – Dominion Power Virginia
EPA-HQ-OAR-2002-0056-6626	Duplicate of 6611
EPA-HQ-OAR-2002-0056-6627	John Hoeven – Governor, State of North Dakota
EPA-HQ-OAR-2002-0056-6628	Ethan Klein – Private Citizen
EPA-HQ-OAR-2002-0056-6629	Meredith Lin – Private Citizen
EPA-HQ-OAR-2002-0056-6630	Mark Lichtenberger – Private Citizen
EPA-HQ-OAR-2002-0056-6631	Gerald and Judith Arnold – Private Citizens
EPA-HQ-OAR-2002-0056-6632	David Walker – Friends of the Cacapon River
EPA-HQ-OAR-2002-0056-6633	Clean Air Task Force (CATF), Izaak Walton League of America, Natural Resources Council of Maine, Ohio Environmental Council, U.S. Public Interest Research Group (USPIRG), Natural Resources Defense Council (NRDC), Chesapeake Bay Foundation, Waterkeeper, Aroostook Band of Micmacs, Houlton Band of Maliseet Indians, Penobscot Indian Nation, and Passamaquoddy Tribe at Indian Township
EPA-HQ-OAR-2002-0056-6634	Clean Air Task Force (CATF), Izaak Walton League of America, Natural Resources Council of Maine, Ohio Environmental Council, U.S. Public Interest Research Group (USPIRG), Natural Resources Defense Council (NRDC), Chesapeake Bay Foundation, Waterkeeper, Aroostook Band of Micmacs, Houlton Band of Maliseet Indians, Penobscot Indian Nation, and Passamaquoddy Tribe at Indian Township
EPA-HQ-OAR-2002-0056-6635	John Dwyer – North Dakota Lignite Energy Council
EPA-HQ-OAR-2002-0056-6636	Joseph Eutizi – San Miguel Electric Cooperative

Docket Item No. EPA-HQ-OAR-2002-0056	Commenter/Affiliation
EPA-HQ-OAR-2002-0056-6637	Sue Vernier – Evansville Audubon Society
EPA-HQ-OAR-2002-0056-6638	Monica Brown – Private Citizen
EPA-HQ-OAR-2002-0056-6639	Linda Murkowski – U.S. Senator, Alaska
EPA-HQ-OAR-2002-0056-6640	Duplicate of 6557
EPA-HQ-OAR-2002-0056-6641	Duplicate of 6560
EPA-HQ-OAR-2002-0056-6642	Charles Enyart – Eastern Shawnee Tribe of Oklahoma
EPA-HQ-OAR-2002-0056-6643	Calvin Williams – Professional Safety Training Services, Inc.
EPA-HQ-OAR-2002-0056-6644	Dorothy Bisbee – Private Citizen
EPA-HQ-OAR-2002-0056-6645	Marlena Machol – Private Citizen
EPA-HQ-OAR-2002-0056-6646	Catherine Zimmer – Minnesota Technical Assistance Program, University of Minnesota
EPA-HQ-OAR-2002-0056-6647	Victoria Golden – Private Citizen
EPA-HQ-OAR-2002-0056-6648	William Campbell – ENSR International
EPA-HQ-OAR-2002-0056-6649	Olon Plunk – Xcel Energy
EPA-HQ-OAR-2002-0056-6650	Bradley Janorschke – Homer Electric Association
EPA-HQ-OAR-2002-0056-6651	Douglas Fulle – Oglethorpe Power
EPA-HQ-OAR-2002-0056-6652	Tom Chapple – Department of Environmental Conservation, State of Alaska
EPA-HQ-OAR-2002-0056-6653	Steven Borell – Alaska Miners Association, Inc.
EPA-HQ-OAR-2002-0056-6654	Duplicate of 6635
EPA-HQ-OAR-2002-0056-6655	Varsha Mathrani – Private Citizen
EPA-HQ-OAR-2002-0056-6656	Joe Alexander – Private Citizen
EPA-HQ-OAR-2002-0056-6657	Tomelars Blair – Private Citizen
EPA-HQ-OAR-2002-0056-6658	Duplicate of 6468
EPA-HQ-OAR-2002-0056-6659	Lee Halper – Private Citizen
EPA-HQ-OAR-2002-0056-6660	Gusten Stone – Private Citizen
EPA-HQ-OAR-2002-0056-6661	Curtis Welch – Private Citizen
EPA-HQ-OAR-2002-0056-6662	Eugene Bigboy, Sr. – Bad River Band of Lake Superior Tribe of Chippewa Indians (dated June 5, 2000)
EPA-HQ-OAR-2002-0056-6663	Gary Grindstaff – Twin Falls County Board of Commissioners, Twin Falls, Idaho
EPA-HQ-OAR-2002-0056-6664	Chey Barnes – Private Citizen
EPA-HQ-OAR-2002-0056-6665	Duplicate of 6581
EPA-HQ-OAR-2002-0056-6666	State Senator Mary Jo White – State of Pennsylvania
EPA-HQ-OAR-2002-0056-6667	Duplicate of 6633 and 6634
EPA-HQ-OAR-2002-0056-6670	Mass comment campaign
EPA-HQ-OAR-2002-0056-6671	Kyle Kinner – Physicians for Social Responsibility, et al. (errata)
EPA-HQ-OAR-2002-0056-6698	Bart E. Cassidy, Manko, Gold, Katcher & Fox, LLP on behalf of ARIPPA (supplement to EPA-HQ-OAR-2002-0056-6529)

1.0 Summary of the Significant Public Comments on the Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units and the Removal of Coal- and Oil Fired Electric Utility Steam Generating Units from the Section 112(c) List: Reconsideration

1.1 Discussion of Issues Subject to Reconsideration

1.1.1 Legal Interpretations

Comment:

Several commenters (6280, 6478, 6530, 6577, and 6634) stated that EPA lacks discretion to revise its December 2000 regulatory determination. They argue that Congress described a tight schedule for EPA's Regulatory Determination and listing decision and that EPA's decision to read CAA §112(n)(1)(A) to permit the Agency to revisit the regulatory determination directly contravenes Congress's interest in both timely decision making and timely industrial hazardous air pollutant (HAP) emission reductions.

According to commenters, Congress created a unidirectional system whereby EPA would promptly study the need for maximum achievable control technology (MACT) standards and then quickly promulgate such standards as needed. Commenters allege that EPA's reading of CAA §112(n)(1)(A) undermines that system, permitting the Agency to revisit the results of its Utility HAP Study and its subsequent "appropriate and necessary" finding-and, thus, to delay or derail promulgation of utility MACT standards-whenever it so desires.

Commenters also state that in addition to the tight timetables written into CAA §112(n) specifically, CAA §112 generally requires rapid Agency regulatory response to air toxics issues, which they argue does not offer even the suggestion of a perpetually open door on this process. They argue that the language of the Act does not support EPA's argument that because there is no deadline specifically enumerated in the Act for making the regulatory determination itself, it has broad discretion to continue considering new information as it becomes available. They also argue that the Agency uses this authority to revise its regulatory decision based primarily on new legal theories, not new data about Hg pollution or health effects, a perspective they say is not supported by the language of the Act.

Commenters also point to the fact that CAA §112(n)(1)(A), unlike other sections of the Act, contains no provision by which EPA is authorized or directed to revisit its regulatory determination and listing decision once it is made. They cite several sections in support of their argument that when Congress intended that a decision be revisited, or a standard be updated and repromulgated based on new information, Congress knew how to include such a requirement in the text of the Act.

Next they contend that in the delisting rule EPA implicitly recognizes that the Agency's interpretation of CAA §112(n)(1)(A) is flawed, citing the preamble to the rule wherein EPA notes that, at the time EPA was to have completed the Utility HAP Study, the Agency "could have only forecast, to the extent possible, how implementation of the requirements of the CAA would impact utility HAP emissions, *based on the science and the state of technology at the time*." See 70 FR 15999 (emphasis added by commenters). According to commenters, Congress was aware of this limitation when it directed EPA to perform the Utility Study and to decide the appropriateness and necessity of utility MACT standards based on the results of that study. Thus, they argue that the obvious implication is that Congress intended EPA to decide whether utility MACT standards were appropriate and necessary "based on the science and the state of technology at the time" of the study, and that EPA then could not reopen the "appropriate and necessary" determination to consider CAIR and CAMR, neither of which could have been anticipated in the early 1990s.

Response:

Neither the timelines set out in CAA §112 nor the lack of specific periodic review language in CAA §112(n)(1)(A) eliminate the Agency's authority, if not duty, to consider "the wisdom of its policy on a continuing basis." See Chevron v. NRDC et al., 467 U.S. 837, 864 (1984). It is inherent to the effective administration of any statute that the implementing Agency be empowered to revise prior findings and conclusions when necessary. As the Supreme Court stated in American Trucking Ass'n v. Atchison, Topeka & Santa Fe Ry., 387 U.S. 397, 416 (1967), an agency "faced with new developments or in light of reconsideration of the relevant facts and its mandate, may alter its past interpretation and overturn past administrative rulings and practice." "[T]his kind of flexibility and adaptability...is an essential part of the office of a regulatory agency." Id. Similarly, the Supreme Court recently observed:

> *An initial agency interpretation is not instantly carved in stone. On the contrary, the agency...must consider varying interpretations and the wisdom of its policy on a continuing basis,...for example, in response to changed factual circumstances, or a change in administrations.*

National Cable & Telecomms. Ass'n v. Brand X Internet Servs., 125 S. Ct. 2688, 2700 (2005) (citations omitted).

The courts have recognized this authority consistently, and granted deference to an Agency's revised interpretation where, as here, the change is accompanied by a reasoned analysis. See Mobil Oil Corp. v. EPA, 871 F.2d 149, 152 (D.C. Cir. 1989) ("an agency's reinterpretation of statutory language is nevertheless entitled to deference, so long as the agency acknowledges and explains the departure from its prior views"); cf. Greater Boston Television Corporation v. FCC, 444 F.2d 841, 852 (D.C. Cir.1970), cert. denied, 403 U.S. 923, 91 S.Ct. 2233, 29 L.Ed.2d 701 (1971) ("An agency's view of what is in the public interest may change, either with or without a change in circumstances. But an agency changing its course must supply a reasoned analysis indicating that prior policies and standards are being deliberately changed, not casually ignored...") (citations omitted). The courts have also recognized the public's right to petition EPA to reconsider or reopen a CAA decision when subsequent information calls into question the wisdom of an earlier decision. See Oljato Chapter of Navajo Tribe v. Train, 515

F.2d 654, 660 (D.C.Cir.1975) ("Congress sought in Section 307 to provide a legal mechanism and an exclusive one to assure that standards were revised whenever necessary."). This tenet of administrative law does not result in, as commenters argue, "a perpetually open door;" the door only opens when, as here, EPA determines that (1) an earlier decision was flawed and/or (2) new information justifies reopening that earlier decision.

Commenters also assert that EPA revised the December 2000 determination even though it had no "new data about mercury pollution or health effects." The record supporting the final rule belies this point. Since 1998 and the December 2000 determination, EPA has obtained better information concerning Hg, including, for example, information concerning the speciation of Hg, and the viability of Hg-specific control technologies. Even assuming, arguendo, that EPA had not obtained any new information concerning Hg, it is well settled that one Administration's permissible interpretation of a statute cannot forever bind subsequent Administrations. See, e.g., National Cable, 125 S. Ct. at 2700. Contrary to the commenters' assertion, EPA may "properly rely upon the incumbent administration's views...to inform its judgments," Chevron, 467 U.S. at 865, provided the agency provides a reasoned analysis of the change, which it has done here.

The fact that at some places Congress ***mandated*** *specific, periodic review of other EPA decisions does not mean that Congress intended to prohibit EPA's exercise of a fundamental premise of administrative law. Indeed, the Agency recently successfully defended revisions to the New Source Review (NSR) programs, and the statutory provisions at issue in those programs also do not contain language specifically authorizing EPA to periodically review the wisdom of its original decisions and rules. See New York, et al., v. EPA, 413 F.3d 3 (D.C. Cir. 2005).*

Moreover, in CAA §112(n)(1)(A), Congress neither set a deadline by which the appropriate and necessary determination was to be made, nor include language prohibiting EPA from revisiting that determination. The existence of timelines surrounding, but not applying specifically to, the initial appropriate and necessary finding does not mean that the Agency is forever bound by that decision, no matter how erroneous it may have been at the time, or how imprudent it may be shown to be by new information. Indeed, the 1977 CAA Amendments that led to the NSR rules mentioned above anticipated a much tighter timeline for implementation of the program than that allegedly set by CAA §112(n)(1)(A), yet EPA's reasonable revisions to them were upheld by the court. See CAA Amendments of 1977, Pub. L. 95-95, §406(d)(2) (SIP revisions were due no later than 9 months after EPA revised its regulations) and CAA §127 (adding §168 to the CAA which made changes to existing PSD regulations effective immediately).

Commenters also mischaracterize EPA's interpretation of CAA §112(n)(1)(A). In the final rule, EPA explained that it interprets the phrase "after imposition of the requirements of th[e] Act" to mean not only those requirements of the Act already imposed and in effect, but also those requirements that EPA reasonably anticipates will be implemented and will either directly or indirectly result in utility HAP reductions. See 70 FR 15998-99. EPA also stated that given its interpretation of the phrase "after imposition of the requirements of th[e] Act," EPA reasonably read the first sentence of CAA §112(n)(1)(A) as calling for a study of the hazards to public health from utility HAP emissions that EPA reasonably anticipates would occur after implementation of the CAA requirements that EPA, at the time of the study, should have *reasonably anticipated would be implemented and would directly or indirectly affect utility HAP emissions. See 70 FR 15999. In an effort to give effect to the "after imposition of the requirements of th[e] Act" language in the first sentence of CAA §112(n)(1)(A), EPA in the study estimated utility HAP emissions through 2010. Relying on EPA's description of the content of the study, commenters argue that the appropriate and necessary determination is to be made based solely on the science at the time of the study and that EPA erred in considering CAIR and CAMR in the final rule because, according to the commenters, "neither could have been anticipated in the early 1990's" when Congress directed that the study be completed.*

Commenters take the sentence in the final rule concerning the content of the study out of context. The statement in the final rule on which the commenters focus merely summarizes the contents of the study. Nothing in CAA §112(n)(1)(A) precludes the Agency from considering new information. Indeed, in the initial December 2000 appropriate and necessary finding, EPA considered information that it acquired after completion of the Utility Study. See 70 FR 15999/3. Significantly, EPA also explained in the final rule that because of Congress' lack of direction as to the substance of the appropriate and necessary finding, EPA looked to Congress' description of the study in the first sentence of CAA §112(n)(1)(A) as guidance in interpreting the phrase "appropriate and necessary." In making the appropriate and necessary finding in March 2005, EPA reasonably relied on new information, including the recently promulgated CAIR and CAMR, in determining whether the level of utility-attributable Hg remaining after imposition of the requirements of the Act, including imposition of CAA §§110(a)(2)(D) and 111, was reasonably anticipated to result in hazards to public health. See 70 FR 15997/3, 16004 & n.31.

Finally, an Agency's ability to revise or correct an earlier decision is even clearer when the original decision has not yet been subject to judicial review. EPA's initial December 2000 Finding was not a final agency action and has not been subject to judicial review. See Utility Air Regulatory Group v. EPA, No. 01-1074, 2001 WL 936363 (D.C. Cir. July 26, 2001) (finding Court lacked jurisdiction to review December 2000 finding that regulation of Utility Units is appropriate and necessary and that units should be listed as a source category under CAA §112(c)); 42 U.S.C. §7412(e)(4) (providing that any action by EPA listing a source category shall not be a final action subject to judicial review except that such action may be reviewed when EPA issues emission standards for such pollutant or category). EPA has authority to revise an Agency action based on new information and public comments that bear on that action, especially an action that has not been subject to judicial review.

Comment:

Several commenters (6280, 6478, 6577, and 6634) stated that the CAA allows EPA to delist a source category that emits HAP only if it first makes highly specific determinations about the health and environmental risks that the category poses. 42 U.S.C. §7412(c)(9)(B). They argue that EPA erred because it did not make either of these determinations in its final rule and indeed asserted that it had no obligation to do so.

They argue that the plain language of CAA §112(c)(9)(B) indicates that Congress did not intend EPA to remove any HAP-emitting source category from the CAA §112(c) list unless the

Agency first demonstrates that the health and environmental risks from that category fall below the specific levels set forth in CAA §§112(c)(9)(B)(i) or (ii). Therefore, they continue, because EPA did not purport to make either of the CAA §112(c)(9)(B) determinations with respect to power plants, the Agency's delisting contravenes the CAA. They point to the undisputed applicability of other CAA §112 provisions that they argue, just like CAA §112(c)(9), were triggered by the Agency's decision to place power plants on the CAA §112(c) list. They argue that EPA admits that its listing triggered CAA §112(c)(2)'s requirement to issue CAA §112(d) MACT standards for power plants. See 42 U.S.C. §7412(c)(2) ("For the categories and subcategories the Administrator lists, the Administrator shall establish emissions standards under subsection (d) of this section"); 67 FR 6521, 6524, n .b. (February 12, 2002) (acknowledging that listing required EPA to issue CAA §112(d) standards). Likewise, they highlight that EPA admits that its listing required sources to obtain case-by-case MACT standards as a precondition for the construction of any new power plants, 42 U.S.C. §7412(g)(2)(B); 40 C .F.R. §63.40(c) (providing that listing triggers CAA §112(g) requirements for power plants), and that EPA also notes that its listing triggered CAA §112(e)(4), which exempts listing determinations from judicial review until final MACT standards are issued for the source category. See 42 U.S.C. §7412(e)(4); 70 FR 15996 (asserting that the listing of power plants under CAA §112(c) was shielded from judicial review by CAA §112(e)(4)). Thus, commenters argue that EPA is picking and choosing the statutory requirements it will obey, and that the December 2000 listing also triggered the applicability of CAA §112(c)(9)'s delisting requirements to any Agency attempt to exempt Utility Units from MACT. They also contend that EPA recognized over a decade ago, when it explained why it elected to exclude power plants from its initial CAA §112(c) list, that a subsequent delisting action "would be subject to the risk-based findings required under CAA §112(c)(9)." See 56 FR 28548, 28550-51 (June 21, 1991).

Commenters disagree with EPA's position that even though CAA §112(c)(9) governs the removal of other source categories from the CAA §112(c) list, it does not apply to power plants, arguing that by its terms CAA §112(c)(9) applies to the removal of "any source category" from the CAA §112(c) list, and it contains no exception for power plants. See 42 U.S.C. §7412(c)(9)(B). Further, they add, CAA §112(c)(9) contains no reference to CAA §112(n)(1)(A), on which EPA seeks to rely. Finally, they state that CAA §112(n)(1)(A) says nothing about removing power plants from the CAA §112(c) list and, therefore, cannot authorize the Agency's action.

Commenters next disagree with EPA's position that it can rely on its inherent rulemaking authority. They argue that EPA has no "inherent authority" to list or delist source categories, but instead only has such authority as the CAA §112(c) confers. Moreover, they refute EPA's citation to CAA §112(e)(4) and *UARG v. EPA,* No. 01-1074 (D .C Cir. July 26, 2001), for the proposition that its listing decisions are not "final agency action" and that the Agency can reverse such decisions "at any time" without making the determinations required by CAA §112(c)(9). In particular, they argue that CAA §112(e)(4) merely provides that judicial review of the listing of a source category under CAA §112(c) is not available until after emission standards are issued, and, therefore, lends no support to EPA's contention.

Finally, commenters take issue with EPA's argument that it can delist categories without complying with CAA §112(c)(9) when it is correcting "an error" made at the time of listing. In particular, they argue that EPA's present action is completely distinguishable from prior delistings. They also contend that the alleged "errors" EPA identified were not really errors at all and did not need to be corrected by the March rule.

Response:

Commenters continue to misconstrue CAA §112(n)(1)(A), and ignore its place in the overall scheme of CAA §112. CAA §112(c)(1) instructs EPA to establish a list of categories of major and certain area sources of HAP emissions, leaving EPA little room to exercise discretion regarding whether or not to list categories of major sources of HAP emissions. CAA §112(c)(9) instructs EPA as to how to delist these source categories. Unlike CAA §112(c)(1), CAA §112(n)(1)(A) grants EPA more discretion for determining whether to regulate Utility Units under CAA §112 in the first place. See Section 1.1.1.3 of this document. EPA's express authority in CAA §112(n)(1)(A) to determine whether Utility Units should be regulated at all under CAA §112 necessarily encompasses the authority to remove Utility Units from the CAA §112(c) list where EPA determines it erred in making a CAA §112(n)(1)(A) finding.[6] *To find otherwise would import the restrictions of CAA §112(c) into CAA §112(n)(1)(A), a result Congress specifically rejected through the creation of CAA §112(n)(1)(A). If EPA determines pursuant to CAA §112(n)(1)(A) that Utility Units do not meet the criteria set forth in CAA §112(n)(1)(A), then EPA cannot lawfully maintain Utility Units on the CAA §112(c) list because the requirements of the section which involves Utility Units (CAA §112(n)(1)(A)) have not been satisfied.*

Thus, although the CAA §112(c)(9) delisting criteria apply to ordinary major and area source categories, the separate "appropriate" and "necessary" criteria of CAA §112(n)(1)(A) alone govern regulation of Utility Units under CAA §112. The above is true even assuming commenters are correct that EPA could not meet the test for delisting set forth in CAA §112(c)(9). To the extent the CAA §112(n)(1)(A) criteria and the CAA §112(c)(9) delisting criteria can be viewed as potentially conflicting where EPA makes an initial erroneous CAA §112(n)(1)(A) finding, the specific criteria in CAA §112(n)(1)(A) for regulating Utility Units trump the CAA §112(c)(9) delisting criteria pursuant to the familiar rule of statutory construction that "[s]pecific terms prevail over the general in the same...statute which might otherwise be controlling." See National Republican Cong. Comm. v. Legi-Tech Corp., 795 F.2d 190, 192 (D.C. Cir. 1986) (quoting MacEvoy Co. v. United States, 322 U.S. 102, 107 (1944)).

Commenters' reliance on a 1991 Federal Register notice is misplaced. The 1991 notice is nothing more than a notice of availability of a preliminary draft list of categories and subcategories under CAA §112 and a request for information and comment. It is not a final Agency action. The 1991 notice does nothing more than set forth EPA's initial thoughts concerning a variety of issues, including the treatment of utilities, and solicit comments on those issues and proposed positions. The notice does not represent or set forth any final EPA position on any issue.

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[6] Commenters highlight the fact that CAA §112(n)(1)(A) says nothing specific about removing Utility Units from the CAA §112(c) list. What commenters fail to recognize is that CAA §112(n)(1)(A) also says nothing about whether to include Utility Units on the CAA §112(c) list even if it does find it appropriate and necessary to regulate them under CAA §112. In other words, the section is silent and EPA's interpretation is reasonable.

Among other things, in the 1991 notice, EPA solicited comment on two possible approaches for addressing Utility Units for purposes of listing under CAA §112. The first approach involved not listing Utility Units on the CAA §112 list "until such time as the conclusions of the section 112(n)(1) study indicate that these categories warrant regulation under section 112," id. at 28551, and the second approach involved including Utility Units on the list "until such time as the conclusions of the section 112(n)(1) study indicate that these categories do not warrant regulation under section 112." Id. As to the second approach, EPA commented that it thought the approach was more equitable, but indicated that in order to delist utilities it would require satisfying the CAA §112(c)(9) criteria. Id. After consideration of comments, in 1992, EPA published the final list of source categories under CAA §112 and pursued the ***first option*** *with regard to utilities. EPA did not include Utility Units on the final list in 1992 because Congress required EPA to conduct and consider the results of the study required by CAA §112(n)(1)(A)* ***before*** *making any determination as to whether it is appropriate and necessary to regulate such units under CAA §112. Thus, in 1992, EPA determined that Utility Units should not be included on the initial list because such listing was not authorized by CAA §112(n)(1)(A). See 70 FR 15995/1.*

As to the statement in the 1991 notice concerning CAA §112(c)(9) and utilities, that statement was made in conjunction with a proposed regulatory option that EPA did not pursue and that proposed regulatory option was contrary to the plain language of CAA §112(n)(1)(A), which indisputably provides that Utility Units not be regulated under CAA §112 unless and until EPA determines that it is both appropriate and necessary. Furthermore, the statement in the 1991 notice concerning CAA §112(c)(9) is simply incorrect for all of the reasons articulated in the final Section 112(n) Revision Rule. EPA clearly stated its position concerning CAA §112(c)(9) and its relationship to CAA §112(n)(1)(A) in the March 2005 final rule, and that position was the subject of notice and comment rulemaking, unlike the 1991 notice of preliminary list and request for information. Moreover, even assuming arguendo that the statement in the 1991 notice concerning the applicability of CAA §112(c)(9) to Utility Units could be construed as a final agency position, which EPA vigorously maintains that it cannot, EPA may change its interpretation of the Act where, as here, we have provided a reasoned explanation.

In addition, although EPA does not concede that CAA §112(c)(9) applies to this action, EPA has always interpreted the CAA §112(c)(9) criteria as inapplicable where the original listing of a source category under CAA §112(c)(1), let alone under CAA §112(n)(1)(A), was inconsistent with statutory listing criteria. See 69 FR 4652, 4689 (January 30, 2004) (citing examples where EPA removed a source category from the CAA §112(c) list without following the criteria in CAA §112(c)(9) due to an error at the time of listing). For example, in 1992, EPA listed asphalt concrete manufacturers as a major source category under CAA §112(c)(1), and then in 2002, removed that source category from the list without following the criteria in CAA §112(c)(9). EPA did so because it determined that the initial criteria for listing had not been met. See 67 FR 6521, 6522 (February 12, 2002). Likewise here, as explained more fully in the preamble and below, even if CAA §112(c)(9) applied, EPA has determined that the initial criteria for listing Utility Units have not been met, and were not met at the time of the December 2000 Finding. At best, commenters point to some ambiguity in the statute; but even to the extent there is statutory ambiguity, EPA's construction is clearly reasonable and entitled to deference *under Chevron U.S.A., Inc. v. NRDC, 467 U.S. 837, 842-45 (1984).*

Moreover, as discussed above, EPA's initial December 2000 Finding was not a final agency action that has been subject to judicial review. See Utility Air Regulatory Group v. EPA, No. 01-1074, 2001 WL 936363 (D.C. Cir. July 26, 2001) (finding Court lacked jurisdiction to review December 2000 finding that regulation of Utility Units is appropriate and necessary and that units should be listed as a source category under CAA §112(c)); 42 U.S.C. §7412(e)(4) (providing that any action by EPA listing a source category shall not be a final action subject to judicial review except that such action may be reviewed when EPA issues emission standards for such pollutant or category). As discussed above, EPA has authority to revise agency action that has not been subject to judicial review based on new information and public comments that bear on that action. Indeed, it cannot be disputed that if, hypothetically, EPA did not reverse an initial erroneous CAA §112(n)(1)(A) finding, then the reviewing court upon judicial review could vacate that erroneous finding and a concomitant decision to list Utility Units without any consideration of the general delisting criteria of CAA §112(c)(9). To hold that EPA lacks the authority to reverse an erroneous listing under CAA §112(n)(1)(A) without applying the CAA §112(c)(9) criteria would lead to an anomalous result: that Utility Units could obtain relief from a Court – namely, vacatur of the listing upon a finding of error – that they could not obtain from EPA, even where the error is conceded by the Agency. EPA need not await an adverse ruling from a court to correct an erroneous finding and achieve the same result that would be reached following an adverse ruling on judicial review. The fact that certain other requirements of CAA §112(c) would come into play (e.g., CAA §112(d) MACT standard) if Utility Units had been listed correctly under CAA §112(c), begs the question of whether Utility Units were properly added to the CAA §112(c) source category list in the first place. If not, then this Court would so find upon judicial review (see above) and CAA §112(d) would not apply anymore than CAA §112(c)(9).

For these and all the reasons discussed in the final Section 112(n) Revision Rule and EPA's Opposition to the Motion for Stay Pending Review in NJ et al. v. EPA (D.C. Cir. 05-1097) (July 18, 2005) (incorporated herein), EPA disagrees that the Section 112(n) Revision Rule is guided by CAA §112(c)(9) instead of CAA §112(n)(1)(A).

Comment:

Several commenters (6504, 6486, 6471, and 6475) stated that EPA was authorized to revise the December 2000 determination. First, they agreed that EPA's December 2000 listing action was not a final agency action, noting that commenter 6475 sought review of the December 2000 notice in the D.C. Circuit and that EPA filed a motion to dismiss UARG's action advising the court that the December 2000 notice was not final agency action subject to judicial review. The court dismissed the commenter's petition for review. As a result, they argue that commenters on EPA's proposed rule were entitled to present evidence as to why EPA's December 2000 notice was incorrect. They state that under basic principles of administrative law, EPA was required to consider that information and respond to it as part of its rulemaking decision, and also that EPA was free to conduct additional scientific studies and to modify or completely reverse its December 2000 listing action.

One commenter argued that had EPA followed CAA §112(c)(9) in the Section 112(n) Revision Rule it would have acted illegally. It is their position that in CAA §§112(n)(1)(A) and 307(d)(1)(C), Congress provided that EGUs may be regulated under CAA §112(n) only following a CAA §307(d) notice and comment rulemaking that addresses whether it is "appropriate and necessary" to regulate HAP emissions from EGUs under CAA §112(n); prior to the completion of that rulemaking and a final decision to regulate, EPA has no authority to regulate EGU HAP emissions under CAA §112. They further contend that when EPA issued its December 2000 notice, it had not undertaken a CAA §307(d) rulemaking, it had not completed "necessary" studies, and it had not considered all of the specific factors required to be considered by CAA §112(n)(1)(A). Thus, they state that the December 2000 notice is simply a notice that cannot bind the Agency to take any particular future course of action.

Commenters stated that EPA properly determined that CAA §112(n)(1)(A) provides the Agency with sufficient discretion to remove EGUs from the CAA §112(c) list without needing to go through the CAA §112(c)(9) delisting process. They agreed that if EPA now believes that its initial determinations were incorrect – and further believes that such regulation is now neither appropriate nor necessary – the Agency properly interprets CAA §112(n)(1)(A) as granting it authority distinct from the CAA §112(c) requirements to determine when to list – and when to delist – as a result of its appropriate and necessary findings.

They also agreed that EPA's authority to make the original appropriate and necessary determination provides it with the subsequent authority to reverse this finding without having to follow the requirements of CAA §112(c)(9). They argue that to find otherwise leads to the perverse result that EPA could be forced to regulate EGUs as a CAA §112(c) source category even after concluding such regulation was unlawful.

<u>Response</u>:

Although EPA may not agree with every argument set forth by commenter, we do agree that, for the reasons we set forth in this document, in the final Section 112(n) Revision Rule, and in EPA's "Opposition to the Motion for Stay Pending Review in <u>NJ et al. v. EPA</u>" (D.C. Cir. 05-1097) (July 18, 2005) (incorporated herein), EPA has authority to revise an Agency action based on new information, and the Section 112(n) Revision Rule is not guided by CAA §112(c)(9).

<u>Comment</u>:

Commenters 6504 and 6486 agreed generally with the legal interpretations supporting the Section 112(n) Revision Rule, stating that EPA's interpretation of central terms in CAA §112(n)(1)(A) is consistent with well-settled principles of statutory construction as well as Congress' intent for power plant emissions to be regulated within a risk-based, discretionary framework. In particular,

- The commenter supports EPA's conclusions that the phrase "hazards to public health" does not include an implicit requirement for EPA to consider environmental effects; that the phrase does not incorporate the statutory "ample margin of safety" concept; and that the phrase's statutory context suggests that EPA is required to consider only health hazards anticipated as a result of power plant emissions.

- They state that EPA properly concluded that it may assess whether additional regulation of power plants is appropriate and necessary based on reductions due to limits in effect when the determination is made, as well as reductions expected from reasonably foreseeable regulation, including emission reductions that can be the result of direct regulation or as a result of regulations that achieve Hg reductions as a collateral co-benefit.

- Commenters agree that EPA's final rescission rule is based on a reasonable construction of the phrase "appropriate and necessary after considering the results of this study."

- "Appropriate." They agree that EPA properly concludes that an Agency decision to impose additional regulation on power plants may not be based on consideration of environmental effects alone.

- "Necessary." Commenters state that EPA may properly determine that regulation of utilities under CAA §112(n)(1)(A) is necessary only where no other authority under the CAA will effectively address health hazards anticipated to result from power plant emissions.

- "After considering the results of the study." Commenters agree that CAA §112(n) allows EPA to consider information in addition to the Utility Study, including newly obtained information, as part of its calculus for making the appropriate and necessary determination.

- New Information. Finally, commenters agree that EPA may appropriately revise a former appropriate and necessary finding based on new information supporting the conclusion that the determination lacked foundation or is no longer current – i.e., the regulation of power plants is no longer appropriate or necessary based on more recent developments.

Response:

EPA agrees that the legal interpretations supporting the Section 112(n) Revision Rule are reasonable. More information regarding comments on more specific issues is included in the relevant subsection below.

Comment:

Several Indian Tribes and organizations (6270, 6498, 6500, 6562, 6582, 6583, 6585, and 6634) stated that the rule does not comply with EPA's Federal trust responsibility, and is inconsistent with EPA's Indian Policy because the rule does not adequately protect the health of Indians. They assert that Tribes have treaty rights to fish, that EPA has not adequately considered how the rule will affect those rights, and point to specific problems with the Agency's methodology in analyzing the potential health effects of Hg on tribal members, including the effects of fish consumption. They note that EPA's assessment of the risks for tribal members must take into account their high levels of fish consumption, and the unique traditional, cultural, and subsistence importance of fish for many Tribes. They conclude that the rule does not adequately protect those rights because it does not reduce Hg emissions to a level that protects the health and safety of tribal members who consume fish and other wildlife. Tribes from Maine assert that EPA should have explicitly discussed the effects of this action on their rights under the Maine Claims Settlement Act and that EPA did not adequately consult with Tribes in developing this regulation.

Response:

EPA recognizes that the Federal government stands in a government-to-government relationship with Federally-recognized Tribes and has a trust responsibility to those Tribes. This relationship and responsibility should guide EPA in the implementation of policies and actions that affect Tribes. Pursuant to the government-to-government relationship, EPA consults with Tribes regarding actions that affect Tribes. In addition, treaties, statutes, and Executive Orders (EO) create certain Federal obligations regarding tribal resources. EPA believes that its actions in developing the final rule have been consistent with the government-to-government relationship and that the final rule itself is consistent with the trust responsibility.

EPA disagrees that the rule will not adequately protect tribal fishing rights. EPA agrees that some Tribes have unique legal rights to fish arising from treaties, statutes, EO's, and agreements. EPA also recognizes that tribal members may catch and consume more fish than the general public as a result of tribal fishing rights as well as tribal culture, traditions, and subsistence lifestyles.

EPA believes that its CAA §112(n)(1)(A) decision, coupled with CAIR and CAMR, adequately protects tribal health and is consistent with the trust responsibility as well as treaty and other tribal rights for several reasons. First, it is important to note that as a co-benefit of CAIR we expect power plants to significantly reduce emissions of Hg. Moreover, the commenters understate the significance of the fact that Hg emissions from Utility Units currently are not subject to performance standards. CAMR will for the first time establish performance standards applicable to Hg emissions, and those standards will require significant reductions in the levels of Hg emissions. Such reductions will provide greater protection to tribal fish resources than would otherwise be available. Acting to provide such heightened protection is consistent with both the statute and the Federal trust responsibility.

Moreover, the commenters offer no specific evidence that the Hg emissions reductions projected in the Section 112(n) Revision Rule (e.g., from CAIR and CAMR) will not adequately protect tribal health. Their main contention is that the regulatory approach set forth in an earlier EPA proposal would have produced a 90 percent reduction in Hg emissions and that any smaller reduction is, therefore, inadequate. That contention rests on a misconception of an earlier Federal Register *notice. EPA has never proposed any such rule, and, in any event, even if EPA had done so, a proposal does not have legal effect. EPA believes that its approach will adequately protect tribal health.*

The commenters also argue that EPA has not adequately considered the significance of tribal fish consumption patterns, specifically the fact that tribal fishers consume more fish than the general population. That comment is misplaced. As described in more detail elsewhere in this document, EPA carefully analyzed available information on fish consumption by tribal members and other subpopulations, and determined how to use the available data most appropriately. One basis for EPA's analysis was a study of tribal fish consumption in one region to model consumption by other Tribes as well as other subpopulations. EPA's approach was to identify areas where Hg deposition from utility emissions had the greatest effects. EPA then compared those high-deposition areas with locations with significant tribal populations to assess the areas of greatest potential risk to Tribes. That analysis found that very few areas where Native Americans live correspond with high levels of Hg deposition caused by utilities. It found further that the standards established in CAMR, as well as the emissions reductions from CAIR, will reduce risks to tribal members.

Those high-deposition areas were not located in Maine, and the Maine Tribes have not shown that they have rights or claims to special consideration greater than those of other Tribes with fishing rights under treaty or statute. Thus, the preceding analysis applies to the comments from Maine Tribes as well as other Tribes.

EPA took several steps to consult with Tribes in the development of CAMR. It gave a presentation at a national meeting of the National Tribal Environmental Council (NTEC) on April 24, 2001. It then worked with NTEC to identify a tribal representative to participate in the workgroup for developing the rule. It included a representative from the Navajo Air Quality Control Program in the workgroup, later adding someone from the Campo Band's Environmental Protection Agency as an alternate. And on March 11, 2004, EPA gave a presentation regarding the rule to NTEC and the National Tribal Air Authority. Thus, a number of Tribes and tribal organizations offered comment on the proposed rule. In addition, Tribal representatives participated in EPA's regional implementation workshops for CAMR in the summer of 2005.

EPA conducted additional informal outreach for Tribes during the reconsideration process. First, EPA prepared an update on the reconsideration and CAMR Federal implementation plan (FIP) development for the EPA Tribal Newsletter in January 2006. Second, EPA, through both Headquarters and Regional Offices, has worked to address Tribes' specific questions or concerns regarding implementation of CAMR. Finally, EPA has met with representatives from one Tribe that is concerned with the implications of CAMR for the development of new tribal electricity generation.

1.1.1.1 Hazards to Public Health Reasonably Anticipated To Occur as a Result of Emissions by Electric Utility Steam Generating Units

Comment:

Commenter 6471 agrees with EPA's approach to the risk analysis and its focus on hazards posed solely by EGU Hg emissions. They note that the language in CAA §112(n)(1) (A) directing EPA to determine whether public heath hazards are "reasonably anticipated" gives the

Agency significant discretion, and that this language differs from that in CAA §112(f), which requires regulation if EPA determines that such regulation is needed to "provide an ample margin of safety to protect public health." Likewise, they argue, the actual language of CAA §112(n)(1)(A) certainly supports, if not compels, the Agency's focus on EGU emissions when assessing the public health hazards.

Response:

EPA agrees that its interpretations of CAA §112(n)(1)(A) with respect to evaluation of public health hazards are reasonable and supported by the statutory language.

1.1.1.1.1 Hazards to Public Health Reasonably Anticipated to Occur[7]

Comment:

Commenters 6475 and 6504 agree with EPA's interpretation of the phrase "hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units" that was presented in the preamble to the final rule and in the notice of reconsideration, although they disagree with EPA's statement that environmental effects can play a secondary role in its CAA §112(n)(1)(A) regulatory determination. They note that the first part of the phrase "hazards to public health" demonstrates Congress' intent that EPA's regulatory determination under CAA §112(n)(1)(A) must be based solely on public health effects, not some broader set of criteria that includes environmental effects. Further, they argue that a comparison of CAA §112(n)(1)(A) and other CAA §112(n) provisions confirms the limited scope of EPA's allowed inquiry under CAA §112(n)(1)(A), and that the omission of environmental effects from CAA §112(n)(1)(A) was not an accident. The commenters added that the legislative history of CAA §112(n)(1)(A) provides further evidence that Congress meant to limit CAA §112(n)(1)(A) to public health effects, citing a statement by Representative Oxley, a sponsor of the House provision and a member of the conference committee.

The commenters agreed that CAA §112(n)(1)(A) does not require EPA to apply the ample of margin of safety test of CAA §112(f) in deciding whether further regulation is "appropriate and necessary." They highlight that the 1990 CAA Amendments enacted a particular regulatory approach under CAA §112 for virtually all emissions sources, including at some point EPA's considering whether it should promulgate more stringent standards for a source category so as to "provide an ample margin of safety to protect public health in accordance with this section (as in effect before November 15, 1990) or to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect (*see* CAA §112(f))." However, they continue, Congress treated EGUs differently than all other source categories under CAA §112. Rather than automatically subjecting those units to the regulatory scheme of CAA §§112(c), (d) and (f), Congress enacted CAA §112(n)(1)(A) to govern their regulation.

Finally, commenters reiterated their argument that EPA has regulatory options regarding

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[7] Some additional comments on this issue are included in Section 1.1.1.3.1 of this document discussing EPA's interpretation of the term "appropriate."

Utility Units under CAA §112 beyond promulgating MACT standards under CAA §112(d). They point to CAA §307(d) as evidence that Congress intended the "under this section" language to authorize regulation directly under CAA §112(n)(1)(A).

Response:

EPA agrees that its interpretations of CAA §112(n)(1)(A) are reasonable. We also agree that the structure of CAA §112, in particular the unique treatment of Utility Units provided for in CAA §112(n)(1)(A), supports our position that we do not have to consider an ample margin of safety, which is a requirement of CAA §112(f), when determining whether utility-attributable HAP emissions remaining after imposition of the requirements of the Act are reasonably anticipated to result in hazards to public health. See 70 FR 15998, 16025.

We disagree, however, with commenters about whether we can consider environmental impacts as a secondary factor in our "appropriate" inquiry if we first find hazards to public health. See 70 FR 16000.

Because we determined it was not appropriate or necessary to regulate Utility Units under CAA §112, we are not addressing commenters' argument regarding whether regulation of Utility Units under CAA §112 could occur under subsection 112(n)(1)(A).

Comment:

Commenter 6280 states that CAA §112(n)(1)(A) does not mandate that EPA abandon its statutory responsibility to provide for an ample margin of public safety, nor does it absolve EPA of what commenters portray as an oft-repeated responsibility under CAA §112 to provide "an ample margin of safety to protect the public health."

The commenter argues that it is unreasonable and an abuse of discretion for EPA to fail to have performed an ample margin of safety analysis that is required by the Act. The commenter focuses on a statement in the final rule, where EPA states that it is "very likely" that its conclusion under the health based prong of the 112(f) analysis would have "been the same" as the conclusion it reached under CAA §112(n)(1)(A), even though the methodology employed "might have been slightly different," and argues that EPA cannot comply with a statutory requirement by merely hypothesizing about what the results might be. Finally, the commenter argues that EPA erroneously weighed "the uncertainties...of the potentially adverse effects associated with Hg exposure," citing case law that it claims holds that EPA must "protect against dangers before their extent is conclusively ascertained," and that the Agency may not use uncertainty as an excuse for not regulating. Moreover, the commenter claims that the health analysis EPA completed was flawed and, as such, should not be used to sanction results that may have been obtained under a hypothetical ample margin of safety analysis.

Finally, the commenter argues that EPA's emphasis on the primacy of established health hazards is inconsistent with EPA's prior position that uncertainty about health impacts is itself a reason to regulate power plant emissions pursuant to CAA §112. Thus, they conclude that any change in position is not entitled to deference because, they allege, EPA has failed to provide a "reasoned analysis" and because any interpretation of the CAA that requires EPA to wait for scientific certainty about health effects before issuing regulations is inconsistent with the CAA's precautionary purpose.

Response:

Commenter's argument is based on the premise that Congress meant to treat Utility Units like other source categories under CAA §112, which is why it believes that the ample margin of safety language in CAA §§112(c)(9) and (f)(2) should guide EPA's CAA §112(n)(1)(A) decision. As explained above, any restrictions regarding EPA's ability to delist a major or area source category under CAA §112(c)(9) are not relevant to this rule which involves a decision concerning whether to regulate Utility Units under CAA §112(n)(1)(A), not CAA §112(c). Similarly, the requirements of CAA §112(f) that may apply once EPA has established an emission standard under CAA §112(d) are not applicable to EPA's decision under CAA §112(n)(1)(A) about whether to regulate Utility Units under section 112 in the first place.

As explained in the final rule and the October Reconsideration Notice, CAA §112(n)(1)(A) does not define what constitutes "hazards to public health reasonably anticipated to occur." See 70 FR 15997-98, 16023-25; 70 FR 62202-03. EPA has the discretion to interpret these terms and, using its technical expertise, to determine whether Hg emissions from Utility Units pose such hazards. See 70 FR 15997-98, 16023-25. In the final rule, EPA explained that in evaluating hazards to public health for purposes of CAA §112(n)(1)(A), EPA looked at various factors, including, for example, the affected population, the characteristics of exposure, the nature of the health effects and uncertainties associated with the data. EPA explained in the final rule that CAA §112(n)(1)(A) neither incorporates the requirements of CAA §112(f) nor speaks of protecting public health with an ample margin of safety. Nevertheless, EPA did refer to the D.C. Circuit's NRDC v. USEPA, 824 F.2d 1146 (D.C. Cir. 1987) ("Vinyl Chloride decision"), and the Agency's benzene analysis (54 FR 38044; 1989), both of which address the ample margin of safety requirement in CAA §112(f). EPA looked to Vinyl Chloride and the benzene analysis for general guidance only, however, in making its CAA §112(n)(1)(A) hazards to public health determination, and in so doing, expressly remarked that the CAA §112(f) ample margin of safety standard is a more stringent standard than the one established in CAA §112(n)(1)(A). See 70 FR 62203 (clarifying that in evaluating hazards to public health reasonably anticipated to occur under CAA §112(n)(1)(A), EPA is not subject to the requirements of CAA §112(f)).

EPA conducted a thorough and sophisticated public health analyses pursuant to CAA §112(n)(1)(A). The final Section 112(n) Revision Rule, the Effectiveness Technical Support Document (TSD)[8] and Reconsideration TSD[9] set forth EPA's methodology and analysis supporting its conclusion under CAA §112(n)(1)(A) that the utility-attributable emissions

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[8] "Methodology to Generate Deposition, Fish Tissue Methylmercury Concentrations, and Exposures for Determining Effectiveness of Mercury Emission Controls," revised March 17, 2005. EPA-HQ-OAR-2002-0056-6130.

[9] "Technical Support Document: Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units from the Section 112(c) List: Reconsideration." October 21, 2005. EPA-HQ-OAR-2002-0056-6303.

remaining after imposition of the requirements of the Act are not reasonably anticipated to pose hazards to public health. Specifically, EPA examined in detail the impact of remaining utility Hg emissions on consumers of self-caught freshwater fish because this exposure pathway is the most impacted by U.S. Utility Unit Hg emissions. See 70 FR 16021, Reconsideration TSD at 1. This sophisticated analysis involved our modeling utility Hg deposition following implementation of CAIR and CAMR, and then applying Mercury MAPS (MMAPS) and actual fish tissue sample data to estimate corresponding changes in MeHg fish tissue concentrations. We then folded into the analysis fish consumption rates from various sources, including the Exposure Factors Handbook (EFH), the Methylmercury Water Quality Criterion, and a study of Native American subsistence fisher consumption rates. All of this information was compiled in order to compare the exposure to utility-attributable MeHg for a freshwater fisher to the Reference Dose (RfD) for Hg – what we labeled the index of daily intake (IDI). This comparison was done not only at several consumption rates, including the mean recreational freshwater fisher and the 99th percentile Native American subsistence fisher, but also for various levels of utility-attributable MeHg fish tissue concentrations. See Effectiveness TSD, Table 6.4 and Table 2 herein. An IDI of less than one (1) is equal to a utility-attributable exposure lower than the RfD. See 70 FR 16021.

As these IDI tables show, CAIR, and furthermore CAMR, reduce the general public's exposure to utility-attributable MeHg due to freshwater fish consumption well below the RfD (e.g., IDI less than 1). In particular, for all consumption rates analyzed, the IDI is below 1 when eating freshwater fish from up to and including the 50th percentile for fish tissue utility-attributable MeHg. When eating solely fish in the 75th to 95th percentiles for fish tissue utility-attributable MeHg concentration, the only two groups with IDIs above 1 are consumers in the 95th and 99th percentile Native American subsistence fishers. Finally, only when eating solely fish from the 99th percentile for fish tissue utility-attributable methylmercury (MeHg) do the 99th percentile recreational fisher and mean Native American subsistence fisher show IDIs above 1 (see tables 2 and 3). These results show that the overwhelming majority of the general public and high-end consumers of self-caught freshwater fish are not expected to be exposed to an IDI above 1 (e.g., utility-attributable MeHg exposure would be below the RfD).

Importantly, as discussed in the final Section 112(n) Revision Rule, the likelihood that factors will converge such that a person would both eat at a high consumption rate and eat ***solely*** *freshwater fish with high utility-attributable MeHg concentrations is small. See 70 FR 16024. This is especially true for Native American subsistence fishers because deposition maps indicate that the overwhelming majority of tribal populations live outside areas most impacted by utility-attributable Hg deposition. Id. Moreover, as discussed elsewhere, although the RfD is an appropriate benchmark, an IDI above 1 (e.g., above the RfD) does not necessarily mean that a public health hazard exists. Id.*

In the Reconsideration TSD, we looked beyond the self-caught freshwater fish exposure pathway. We were able to undertake a similar IDI analysis for the marine fish consumption pathway. That analysis, which likely overstates the utility-attributable Hg levels in marine fish, showed that for the general public eating at both mean and high-end consumption rates the IDIs are well below 1 (e.g., 0.00 to 0.05). See Reconsideration TSD, Table 3.2. EPA went further and calculated IDI values for consumption of marine species with high MeHg concentration, yet *those IDIs also were below 1, even for a person consuming in the 99.9th percentile consuming exclusively fish with high utility-attributable MeHg concentrations.* Id.*, Table 3.3; Table 3 herein. Although scientific uncertainties and a lack of data made similar IDI analyses for other pathways (e.g., commercial freshwater, estuarine, and aquaculture) not possible, EPA presented detailed qualitative analyses showing that the contribution from these pathways would be small, and in all cases are bounded by the self-caught freshwater pathway.* See *Reconsideration TSD, Sections 4 through 7.*

Finally, in addition to the above IDI analyses, EPA evaluated whether, following CAIR and, furthermore, following CAMR, there would be any utility hotspots, defined as water bodies that are a source of consumable fish with MeHg tissue concentrations attributable solely to utilities greater than the MeHg water quality criterion of 0.3 mg/kg. See *70 FR 16026. EPA's analysis showed that after implementation of CAIR and, furthermore, after CAMR, we do not believe that there will be any utility hotspots.* See *70 FR 16026-27. Nonetheless, as indicated elsewhere, EPA intends to monitor the situation and take action as necessary.* Id.

The above summarizes the information supporting EPA's conclusion that following CAIR, and independently CAMR, utility Hg emissions are not reasonably anticipated to result in a hazard to public health.

EPA went further in the final rule, however, and explained that even assuming, arguendo, that we were proceeding under the human health prong of the CAA §112(f) ample margin of safety inquiry, our conclusion regarding hazards to public health would remain the same. See *70 FR 16025. The commenter objects to this aspect of the final rule, arguing that EPA's hypotheses as to what a CAA §112(f) analysis might reveal do not satisfy the statutory requirement to conduct such an analysis. The commenter misses the mark, however, because EPA has no legal obligation to undertake a CAA §112(f) ample margin of safety analysis for purposes of determining whether to regulate Utility Units under CAA §112(n)(1)(A). In the final rule, EPA simply illustrated that even assuming, arguendo, that commenters were correct and that EPA had to conduct the human health-based aspect of the CAA §112(f) inquiry, EPA's conclusion concerning hazards to public health would likely remain the same and that considerations of costs and other factors would support EPA's finding that CAIR, and even more so CAMR, not only protects public health but does so with an "ample margin of safety." Specifically, for the reasons set forth elsewhere, and discussed in the context of a CAA §112(f)(2) analysis below, EPA has made a science-informed policy judgment that all levels of exposure (e.g., IDI values) presented in Tables 2 and 3 herein, including those above an IDI of 1, provide an ample margin of safety.*

CAA §112(f)(2) requires us to determine for source categories subject to certain CAA §112(d) standards whether the emissions limitations protect public health with an ample margin of safety. As explained below, in EPA's public health analysis for utilities, we effectively looked at whether CAIR and independently CAMR protect public health with an ample margin of safety.

In CAA §112(f)(2) assessments of public health risk associated with HAP emitted from sources, we consider risks of cancer and other health effects. We performed this analysis for utilities, focusing on mercury as the HAP of greatest concern. In CAA §112(f)(2) assessments *the "noncancer risks are characterized through the use of hazard quotient (HQ) and hazard index (HI) estimates. An HQ is calculated as the ratio of the exposure concentration of a pollutant to its health-based reference concentration. An HI is the sum of HQ for pollutants that target the same organ or system. The HI is a numerical indication of the degree to which acceptable exposure levels are approached or exceeded. As the index increases beyond 1.0, the concern that adverse health effects will occur increases. It is also important to note that the RfD does not define a bright line, above which individuals are at risk of adverse effects. Values that are below 1.0 are considered to represent exposure levels with no significant risk of adverse health effects." See 70 FR 20000. In the analysis of utilities, we used the IDI as a concept similar to HI and HQ. Like the cancer framework, we do not consider an HI or IDI value of 1 to be a bright line. Instead, we evaluated the magnitude of the IDI value in this analysis by looking at the underlying RfD as we would for a CAA §112(f)(2) analysis; "We will evaluate the magnitude of the HI on a case-by-case basis." See 70 FR 20000.*

The benzene analysis provides a two-step ample margin of safety inquiry. See 69 FR 48348. The first step focuses on human health considerations only and involves determining the emission level that represents an acceptable risk. As the D.C. Circuit in Vinyl Chloride held, "safe" does not mean risk-free. See 824 F.2d 1165. Rather, EPA must "determine what inferences should be drawn from available scientific data and decide what risks are acceptable in the world in which we live." Id. In the first step of the benzene analysis, EPA considers estimates of individual risk and other factors, including incidence (numbers of exposed persons within various risk ranges), scientific uncertainties, and weight of evidence. The following shows how EPA considered each of these factors in our public health analysis:[10]

Maximum Individual Risk: *Estimates of individual risk are presented in Table 2 and 3 below and in the Effectiveness TSD and Reconsideration TSD. The IDI values associated with a 99th percentile fish consumption rate combined with the 99th percentile watershed reasonably represents the most exposed individual (MIR). Although it is theoretically possible that a confluence of highly unlikely factors could produce a higher IDI value, we have no evidence that this occurs. After considering what is known about the location of high-fish consuming Native American Subsistence fishers in relation to the watersheds with higher levels of utility-attributable MeHg, we estimate the MIR is associated with an IDI value of less than 10. We note that the MeHg reference dose has an uncertainty factor (UF) of 10, taking into account pharmacodynamic and pharmacokinetic variability and uncertainty.*

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[10] EPA focused on only the human health aspect of the CAA §112(f) ample margin of safety inquiry and not the environment inquiry, because CAA §112(n)(1)(A) speaks only of "hazards to public health." Compare CAA §112(n)(1)(A) (requiring analysis of "hazards to public health"), with CAA §112(f) (calling for the promulgation of additional standards if needed to "provide an ample margin of safety to protect public health . . . or to prevent . . . an adverse environmental effect."). As explained in the final rule and below, under EPA's interpretation of the term "appropriate" in CAA §112(n)(1)(A), the threshold factor to evaluate in determining whether it is appropriate to regulate Utility Units under CAA §112 is whether the level of utility-attributable HAP emissions remaining after imposition of the requirements of the Act is reasonably anticipated to result in hazards to public health. If we conclude that such emissions are not reasonably anticipated to result in hazards to public health, our inquiry under the appropriate prong ends. See 70 FR 16000-01; Responses below address comments concerning consideration of environmental effects under CAA §112(n)(1)(A). Because EPA's threshold analysis under CAA §112(n)(1)(A) focuses on "hazards to public health," EPA properly limited its CAA §112(f) illustration in the final rule accordingly. Nonetheless, as shown below, even if assuming, arguendo, we were to also consider the adverse environmental effect prong of CAA §112(f) we would reach the same conclusion.

Incidence: *Estimates of incidence are normally applied to carcinogens but the MeHg RfD is not based on cancer endpoints. Nonetheless, we took a similar approach in estimating the total intelligence quotient (IQ) loss and associated public health benefits associated with eliminating utility-attributable Hg exposure following CAIR. Our estimate presented in the Reconsideration TSD, Section 8, is a conservative overestimate of such IQ loss and associated benefits.*

Numbers of Exposed Persons within Various Risk Ranges: *As presented in Table 2 and 3 and explained further in the Reconsideration TSD and the Exposure TSD, we estimated various exposure levels (risk ranges) associated with combinations of utility-attributable MeHg in fish and such fish consumption rates. We are not able to estimate with precision the number of people in each of these exposure levels but reasonably conclude that a small number of people, if any, are exposed above an IDI value of 1. See 70 FR 16024.*

Scientific Uncertainties: *We considered and discussed scientific uncertainties in our analysis included in the emissions estimate, air quality modeling, MeHg fish tissue estimates, exposure estimates, and the derivation of the RfD for MeHg. In several places along the analysis we made conservative assumptions thereby tending to overestimate the utility-attributable exposure.*

Weight of Evidence: *We considered the extensive body of evidence including the factors listed above in weighing the evidence regarding whether hazards to public health are reasonably anticipated to occur.*

Considering the above factors, the Agency concludes that the utility-attributable Hg risks following CAIR and, furthermore, following CAMR, are acceptable. Assuming, arguendo, that the risks are still at a level that requires us to consider additional factors to ensure there is an ample margin of safety, we proceeded to the second step of the benzene inquiry. In the second step, EPA must decide whether additional reductions are necessary to provide an ample margin of safety. See 70 FR 19997; 54 FR 38049. In this step, we examine the same risk factors considered in step 1 along with additional factors relating to the appropriate level of control, including costs, economic impacts of controls, technological feasibility, and uncertainties.

Technical feasibility, cost, and economic impact: *As described in more detail in "Control of Mercury Emissions from Coal Fired Electric Utility Boilers: An Update,"*[11] *we considered the technical feasibility of Hg-specific and multipollutant controls. As described in the Cost and Energy Impacts TSD (see http://www.epa.gov/ttn/atw/utility/cost-TSD-112.pdf), we considered the cost and energy impacts associated with reducing Hg beyond the level required by CAIR and CAMR.*

Based on the foregoing, EPA reasonably stated in the final rule that it is very likely that its CAA §112(n)(1)(A) conclusion regarding hazards to public health would remain unchanged even assuming, arguendo, that it was required to apply the health-based prong of the CAA §112(f) ample margin of safety inquiry. Comments on the substance of EPA's analysis

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[11] See EPA-HQ-OAR-2002-0056-6141. ORD White Paper.

concerning costs and other factors in the context of the CAA §112(f) inquiry are addressed elsewhere in this document.

Under CAA §112(f), EPA must adopt more stringent standards if necessary to prevent an adverse environmental effect (defined in CAA §112(a)(7) as "any significant and widespread adverse effect...to wildlife, aquatic life, or natural resources..."), but EPA can consider cost, energy, safety, and other relevant factors in doing so. As discussed elsewhere, we have no evidence that utility-attributable Hg will cause significant and widespread adverse environmental effects, based in part on our analysis of the percent of total Hg deposition attributable to utilities.

In addition, relying on the Vinyl Chloride decision, commenters argue that uncertainty in the available data necessitates EPA's regulating Utility Units under CAA §112(n)(1)(A). Contrary to the commenter's assertion, the Vinyl Chloride decision stands for the proposition that the existence of uncertainties does not necessitate that EPA adopt the most protective option (in that case, prohibition on all emissions). See Vinyl Chloride decision at 1153. Rather, uncertainties are to be considered as part of the Administrator's exercise of his discretion. Id. EPA is not, as commenters portray, waiting for scientific certainty; rather, the Administrator is correctly acknowledging the existence of uncertainty when exercising his discretion under CAA §112(n)(1)(A). See, e.g., 70 FR 16023, 16025. We also note that the cases cited by commenters concerning related sections of the CAA requiring the establishment of the NAAQS, which must be set at a level requisite to protect public health with an adequate margin of safety, or MACT, are not relevant when interpreting CAA §112(n)(1)(A) in which Congress provided a different standard and granted EPA much more discretion.

Finally, we have provided a "reasoned analysis" for any changes in interpretation from the December 2000 finding. As demonstrated by the substantial record in this matter, EPA conducted a thorough re-analysis of the record before the Agency in December 2000 and considered all relevant new information when it issued the March 2005 determination after notice and comment rulemaking.

Comment:

Commenters 6280 and 6634 argue that EPA erroneously faults the December 2000 determination as "[o]verbroad [t]o [t]he extent [i]t [h]inged [o]n [e]nvironmental [e]ffects." They contend that the December 2000 determination did not "hinge on environmental effects" at all, but instead considered them along with other relevant factors, thus, this alleged "error" did not actually occur, and cannot be the basis for reversing a decision to list and regulate EGUs. They argue that there is no limitation anywhere in CAA §112(n) on EPA's ability to consider environmental impacts; indeed CAA §112(n)(1)(B) directly requires EPA to study and Report to Congress on "the environmental effects" of Hg emissions from, among other things, power plants. Moreover, they contend that the purpose and structure of CAA §112 as a whole undermines EPA's position.

They allege that CAA §112 requires the installation of pollution controls on a faster schedule than do other sections of the CAA, which supports their argument that EPA could find it "appropriate and necessary" to regulate EGUs pursuant to CAA §112 because regulations under that section would apply more quickly and would address a broader range of problems than regulations under other sections of the CAA. Finally, they argue that making health hazards a threshold consideration here is at odds with EPA's approach in the final CAMR because in both the de-listing rule and CAMR, EPA stated that "Remaining Emissions" did not pose hazards to public health. However, in CAMR, they continue, EPA determined that it was nevertheless "appropriate" to issue CAMR because that rule would "further the goal of reducing the domestic and global Hg pool." They take the position that regulation under CAA §112(n)(1)(A) would likewise reduce the domestic and global Hg pools, but EPA has arbitrarily concluded that it cannot consider that fact.

Finally, they argue that because they believe CAA §112(c)(9) applies and that section includes an environmental finding, Congress must have intended that the delisting decision be made including analysis of environmental effects, and that the environmental analysis will be coequal with the analysis of the public health effects.

<u>Response</u>:

As EPA stated in the final rule, the December 2000 determination was erroneous ***to the extent*** *it hinged on environmental effects because under EPA's interpretation of the term "appropriate" in CAA §112(n)(1)(A) environmental effects cannot be considered unless and until EPA first finds a hazard to public health stemming from utility-attributable emissions. In the final Section 112(n) Revision Rule, EPA explained that the December 2000 finding lacked foundation because in evaluating hazards to public health, EPA failed to properly account for the level of Hg emissions remaining after imposition of the requirements of the Act. <u>See</u> 70 FR 15997-98; 16000-03.*

Commenters do not dispute that the term "appropriate" is a broad term, that the study required by CAA §112(n)(1)(A) refers only to "hazards to public health" or that the phrase "environmental effects" appears nowhere in the language of CAA §112(n)(1)(A). EPA reasonably interpreted the term "appropriate" in CAA §112(n)(1)(A) to focus first on whether utility-attributable emissions are reasonably anticipated to pose a hazard to public health and only if such hazards exist should EPA proceed to analyze other factors, such as costs and environmental effects. Moreover, in interpreting the broad term "appropriate," EPA has discretion to choose which factors to evaluate and how to evaluate them. <u>See</u> 70 FR 160001-02. The courts have recognized that there is a difference between what the Administrator is "permitted" to do versus what he is "required" to do under the CAA. <u>See</u> Vinyl Chloride decision at 1146 and 1154.

To support their claim that EPA should consider environmental effects as part of its threshold "appropriate" inquiry, commenters point to CAA §112(n)(1)(B) of the Act. They argue that CAA §112(n)(1)(B), which requires EPA to study Hg emissions from various sources, including Utility Units, calls for an analysis of both "health and environmental effects." Commenters fail to note, however, that CAA §112(n)(1)(C), which also requires a study of Hg, like CAA §112(n)(1)(A) focuses exclusively on "health effects." It is well settled that "[w]here Congress includes particular language in one section of a statute but omits it in another section *of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion."* *See Russello v. United States, 4646 U.S. 16, 23 (1983); see also Duncan v. Walker, 533 U.S. 167, 171 (2001). As fully explained in the March 2005 preamble, although a subsection of CAA §112(n) and other provisions of CAA §112 reference both public health* ***and*** *"environmental effects" or impacts on health* ***and*** *"the environment," – indeed CAA §112(a) contains a definition of "adverse environmental effect" – CAA §112(n)(1)(A) refers only to "hazards to public health." The lack of language regarding environmental effects in CAA §112(n)(1)(A) must be given import, and EPA's interpretation does that.*

The commenters further argue that EPA should have regulated Utility Units under CAA §112 because they believe that regulation under CAA §112 is a better way to address HAP emissions than other sections of the CAA. The issue is not, however, whether commenters prefer one statutory section over another. The issue is whether EPA reasonably interpreted and implemented CAA §112(n)(1)(A), which it has done here. In particular, commenters assert that EPA should have considered, as part of the CAA §112(n)(1)(A) "appropriate" analysis, the fact that regulation under CAA §112 would have furthered the goal of reducing global Hg emissions. EPA properly did not consider such factor in the context of its threshold appropriate inquiry. As explained in the final rule, CAA §112(n)(1)(A), as supported by its limited legislative history, focuses on the public health risks of Hg deposition from domestic EGUs, not Hg emissions from the entire global pool. EPA reasonably evaluated the domestic utility-attributable Hg emissions remaining after imposition of the requirements of the Act and determined that such emissions are not reasonably anticipated to pose hazards to public health. EPA, therefore, properly ended its appropriate inquiry and did not proceed to evaluate other factors.

To the extent the commenters object to our alternative global pool analysis (see Section 1.1.1.1.2 below) because they believe that environmental effects should have warranted a finding that it is appropriate to regulate Utility Units under CAA §112, the commenters have not made – and cannot make – such a showing. First, the commenters have not provided EPA with any quantitative information about alleged environmental effects or impacts to support their argument that had we considered environmental effects and benefits in our global pool analysis, we would have reached a different conclusion. As explained in the Regulatory Impact Analysis (RIA) for CAMR, evidence of environmental effects at current Hg levels is limited and such effects can only be discussed qualitatively at this time. (See RIA; Chapter 2 and Appendix B for CAMR; see RIA B-1 "Further study of ecosystem-specific exposures will be necessary to determine the nature and magnitude of the risks posed to wild species by mercury."; see RIA B-2 "While the benefit of further reducing mercury emissions cannot be quantified for ecosystems at this time, we have described this benefit qualitatively for context.")

Second, as described elsewhere (e.g., the Effectiveness TSD), the utility-attributable fraction of MeHg in most ecosystems is relatively small today and will decline first following implementation of CAIR, and still further following CAMR. EPA is not aware of, and commenters have not provided, evidence to suggest that this small utility-attributable fraction would cause adverse environmental effects, or that there would be quantifiable benefits from further reducing this small amount.

Finally, even assuming, arguendo, that the environmental benefits of further reducing Hg emissions beyond the CAIR levels were assumed to be the same as the upper-bound quantified human health benefits, the costs of such reductions (e.g., $750 million) would still exceed the cumulative benefits (that is, the human health and environmental benefits) (e.g., $420 million), further supporting the Agency's decision that it is not appropriate to regulate Utility Units under CAA §112.

To the extent commenters argue that EPA should have considered the benefits associated with promoting the development of technology in other countries and the resulting reduction in global Hg emissions in its alternative global pool appropriate inquiry, EPA again maintains that its conclusion would not change. As explained in the proposed rule and the final Section 112(n) Revision Rule, it has been the Agency's experience that cap and trade programs, like the one set forth in CAMR, encourage the development of cost-effective technology far better than a command-and-control program like MACT. See 70 FR 16005. Thus, EPA believes that regulation of utility-attributable Hg emissions via a CAA §112(d) MACT standard would not promote the development of technologies, and, therefore, would not reduce other countries' contribution to the global pool, to any great extent.

Moreover, the commenters' argument concerning CAMR confuses the issue. Contrary to the commenter's assertion, EPA's decision that it is not appropriate to regulate Utility Units under CAA §112 does not foreclose its ability to regulate such units under another section of the Act. Indeed, in the final CAMR, EPA explained its basis for issuing CAMR notwithstanding the public health conclusions reached in the final Section 112(n) Revision Rule, and cited as a basis for regulating under CAMR, its desire to promote the development of technology in other countries through a final 111 cap-and-trade program and the attendant reduction in global Hg emissions associated with such efforts.

Finally, we note, again, that any restrictions regarding EPA's ability to delist a source category under CAA §112(c)(9) are not relevant to this rule which involves decision made under CAA §112(n)(1)(A), not CAA §112(c). Similarly, requirements that may apply when EPA establishes an emission standard under CAA §112(d) are not applicable to EPA's decision under CAA §112(n)(1)(A) about whether to regulate Utility Units under CAA §112 in the first place.

1.1.1.1.2 "As a Result of" Emissions from Electric Utility Steam Generating Units

Comment:

Several commenters (6280, 6478, 6498, 6582, and 6634) disagree with EPA's interpretation of the phrase "as a result of emissions from" EGUs. One commenter states that EPA's interpretation of "as a result of" to mean "resulting solely, only or exclusively from" EGUs is inconsistent with the language of the Act, and improperly fails to consider the larger context of the CAA §112 generally and CAA §112(n) specifically. First, they argue, there is nothing in the language of the Act that supports EPA's interpretation that it is authorized to segregate and evaluate only the effects of domestic EGU emissions for the purpose of determining whether regulation under CAA §112 is appropriate and necessary. Similarly, they continue, nothing in the language of CAA §112 at large suggests that the degree to which any industrial source category contributes to a "global pool" of HAP emissions has any relevance or bearing whatsoever on whether that industry should be listed.

They contend that EPA's "utility-attributable" interpretation unreasonably, and, therefore, unlawfully, imports a sole causation element into the first sentence of CAA §112(n)(1)(A). In particular, they assert that EPA's argument ignores the fact that an effect can be "a result of' a particular action even if that action is not the "exclusive cause" of the effect. They present the following example: A person climbs into a bathtub filled to the brim with water. They argue that although the overflow that occurs after the person climbs in is unarguably "a result of" the addition of the person to the tub, it is not the sole cause. Similarly, they contend, the public health risk that is evidenced by the high levels of MeHg in fish is the "result of" EGU emissions of Hg, whether or not EGUs are the sole or even the proximate cause of the public health risk. Thus, in their view, EPA's attempt to read this language to limit the consideration only to "utility-attributable" Hg or "utility-attributable risk" is unjustified and unreasonable.

Commenters state that causation usually contains two components: factual and proximate cause. They explain that if one applies the factual cause analysis to Utility emissions (they argue proximate cause will always be satisfied under the existing facts), it becomes clear that public health hazards can result from such emissions even when the IDI does not exceed 1. Commenters provide the following examples:

- but for utility-attributable emissions, the RfD would not have been exceeded, even though the IDI is less than 1;[12] and

- the RfD would have been exceeded regardless of utility-attributable emissions, but utility emissions enhance the exceedance and the associated public health hazards.[13]

Commenters also disagree with EPA's reliance on CAA §110(a)(2)(D), arguing that Congress chose language that encourages MACT regulation where the air pollutant in question contributes to a larger public health problem, just as the public health risk associated with Hg emissions is the result of pollution from numerous sources. They contend that CAA §110 was dealing not with the distinction between sources that cause a State's nonattainment, but with the difference between sources that significantly contribute to non-attainment and those that simply contribute. They also believe that EPA's interpretation ignores the statutory context and goals of CAA §112, and that the ***only*** interpretation of the phrase "as a result of" in CAA §112(n)(1)(A) that effectuates Congress' intent to regulate all major sources of HAP and have emissions set at a

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[12] For example, if Fisherman X's freshwater fish consumption results in an IDI of 0.9 (which is below the amount necessary to, by itself, place Fisherman X above the RfD), but he has a total daily intake of 0.12 µg/kg-day (which is above the RfD threshold of 0.1 µg/kg-day) the EPA would conclude that the public health hazard is not a "result of' Utility emissions. Under standard causation theory, however, the Utility emissions would be considered a legally sufficient cause, because "but for" those emissions, Fisherman X would not have exceeded the RfD.

[13] For example, if Fisherman Q's freshwater fish consumption results in an IDI of 0.9, but he has a total daily intake of 0.2 µg/kg-day (double the RfD threshold), the EPA would conclude that the public health hazard is not a "result of' Utility emissions. If it can be demonstrated that the public health risks of a daily consumption equal to 0.2 µg/kg-day are more significant than the risks associated with a daily consumption of 0.11, however, "but for" the utility-attributable Hg, those enhanced public health risks to Fisherman Q would not have occurred, and therefore, the Utility emissions would undeniably constitute a legally sufficient cause of the enhanced risks.

level which provides an ample margin of safety to protect public health is one that addresses the contributory impact of each source.

Next commenters argue that EPA's suggestion that it can study the consequences of power plant Hg emissions in isolation from all other emissions has already been rejected by the Court, by science, and by EPA itself. They cite to a D.C. Circuit opinion for the proposition that that "an analysis cannot treat an identified environmental concern in a vacuum," as an incremental approach attempts to do, but rather the analysis must address the accumulated impacts of various sources.[14] Furthermore, they continue, scientific research has recognized that for babies already known to be exposed *in utero* to excessive MeHg from a combination of emission sources, each additional increment of utility-attributable Hg, however small, carries a predictable risk of additional IQ loss and other effects. Finally, they contend that EPA acknowledges that the approach it is taking in the Final Rule is inconsistent with the "collective contribution" approach it took in the NO_x SIP Call.

Commenters argue that the dictionary definition of "hazard" specifies that a hazard is "a source of danger" that HAP emitted by EGUs are among the source of neurological harm, and thus, these emissions pose a "hazard" to public health.

Commenters also contend that EPA's "utility-attributable" formulation impermissibly relies on phrases and words taken out of their context. They allege that CAA §112 generally does not consider the risks caused by a given industry before subjecting sources to controls; rather, if an industry includes major sources of HAP listed by Congress in CAA §112(b), then EPA "shall" include it in the list of industries for which CAA §112(d) MACT standards are required. Moreover, they argue, EPA's approach to CAA §112(n)(1)(A) also ignores the fact that it has previously interpreted the §112(k)(3)(A) phrase "as a result of emissions from area sources" as simply identifying the commercial sector to which the provision as a whole is applicable, not as limiting the analysis of the public health effects solely caused by those emissions, and those emissions alone. Commenters argue that the phrase "as a result of emissions by electric utility steam generating units" in CAA §112(n)(1)(A) similarly specifies the industrial sector for which the study is to be performed.

Finally, commenters set forth what they allege are several congressional commands in the CAA to strictly regulate domestic Hg pollution from particular industries, regardless of the fact that there are other global sources of Hg pollution. Thus, they conclude if Congress was concerned about not over-regulating U.S. Hg polluters in light of "the unique situation posed by mercury," it had an extremely odd way of showing it.

Response:

Commenters arguments related to the general structure and goals of CAA §112, as well as the more general regulation of Hg from other source categories, fail to account for the fact that Congress specifically excluded Utility Units from that structure and those requirements – therefore, any limitations on EPA's discretion that may be contained in CAA §112(c), for example, is irrelevant to EPA's exercise of its judgment under CAA §112(n)(1)(A) because CAA

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[14] See Grand Canyon Trust v. FAA, 290 F.3d 339, 346 (D.C. Circuit 2002).

§112(c) does not apply to Utility Units absent an affirmative finding under CAA §112(n)(1)(A). Congress clearly envisioned that Utility Units would be treated differently under CAA §112 than other major sources of HAP. They took away the presumption that all major sources of HAP are regulated under CAA §112 for Utility Units and instead said Utility Units are to be regulated only if EPA determines it to be appropriate and necessary. Commenters point to the fact that Congress focused numerous times on Hg emissions from other source categories and left little discretion to EPA regarding how to regulate these sources as an indication that Congress wanted to regulate Hg emissions whenever possible, yet they miss the point that Congress specifically excluded Utility Units from this type of treatment. See, e.g., CAA §112(c)(6). Thus, under CAA §112(n)(1)(A), EPA's point was that Congress was concerned not with the unique situation imposed by Hg in general, but with Hg from Utility Units in particular.

Commenters response to EPA's CAA §110 argument amounts merely to a disagreement about the meaning of ambiguous statutory terms. EPA has explained in this document and elsewhere why its interpretation is reasonable given the unique treatment Utility Units received in CAA §112. Indeed, commenters' arguments that EPA must consider all Hg emissions from all sources when evaluating the appropriateness of regulating just one source category (Utility Units) contain a fundamental flaw – they would essentially mandate EPA finding it appropriate and necessary to regulate Utility Units under CAA §112(n)(1)(A) because Hg is a HAP listed under CAA §112(b) and because Utility Units emit relatively large amounts of Hg. Congress had already listed the HAP under CAA §112(b), indicating that generically the HAP was a concern or hazard as to public health. Indeed, the "H" in HAP stands for "hazardous" so the mere fact that a pollutant is a "hazard" as a general matter cannot be enough to justify regulating Utility Unit HAP emissions under CAA §112. Rather, via CAA §112(n)(1)(A) Congress wanted EPA to look beyond the mere facts that Utility Units may emit HAP in major source amounts; any other interpretation would render CAA §112(n)(1)(A) superfluous. The above explanation shows why commenter's bathtub analogy must fail. The HAP listed under CAA §112(b) are like the water in the bathtub – Congress knew they were being emitted at levels which raised concerns (which is why they were listed) when it decided not to regulate Utility Units unless EPA found it was appropriate and necessary. If Congress wanted to regulate every drop of water in the bathtub (e.g., every major source of HAP), it would not have created CAA §112(n)(1)(A) – it simply would have required regulation of Utility Units under the same CAA §§112(c), (d) and (f) scheme as other source categories.

We note that although we appropriately looked at the utility-attributable Hg emissions,[15] *as reflected in the IDI approach, we in the alternative also looked at the contribution of Utility Units to the global Hg pool, and the benefits that could accrue to the U.S. population from additional Hg controls at Utility Units, even for those persons at or above the RfD. See 70 FR 16028-29 (setting forth global pool analysis); Reconsideration TSD, Section 8. In this regard, EPA looked at the global Hg pool and the impact of eliminating all domestic Utility Unit Hg*

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[15] In the final rule, EPA concluded that the utility-attributable emissions remaining after imposition of the requirements of the Act are not reasonably anticipated to pose hazards to public health. Based on this finding and consistent with its interpretation of the term "appropriate," EPA concluded that it was not appropriate to regulate Utility Units under CAA §112. EPA's analysis did not end there, however. EPA went further in the final rule and concluded that even examining the impact of the global Hg pool, as opposed to the impacts associated with utility-attributable emissions only, it is still not appropriate to regulate Utility Units under CAA §112. See 70 FR 16028-29 (setting forth global pool analysis).

emissions, including those that enter the global mix (versus deposit relatively quickly in the U.S. or nearby ocean waters). See *70 FR 16028-29; 70 FR 62208-09. EPA's analysis showed that total domestic utility-attributable emissions are "a very small fraction of overall methylmercury levels."* Id*. at 16028. The modeling further showed that even if we were to eliminate (versus merely further reduce) all domestic utility-attributable Hg, "virtually none of the risks to public health stemming from the global pool" would be reduced.* See *70 FR 16029. In the Reconsideration TSD we went further and undertook a bounding exercise of the monetary benefits, based on IQ decrements, that would occur from elimination of utility Hg emissions. In the context of this global pool argument, EPA assumed a hazard to public health existed as a result of global Hg emissions, and then properly proceeded with its analysis under the "appropriate" prong. Specifically, in light of its finding that eliminating all domestic utility-attributable Hg would reduce virtually none of the health risks stemming from the global pool, EPA proceeded in the appropriate inquiry by considering the factor of cost. As explained in detail in Section 8 of the Reconsideration TSD, the lower bound cost of regulating under CAA §112 beyond CAIR (e.g., $750 million) exceeds the upper bound estimate of the benefits of such regulation (e.g., $210 million).*[16] See *70 FR 62209. This cost/benefit analysis further supports EPA's conclusion that it is not appropriate to regulate Utility Units under CAA §112.*

CAA §112(n)(1)(A) belies commenters' claim that Congress' intent was to "regulate all major sources of HAP" – Congress specifically declined to subject Utility Units that are major sources of HAP to CAA §112 automatically. Commenters declare that the Congress did not distinctly provide that EPA could ignore other sources of Hg when conducting its assessment of Utility Unit emissions under CAA §112(n)(1)(A). EPA notes that Congress also did not plainly require EPA to consider the global pool of emissions, leaving the language ambiguous and subject to EPA's reasonable interpretation. Commenters essentially insist that we must read the phrase "as a result of" to mean the same as "which alone or in conjunction with other sources...,may reasonably be anticipated to cause or contribute" to hazards to public health. But this latter, arguably less ambiguous, language that Congress did use elsewhere (CAA §169A) does not exist in CAA §112(n)(1)(A). In fact, the plain language of CAA §112(n)(1)(A) better supports EPA's position – EPA is to consider the hazards to public health reasonably anticipated "to occur as a result of emissions by" Utility Units.

Furthermore, the case law cited by commenters in support of their argument that EPA cannot look solely at utility-attributable emissions does not stand for that proposition. The issue in Grand Canyon Trust v. FAA*, 290 F.3f 339 (D.C. Cir. 2002) involved Council on Environmental Quality (CEQ) implementing regulations that specifically require an Environmental Impact Statement for actions "significantly" affecting the quality of the human environment. Importantly, the regulations specifically define "significantly" as those actions with individually insignificant but cumulatively significant impacts. The regulations directly state that significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. In other words, the implementing regulations for the applicable statute – the National Environmental Policy Act (NEPA) – specifically require a look at cumulative impact, which is why the FAA's failure to do so regarding noise from a new airport made its Environmental Assessment faulty. The case does not, as commenters argue, establish new general precedent. Notably, CAA §112(n)(1)(A) does not contain language similar to that in the*

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[16] As explained below, we revised our original estimate of $168 based on corrections made to the Ryan study.

CEQ regulations, which clearly mandate that EPA look at cumulative impacts.

Commenters argue that EPA cannot interpret the phrase "as a result of emissions from" as it has in subsection 112(n)(1)(A) because it interpreted the same phrase differently when writing rules under subsection 112(k)(3)(A). Commenter's argument, however, fails to recognize fundamental differences in the provisions in those two subsections. CAA §112(n)(1)(A) looks at a particular source category (Utility Units). As with other source-category specific rules promulgated under CAA §112, we looked at the impacts from the particular source category at issue, and not all sources of HAP that also are emitted by that source category. <u>See</u>, e.g., National Emissions Standards for Coke Oven Batteries; Final Rule, 70 FR 19992, 19996-7 (April 15, 2005). On the other hand, CAA §112(k) specifically discusses aggregate and cumulative emissions, particularly from numerous categories of area sources in urban areas. <u>See</u>, e.g., CAA §112(k)(1) (finding that emissions of HAP from area sources "may individually, or in the aggregate" present significant risks; looking at ambient air concentrations of HAP in urban areas). CAA §112(k)(3)(A) looks at 30 HAP emitted by numerous source categories in urban areas. The goal is to reduce overall HAP emissions from area sources in urban areas, not to decide whether CAA §112 is the appropriate or necessary venue for addressing HAP emissions from a particular source category. Thus, EPA reasonably adopted a more holistic approach under CAA §112(k)(3)(A) than is required by CAA §112(n)(1)(A).

The language of CAA §112(n)(1)(A) (e.g., "appropriate" and "necessary") inherently authorizes EPA to exercise discretion. <u>See</u>, e.g., Vinyl Chloride decision at 1155 ("the language used, and the absence of any specific limitation, gives the clear impression that the Administrator has some discretion in determining what, if any, additional factors he will consider..."); <u>id</u>. at 1159 ("the absence of enumerated criteria may well evince a congressional intent for the Administrator to supply reasonable ones."). Commenters' approach on this and other issues, however, would essentially strip EPA of its ability to exercise that discretion. <u>Id</u>. at 1153 (rejecting approach that would eliminate any discretion and render words of the statute meaningless). The courts have recognized a truth that commenters ignore – there is a difference between what the Administrator is "permitted" to do versus what he is "required" to do under the Act. <u>Id</u>. at 1154. Commenters essentially believe that their interpretation is more reasonable than EPA's; without conceding that point, as long as EPA's position also is reasonable, EPA must prevail under Chevron Step 2. For the reasons stated in the final rule preamble and here, EPA's interpretation that it can look at utility-attributable Hg emissions under CAA §112(n)(1)(A) is reasonable.

<u>Comment</u>:

Commenters 6475 and 6504 agree with EPA's interpretation. They note that EGUs are afforded unique treatment under CAA §112, and that when Congress added CAA §112(n)(1)(A) to the CAA, it was aware of the many other provisions of the 1990 Amendments that would require EGUs to install new pollution control equipment. Yet, they continue, rather than treat utilities the same as other major sources under CAA §112, Congress crafted CAA §112(n)(1)(A) to require EPA to determine if HAP emissions from EGUs caused a public health risk after all other provisions of the CAA were implemented. They also note that CAA §112(c)(6) provides further evidence that Congress intended EPA to focus solely on the health impacts from EGU emissions in making its CAA §112(n)(1)(A) determination because this section, which focuses on ensuring that MACT standards are in place to control virtually all sources emitting seven HAP, including Hg, contains one explicit exclusion. The last sentence of the section states that "[t]his paragraph shall not be construed to require the Administrator to promulgate standards for such pollutants emitted by electric utility steam generating units."

Commenter 6475 adds that, as EPA explains in the preamble to the final rule, Congress knew how to require the regulation of pollutants from certain sources even if the emissions from those sources did not themselves cause a health problem but instead merely "contributed" to a problem. The commenter discusses CAA §§108, 109, and 110, which were enacted to provide EPA authority to control pollutants that cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare and whose presence in the ambient air results from numerous or diverse mobile or stationary sources. They continue that Congress knew how to draft specific statutory language to require the regulation of sources that do not by themselves pose health risks but only contribute to the overall ambient levels of a given pollutant, yet no similar language is found in CAA §112(n)(1)(A). Thus, they conclude, the only appropriate interpretation of CAA §112(n)(1)(A) is that Congress required EPA to look only at the HAP emissions from EGUs and to decide if those emissions, by themselves, posed risks to public health.

Response:

EPA agrees with the commenters that the Agency reasonably interpreted CAA §112(n)(1)(A) and correctly focused on HAP emissions attributable to Utility Units.

1.1.1.2 After Imposition of the Requirements of the Act

Comment:

Three commenters (6475, 6471, and 6504) agree with EPA's interpretation of this phrase. First, they note that the 1990 Amendments to the CAA imposed many requirements on coal-fired power plants. They agree that EPA's interpretation is consistent with the language and context of the statute, as well as the Congressional intent that EGUs not be subject to duplicative or otherwise inefficient regulation. Commenters argue that an interpretation that precludes the Agency from considering CAA requirements yet to be implemented would have prevented EPA from even considering the emissions reductions contained within the Title IV Acid Rain Program, despite the fact that this program was the most significant regulation affecting EGUs under the 1990 Amendments.

They next note that Congress was aware of those requirements when it created a special provision in CAA §112 for EGUs, a provision that did not automatically require EPA to promulgate CAA §112 regulations covering coal-fired power plants. The commenters also agreed that 2020 is an appropriate year to assess the health impacts of remaining HAP emissions from EGUs.

Finally, commenters agree that EPA has properly determined that it may consider both the direct and indirect impact on emissions of other requirements of the Act.

Response:

EPA agrees that its interpretation of CAA §112(n)(1)(A) is reasonable.

Comment:

Several commenters (6280, 6478, 6479, and 6634) stated EPA's reliance on the emissions reductions associated with CAIR and CAMR as evidence to support a finding of no adverse impacts "after imposition of the requirements of the Act" is contrary to law. As an initial matter, they argue that Congress directed EPA to focus on the "requirements of this chapter" as of 1990 and not on possible future regulatory requirements that EPA anticipates from a later vantage point. Commenters believe that EPA's interpretation is sufficiently vague that it appears to encompass virtually any activity that EPA might engage in at any time, including, for example, regulations of Hg emissions from chloralkali plants, even though such regulations do not directly affect power plant emissions. Commenters contend that CAIR is not a "requirement" for the EGU industry at all because CAIR cannot and does not require States to regulate power plants or require emissions reductions from the EGU industry at all. Thus, they conclude, no emissions reductions – in NO_x or sulfur dioxide (SO_2), much less HAP – are guaranteed from the EGU industry via CAIR – and, thus, CAIR is not a "requirement of the Act" for EGUs under CAA §112(n).

Their next point is that CAIR does not regulate Hg or other HAP emissions; therefore, it does not "require" Hg reductions (or reductions in any other HAP). They argue that with respect to Hg at least, EPA cannot state, with any assurance, anything about "the public health hazards reasonably anticipated to occur" after CAIR is implemented, as CAA §112(n)(1)(A) requires. Commenters disagree that EPA can assume or predict that the pollution control technologies used to comply with CAIR in the future will successfully control Hg emissions. In particular, they express concern that because control technology evolves, it is possible that a better method of controlling SO_2 and NO_x emissions may be developed; technology that may well be used to ensure compliance with CAIR, whether or not it achieves the same degree of Hg control as the current technologies. Moreover, they continue, the control technologies that are anticipated under CAIR are frequently not the best technologies for Hg emission control. They assert that EPA ignores these possibilities and that the inherent uncertainty concerning which technologies will be used under CAIR in the future highlights the inappropriate nature of the Agency's interpretation of the terms found in CAA §112(n).

Next they argue that any EGU Hg emissions reductions, or reductions of any other HAP, that actually do result from CAIR will be only co-benefits of the rule's NO_x or SO_2 reductions, and will not occur until 2010 or later – a date they claim defeats both the timelines in CAA §112(n), as described above, and Congressional intent to achieve immediate and direct HAP emissions reductions from all regulated industries, including EGUs, as expressed in the larger context of CAA §112.

Commenters also believe that the fact that CAIR applies only to States in the eastern half of the U.S. undermines EPA's ability to rely on it. They also state that EPA does not take into account existing and potential new Hg hotspots resulting from CAIR's NO_x and SO_2 trading schemes.

Commenters then argue that the following facts – (i) CAIR is presently the subject of litigation by utility companies and their trade associations seeking to limit the rule's scope and coverage, weaken its levels of emissions reductions, and otherwise disrupt its implementation, (ii) EPA had recently granted reconsideration of portions of CAIR, partly in response to the efforts of these litigants, and (iii) an association of Florida utility companies has moved for a judicial stay of the rule – lend further delay and uncertainty to the CAIR reductions and their asserted associated Hg cobenefits, therefore, making it is impossible to say what the rule will look like after the reconsideration process and the litigation are completed.

Finally, commenters note that EPA's own modeling for CAIR and the anticipated adoption of advanced pollution controls for SO_2 and NO_x shows that there are numerous EGUs that will not adopt any such advanced controls for SO_2 or NO_x or both, by 2015 and even by 2020. The commenter provided a copy of a summary table prepared by Environmental Defense from EPA's own modeling for CAIR that shows numerous EGUs without scrubbers for SO_2 in the CAIR region, even as late as 2015. Commenter then contend that this modeling is generous toward EPA's decision-making because EPA's modeling assumes universal adoption of utility controls by States in the CAIR region, something that CAIR does not require and that EPA cannot guarantee.

Response:

Commenters' arguments are based on several false premises. First, the direction to consider Utility Unit emissions "after imposition of the requirements of the Act" is in no way limited to requirements that directly regulate Utility Units at the Federal level, or that directly regulate HAP emissions. For example, the Act's requirements include the submission by the States of ozone and fine PM attainment demonstrations and SIP provisions needed to reach attainment of the NAAQS; such provisions could include controls on EGUs to reduce SO_2 *and* NO_x*, which controls could also yield Hg reductions. More generally, EPA has more than 35 years experience writing rules that States must follow when developing SIPs. Based on that experience, including the recent* NO_x *SIP Call, EPA reasonably predicted that States will develop plans under CAIR that regulate* SO_2 *and* NO_x *emissions from Utility Units. Therefore, EPA reasonably anticipated what Utility Units emissions would be after implementation of CAIR. (See final Section 112(n) Revision Rule and the Effectiveness TSD.) States in the CAIR region are required to submit SIP revisions meeting the requirements of CAIR to EPA by September 2006. See 70 FR 25162, 25329. In addition, EPA has promulgated Federal Implementation Plans (FIPs) for all States in the CAIR region. The FIPs will regulate EGUs in the affected States and achieve the emissions reduction requirements established by CAIR until States have approved SIPs to achieve the reductions. The FIPs require EGUs in the affected States to participate in regional cap-and-trade programs to reduce emissions of* NO_x *and/or* SO_2*. See 71 FR 25328, 25338-62 (2006). Moreover, the fact that a rule has been challenged in court is not unusual and does not prohibit EPA from being able to reasonably rely on it when forecasting emissions. The Agency is confident that CAIR will be upheld by the court, which has* *already denied the motion to stay CAIR pending litigation. We also note that EPA has completed its reconsideration of CAIR and none of the relatively minor changes made to CAIR in response to reconsideration change our CAA §112(n) analysis. (See 71 FR 25304; April 28, 2006.)*

Congress' instruction also was not limited to requirements that directly regulated HAP. Indeed, it would be incongruous to read the language in that manner – why would Congress instruct EPA to consider only "requirements" that apply to Utility Unit HAP emissions as part of the analysis looking at whether to directly regulate Utility Unit HAP emissions under the section of the CAA that regulates HAP? Commenters cannot disagree that Congress at least had the Acid Rain Program in mind when it wrote CAA §112(n)(1)(A), yet that program also does not directly regulate HAP. Thus, the fact that CAIR does not directly regulate Hg emissions does not mean it is not a "requirement of the Act" that deserves appropriate consideration under CAA §112(n)(1)(A). Commenters hypothesize that new control technologies for NO_x *and* SO_2 *that do not also reduce Hg emissions may be developed and installed by industry; thus, EPA cannot look at CAIR as part of its CAA §112(n)(1)(A) analysis. EPA has been regulating power plants for more than 30 years, and its expertise regarding what control equipment it can reasonably expect to be installed and operated in response to CAIR is more persuasive than any fictional scenario woven by commenters. Moreover, the tight timeline for meeting the CAIR emissions reductions makes it even more unlikely that some fantastical new control option that does not reduce Hg at all will become available in time – power plant control options do not evolve that quickly. Scrubbers have been a mainstay piece of control equipment for over 20 years, and selective catalytic reduction (SCR) has been around for a decade. Considering the time and expense involved in designing and installing these controls, even if new, unforeseen control options become available in the future, it is highly unlikely that existing plants that have installed scrubbers and SCR would remove and replace them. Thus, even though CAIR does not directly regulate HAP from Utility Units, EPA appropriately considered the reductions of Hg that are expected to occur as a co-benefit of CAIR. Finally, EPA did modeling showing that after CAIR, and furthermore after CAMR, there will be no utility hotspots. Thus, the fact that CAIR does not directly regulate Hg does not mean that it was improper for EPA to consider it in its CAA §112(n)(1)(A) analysis. However, as noted in the final rule, CAMR, independent of CAIR, reduces Hg from Utility Units directly to levels that are not reasonably anticipated to result in hazards to public health.*

Third, commenters seem to be under the impression that any decision by EPA that does not result in MACT-equivalent controls at every Utility Unit is arbitrary and capricious. They point to the fact that CAIR does not apply nationwide as a reason why EPA cannot rely on it as part of the CAA §112(n)(1)(A) analysis – but if after implementation of CAIR utility Hg emissions are at levels not reasonably anticipated to result in hazards to public health, it does not matter that CAIR does not apply nationwide, to every unit. The fact remains that it is still resulting in significant, and sufficient, Hg reductions. Similarly, it is reasonable for EPA to determine that it is not appropriate or necessary to regulate Utility Units under CAA §112 even if the result is that some Utility Units do not install controls beyond what they have in place today. Nor must EPA first find that Utility Units have installed, or will be installing, controls that commenters believe are as effective as MACT would be for Hg. The relevant question is not, as commenters appear to believe, whether utility-attributable Hg emissions could be lower at *some, or all, Utility Units. The relevant question under CAA §112(n)(1)(A) is whether it is reasonably anticipated that the level of utility-attributable Hg emissions remaining after imposition of the requirements of the Act will cause hazards to public health? If the answer is no, as it is here, then EPA reasonably finds it is neither appropriate nor necessary to regulate Utility Units under CAA §112.*

Finally, commenters attack, again, EPA's looking at projected emissions and deposition rates for the years 2015 and 2020 when making its appropriate and necessary findings. As we discussed in more detail in the final Section 112(n) Revision Rule and the Reconsideration notice, Congress' instruction to consider Utility Unit emissions after imposition of the requirements of the Act necessarily requires projecting what emissions would be in the future, once those requirements are implemented. For example, the Acid Rain program added as part of the 1990 CAA Amendments had requirements that did not become effective until the year 2000 and would not be fully implemented until about 2010. In addition, at the time of the December 2000 finding, EPA knew about the 1997 ozone and particulate matter (PM) NAAQS revisions, the boilers NSPS, and the NO_x *SIP Call, and, as explained in the final rule, EPA should have accounted for implementation of those programs and their impact on Hg emissions.* See *70 FR 16003-04. Similarly, EPA's consideration of CAIR and CAMR does not defeat the alleged timeline set forth in CAA §112(n)(1)(A), which itself requires EPA to consider implementation of other requirements of the CAA. Moreover, as discussed elsewhere, EPA modeled scenarios for the years 2010, 2015, and 2020 that included CAIR, CAMR, and Clean Air Visibility Rule (CAVR) programs, and this modeling supports our position that the expected Hg deposition with CAIR plus CAMR in 2015 is expected to be similar to the Hg deposition with CAIR plus CAMR in 2020, and that most of the Hg reductions from CAIR will occur by 2010. (*See *Air Quality Modeling TSD, Section V.B.*[17]*; Reconsideration TSD, Section 10) This timeline is consistent with the Utility Study, which commenters place much weight on, and which estimated what Utility Unit HAP emissions would be as of the year 2010. Moreover, as discussed above, we can consider new information and newly implemented requirements at the time we amend our appropriate and necessary finding.*

EPA also believes its interpretation of the "requirements" provision of CAA §112(n)(1)(A) is supported by compelling policy reasons. Because EPA projects that CAIR and, independently, CAMR reductions will achieve the public health goals that CAA §112(n)(1)(A) is designed to assure, it would, as a practical matter, be quite wasteful and involve unnecessary expense to disregard CAIR or CAMR, and thereby require further regulation of EGUs under CAA §112.

It should also be noted that the commenters' statement that co-benefit reductions under CAIR will not be achieved until 2010 or later is fundamentally incorrect. First, the ability for sources to bank pre-2010 title IV allowances for use at a 1:1 ratio under CAIR provides a strong incentive for significant pre-2010 reductions in SO_2 *emissions. Second, the CAIR* NO_x *program begins in 2009, not 2010, and provides incentives for* NO_x *reductions even earlier than 2009 by allowing for early reduction credits. These two incentives for early reductions provide sources in the CAIR region an incentive for optimizing* SO_2*,* NO_x*, and Hg control in the near term, and*

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[17] "Technical Support Document for the final Clean Air Mercury Rule: Air Quality Modeling." March 2005. EPA-HQ-OAR-2002-0056-6130.

will result in reductions of emissions of all three pollutants prior to 2010.

1.1.1.3 Appropriate and Necessary After Considering the Results of the Study

1.1.1.3.1 Appropriate

Comment:

Several commenters (6475, 6471, 6557, 6636, 6504, and 6560) state that the terms "appropriate" and "necessary" have been used in other statutes and the courts have generally interpreted the terms as providing a broad delegation of authority to the Federal Agency.

A commenter set forth several reasons why it strongly disagreed with the apparent interpretation of the term "appropriate" in the December 2000 finding, including that EPA allegedly did not specifically find that Hg emissions from coal-fired power plants actually caused significant public health concerns, and that the decision relied on environmental effects as a basis for an "appropriate" finding. The commenter stated, however, that in the March 2005 rule EPA correctly concluded that the paramount factor in an "appropriate" determination under CAA §112(n)(1)(A) is "whether the level of utility HAP emissions remaining 'after imposition of the requirements of the Act' would result in hazards to public health." Commenters agreed that EPA acted within its statutory authority when it considered such factors as the available health effects data, the uncertainties of those data, the weight of the scientific evidence, and the extent and the nature of any health effects. The commenter believes that these issues are the crux of any determination about whether regulation is "appropriate," and that other factors, such as whether the available control would be effective in eliminating the health risk or that the benefits of regulation are greatly outweighed by the costs to society, are of secondary importance.

Response:

EPA agrees that its interpretation of CAA §112(n)(1)(A), and its finding that it is neither appropriate nor necessary to regulate Utility Units under CAA §112, is reasonable. As noted elsewhere, however, EPA can consider environmental effects in its appropriate analysis once it has determined that Utility Unit HAP emissions remaining after imposition of the requirements of the Act are reasonably anticipated to result in hazards to public health.

Comment:

Commenters 6634 and 6478 assert that EPA's interpretation of "appropriate and necessary" in the final delisting rule is unlawful. The commenters state that EPA's interpretation of "appropriate" as allowing it to ignore environmental effects, but at the same time to consider non-statutory factors such as cost-effectiveness, is contrary to law, arbitrary and capricious. In addition to reiterating concerns with EPA's looking at emissions solely from Utility Units, the commenters argue that CAA §112(n)(1) in no way limits EPA's ability to consider environmental impacts of EGU HAP emissions, as part of deciding whether it is appropriate to regulate Hg emissions under CAA §112. Moreover they contend that EPA does not offer any reasoned explanation why "hazards to public health" does not include the concept of environmental impacts. For instance, they contend, it is well-accepted in the field of ecology that adverse effects on environmental systems commonly have adverse effects on public health (see James Lovelock, GAIA, Oxford University, 1979). Commenters point to comments submitted by certain Tribes in which the Tribes note that the markers for environmental damage including increased Hg concentrations in wildlife, translate into "hazards to public health" for Native Americans who consume such wildlife, either for subsistence purposes, or as part of custom and ritual. They further note that because the pathway of human exposure to Hg emitted to the atmosphere is through consumption of fish and other wildlife, the difference between environmental effects and health effects is simply a matter of degree, which varies among different parts of the population.

Moreover, they argue that the text of related subsections of CAA §112 clearly indicates that Congress considered it appropriate to consider environmental impacts as part of assessing whether regulating a source category is required (e.g., CAA §112(c)(9)).

Commenters also assert that an interpretation of "appropriate"– which allows the Agency to reject CAA §112 regulation based on considerations of cost-effectiveness and other factors – is inconsistent with the statute. They contend that EPA improperly injects notions of cost-effectiveness, administrative ease, and compliance flexibility into the "appropriate" inquiry, which will generally tilt away from CAA §112's technology-forcing approach Commenters assert that EPA's approach finds no support in the language of the statute because if Congress wanted these kinds of implementation questions, rather than the ultimate question of EGUs' risk to public health and the environment, to drive EPA's assessment of "appropriateness," it would have said so, as it has done in numerous CAA provisions. In addition, commenters cite case law in support of their argument that Congress did not intend EPA to consider cost. See *Whitman v. American Trucking Assn's, Inc.*, 531 U. S. 457, 467 (2001) ("Whitman").

Commenters also address EPA's reference to a dictionary definition of "appropriate," arguing that EPA's interpretation arbitrarily and capriciously ignores the ways in which CAA §112 regulation would be "especially suitable" for HAP if the Agency were permitted to look beyond the risks that EGUs pose. They also note that the same dictionary that EPA relies on for defining "appropriate" as "suitable" also defines "suitable" as "adapted to a use or purpose." Commenters argue that CAA §112 was amended or adapted to a particular use or purpose to address EPA's past failures regarding HAP regulation; that is, to strictly control HAP like Hg from major sources like coal-fired power plants.

Finally, commenters argue that EPA has ignored other benefits of strict MACT regulation that – if it were permissible to look at factors beyond the risk caused by EGUs in making the "appropriate" determination-would make it "especially suitable" to rely on CAA §112. In particular, they assert that the Agency failed to consider the impact strict versus weak regulation would have on the Agency's ability to meet the terms of the Chesapeake 2000 Agreement, an agreement signed by EPA on behalf of the U.S. along with six States. Commenters believe that, by rescinding its "appropriate" finding, EPA completely ignored the Chesapeake 2000 Agreement, the findings of the Agency's own Chesapeake Bay Program, and its Toxics Subcommittee.

Response:

In the final rule, EPA explained that the threshold factor in any "appropriate" inquiry under CAA §112(n)(1)(A) is whether the level of Utility HAP emissions remaining after imposition of the requirements of the Act is reasonably anticipated to result in hazards to public health. Only if such hazards exist should EPA proceed to consider additional factors, such as environmental effects and cost-effectiveness, in determining whether regulation of Utility Units under CAA §112 is appropriate. See 70 FR 16000, 16002-03. Commenters argue that the term "appropriate" should be read to require consideration of environmental effects in conjunction with hazards to public health. We disagree.

Commenters do not dispute that the term "appropriate" is a broad term, that the study required by CAA §112(n)(1)(A) refers only to "hazards to public health" or that the phrase "environmental effects" appears nowhere in the language of CAA §112(n)(1)(A). In support of their position that environmental effects should be considered in conjunction with health effects, commenters rely on statutory provisions other than CAA §112(n)(1)(A) and point out that those provisions include the phrase "environmental effects." Commenters' reliance on these other statutory provisions does not advance their case, however, because it is well-settled that "[w]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." See Russello v. United States, 4646 U.S. 16, 23 (1983); see also Duncan v. Walker, 533 U.S. 167, 171 (2001). Although one subsection of CAA §112(n) and some other provisions of CAA §112 reference both public health ***and*** *"environmental effects" or impacts on health* ***and*** *"the environment," – indeed CAA §112(a) contains a definition of "adverse environmental effect" – CAA §112(n)(1)(A) refers only to "hazards to public health." The lack of language regarding environmental effects in CAA §112(n)(1)(A) must be given import, and EPA's interpretation does that. Moreover, Congress would not have included references to environmental impacts in these other sections of the Act if, as commenters argue, Congress expected EPA to include environmental impacts when looking at impacts on public health. EPA cannot ignore the distinction and treat environmental impacts as simply a "matter of degree" of public health. EPA must give effect to the distinction created by Congress. The "other wildlife" pathway is discussed elsewhere in this document.*

In addition, the commenters' statement that EPA erred by not considering environmental effects, but at the same time considering the non-statutory factor of cost-effectiveness, reveals the error of their own position. Neither environmental effects nor cost-effectiveness are specifically included in CAA §112(n)(1)(A). Pursuant to EPA's interpretation of the term "appropriate," which is reasonable, EPA properly did not consider either factor in its CAA §112(n)(1)(A) utility-attributable public health analysis because it concluded that the level of utility-attributable Hg emissions remaining after imposition of the requirements of the Act is not reasonably anticipated to pose hazards to public health.

Moreover, as explained above, had EPA found that the level of utility-attributable HAP remaining after imposition of the requirements of the Act was reasonably anticipated to pose hazards to public health, we would have considered other factors, including cost and environmental effects, in determining whether it was appropriate to regulate Utility Units under CAA §112. See 70 FR 16002. Indeed, as discussed above, EPA undertook an alternative *appropriate analysis called the global pool analysis. In that analysis, EPA assumed hazards to public health and therefore, consistent with its interpretation of the term "appropriate," properly proceeded to consider the costs and benefits of regulating Utility Units under CAA §112. As discussed in more detail above, that alternative global pool analysis also supports our determination that it is not appropriate to regulate Utility Units under CAA §112.*

Objecting to EPA's consideration of costs in EPA's alternative global pool appropriate inquiry, commenters cite to <u>*Whitman*</u> *at 457. They do not address, however, EPA's discussion of that case in the final Section 112(n) Revision Rule, 70 FR 16001, n. 19, where we explain why our consideration of costs in terms of the "appropriate" inquiry is reasonable and consistent with the case law. Contrary to the commenters' assertion, the term "appropriate" is a broad term that does, in fact, leave room for the consideration of costs once EPA has concluded that hazards to public health exist. To the extent that commenters object to the alternative global pool analysis because they believe that environmental effects should have warranted a finding that it is appropriate to regulate Utility Units under CAA §112, the commenters have not made – and cannot make – such a showing for the reasons explained above.* <u>*See*</u> *Section 1.1.1.1.1.*

Nor does the fact that other, unrelated sections of the CAA contain more description of what EPA should consider when making "appropriateness" decisions mean that EPA has no discretion when making such a determination under CAA §112(n)(1)(A). Indeed, the lack of any specific criteria implies that the Agency has discretion when determining whether it is appropriate or necessary to regulate Utility Units under CAA §112. <u>*See*</u>*, e.g*<u>*.,*</u> *Vinyl Chloride decision at 1155 ("the language used, and the absence of any specific limitation, gives the clear impression that the Administrator has some discretion in determining what, if any, additional factors he will consider..");* <u>*id*</u>*. at 1159 ("the absence of enumerated criteria may well evince a congressional intent for the Administrator to supply reasonable ones."). Moreover, the term "appropriate" by itself brings to mind the exercise of discretion considering what the decisionmaker reasonably believes are relevant factors. The broad terms "appropriate" and "necessary" inherently carry with them a broad delegation of authority to EPA to interpret them.* <u>*See*</u>*, e.g.,* <u>*BCCA Appeal Group v. EPA*</u>*, 348 F.3d 93, 115, rehearing denied as amended, 355 F.3d 817 (5th Cir. 2003);* <u>*Ninilchik Traditional Council v. U.S.*</u>*, 227 F.3d 1186, 1191 (9th Cir. 2000);* <u>*AFL-CIO v. API*</u>*, 448 U.S. 607 (1980) (overturning an OSHA rule because the Agency had not provided a reasonable basis for its regulation).* <u>*See*</u> *also* <u>*Whitman*</u> *at 475 ("[A] certain degree of discretion...inheres in most executive...action.") (citations omitted). Commenters essentially take the lack of a specific Congressional directive to ignore environmental effects and try to turn it into unambiguous and nondiscretionary instructions to EPA to consider such effects, but their efforts fail.*

We also note that any restrictions regarding EPA's ability to delist a source category under CAA §112(c)(9) are not relevant to this rule which involves decision made under CAA §112(n)(1)(A), not 112(c). <u>*See*</u> *discussion above concerning CAA §112(c)(9). Similarly, commenters' discussion regarding the purposes behind passage of the 1990 CAA Amendments revisions to CAA §112 completely ignores the fact that Congress did not treat Utility Units like other sources of HAP when revising CAA §112 (e.g., Utility Units not automatically subject to CAA §§112(d) or (f)). Congress did not determine that CAA §112 was "especially suitable" for Utility Units – rather, it left that determination to EPA and instructed EPA to look at what* *utility-attributable emissions would be after imposition of other requirements of the Act, including requirements that exist outside of CAA §112. Compare CAA §112(m)(6) (requiring EPA to examine whether the other provisions of section 112 are adequate to prevent adverse effects to public health and the environment associated with atmospheric deposition to certain water bodies) with CAA §112(n)(1)(A) (requiring EPA to examine whether Utility Unit emissions remaining after imposition of the requirements of the Act pose hazards to public health and whether regulation of Utility Units under CAA §112 is appropriate and necessary).*

Commenters further claim that nothing in the statute supports what they see as a tilt away from the technology-forcing aspect of regulation via MACT standards under CAA §112. Without necessarily agreeing with commenters' description of CAA §112, we note that their position ignores the presence of CAA §112(n)(1)(A) itself. Congress treated Utility Units differently from other major and area sources and enacted CAA §112(n)(1)(A) specifically to address such units. Pursuant to that section, EPA can only regulate Utility Units under CAA §112 if it determines that it is both appropriate and necessary to do so. Finally, EPA did consider the Chesapeake Bay when it made its determination under the CAA §112(n)(1)(A). See, e.g., section 4.3 of the Reconsideration TSD, where we note that "EPA's analysis of projected mercury deposition rates after implementation of CAIR and CAMR show some of the largest reductions in mercury deposition are expected to occur in the Chesapeake Bay region."

1.1.1.3.2 Necessary

Comment:

Several commenters (6471, 6475, and 6504) supported EPA's interpretation of "necessary." They state that when Congress creates a statutory framework that gives a Federal Agency an option of choosing among several regulatory approaches, the Agency should choose the one that is most effective from society's point-of-view, and that when evaluating effectiveness, the Agency should perform cost-benefit analyses, as well as consider the ease of administrative implementation. They argue that the alternative interpretation – that EPA cannot regulate under CAA §112 if any alternative legal authority exists – would have prevented EPA from regulating under CAA §112 even where CAA §112 was the most effective regulatory approach. Thus, they agree that EPA properly concluded that nothing in the statute mandates such a counter-productive result.

The commenters stated that CAMR will produce effective Hg regulation in the U.S. They note that Hg is a global pollutant, and that setting a nationwide cap for Hg emissions which allows utilities to decide how best to meet that limit is sound public policy from a public health perspective. They also believe that a cap-and-trade program is also the most cost effective way to reduce Hg emissions from coal-fired power plants, citing the success of the Title IV Acid Rain Program.

Response:

Although we do not necessarily agree with all the arguments set forth by commenters, we do agree that our interpretation of CAA §112(n)(1)(A), and our finding that it is neither appropriate nor necessary to regulate Utility Units under CAA §112, is reasonable.

Comment:

Commenter 6478 argues that although EPA posits the "effectiveness" factor as a *limitation* on the type of other CAA requirements that may be considered in order to render regulation under CAA §112 unnecessary, in fact, EPA uses the concept of cost effectiveness as an affirmative criterion for evaluating an alternative requirement against CAA §112 in order to determine if regulation under that section is "necessary." The commenter contends that nothing in the CAA justifies this injection of cost effectiveness factors into the determination of whether regulation under CAA §112 is necessary. According to the commenter, EPA must simply determine whether other statutory requirements address the public health threat from EGU HAP. If not, commenter asserts, EPA must regulate EGUs under CAA §112.

Commenter 6634 further asserts that EPA's "effectiveness" factor in the context of its interpretation of the term "necessary" is flawed. Specifically, the commenter argues that consideration of the "effectiveness" of other provisions of the Act in reducing HAP emissions imports a "health test" into the "necessary" prong of the CAA §112(n)(1)(A) analysis. The commenter states that by importing a "health test" into the "necessary" prong, EPA contradicts its position that the term "necessary" means something different than the term "appropriate," which according to EPA, requires an analysis of the hazards to public health associated with HAP from utilities. The commenter also complains that it is unclear exactly what EPA means by "effective" regulation, because the Agency does little more than reference cost and administrative effectiveness in passing, and it does not seem that EPA is taking either of the dictionary definitions of the term when used as an adjective, namely "producing a decided, decisive, or desired effect," or "ready for service or action." As the commenters have previously argued, the co-benefits from CAIR, on which the Agency relies, are neither decided, nor decisive, and as they will not even occur until some 10 years from now, CAIR certainly cannot be described as "ready for service or action" with respect to EGU Hg emissions.

Commenter 6634 also alleges that EPA makes much of the fact that its alternative regulatory scheme – the NSPS and CAMR's pollution trading market – would provide economic benefits to the EGU industry, they then argue that there is nothing in the Act that permits EPA to read the term "necessary" to include a cost-benefit analysis in deciding whether to regulate utility units under the strict standards of CAA §112. They continue that EPA's interpretation is contrary to law, arguing that Supreme Court case law has concluded that the fact that Congress so often explicitly required EPA to consider costs when making decisions under the CAA is a powerful indication that costs should be excluded where the relevant statutory language does not explicitly state that costs are among the factors for consideration. Thus, they conclude that because CAA §112(n)(1)(A) does not direct EPA to assess costs, administrative convenience, or other factors in determining what is "necessary" under CAA §112(n)(1)(A), EPA may only look at the plain meaning of "necessary" – that is whether other statutory requirements are already in place, at the time of the regulatory determination and listing decision (i.e., December 2000), to address any identified public health threat.

Furthermore, commenter 6634 argues that creating a cost-based loophole in the "appropriate and necessary" decision under CAA §112(n)(1)(A) ignores the larger context of

CAA §112, citing to case law about setting MACT floors under CAA §112(d). The commenter asserts that EPA attempts an end-run around MACT, by injecting cost into the decision whether or not the Agency can avoid the CAA §112 MACT.

Finally, the commenter contends that EPA implicitly accepts a cross-reference to CAA §112(n)(1)(B) by analogy in construing the word "necessary" – i.e., in the Agency's attempt to import issues related to the cost of alternative regulation into the CAA §112(n)(1)(A) regulatory determination, where costs of alternative technologies are only referenced in CAA §112(n)(1)(B). Yet, they continue, the fact that the Agency is willing to do this in support of its position on the word "necessary," while at the same time ignoring the CAA §112(n)(1)(B) reference to environmental effects of EGU Hg pollution in the same regulatory determination, demonstrates the internal inconsistency, arbitrariness, and results-driven nature of this rule.

Response:

As noted in the final Section 112(n) Revision Rule, EPA determined that its 2000 "necessary" finding was in error because EPA did not consider all the alternative legal authorities that could, if implemented, address the remaining emissions from Utility Units. See 70 FR 16001, 16004-5. This conclusion and EPA's interpretation that the term "necessary" involves an analysis of whether there are any other authorities under the Act that, if implemented, would reduce HAP emissions from Utility Units was not re-opened for comment and, therefore, any comments on this aspect of EPA's interpretation of the term "necessary" and application of that term are not being considered as part of this reconsideration.

In the reconsideration notice, however, EPA did re-open one aspect of its interpretation of the term "necessary." Specifically, EPA solicited comment on its position that the "necessary" inquiry entails an analysis of whether the alternative authorities identified under the Act would "effectively address" the remaining HAP emissions from Utilities. EPA modified its interpretation of the term "necessary" in the final rule to include this effectiveness inquiry in response to comments received on the proposal. See 70 FR 16001. Specifically, commenters on the proposed rule pointed out that under EPA's proposed interpretation of the term "necessary," EPA could not regulate under CAA §112 if it identified any other authority under the Act, even if that authority would not effectively address the remaining utility-attributable HAP emissions. In the final rule, EPA gave two examples of criteria to be considered as part of the effectiveness inquiry: the cost-effectiveness of regulation under the identified statutory authority and the ease of administrative implementation of that particular authority. See 70 FR 16001.

Commenters' dispute focuses on whether EPA, in evaluating whether it is necessary to regulate Utility Units under CAA §112, can consider the effectiveness of available statutory authorities. We agree with commenters that the "appropriate" inquiry is distinct from the "necessary" inquiry and, therefore, seek to clarify the nature of the "effectiveness" inquiry under the "necessary" prong of CAA §112(n)(1)(A). CAA §112(n)(1)(A) provides that EPA regulate Utility Units under CAA §112 only if it determines that such regulation is both appropriate and necessary. Thus, even were it appropriate to regulate Utility Units under CAA §112, which it is not, EPA would have to conclude that it was also necessary to do so before Utility Units could be regulated under that section. In interpreting the phrase "necessary" to *incorporate an effectiveness inquiry, we did not intend for such an inquiry to involve a public health-based assessment, or "health test," as commenters call it. See 70 FR 16001. Rather, the sole purpose of including the effectiveness inquiry as part of the "necessary" analysis was to ensure that EPA was not precluded from regulating Utility Units under CAA §112 where the other statutory authority identified – even though it would address any remaining hazards to public health – would do so in a manner that was either not cost-effective or not administratively effective in terms of ease of implementation of the program for regulators and the regulated community.*

EPA, therefore, is clarifying that the "effectiveness" aspect of the "necessary" inquiry does not involve an assessment of public health or any health test. Rather, the effectiveness prong of the necessary analysis focuses solely on whether implementing a program under the alternative identified statutory authority would be cost-effective and administratively effective in terms of ease of program implementation for regulators and the regulated community. Contrary to commenters' characterization, in the effectiveness inquiry, EPA analyzes the other identified statutory authority (e.g., CAA §111) in isolation to determine whether implementation of that authority would pose any significant issues from a cost-effectiveness and ease of implementation stand-point. To summarize, there are two aspects of the "necessary" inquiry. The first aspect, which we did not re-open on reconsideration, involves a determination as to whether there are any other authorities under the Act that, if implemented, would address any hazards to public health posed by the remaining Utility HAP emissions. The second aspect involves the effectiveness inquiry, which we have now clarified involves an assessment of whether the alternative statutory authority identified can be implemented in a cost-effective and administratively-effective manner.[18]

Commenters specifically object to the consideration of costs as part of the effectiveness analysis, but they fail to cite any case law to support their position. They also fail to address EPA's discussion in the final rule concerning the propriety of considering costs. See 70 FR 16001 n.19. The term "necessary" is indisputably a broad term, which is not defined in CAA §112(n)(1)(A). EPA reasonably exercised its discretion in interpreting that term to include an assessment of whether the alternative legal authorities identified under the Act, if implemented, would result in cost-effective regulation. See 70 FR 16001 & n.19. To adopt commenters' interpretation of the term "necessary" would mean that EPA must rely on any alternative identified authority in the Act no matter how cost-prohibitive or inefficient – from an administrative implementation perspective – that authority may be. EPA's interpretation of the term "necessary" is reasonable. That commenters may advocate another interpretation, even if it is reasonable, is irrelevant. The proper inquiry is whether EPA's interpretation is unreasonable and that is plainly not the case.

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[18] We recognize that the final rule may have engendered some confusion as to the two distinct steps of the "necessary" inquiry. For example, in the first column of page 16005 of the final rule, we note that regulation under *CAA §§*110(a)(2)(D) and 111 "would effectively address" utility Hg emissions because the level of utility Hg emissions remaining after CAIR will not result in hazards to public health. This discussion in the preamble mixes the first and second steps of the "necessary inquiry." As explained above, the first inquiry under the "necessary" prong is whether there are any alternative authorities in the Act that, *if implemented*, would address the identified hazards to public health associated with the remaining Utility Unit HAP emissions. The second inquiry under the necessary prong involves the effectiveness inquiry and the scope of that inquiry is clarified above.

In addition, commenter's reliance on CAA §112(d) as evidence that EPA cannot consider costs in the effectiveness inquiry of the necessary prong is misplaced. Any restrictions that may exist regarding the consideration of cost in setting MACT standards under CAA §112(d) are not relevant to this rule which involves a decision under CAA §112(n)(1)(A) as to whether Utility Units should even be regulated under CAA §112. Once again, Congress treated Utility Units differently from other major and area sources and enacted CAA §112(n)(1)(A) specifically to address such units.

Moreover, the commenter's CAA §112(n)(1)(B) argument lacks merit. Our consideration of costs in the second step of the "necessary" inquiry is focused on the cost of the control strategy at issue under the alternative identified statutory authority. For example, in evaluating CAIR and CAMR, we considered whether the cap-and-trade programs for Utility Units implemented pursuant to these rules would be cost-effective. Nothing in CAA §112(n)(1)(A) indicates that EPA cannot consider costs in this respect in interpreting the term "necessary." Further, consideration of such costs is consistent with CAA §112(n)(1)(A), where Congress asked EPA to report on "alternative control strategies." The focus on alternative strategies may reasonably be read as evidence of the relevance of the costs of such strategies. By contrast, CAA §112(n)(1)(B) addresses the costs of particular Hg control technologies, which is not the relevant issue under EPA's "necessary" inquiry. Thus, contrary to commenter's assertion, EPA has not impliedly or otherwise incorporated the requirements of CAA §112(n)(1)(B) into CAA §112(n)(1)(A).

The record demonstrates that EPA properly conducted its effectiveness inquiry. Specifically, as explained in the final rule and the Cost and Energy Impacts Reconsideration TSD, controlling Hg emissions through a cap-and-trade system is highly cost-effective. Moreover, the cap-and-trade programs contemplated under CAA §§110(a)(2)(D) and 111 for Utility Units complement other cap-and-trade programs that also apply to Utility Units. Because of the successes of these other cap-and-trade programs, EPA modeled the trading programs in CAIR and CAMR on these programs. EPA, therefore, reasonably anticipates that there will be efficiencies from an administrative program implementation perspective. Accordingly, in terms of its effectiveness inquiry, the scope of which is clarified above, EPA maintains that the cap-and-trade programs pursuant to CAA §§110(a)(2)(D) and 111 constitute an effective means of addressing remaining HAP emissions and that it is, therefore, not necessary to regulate Utility Units under CAA §112. To the extent commenters disagree with the discussion of why a cap-and-trade program under CAA §111 is cost-effective and poses no significant issues in terms of program administration, their comments are not detailed enough to cause us to change our determination, as set forth in the March rule.

Curiously, even were we to agree with commenters and not consider cost-effectiveness or the administrative-effectiveness of the programs implemented under CAA §§110(a)(2)(D) and 111 in the "necessary" prong (i.e., not proceed to the second step of the necessary inquiry), we would still find that it was not "necessary" to regulate Utility Units under CAA §112 because CAA §§110(a)(2)(D) and 111 constitute adequate authorities that, if implemented, would address any hazards to public health posed by any remaining emissions).[19] *Such a result is*

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[19] As explained in the final rule, we disagree with commenter 6634's suggestion that we are limited in the first prong of the necessary inquiry to considering only those statutory authorities that were implemented as of December

directly at odds with what the commenters advocate, which is a positive necessary finding.

1.1.1.3.3 After Considering the Results of the Study

Comment:

Commenters 6475 and 6504 agreed that EPA has discretion to evaluate other relevant factual information in making its determination. They state that although Congress plainly intended that EPA use the results of that study in any regulatory decision, it did not specify that the Utility Study must form the sole basis for EPA's determination. Indeed, the note, at the time EPA issued the Utility Study, it identified eleven areas where additional research was needed, presumably before a regulatory determination could be made.

Commenter 6471 also believes that the Agency adopted a reasonable approach. They agree that the Act requires EPA to consider the study, but it does not limit EPA to that single document. Absent such an express restriction, and in light of EPA's overarching and continuing role of gathering and assessing data to justify its regulatory decisions, they believe it would be unreasonable to force the Agency to ignore recent data; to do so would undercut EPA's traditional role in administering the CAA.

Response:

EPA agrees that its interpretation of CAA §112(n)(1)(A), and its finding that it is neither appropriate nor necessary to regulate Utility Units under CAA §112, is reasonable.

1.1.2 EPA's Methodology and Conclusions Concerning Why Utility Hg Emissions Remaining after Imposition of the Requirements of the CAA Are Not Reasonably Anticipated To Result in Hazards to Public Health

Comment:

Commenters 6280 stated that EPA's analysis is inadequate to assess the potential health impacts on several affected populations. EPA's analysis fails to adequately protect several affected populations, including pregnant women and women of child-bearing age. The presence of high levels of Hg in the blood of both women of childbearing age and pregnant women is well documented. The commenter states that data from the Centers for Disease Control and Prevention (CDC) indicate that the RfD[20] is exceeded by between 6 and 10 percent of U.S. women of childbearing age.[21] Regarding pregnant women, Mahaffey (2004)[22] found that,

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2000. See, e.g., 70 FR 16004-05. The commenters' concerns regarding the appropriateness of relying on CAIR are addressed elsewhere in this document.

[20] "RfD" has been defined by EPA as an estimate of a daily oral exposure "that is likely to be without an appreciable risk of deleterious effects during a lifetime." 70 FR 16012. Exceedance of the RfD by a pregnant woman can result in significant developmental impacts in even the limited time frame of her pregnancy.

[21] See OAR-2002-0056-6291, Exh. 10; Schober, et al., 2003; McDowell, et al., 2004 (OAR-2002-0056-6291, Exh. 11).

[22] See OAR-2002-0056-6291, Exh. 12.

assuming a 1:1.7 ratio of Hg in maternal blood to Hg in cord blood, approximately 630,000 U.S. babies (i.e., 15.7 percent of total U.S. births) are born to mothers whose cord blood levels of Hg exceeded the RfD.[23] Similarly, data from New Jersey suggest a 10-15 percent exceedance of the RfD among pregnant women..[24] EPA's RfD is an established public-health guideline and women whose Hg blood levels exceed the RfD are an affected population that EPA's analysis does not adequately address.

For babies who are already known to be exposed in utero to excessive MeHg from a combination of emission sources, each additional increment of utility-attributable Hg, however small, carries a predictable risk of additional IQ loss and other effects.[25] Each such additional increment in the maternal blood stream adds to the Hg dose delivered to the fetal brain[26] whether maternal exposure is from the single dietary pathway recognized by EPA, i.e., recreationally-caught freshwater fish, or from any of the other pathways unreasonably ignored by EPA, such as estuarine, marine, and commercial fish. Notably, the "overlap" population of pregnant women who have both Hg levels that exceed the RfD and consume recreationally-caught freshwater fish is an especially sensitive subpopulation that EPA ignores. EPA's claimed reductions in MeHg in fish tissue do not entirely remove the utilities' portion of this neurotoxin from recreationally-caught freshwater fish. Therefore, the fish diet of this maternal subpopulation will continue to add utility-attributable Hg to babies in utero who are already exposed beyond the RfD.

This problem is further compounded by the fact that EPA underestimated the amount of recreationally-caught freshwater fish that pregnant women consume. EPA relies on an estimate that the mean consumption rate for these women is 8 grams per day (g/day) and that "the 95th percentile" consumption rate is 25 g/day.[27] Comparison to other sources suggests that these EPA estimates are too low and that EPA is underestimating fetal Hg exposure through the only pathway – recreationally-caught freshwater fish – that it considers valid. Gassel (1997), for example, has compiled a "final draft" report for the California Environmental Protection Agency which summarizes various U.S. studies of fish consumption.[28] Tables 6 and 8 of this report show: a 1990s Michigan study found an average consumption rate of 14.5 g/day and a 96th percentile consumption rate of 81.6 g/day of self-caught sport fish; a 1989 Wisconsin study found an average consumption rate of 12.3 g/day and a 95th percentile consumption rate of 37.3 g/day of self-caught sport fish; and a 1988 Michigan study found an average consumption rate of 42.3 g/day and a 95th percentile consumption rate of 98.0 g/day of self-caught sport fish.[29,30] In light of these values, EPA's estimates are grossly low and the Agency is substantially underestimating both recreationally-caught freshwater fish consumption and the Hg intake of the approximately 500,000 pregnant women per year who eat these fish.

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[23] See also Stern Decl. ¶¶ 7-8.

[24] See OAR-2002-0056-6291, Exh. 13.

[25] See Stern Decl. ¶ 9, OAR-2002-0056-6291, Exh. 14.

[26] See NRC 2000, at 56-60 and 112-117 (see EPA Docket OAR 2002-0056-5927, -5928, and -5929)

[27] Id.

[28] See OAR-2002-0056-6293, Exh.15.

[29] Id.

[30] See OAR-2002-0056-6293, Exh. 16, Vol. 2, Appendix B (containing freshwater angler data); see also OAR-2002-0056-6293, Exh. 17 (the freshwater angler data in a 1994-1995 study conducted by Washington State (2001).

Response:

EPA did look at other pathways as part of the reconsideration notice. We disagree that our estimates are inaccurate for commercial freshwater fish consumption on specific consuming populations because the Agency considered the exposure to these fish as part of the total national fish consumption. Inclusion of the national fish consumption values was done for the population-level analysis and was necessary to conclude that freshwater commercial fish consumption is not a significant exposure pathway. EPA continues to maintain that most of the consumption by higher end groups (e.g., subsistence fishers) is self-caught and it is highly unlikely, given the nature of their fishing activity, that more than a small fraction, if any, of their consumption is comprised of commercially caught freshwater fish. Regardless, for any given total fish consumption rate noted in EPA's analyses, introducing any other type of fish into the diet of a self-caught freshwater fish consumer necessarily implies reducing consumption of self-caught freshwater fish. Utilities contribute more Hg to freshwater fish species than to any other fish species, supporting the assertion that self-caught freshwater fish consumption represents the primary source of utility-attributable Hg exposure.

Consumption rates for recreationally-caught freshwater fish were taken from EPA's Exposure Factors Handbook (EFH), which provides a summary of the available statistical data used in assessing human exposure and recommends consumption rates to be used in analyses that require estimates of consumption. The recommended consumption value for recreationally-caught freshwater fish is based on data from four studies. Importantly, the EFH includes three of the four studies noted in Table 6 of the "draft final" Gassel (1997) report (West 1989, West 1993, and Fiore 1989). Although the 1990 Connelly study is not included in the EFH, a later Connelly study involving the same basic type of survey is included in the EFH (Connelly 1996). The EFH recommended values was based on the two West studies, the later Connelly study, and an Ebert 1993 study. EPA considered the Fiore 1989 study limited because of the absence of data on weight of fish consumed and the fact that the results were based on one year recall (see EFH, p. 10-18). Importantly, the analysis in EPA's Reconsideration TSD explicitly includes very high-end freshwater fish consumers, analyzing consumers as high as the 99th percentile consumption levels. In addition, EPA analyzed the impact of these very high-end consumers, assuming that they were ***exclusively*** *eating fish with the some of the highest levels of Hg contamination.*

Commenters argue that EPA should have considered, as a separate subpopulation, women of child-bearing age. The focus on women of child-bearing age is because of concern about in utero exposure of the developing fetus. Our IDI health analysis was based off the RfD, which in turn is based on several studies that looked at the prenatal and early childhood exposure to MeHg, thought to be the most sensitive population. The RfD is "a scientifically justified level for the protection of public health," including sensitive subgroups. See 70 FR 16013. The commenter notes that national surveys can be used to estimate the number of people exposed above the RfD but fails to recognize that the vast majority of Hg exposure is due to the global background, not U.S. utilities. See Section 1.1.1.1.2 for an explanation of why it was reasonable to focus our public health analysis on utility-attributable exposure. Furthermore, the commenter cites analysis of the number of women of childbearing age who have blood-Hg concentrations at or above particular levels but that particular level corresponds to a MeHg oral *intake rate less than the EPA's RfD of 0.1 ug/kg-bw-day. The most recent Centers for Disease Control and Prevention estimate based on samples collected from the years 1999-2002 indicates that 5.7 percent of women of childbearing age are exposed to Hg at levels greater than the RfD.*

Commenters further argue that EPA should have considered as a separate subpopulation those women of child-bearing age that are already above the RfD due to non-utility-attributable emissions. See Section 1.1.1.1.2 for a discussion of why it was reasonable for EPA to look at utility-attributable exposure. Moreover, in our alternative argument regarding the costs and benefits of further regulation of Utility Unit Hg emissions, we did assume that everybody had background exposure above the RfD. <u>*See*</u> *Reconsideration TSD, Section 8. This assumption obviously does not represent the real world exposure, but rather is a conservative over-estimate of the benefits from reducing utility-attributable Hg emissions.*

<u>Comment</u>:

Commenters 6479 stated that EPA's evaluation of the health hazards expected to result from EGU Hg emissions is arbitrary and capricious because, among other reasons, EPA limited its analysis of human exposures to a single exposure pathway – consumption of recreationally-caught freshwater fish. In response, EPA claims that those pathways are insignificant or of only a "small concern."[31] But that argument ignores the bioaccumulative nature of Hg and the realities of fish consumption by U.S. consumers. In addition, for each pathway that EPA has decided to ignore, EPA has either underestimated the amount of fish consumed (especially for specific groups of consumers) or has underestimated the impact of U.S. power plants on the pathway.

<u>Response</u>:

EPA respectfully disagrees with these assertions. First, EPA provided a revised analysis in the Reconsideration TSD that estimates the upper bound for exposure from several other types of fish consumption in addition to recreationally-caught freshwater fish. EPA analyzed the exposure resulting from utility-attributable Hg in fish consumed in the U.S.

Second, EPA's exposure analysis was based on an upper-bound for fish tissue Hg concentrations that would likely overestimate the maximum bioaccumulation that would occur in any species (<u>*see*</u> *Sections 3 to 6 of the Effectiveness TSD). It, therefore, provides a reasonable upper bound for bioaccumulation of utility derived Hg.*

Third, EPA disagrees that we have underestimated the rates of fish consumption. EPA conducted an analysis of the exposure due to the consumption of various types of fish. Consumption rates for recreationally-caught freshwater fish were taken from EPA's EFH, which provides a summary of the available statistical data used in assessing human exposure and produces recommended values based on a synthesis of this data. The recommend consumption values for marine fish are based on data from the National Marine Fisheries Service, which is the government's primary source of information on marine fish. Although it is true that the recommended mean (or average) values are for the general population rather than specific

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[31] <u>See</u> 70 FR 62207.

subgroups or consumers, the analysis in EPA's Reconsideration TSD explicitly includes very high-end marine fish consumers, analyzing consumers as high as the 99 percent consumption level for freshwater fish and as high as the 99.9 percent consumption levels for seafood. In addition, EPA analyzed the impact of these very high-end consumers, assuming that they were exclusively eating fish with some of the highest levels of Hg contamination. See Table 3 herein showing cumulative IDI from consumption of freshwater and marine fish.

For Hg exposure from the estuary, aquaculture, and commercial freshwater pathways, scientific uncertainty or data limitation precluded a complete formal analysis. Nevertheless, consumption from these pathways is estimated to be small based on data from the National Marine Fisheries Service or the Fish and Wildlife Service.

Finally, EPA disagrees that it has underestimated the impact of U.S. power plants on these pathway. In all cases, the impact is based on the deposition rates taken from EPA's peer-reviewed air quality model and is converted to impacts by assumptions which would tend to overstate the impact, not underestimate it.

Comment:

Commenter 6474 stated that the methodology used by EPA to assess health effects is sound. The commenter commends EPA for preparing the detailed technical analyses it included in the record to support its final rule. The scientific record underlying the final rule is the most detailed of any rulemaking undertaken under this section of the CAA. Specific to the methodology used to assess the amount of utility-attributable Hg levels in fish tissue and the public health implications of those levels, commenter 6474 agrees with the following assumptions and conclusions:

The analytical tools (e.g., Community Multiscale Air Quality model [CMAQ], MMaps) and data sources (e.g., emissions inventories, GEOS-CHEM global background, and fish tissue concentrations) relevant to the methodology are appropriate support the Agency's determination that utility-attributable Hg emissions remaining after CAIR, and independently CAMR, are not "reasonably anticipated to result in hazards to public health."

EPA's approach to estimating utility-attributable exposure through a single exposure pathway – freshwater fish caught by recreational and subsistence fishers – is appropriate. The commenter agrees with the detailed analyses presented in a new TSD that shows that the greatest health effects result from the freshwater fish pathway while marine, aquaculture, estuarine and commercial freshwater pathways are not as significant.

Response:

EPA agrees that its methodology to assess health effects is appropriate.

Comment:

Commenter 6474 noted that several recent health effects studies focus on cognitive and cardiovascular effects of MeHg, deposition patterns in the Great Lakes, Hg levels in saltwater fish, as well as the risks and benefits of eating fish. In the commenters opinion none of these studies alter EPA's final rule conclusions. The commenter noted that as to the cognitive and cardiovascular effects studies, based on the contradictory nature of studies to date there is neither "emerging evidence" that MeHg has major effects on cardiovascular systems at low doses of exposure, nor is there good evidence for the hypothesis that fish Hg content diminishes the cardioprotective effect of fish intake. The commenter noted that most of these studies (1) rely on outdated modeling analyses, (2) contain only selective use of health data, (3) use an adjustment to the RfD that results in double counting, and (4) rely on cardiovascular effects that the NAS and EPA have both said are too speculative to be used for regulatory decisions. Again, we refer the Agency to comments submitted by the Electric Power Research Institute (EPRI) which include an extensive critique of the evidence for the cardiovascular effect of MeHg.

Response:

The Agency's interpretation and use of the available evidence of potential cardiovascular effects is discussed in Section 1.1.3.2. The Agency's interpretation and use of the available evidence for potential cognitive effects is discussed in Section 1.1.5.

Comment:

Commenter 6498 stated EPA has reopened for public comment all aspects of its methodology for assessing the impacts of utility-attributable Hg emissions and its conclusions that such emissions are not reasonably anticipated resulting in public health effects.[32] In addition to the above comments on the legal interpretation of specific language contained in CAA §112(n), which, if accepted, would require EPA to reconsider its methodology and conclusions, NCAI and the Treaty Tribes would like to comment on four areas where EPA's methodology and conclusions are erroneous: (1) determination of the average daily fish consumption by Native American subsistence fishers; (2) failure to consider the health risk posed by short-term exposure to large quantities of Hg; (3) limiting consideration of exposure pathways for Native American subsistence fishers to freshwater fish; and (4) concluding that it is not appropriate and necessary to regulate utility Hg emissions under CAA §112(n) even though EPA's data indicated that an untold number of Native American subsistence fishers exceed the RfD several times over, even when only considering Hg attributable solely to utility emissions. Each of these arguments is addressed in turn below.

A. Determination of average daily fish consumption by Native American subsistence fishers

To determine whether utility-attributable Hg emissions pose a health hazard to Native American subsistence fishers, EPA first needed to determine a likely range of daily fish consumption rates (FCR) for such fishermen. EPA ultimately concluded that the FCRs for Native American subsistence fisherman should be as follows: 60 g/day (mean); 170 g/day (95th percentile); and 295 g/day (99th percentile). EPA, however, did not utilize a reasonable methodology in arriving at these FCRs for Native American fishermen. Substantial information

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[32] See 70 FR 62203.

exists which indicates that the FCRs used by EPA are lower (and in some cases, significantly lower) than actual rates of consumption.

EPA based its FCRs for Native American subsistence fisherman on the results of a single fish consumption study. That study, which was conducted by the Columbia River Inter-Tribal Fish Commission (CRITFC), was initiated to determine whether Indians residing in the Columbia River Basin consumed more fish than non-Indians in the same location. See CRITFC, "A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin," Technical Report No. 94-3 (Portland, Oregon 1994) (the "CRITFC Study"). To make such a determination, the CRITFC Study surveyed approximately 500 adult tribal members from four different Indian Tribes in the Pacific Northwest: the Nez Perce, Yakama, Warm Springs, and Umatilla Tribes. The survey included individuals who did not consume any fish. Even more importantly, it excluded responses from seven tribal members who reported that they consumed between 486 g/day and 972 g/day, because those responses "seemed unreasonably high."[33] After doing so, the CRITFC study concluded that the mean consumption rate for all forms of fish consumed by adult members of these Tribes was approximately 60 g/day.

EPA's decision to take the results of the CRITFC Study and use those results as the sole basis for FCRs for all Native American subsistence fishers, is scientifically unsound.[34] First, by eliminating data from high-end fish consumers and incorporating data from individuals who consumed no fish, at best, the CRITFC Study is an indication of average fish consumption rates for the participating Tribes, *not* fish consumption rates for the subset of tribal *subsistence* fishers. Additionally, the CRITFC Study analyzed the fish consumption patterns of only 500 individuals from four Indian Tribes in a limited geographical area. There is no indication that the consumption rates of these tribal members is comparable to the large number of Native American subsistence fishers from nearly 550 Federally recognized Indian Tribes located throughout the U.S.

In fact, EPA acknowledged in the March 2005 Rule that extrapolating data in this manner posed serious concerns:

> An additional challenge in characterizing high-level fish consumption is that care needs to be taken in extrapolating study results from one sub-population to other sub-populations. This reflects the fact that high-level fish consumption is often tied to socio-cultural practices and consequently consumption rates for a study population can not be easily transferred to other populations which may have different practices, (e.g., practices for one Native American tribe may not be relevant to another and consequently behavior

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[33] See CRITFC Study at 26, 81.

[34] A recent study conducted by one of the Tribes participating in the CRITFC study, the Umatilla, describes several additional flaws in the CRITFC study. See Exposure Scenario for Confederated Tribes of the Umatilla Indian Reservation at 5-6 (September 15, 2004) ("Umatilla Study"). For example, because participants were required to drive to a central location on a particular day to respond to the survey questions, the Umatilla tribe concluded that "traditional members [who consume the most fish] were under-represented due to refusal, lack of phone, car, or permanent address, or inability to respond for the small amount of payment ($40)." Id. at 6.

regarding fish consumption may not be generalized).[35]

Yet despite this acknowledgement, EPA used the results of the CRITFC Study as its sole authority when establishing the FCRs for all subsistence populations. At a minimum, EPA must take into account other existing tribal fish consumption studies, including (1) Suquamish Tribe, "Fish Consumption Survey of The Suquamish Indian Tribe Of The Port Madison Indian Reservation, Puget Sound Region" (2000) (Suquamish Study), (2) Elizabeth D. Nobmann, et al., "The Diet of Alaska Native Adults: 1987-1988," 55 *American Journal of Clinical Nutrition* 1024-32 (1992) (Alaska Study), and (3) Great Lakes Indian Fish and Wildlife Commission, "Survey of Tribal Spearers" (1993) (GLIFWC Study) which were provided with the comments. These surveys conclude that fish consumption rates for the Indian Tribes being studied are significantly higher than those reported in the CRITFC Study and relied upon by EPA in establishing the FCRs for Native American subsistence fishers.

For example, the Suquamish Study surveyed approximately 92 adult tribal members randomly selected from the tribe's enrollment roster. Unlike the CRITFC Study, the Suquamish Study did not adjust the data to eliminate potential outliers, as it was believed that survey participants reflected their real consumption rates. It did, however, include non-fish consumers in its survey. The Suquamish Study concluded that fish consumption rates for adult members of its tribe were as follows: 213.9 g/day (mean); 796.9 g/day (95th percentile); and 1,453.5 g/day (99th percentile). These numbers are between 3.5 and 4.9 times higher than EPA's FCRs for Native American subsistence fishers.

B. Health risks posed by short-term exposure to large quantities of Hg

When considering the "hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units," EPA only examined risks associated with long-term daily consumption of Hg-contaminated fish (RfD/IDI analysis). This analysis may be insufficient to determine health risks to Native American subsistence fishers, however, because their fish consumption evidences significant seasonal fluctuations. For example, the GLIFWC Study concludes that members of certain Ojibwe Great Lakes Tribes may consume between 156 and 241 g/day of fish during the fall, and 293 g/day of fish during the busy spring spearing season. If a Native American subsistence fisher (or spouse) is pregnant during the spring spearing season and consumes 293 g/day of fish, an important question arises as to the extent and nature of the health effects on the developing fetus. The answer to this question is not addressed by EPA despite the fact that these numbers, which are several times EPA's mean subsistence FCR of 60 g/day, suggest that large seasonal consumption of contaminated fish could create a public health hazard for Native American subsistence fishers separate and apart from the health risk measured by the RfD and IDI.

C. Limiting consideration of exposure pathways for Native American subsistence fishers to freshwater fish

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[35] See 70 FR 16022. See also 70 FR 16022 ("application of these subsistence consumption rates outside of the original Columbia River study area could be problematic because it would be difficult to transfer these consumption rates to a different group that might exhibit different fishing behavior. However, these recommended rates can be used to model subsistence scenarios at different locations").

In the March 2005 Rule, EPA considered only one exposure pathway for Hg contamination-consumption of freshwater fish. In doing so, EPA offered no analysis of Hg exposure pathways through the consumption of aquatic plants or wild game. Additionally, in its calculations, EPA did not differentiate between the types of freshwater fish consumed, the specific fish parts ingested, or the method of fish preparation, even though these variables can all greatly affect the level of Hg contamination humans are exposed to when consuming freshwater fish. This was a highly inappropriate approach for Native American subsistence fishers.

EPA has determined that Native American subsistence fishers could be exposed to IDI rates nearly 18 times the RfD. That is, exposure to Hg contamination from utilities through one pathway – freshwater fish consumption – may result in an average daily Hg intake of 17.8 micrograms per kilogram per day (µg/kg-day).[36] EPA nonetheless concluded that despite such exposures, it was not appropriate and necessary to regulate utility Hg emissions under CAA §112. Although, as discussed below, the commenter does not believe this decision to be reasonable, regardless, it should not have been made without an assessment of all other potential exposure pathways for Native American subsistence fishermen that could increase the IDI.

Mercury bioaccumulates in fish and in animals that feed on fish.[37] Moreover, Hg accumulates at greater rates as species ascend the food chain. Predator-species such as fish-eating birds and mammals accumulate more Hg than any other known component of aquatic ecosystems.[38] Although such animals may not be consumed by the general public, they are part of the traditional diet of many Indian Tribes, and are routinely consumed by tribal members exercising treaty hunting rights. Yet the March 2004 Rule contained no analysis regarding consumption of wild game as an exposure pathway for Native American subsistence fishers. Because a portion of the Hg accumulation in wild game is directly attributable to Utility emissions, EPA must evaluate the cumulative risks posed by high-end fish and wild game consumption before it can conclude that such exposure does not pose a public health hazard.

Additionally, EPA's analysis to date has failed to account for the fact that Native American subsistence fishers often consume different parts of freshwater fish than the general public, such as the skin, head, eggs, bones, and organs.[39] Because these fish parts may absorb and concentrate Hg at higher levels than the fillet of the fish, Native American subsistence fishers consuming the same fish as the general public may be subjected to greater Hg exposure. EPA should, therefore, determine whether the use of higher default Hg concentrations for fish are appropriate when calculating risks to Native American subsistence fishers who consume fish parts that accumulate Hg more readily.

D. Concluding that utility-attributable Hg emissions are not reasonably anticipated to result in public health hazards for Native American subsistence fishers

Even if all of the above comments are rejected, EPA should still conclude that it is

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[36] See Effectiveness TSD. OAR-2002-0056-6186.

[37] See EPA, Mercury Study, Volume III: Fate and Transport of Mercury in the Environment, at 2-14.

[38] See EPA, Mercury Study, Volume I: Executive Summary, at 0-3.

[39] See CRITFC Study at 96 (Table 20).

appropriate and necessary to regulate Hg emissions from utilities under CAA §112(n). EPA's own data, as described in the Effectiveness TSD, indicates that large numbers of Native American subsistence fishermen will be exposed to utility-attributable Hg intake in excess of 0.1 µg/kg-day. Indeed, Table 6.4 from the Effectiveness TSD establishes that Native American subsistence fishermen falling into each of the categories in bold below, will be exposed to unsafe levels of Hg attributable solely to Utility emissions:

Daily Mercury Intake Attributable To Utility Emissions

	Consumption Rate	5th	10th	15th	20th	50th	75th	85th	90th	95th	99th
Mean Subsistence Native American	60	0	0.03	0.06	0.11	0.42	0.90	**1.27**	**1.59**	**2.31**	**3.61**
95th Percentile Subsistence Native American	170	0	0.08	0.16	0.32	**1.20**	**2.55**	**3.59**	**4.50**	**6.53**	**10.24**
99th Percentile Subsistence Native America	295	0	0.14	0.28	0.55	**2.07**	**4.43**	**6.22**	**7.81**	**11.34**	**17.77**

In the worst cases, this Hg exposure is between 6 and 17+ times the suggested daily intake of Hg from all sources. It cannot be contended that this is not a public health hazard attributable to Utility emissions. Indeed, although the March 2005 Rule explicitly concludes that "Utility Unit Hg emissions do not cause hazards to the health of the general public or higher fish consuming recreational anglers,"[40] such a conclusion with respect to Native American subsistence fishermen is noticeably absent. Under these circumstances, EPA must regulate EGUs under CAA §112.

Response:

EPA has the following response regarding the criticism of EPA's default subsistence fisher consumption rates made by the commenter. The commenter makes the point that the study underlying EPA's Native American Subsistence Fisher fish consumption rates of 60 g/day mean and 170 g/day 95th percentile are not high enough because (a) the study includes consuming and non-consuming adults (i.e., the non-consumers will dilute the fish consumption rate), and (b) several high-end individuals were dropped from the study because they seemed unreasonably high.[41]

The EFH recommended upper percentile fish consumption rate for Native American Subsistence Populations is 170 g/day, corresponding to the 95th percentile consumption rate from the CRITFC (1994) (see Table 10-85, page 10-80, EFH, August 1997). Note that consumption rates for the Native American general population is far lower than these rates for Native American subsistence populations (see EFH page 10-27). The EFH does not recommend

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[40] See 70 FR 16022.

[41] Note that the EFH recommended mean consumption rate is 70 g/day while our analysis uses the mean estimate from the CRIFTC of about 60 g/day (rounded up from 59 g/day). The mean value from the CRIFTC reflects self-caught freshwater consumption while the 70 g/day reflects consideration of both CRIFTC and Alaskan data and, therefore, pulls in saltwater self-caught.

a consumption rate higher than 170 g/day. Recognizing the difficulties in extrapolating to the very high end of the distribution of consumption rates given the few data points upon which such values depend and the difficulty in applying such a distribution from one population to another, EPA's public health analysis still presented the IDI values associated with even higher consumption rates. In Table 6.4 of the Effectiveness TSD, EPA estimated the IDI values associated with a modeled 99th percentile consumption rate of 295 g/day. This modeled value was derived from fitting a distribution to the values of 60 and 170 g/day values (corresponding to the mean and 95th percentiles for this population also presented in Table 6.4). EPA believes this modeled 99th percentile value to be a reasonable characterization of even higher-end fish consumption than the 95th percentile recommended by the EFH for a population believed to engage in subsistence fish consumption behavior. Nonetheless, in response to the comments, EPA has included in Table 2 below the IDI value corresponding to the even higher fish consumption rate of 389 g/day, which represents the 99th percentile of the CRITFC (1994) survey (see Table 10-72 of EFH).

Despite the limited data underlying the 99th percentile of small populations, both the modeled consumption rate of 295 g/day and the survey consumption rate of 389 g/day are informative when considering the potential for very high-end exposure. The 99th percentile, by definition, means that 1 percent of the particular population of subsistence Native American consume fish at a greater rate. Even though consumption rates higher than 389 g/day have been documented, they do not show that the 99th percentile consumption rate of either 295 g/day or 389 g/day is inaccurate because these higher rates could be in that 1 percentile between the 99th and 100th percentiles. The wide range of consumption rates for this highest 1 percent of the subsistence Native American population illustrates why it exceedingly difficult to base exposure analyses on higher consumption rates. However, higher consumption rates would correspond to proportionally higher IDI values for a given level of utility-attributable MeHg concentration in fish (e.g., a fish consumption rate 10 percent higher would correspond to an IDI value 10 percent higher). Yet, even if there were Native American subsistence fishers consuming at higher rates, it is unlikely that they would also be eating exclusively fish containing high levels of utility-attributable MeHg. As explained in the Effectiveness TSD, EPA considered the location of possible populations of subsistence Native Americans and has concluded that it is unlikely that they are consuming in watersheds representing the higher percentiles of utility-attributable MeHg in fish. See also 70 FR 16024.

Regarding the issue of inclusion of non-consumers in the underlying study, a review of the original study suggests that nearly 90 percent of the respondents reported some form of self-caught fish consumption (e.g., self-caught, or obtaining from friends or Tribal Ceremonies, both of which are likely to represent self-caught fish). A small percentage (7 percent) of respondents indicated that they were not fish consumers (see EFH page 10-21). Therefore, EPA believes that inclusion of non-consumers within the study is likely to have a relatively small impact on the overall results including percentile estimates, although it is difficult to assess the true degree of the "dilution" impact without access to the original data and recalculation of "consumers only" percentiles. Regarding exclusion of the two high-end fish consumption rates in the original study, it is informative to consider that these two values (486 and 972 g/day) are well above both the 99th percentile (estimated) consumption rate of 295 g/day which was included in the public health analysis and, therefore, could well represent outliers (especially the 972 g/day value *which translates into 2 lb of fish a day). These higher rates are also well above the CRITFC survey 99th percentile consumption rate of 389 g/day. However, without access to the underlying survey data, it is difficult to evaluate the reasonableness of identifying these data points as outliers. As a general observation, it is worth noting that there are very few data available for characterizing Native American subsistence fishing activity that match the exposure scenario modeled in this risk assessment (i.e., annual-averaged, freshwater, self-caught). Therefore, this necessitates the use of fish consumption data that may be subject to certain limitations, as is the case with the CRIFTC data.*

EPA has the following response regarding the three alternative Native American fish consumption data sources referenced by the commenter. As discussed in the Effectiveness TSD, fish consumption data used in this analysis need to meet several requirements to be considered appropriate for the exposure scenarios being modeled. Key criteria in relation to the three studies referenced by the commenter include: (a) the studies need to focus on self-caught freshwater fish consumption (the Suquamish and Alaskan studies do not meet this requirement because they include saltwater-sourced fish consumption), and (b) the studies need to provide annual-averaged fish consumption rate data for identifiable population percentiles (the GLIFWC study does not provide these types of data). Therefore, the three studies referenced by the commentator, although useful in gaining a perspective on Native American fish consumption rates in diverse locations, do not provide quantifiable data directly useable in the public health analysis.

Regarding concerns voiced by commenters that EPA used CRIFTC-based fish consumption rates to model subsistence behavior in other parts of the study area, despite having warned that such extrapolations are subject to uncertainty, EPA has the following response. As noted elsewhere, EPA believes that the CRIFTC dataset is the optimal fish consumption dataset available for modeling subsistence fish consumption given criteria identified for the public health analysis (i.e., annual-averaged, freshwater-only, self-caught, population-representative in terms of identifying specific percentile rates). Given that the CRIFTC dataset matched these criteria better than any other available dataset, EPA decided to use it to represent higher-end subsistence fishing behavior for all in-land (non-coastal) locations for purposes of the IDI calculation. Implicit in this decision is the assumption that uncertainty associated with extrapolating the CRIFTC dataset to represent other subsistence populations is less than the uncertainty associated with attempting to use alternate datasets such as the GLIFWC. EPA believes that this judgment regarding overall uncertainty is reasonable if one considers the number of extrapolation steps necessary to derive appropriate consumption rates using these other studies including: (a) assumptions necessary to go from seasonal to annual rates, (b) assumptions in going from consumption rates reflecting a large shellfish component to a primarily finfish value, and (c) assumptions necessary to develop population-differentiated percentile rates from specific non-population defined point values. EPA does recognize that there are uncertainties and subjective judgments associated with the derivation and extrapolation of consumption rates in these types of risk assessments and believes that concerns over these types of fish consumption rates speaks to the need for the collection of additional data on consumption rates that are representative for specific populations of concern, such as those represented by the commenter. Any effort to work with non-optimal data in order to derive (scenario-specific) consumption rates, is subject to uncertainty which, in turn, introduces

Table 2. Fish Tissue Concentration Percentiles and EPA EFH and OW Fish Consumption Rates and Resulting IDI Values.

2001 Base Case

Consumption Rate		Fish Tissue Methylmercury Percentile									
		5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
		0	**0.002**	**0.004**	**0.008**	**0.03**	**0.064**	**0.09**	**0.113**	**0.164**	**0.257**
EPA EFH Mean Recreational Fisher	8	0.00	0.00	0.01	0.02	0.06	0.12	0.17	0.21	0.31	0.48
EPA OW 90th Percentile General Population	11.7	0.00	0.01	0.01	0.02	0.08	0.18	0.25	0.31	0.45	0.70
EPA EFH 95th Percentile Recreational Fisher	25	0.00	0.01	0.02	0.05	0.18	0.38	0.53	0.66	0.96	1.51
EPA EFH 99th Percentile Recreational Fisher	47	0.00	0.02	0.04	0.09	0.33	0.71	0.99	1.24	1.81	2.83
EPA EFH Mean Subsistence (Native American)	60	0.00	0.03	0.06	0.11	0.42	0.90	1.27	1.59	2.31	3.61
EPA EFH 95th Percentile Subsistence (Native American)	170	0.00	0.08	0.16	0.32	1.20	2.55	3.59	4.50	6.53	10.24
EPA EFH 99th Percentile Subsistence (Native American)	(Modeled) 295	0.00	0.14	0.28	0.55	2.07	4.43	6.22	7.81	11.34	17.77
EPA EFH 99th Percentile Subsistence (Native American)	(Survey) 389	0.00	0.18	0.36	0.73	2.74	5.84	8.21	10.30	14.95	23.43

2020 Base with CAIR

Consumption Rate		Fish Tissue Methylmercury Percentile									
		5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
		0	**0.001**	**0.002**	**0.004**	**0.01**	**0.02**	**0.027**	**0.035**	**0.052**	**0.102**
EPA EFH Mean Recreational Fisher	8	0.00	0.00	0.00	0.01	0.02	0.04	0.05	0.07	0.10	0.19
EPA OW 90th Percentile General Population	11.7	0.00	0.00	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.28
EPA EFH 95th Percentile Recreational Fisher	25	0.00	0.01	0.01	0.02	0.06	0.12	0.16	0.21	0.30	0.60
EPA EFH 99th Percentile Recreational Fisher	47	0.00	0.01	0.02	0.04	0.11	0.22	0.30	0.39	0.57	1.12
EPA EFH Mean Subsistence (Native American)	60	0.00	0.01	0.03	0.06	0.14	0.28	0.38	0.49	0.73	1.43
EPA EFH 95th Percentile Subsistence (Native American)	170	0.00	0.04	0.08	0.16	0.40	0.80	1.08	1.39	2.07	4.06
EPA EFH 99th Percentile Subsistence (Native American)	(Modeled) 295	0.00	0.07	0.14	0.28	0.69	1.38	1.87	2.42	3.60	7.05
EPA EFH 99th Percentile Subsistence (Native American)	(Survey) 389	0.00	0.09	0.18	0.36	0.91	1.82	2.46	3.19	4.74	9.30

2020 with CAIR + CAMR Requirements

Consumption Rate		Fish Tissue Methylmercury Percentile									
		5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
		0	**0.001**	**0.002**	**0.004**	**0.009**	**0.017**	**0.024**	**0.031**	**0.047**	**0.092**
EPA EFH Mean Recreational Fisher	8	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.06	0.09	0.17
EPA OW 90th Percentile General Population	11.7	0.00	0.00	0.01	0.01	0.02	0.05	0.07	0.09	0.13	0.25
EPA EFH 95th Percentile Recreational Fisher	25	0.00	0.01	0.01	0.02	0.05	0.10	0.14	0.18	0.28	0.54
EPA EFH 99th Percentile Recreational Fisher	47	0.00	0.01	0.02	0.04	0.10	0.19	0.26	0.34	0.52	1.01
EPA EFH Mean Subsistence (Native American)	60	0.00	0.01	0.03	0.06	0.13	0.24	0.34	0.44	0.66	1.29
EPA EFH 95th Percentile Subsistence (Native American)	170	0.00	0.04	0.08	0.16	0.36	0.68	0.96	1.24	1.87	3.67
EPA EFH 99th Percentile Subsistence (Native American)	(Modeled) 295	0.00	0.07	0.14	0.28	0.62	1.18	1.66	2.14	3.25	6.36
EPA EFH 99th Percentile Subsistence (Native American)	(Survey) 389	0.00	0.09	0.18	0.36	0.82	1.55	2.19	2.83	4.29	8.39

Table 3: Hypothetical Joint Consumption of Freshwater and Marine Fish.

2001 Base Case

Consumption Rate	Fresh	Marine	Fish Tissue Methylmercury Percentile									
			5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
			0	**0.002**	**0.004**	**0.008**	**0.03**	**0.064**	**0.09**	**0.113**	**0.164**	**0.257**
EPA EFH Mean Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	8	123	0.03	0.03	0.04	0.04	0.09	0.15	0.20	0.24	0.34	0.51
EPA OW 90th Percentile General Population and 99% Carrington & Bolger Seafood Consumption	11.7	123	0.03	0.03	0.04	0.05	0.11	0.20	0.28	0.34	0.48	0.73
EPA EFH 95th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	25	123	0.03	0.04	0.05	0.08	0.20	0.40	0.56	0.69	0.99	1.53
EPA EFH 99th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	47	123	0.03	0.05	0.07	0.12	0.36	0.73	1.02	1.27	1.84	2.86
EPA EFH Mean Subsistence (Native American) and 99% Carrington & Bolger Seafood Consumption	60	123	0.03	0.06	0.09	0.14	0.45	0.93	1.29	1.62	2.34	3.64
EPA EFH 95th Percentile Subsistence (Native American) and Wolfe and Walker (1987) 95th percentile (Native American)	170	320	0.07	0.15	0.23	0.39	1.27	2.62	3.66	4.58	6.61	10.31
EPA EFH 99th Percentile Subsistence (Native American) - Modeled and Wolfe and Walker (1987) 99th percentile (Native American)	295	475	0.11	0.25	0.39	0.66	2.19	4.54	6.33	7.92	11.45	17.88
EPA EFH 99th Percentile Subsistence (Native American) - Survey and Wolfe and Walker (1987) 99th percentile (Native American)	389	381	0.09	0.27	0.45	0.82	2.82	5.92	8.29	10.39	15.04	23.52

2020 Base with CAIR

Consumption Rate	Fresh	Marine	Fish Tissue Methylmercury Percentile									
			5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
			0	**0.001**	**0.002**	**0.004**	**0.01**	**0.02**	**0.027**	**0.035**	**0.052**	**0.102**
EPA EFH Mean Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	8	123	0.03	0.03	0.03	0.04	0.05	0.07	0.08	0.09	0.13	0.22
EPA OW 90th Percentile General Population and 99% Carrington & Bolger Seafood Consumption	11.7	123	0.03	0.03	0.03	0.04	0.06	0.08	0.10	0.12	0.17	0.31
EPA EFH 95th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	25	123	0.03	0.03	0.04	0.05	0.09	0.15	0.19	0.23	0.33	0.63
EPA EFH 99th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	47	123	0.03	0.04	0.05	0.07	0.14	0.25	0.33	0.41	0.60	1.15
EPA EFH Mean Subsistence (Native American) and 99% Carrington & Bolger Seafood Consumption	60	123	0.03	0.04	0.06	0.09	0.17	0.31	0.41	0.52	0.76	1.46
EPA EFH 95th Percentile Subsistence (Native American) and Wolfe and Walker (1987) 95th percentile (Native American)	170	320	0.07	0.11	0.15	0.23	0.47	0.87	1.15	1.47	2.15	4.14
EPA EFH 99th Percentile Subsistence (Native American) - Modeled and Wolfe and Walker (1987) 99th percentile (Native American)	295	475	0.11	0.18	0.25	0.39	0.80	1.49	1.98	2.53	3.71	7.16
EPA EFH 99th Percentile Subsistence (Native American) - Survey and Wolfe and Walker (1987) 99th percentile (Native American)	389	381	0.09	0.18	0.27	0.45	1.00	1.91	2.55	3.28	4.83	9.39

2020 with CAIR + CAMR Requirements

Consumption Rate	Fresh	Marine	Fish Tissue Methylmercury Percentile									
			5th	**10th**	**15th**	**25th**	**50th**	**75th**	**85th**	**90th**	**95th**	**99th**
			0	**0.001**	**0.002**	**0.004**	**0.009**	**0.017**	**0.024**	**0.031**	**0.047**	**0.092**
EPA EFH Mean Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	8	123	0.03	0.03	0.03	0.04	0.05	0.06	0.07	0.09	0.12	0.20
EPA OW 90th Percentile General Population and 99% Carrington & Bolger Seafood Consumption	11.7	123	0.03	0.03	0.03	0.04	0.05	0.08	0.09	0.11	0.16	0.28
EPA EFH 95th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	25	123	0.03	0.03	0.04	0.05	0.08	0.13	0.17	0.21	0.30	0.57
EPA EFH 99th Percentile Recreational Freshwater Fisher and 99% Carrington & Bolger Seafood Consumption	47	123	0.03	0.04	0.05	0.07	0.13	0.22	0.29	0.37	0.55	1.04
EPA EFH Mean Subsistence (Native American) and 99% Carrington & Bolger Seafood Consumption	60	123	0.03	0.04	0.06	0.09	0.16	0.27	0.37	0.46	0.69	1.32
EPA EFH 95th Percentile Subsistence (Native American) and Wolfe and Walker (1987) 95th percentile (Native American)	170	320	0.07	0.11	0.15	0.23	0.43	0.75	1.03	1.31	1.95	3.74
EPA EFH 99th Percentile Subsistence (Native American) - Modeled and Wolfe and Walker (1987) 99th percentile (Native American)	295	475	0.11	0.18	0.25	0.39	0.73	1.29	1.77	2.25	3.36	6.47
EPA EFH 99th Percentile Subsistence (Native American) - Survey and Wolfe and Walker (1987) 99th percentile (Native American)	389	381	0.09	0.18	0.27	0.45	0.91	1.64	2.28	2.92	4.37	8.48

additional uncertainty into exposure and risk estimates generated at the population-level.

Importantly, any uncertainty associated with extrapolating fish consumption rates across subsistence populations (e.g., using the CRIFTC data to represent other subsistence populations) increases for higher percentile consumption rates. For example, the degree of uncertainty associated with extrapolating a 95th percentile consumption rate from one subsistence population to another is significantly larger than that associated with extrapolating a mean value. This reflects the fact that higher percentile self-caught fish consumption rates reflect increasingly rare behaviors that likely reflect specific local conditions and/or cultural practices (e.g., proximity to water bodies, lack of access to alternate food sources, heightened awareness of and commitment to cultural practices). We do not know whether the specific mix of conditions that may produce extremely high consumption rates in one subsistence population would be duplicated at a different location and for a different subsistence population. It is also important to point out that often the surveys used to derive consumption rates derive high-end percentile values based only on a few survey respondents. This diminishes confidence in the stability or representativeness of a very high end percentile such as the 99th percentile relative to other percentiles in the distribution that are based on a larger number of survey respondents. For example, the 99.8th percentile value from CRIFTC study (778 g/day) is based on the highest 2 respondents out of 464 surveyed. It is difficult to conclude, given the small number of individuals forming the basis for this percentile, that this value represents a stable characterization of this percentile of the <u>actual consuming population</u> (i.e., the sample size available for actually defining behavior at the 99.8th percentile is so small that it is subject to considerable instability or variability). For that reason, extrapolating a high percentile rate, such as this 99.8th percentile (which is based on so few data points) across subpopulations to represent behavior in other geographic locations would be subject to high (and potentially unacceptable) levels of uncertainty.

The commenter notes that certain populations may have seasonal consumption rates in excess of the annual consumption rates used in the public health analysis or the benefits analysis. The RfD for MeHg is for chronic (long-term) oral exposure and is based on studies that look for a relationship between maternal blood for different neuropsychological effects in the offspring at 5 to 7 years of age (<u>see</u> http://www.epa.gov/iris/subst/0073.htm). Because EPA's public health analysis is based off of the RfD, this analysis appropriately focused on long-term consumption rates and we reasonably used annual consumption rate. The Hg blood concentration at any given point of time is affected by the cumulative ingestion of Hg over the course of several months due to the clearance half-life of Hg in the blood. (<u>See</u> http://www.epa.gov/iris/subst/0073.htm.) Although it is conceivable that there are particular windows of sensitivity to Hg during pregnancy such that peak exposures could be more relevant than the chronic body burden, EPA has no information addressing this specifically for Hg and the subtle neurodevelopmental effects that are of concern here. EPA's global pool (e.g., cost and benefits) analysis focused on annual consumption rates for the above reasons and because this represents the best available scientific information. Moreover, the dose-response function available for relating maternal exposure to IQ loss is based on longer-term averaged MeHg exposure (<u>see</u> Section 9.0 of the RIA for additional details regarding the dose-response function).

Although it is possible for Hg to impact non-fish species consumed by subsistence *populations (especially those species which themselves prey on fish and, therefore, may be exposed to high Hg-containing food sources), sufficient data do not currently exist for population-level modeling of this non-fish self-caught consumption pathway. As discussed elsewhere in this document in relation to modeling self-caught fish consumption, the modeling of self-caught consumption requires percentile consumption rates for fishing/hunting populations for specific target species. This type of information does not appear to be available for non-fish species, including those referenced by the commenter. The alternative recommended by the commenter of using conservative consumption rates not linked to a specific population-percentile produces conservative risk estimates that cannot be characterized in terms of their representativeness and are, therefore, not appropriate for a population-level risk assessment such as that presented in the TSD. Furthermore, EPA expects that modeling of risk for subsistence fisher populations is likely to cover the majority of significant Hg exposures that might result from self-caught food consumption (i.e., overall exposures from high-end fish consumption would likely equal or exceed high-end exposures from consumption of terrestrial species). Furthermore, it is unlikely that subsistence individuals would engage in both high-end self-caught fish consumption and high-end consumption of self-caught non-fish species for protracted periods of time. This reflects the fact that if an individual is obtaining a large fraction of his/her protein from self-caught fish, that leaves a lesser fraction attributable to self-caught non-fish species consumption.*

EPA recommends using composite samples of fish fillets from the types of fish people in the local area eat because MeHg binds to proteins and is found primarily in fish muscle, not other parts of fish (e.g., skin, head, bones, and organs). Thus, persons eating parts of the fish in addition to the fillet are actually be exposed to less mercury than if they ate the same amount of fish in fillet form alone. Using skinless fillets is a more appropriate approach for addressing Hg exposures for members of the general population and most recreational fishers because fish consumers generally eat the fillets. Because Hg is differentially concentrated in muscle tissue, leaving the skin on the fish fillet actually results in a lower Hg concentration per gram of skin-on fillet than per gram of skinless fillet.[42] *Analysis of skinless fillets might also be more appropriate for some target species such as catfish and other scaleless finfish species. However, some fish consumers do eat fish with the skin on. In areas where the local population eats fish with the skin, the State or authorized Tribe should consider including the skin in the sample. Table 4 provides a breakdown of the sample methods that are found in the combined National Listing of Fish Advisories (NLFA) and National Lake Fish Tissue Survey (NLFTS) Hg fish tissue data set that was used for the Effectiveness TSD. Note that consistent with our analysis underlying the CAA §112(n) decision, all of these samples are from fish at least 7 inches in length and sampled after 1999. See Effectiveness TSD, Section 3. As these data show, 63 percent of samples were from fish fillets, and the rest were from unspecified portions or whole fish.*

Table 4. Sample Methods Found in NLFA and NLFTS.

Sample method	*Percent*
Fillet	*63*

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[42] See Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume 1: Fish Sampling and Analysis. Third Edition. EPA/823/B-00/007. U.S. Environmental Protection Agency, Office of Water. Washington, D.C. Available online at http://www.epa.gov/ost/fishadvice/volume1/index.html.

Unspecified sample method	*28*
Whole	*8*
Organ	*1*

See Section 1.1.1.1.2 of this document, as well as the final Section 112(n) Revision Rule, for a discussion on EPA's rationale for focusing on utility-attributable emissions when determining whether it was appropriate or necessary to regulate Utility Units under CAA §112.

As we stated in the final Section 112(n) Revision Rule and accompanying TSDs, although our analysis showed that under certain circumstances there are some subpopulations where the IDI may be greater than 1, we believe the likelihood of these circumstances occurring at the same time is very small. See, e.g., 70 FR 16024 ("As discussed in the TSD, the probability of these factors converging is quite low."). The commenters' reference to an IDI "nearly 18 times the RfD" fails to note that this number is pre-CAIR and CAMR implementation. Once CAIR and CAMR are implemented, the highest IDI value (99th percentile subsistence and 99th percentile fish tissue MeHg concentration) is 6.36 and 8.39 (for modeled 99th percentile and survey 99th percentile respectively), not 18. Moreover, an IDI above 1 merely represents exposure above the RfD attributable only to utilities, which, as we have explained elsewhere, does not mean there are adverse impacts. In other words, the RfD is not a bright-line exposure above which necessarily constitutes adverse health effects. See, e.g., 70 FR 16013 ("In determining the RfD for methylmercury, EPA said that the 'RfD can be considered a threshold for a population at which it is unlikely that adverse effects will be observed' [Water Quality Criteria for the Protection of Human Health: Methylmercury, EPA–823–R–01–001]. The RfD was calculated to be a level likely to be without an appreciable risk of 'deleterious effects' for all populations, including sensitive subgroups."). The World Health Organization, Health Canada, and the Agency for Toxic Substances and Disease Registry all set higher thresholds for Hg than EPA's RfD, which would in turn lead to lower IDIs.[43] *See 70 FR 16013, 16024.*

Several comments have stated that the IDI values presented in Table 6.4 of the Effectiveness TSD (and presented with additional consumption rates in Table 2 above) from freshwater fish consumption do not include the added exposure if the individuals consume additional fish from other sources. As explained in the reconsideration TSD, to the extent that individuals substitute consumption from other sources for freshwater fish consumption, utility-attributable exposure will generally decrease, not increase as commenters have suggested. However, some consumption of fish from other sources may be additional to freshwater fish consumption, particularly for individuals consuming towards the lower end of the freshwater fish consumption rates presented on Table 2. If individuals do consume marine fish in addition to the freshwater fish consumption presented Table 2, the IDI values will not increase very much because of the low concentration of utility-attributable MeHg estimated to be in most marine fish. As an illustrative example, if 123 g/day (99th percentile of the general population) of average marine fish is consumed in addition to the freshwater fish consumption presented in Table 2, the values in Table 2 would increase by 0.03.[44] *This very small increase would not*

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[43] For example, the World Health Organization sets the level at 0.23 g/kg/day; Health Canada sets the level at 0.2 g/kg/day; and the Agency for Toxic Substances and Disease Registry (ATSDR) sets a value of 0.3 g/ kg/day.

[44] See Table 3.2 of the Reconsideration TSD estimating an IDI value of 0.03 (0.0288281 before rounding) corresponding to a consumption rate of 123 g/day.

affect the distribution of IDI values across the population in any meaningful manner.

Given the very low utility-attributable MeHg levels in average marine fish, even higher consumption rates of average marine fish would not appreciably increase the joint consumption IDI values. As an illustration of this, EPA obtained data from Wolfe and Walker (1987) as cited in the 1997 Exposure Factors Handbook. Wolfe and Walker (1987) collected data form multiple studies of subsistence populations including 94 smaller communities in Alaska. The highest consumption rate for a community is 770 g/day. The median consumption rate of the communities is 81 g/day. If 770 g/day is assumed to represent the 99th percentile and a lognormal distribution is fitted, the 95th percentile would be 490 g/day. If 381 g/day (770 g/day minus 389 g/day from the 99th percentile survey subsistence Native American) is the assumed to be the additional marine fish containing the average level of utility-attributable MeHg consumed for the 99th percentile subsistence Native Americans, the IDI values would increase by 0.09.[45] *If the assumed additional marine fish consumption for the 95th percentile subsistence Native American is taken to be 320 g/day (490 g/day representing the 95th percentile total fish consumption for subsistence Native Americans minus 170 g/day representing the 95th percentile of freshwater fish consumption for subsistence Native Americans), the IDI values would increase by 0.08.*[46] *If the assumed additional marine fish consumption for the remaining populations presented in Table 2 were assumed to be 123 g/day (the 99th percentile of the general population presented in the Effectiveness TSD), the IDI values would increase by 0.03. Table 3 shows these increased IDI values compared to Table 2. Such an increase is highly unlikely because an individual would need to eat a large amount of marine fish in addition to a given amount of freshwater fish. Even if it were to occur, such an increase would not materially affect the IDI values and again supports the focus on utility-attributable exposure from freshwater fish consumption.*

Finally, the determination of what constitutes acceptable or unacceptable risk includes factoring in the size of the population at risk as well as the distribution of risk within the population. Thus, the possibility that a subpopulation may have an IDI above 1 is not sufficient information alone to determine that utility Hg emissions are reasonably anticipated to cause hazards to public health.

In summary, the Agency considered a number of factors including: (1) Confidence in the risk estimate (e.g., how certain is the scientific information supporting the link between possible health effects and exposures?); (2) the effects of concern (e.g., how serious are the health effects?); and (3) the size of the population at risk, as well as the distribution of risk within the population. The Agency has considered these factors in the case of Hg and has concluded that the exposures above the IDI described elsewhere do not lead us to conclude that utility Hg emissions are reasonably anticipated to cause hazards to public health.

Comment:

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[45] The IDI value associated with consumption of 381 g/day of average marine fish is 3.1 (381/123) times the IDI value associated with consumption of 123 g/day.

[46] The differences between Table 2 and Table 3, herein, for the 95th percentile subsistence (Native American) fisher may be either 0.07 or 0.08 for different fish tissue MeHg percentiles, due to rounding of numbers.

Commenter 6625 supports EPA's analysis citing: (1) it is documented that the majority of Hg deposited in the U.S. comes from outside the U.S.; (2) full implementation of CAMR and CAIR will reduce U.S. Hg emissions substantially; (3) EPA Hg deposition modeling using the national scale CMAQ model indicates that the CAIR reductions, combined with the CAMR reductions, would have the same effect on Hg deposition as would the complete elimination of power plant emissions of Hg by 2020; and (4) EPA deposition modeling indicates that after CAMR and CAIR are fully implemented, nowhere in the U.S. will Hg deposition contribute to fish MeHg levels above the 0.3 milligram per kilogram (mg/kg) level of concern.

Commenter 6636 stated that EPA's methodology and conclusions as they relate to the delisting of EGUs from CAA §112 and to the implementation of a cap-and-trade program as a means for controlling Hg emissions from EGUs are consistent with the requirements of the CAA and are not reasonably anticipated to result in hazards to public health.

Commenter 6557 stated EPA's methodology and conclusions as they relate to the delisting of EGUs from CAA §112 and to the implementation of a cap-and-trade program as a means for controlling Hg emissions from EGUs are consistent with the requirements of the CAA and are not reasonably anticipated to result in hazards to public health.

Response:

EPA appreciates the support from the commenter. However, EPA notes that CAIR and CAMR do not have the same effect on Hg deposition as would the complete elimination of power plant Hg emissions (see Effectiveness TSD, Section 2.1).

1.1.3 Detailed Discussion of Certain Reconsideration Issues Related to Coal-Fired Utility Units as Set Forth in Section VI of the Final Section 112(n) Revision Rule

1.1.3.1 Modeling of Hg Deposition Changes That Result From Implementation of CAIR and CAMR

Comment:

Commenter 6490 stated EPA's version of CMAQ for Hg has not yet established itself as being the best model for the task and although this comparison is planned to occur, it still has yet to take place. In addition, the CMAQ modeling for CAMR directly conflicts with the Industrial Source Complex (ISC3) modeling presented in the docket as well as several published field studies that suggest that the majority of Hg deposits within 30 kilometer (km) of a major source of Hg.

Response:

The CMAQ model contains the best science available to EPA to model Hg deposition. The CMAQ model contains much more sophisticated atmospheric chemistry and deposition algorithms than the ISC3 model. The ISC3 model has been replaced by the American

Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) for local scale dispersion model applications. The ISC3 outputs for wet and dry deposition were never verified for use in regulatory applications.

The CMAQ results include consideration of the global pool of Hg, whereas the ISC3 modeling and field studies do not consider the global pool of Hg. The New York Department of Environmental Conservation (NYDEC) model comparison findings to date show CMAQ to be the best performing regional photochemical model for predicting wet deposition at the Mercury Deposition Network (MDN) sites. The NYDEC is currently involved in a North American model intercomparison study, which includes model result comparisons from CMAQ, REMSAD, and TEAM. In addition, several different global models are being evaluated for their ability to provide boundary inputs for the regional modeling platforms. At this time, the TEAM modeling and the complete global model intercomparison effort has not been completed and the overall results are not publicly available. However, to date, the CMAQ model has been the best performing regional photochemical modeling platform.

Comment:

Commenter 6497 stated that receptor modeling techniques can provide valuable complementary information regarding source-receptor relationships. However, one must be aware of their limitations and their potential misuse. For example, some studies (e.g., Han, et al., 2005) neglected Hg chemical transformation and, thus, limited their approach to a chemically inert system, although atmospheric Hg transformation is widely accepted. The commenter states that this approach ignores Hg^0 that may be transported over long distances and slowly oxidized to Hg^{+2}. The commenter provides information that indicates that anthropogenic sources in Asia could contribute up to 24 percent of the Hg at New York State receptors and that natural sources could contribute up to 35 percent. The commenter also states that a weak correlation between sulfur and Hg (used in some studies) should not be taken as evidence of significant impact of coal-fired EGUs in New York State on Hg deposition in New York. Reconciling results obtained from different transport models as well as from receptor models is important and should be conducted to improve confidence in source-attribution results. The commenter provided a detailed explanation with multiple references to support the comment.

Response:

EPA agrees that care must be used in the use of receptor modeling. Further, EPA believes that CMAQ is the modeling approach best suited to address these limitations at the current time.

Comment:

Commenter 6612 stated that new data continue to become available that would impact the assumptions used in EPA’s models. One of these areas is regarding the speciation of Hg. New information is challenging the estimated lifetime of elemental Hg before it is deposited. Also, new data is demonstrating the oxidation of elemental Hg to RGM during periods of enhanced photochemical activity with high ozone and warm temperatures (Keeler and Dvonch, 2005).

Regarding the topic of deposition contribution of Hg from coal-fired utilities, there will be new information published in the near future that will outline how EPA underestimated the deposition impact from coal-fired utilities. EPA should utilize this information in their reconsideration of the modeling and impact aspects of this rule. In 2002, the University of Michigan's Air Quality Laboratory scientists were awarded an EPA cooperative agreement to set-up a Hg super-site in Steubenville, Ohio, to monitor the direct impacts of coal combustion emissions from the Ohio River Valley and Midwest U.S. on Hg deposition. Data collected at the Steubenville site included long-term data on Hg in wet and dry deposition, speciated ambient Hg as well as several other co-pollutants. Preliminary source apportionment results from the Steubenville site shows between 60 to over 70 percent deposition is contributed from the coal-fired utility. Positive Matrix Factorization and UNMIX techniques are two multivariate approaches that were used that produced source contributions that were merged with air mass trajectories to investigate the sources and the source areas impacting the site.

Additionally, a study was recently published that found the main sources of RGM to rural sites in New York State were suggested to be coal-fired power plants in New York and Pennsylvania, a large copper smelter in Quebec and taconite mining areas around the Great Lakes (Han, et al., 2005). This demonstrates regional depositional impacts that should also be considered.

Response:

EPA/ORD has been involved in a receptor modeling study in Steubenville, Ohio. The results of the Steubenville, Ohio, receptor modeling study conducted by EPA ORD are consistent with those obtained by the CMAQ modeling. The results of this receptor modeling study show that 67 percent of the Hg depositing in precipitation in 2003 at the Steubenville monitor location is from all forms of coal-combustion, with an uncertainty range of +/- 14 percent. The CMAQ Hg modeling predicts for 2001 (e.g., pre-CAIR and CAMR) that utility coal combustion contributes 44 percent to Hg deposition at the CMAQ 36-km square grid cell containing the Steubenville, Ohio, monitoring site. One grid cell to the north and three grid cells to the east of this monitoring site, the CMAQ model predicts 57 percent and 71 percent, respectively of Hg deposition from utility coal combustion for 2001. Thus, because this receptor modeling study provides utility coal combustion percentages roughly in the same range as those provided by the CMAQ model, it improves confidence in the CMAQ source-attribution results. Furthermore, the CMAQ model predicted wet deposition at the grid cell containing the ORD Steubenville monitoring site of 14.2 micrograms per square meter (µg/m^2) for 2001. The measured Hg wet deposition at the Steubenville monitoring site for 2003 is 13.1. At the closest MDN site (PA37) to Steubenville, the 2001 CMAQ predicted and measured Hg wet deposition rates are 9.9 and 9.4 µg/m^2. Thus, it appears that CMAQ model is predicting Hg wet deposition values in the Steubenville area with sufficient accuracy for these rules.

The Steubenville study estimates current deposition at a single point. These data will be useful for validating air quality models but aren't useful for estimating exposure because deposition over a larger geographic area is needed to estimate the contribution to watersheds, *MeHg concentrations in fish, and ultimately human exposure. As explained in the Effectiveness TSD, Section 2, the hydrologic unit code (HUC-8) watershed is the appropriate scale for estimating exposure to Hg. The CMAQ model, not a single point estimate, is used for estimating deposition within the watersheds. Finally, we note that the location of the sole monitor for the Steubenville study is not designed to be representative of the deposition to the entire watershed. In fact, it is placed on top of a hill and not at a location where fish are caught.*

EPA used the best available Hg science when applying CMAQ. As new Hg scientific information becomes available, EPA will consider it and as appropriate incorporate it into the CMAQ model. The information presented in Keeler and Dvonch, 2005, is still in the process of being evaluated by the modeling community to determine if there are any substantive differences as a result of the new findings. Regional Hg deposition from all Hg sources in the CMAQ modeling domain, which includes the continental U.S. and roughly the southern half of Canada, were predicted by the CMAQ model. This includes the effects of sources of reactive Hg from coal-fired power plants in New York and Pennsylvania, a large cooper smelter in Quebec, and taconite mining areas around the Great Lakes.

Comment:

Commenter 6490 stated that as EGUs in the eastern U.S. install SCR technology to reduce NO_x emissions to satisfy NO_x SIP call requirements, more of the Hg emissions at the affected units will become oxidized from whatever condition they were in previously. If inventories are not corrected to reflect the increased oxidized Hg emissions, the modeling will incorrectly apply a longer atmospheric lifespan to the Hg, thus, minimizing modeled hotspots that otherwise exist in reality.

Response:

EPA used the Integrated Planning Model (IPM) to predict future-year, speciated Hg emissions from coal-fired EGUs for both CAIR and CAMR. IPM uses emission modification factors (EMFs) to estimate the percentage of Hg which is removed by specific combinations of air pollution control devices and its effects on Hg emissions speciation. Thus, in using IPM to predict future-year emissions, EPA has accurately accounted for both the change in future-year emissions and speciation in those years. To that end, EPA has accurately taken into account the anticipated emissions changes and the change in speciation of those emissions, which are anticipated to occur from the implementation of both the CAIR and CAMR controls.

Comment:

Commenter 6490 considers the CAMR modeling tools to be rushed by the timelines needed to implement the rule in place of an EGU MACT. Particularly troubling is that the state-of-the-science and, consequently, the model development are not yet ready to perform Hg deposition modeling with the accuracy claimed by EPA. About one year ago, EPA concluded in its own published assessment of CMAQ model development (Byun and Schere, 2004) that "The capabilities for simulating air toxics, such as mercury, dioxins, and other gas-, aerosol-, and metal-phase air toxics are now emerging in research versions of the CMAQ model." It took over a decade for photochemical models to mature into reasonably reliable tools, but even now they must be used in a relative sense for SIP purposes because model-predicted magnitudes are still in question. Because the CAMR modeling uses model-predicted results on an absolute basis, this represents a remarkable transition from an emerging research-grade tool to a reliable tool with SIP implications and assurances that hotspots will not form, in only a few months – noting that the CAMR modeling was conducted shortly after the above quote was made. Clearly the CMAQ model with Hg capabilities has been rushed through development and further, the "peer review" conducted for it was also rushed and performed after the CAMR modeling was completed. Although CMAQ has gone through a rigorous peer review for its ozone and fine particle performance, it has only undergone an abbreviated "peer panel" process for Hg. Consensus among the scientific community is that there is not yet a single best version of a CMAQ-Hg model, and no version has completed a traditional peer review that includes rigorous testing and publication in a prestigious peer review publication. NYDEC has only recently been requested to perform a comparative study of the different Hg predicting models, but a uniform set of data samples has yet to be provided to them. This is disconcerting, because EPA used its version of the model for CAMR nearly a year ago when its version may not be the best.

Further, CMAQ-Hg has been incorrectly applied in the near-field application. The application of the CMAQ model with 36-km grid cells distorts the short-range chemistry and deposition processes and dilutes ambient Hg concentrations and consequently smoothes out and minimizes peak deposition areas (hotspots). The modeling, as conducted, does not have the chance to correctly replicate the near-field studies conducted to assess Hg deposition in order to provide a well-rounded assessment of the potential for local hotspot development, nor is there any attempt to do so.

Response:

EPA disagrees that its use of CMAQ was rushed. The CMAQ model contains the best science available to EPA to model Hg deposition. Although it is true that the Hg portion of the model has not been subject to the kind of evaluation against measurements that the ozone and fine particle portions have because the necessary Hg measurements for this type of evaluation do not exist, we applied the CMAQ model for this rules only in a relative sense (the CMAQ estimate of the percent of deposition, not the absolute amount, due to power plants was used as an input into the MMaps model as described in the Effectiveness TSD). Thus, the modeling for the public health analysis did not use model-predicted results on an absolute basis (i.e., µg/m^2). The CMAQ-predicted Hg deposition data were applied proportionally to change the sampled fish tissue concentrations to represent decreases in utility-attributable Hg deposition. As described in the Effectiveness TSD, MMaps predicts that a change in deposition will lead to a ***proportional*** *change in fish tissue concentrations. Thus, the relevant estimate is the fraction of Hg deposition attributable to power plants, not the total absolute amount.*

The CMAQ peer review process has been the same for Hg, ozone, and PM$_{2.5}$. In fact, the latest peer review of CMAQ focused both on PM$_{2.5}$ and Hg. The peer review panel consisted of six to eight experts from academia, industry, and consulting. The panel was charged with review and oversight of all aspects of CMAQ, including emissions pre-processors, meteorological inputs and chemical mechanisms in the model. The peer review panel received documentation *and presentations from EPA ORD scientists on ozone, $PM_{2.5}$, Hg, and other aspects of CMAQ science. The peer review panel was also able to question, in-person, EPA ORD scientists on all aspects of the science contained in CMAQ. After the latest peer review*[47]*, the panel then prepared a report on the results of their peer review, which is contained on the Community Modeling and Analysis System (CMAS) web site (http://www.cmascenter.org) and in the CAMR docket.*[48,49] *In addition the ORD response to this peer review is also found at this location on this web site. The NYDEC findings to-date show CMAQ to be the best performing model for wet deposition at the MDN sites.*

All atmospheric modeling analyses include some assumptions that are improved and uncertainties that are reduced as scientific understanding evolves. Thus, although EPA CMAQ was applied using the best available Hg science for the Section 112(n) Revision Rule and CAMR, we recognize that, as new Hg scientific information becomes available, we will incorporate it as appropriate into future versions of the CMAQ model.[50] *The peer review process was part of this process. Importantly, the peer review process did not identify any concerns regarding assumptions used or with uncertainties in the modeling that EPA was not already aware of and considering as it used the model. Thus, although it is true that a portion of the peer review occurred after EPA issued the Section 112(n) Revision Rule and CAMR, peer review was complete before we granted reconsideration in October 2005. Based on the comments received during reconsideration, we have no evidence that had the peer review occurred earlier it would have resulted in EPA's using CMAQ differently or reaching a different conclusion. The 36-km grid square resolution used in the CMAQ modeling is used to estimate the relative fraction of the Hg deposition at the HUC-8 watershed level attributable to power plants. As described in the Effectiveness TSD Section 2.1, the HUC-8 watershed-scale analysis is appropriate for estimating IDI values considering the exposure pathway. The question of the adequacy of the CMAQ 36-km grid cell modeling, therefore, is whether that scale modeling provides sufficient spatial detail to estimate deposition in a HUC-8 watershed. Because HUC-8 watersheds are generally larger than 36-km grid cells, averaging to the HUC-8 will generally result in averaging two or more CMAQ grid cells. Were EPA to use a finer resolution grid cell (12-km or 4-km), this averaging would still occur but across more grid cells. EPA has no reason to believe that finer resolution CMAQ modeling would render significantly different results after the grid cells were aggregated to the HUC-8 watershed.*[51]

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[47] A December 2003 peer review focused on the total CMAQ platform and specifically on enhancements to the Hg chemical solver, which is responsible for Hg transformation and deposition in CMAQ. A May 2005 peer review included an extended discussion on the CMAQ Hg model science, the specific version of CMAQ used in CAMR, the 2001 model-MDN intercomparison study and the upcoming North American Intercomparison Study.

[48] Community Modeling and Analysis System (CMAS). Final Report: Second Peer Review of the CMAQ Model. July 2005. http://www.cmascenter.org. See also EPA-HQ-OAR-2002-0056-6307.

[49] CMAS is an independent contractor to EPA for the development, support, and peer review of CMAQ. It is affiliated with the University of North Carolina at Chapel Hill.

[50] The EPA released an updated version of the CMAQ Hg model on the CMAS web site in March 2006 which partially addresses the concerns of the peer review. Future versions of CMAQ will address other aspects of the peer review.

[51] In preparation for ORD's Spring 2007 peer review of CMAQ, EPA's ORD plans to perform modeling with an updated version of CMAQ at 12-km resolution when EPA obtains all the necessary data (e.g., meteorology, emissions, land type, activity data) to confirm that the results aggregated to the HUC-8 are not very sensitive to CMAQ grid size.

As explained in the Effectiveness TSD, EPA had several reasons to support using HUC-8 and, therefore, a 36-km grid square size. First, the larger grid size would account for Hg deposition that enters a watershed through subsurface inflow and runoff, as opposed to a smaller grid size which may only account for direct inputs to surface water. Secondly, in larger water bodies, where there is substantial fishing activity, the fish species consumed by humans are likely migratory and the accumulation of Hg in these fish will come from deposition over a larger area. Third, many fishers may catch fish from a variety of water bodies in a watershed; thus, a larger grid size would account for this fishing pattern. Moreover, the highest 36-km grid cell depositions of Hg do occur in the grid cells with the largest sources of Hg emissions. Thus, elevated localized Hg depositions from large EGUs and other sources of Hg are captured in the 36-km CMAQ modeling domain.

Comment:

Commenter 6475 stated that they have endorsed (in their prior comments) the detailed Hg deposition modeling performed by EPRI using its Trace Element Analysis Model (TEAM).[52] Over the years, EPRI's modeling efforts have evolved to address many of the important issues affecting the accuracy of Hg dispersion modeling in the U.S. including the development of a good inventory of worldwide Hg emissions, the atmospheric chemistry of the various Hg species, and the specification of boundary conditions for modeling U.S. deposition as output from a global Hg model. Although some modeling issues still exist, the commenter views the EPRI work as the state-of-the-science on Hg deposition modeling.

The commenter stated that EPA's modeling of Hg deposition has also improved with time. EPA's modeling work for the Utility Study was done using a Eulerian regional dispersion model, RELMAP, that over predicted the local deposition of Hg emissions from coal-fired power plants.[53] As technical support for its final regulatory determination under CAA §112(n)(1)(A), EPA prepared a RIA and Air Quality Modeling TSD using the CMAQ. CMAQ is a three-dimensional grid-based Eulerian model as well, as is EPRI's TEAM model. CMAQ uses Hg atmospheric chemistry that is similar to that used by EPRI. For boundary conditions, EPA used the output of a global Hg model, the GEOS-Chem model variant developed by D. Jacob at Harvard University. The commenter believes that EPA's CMAQ results provide a sound scientific basis for EPA's decision not to regulate EGUs under CAA §112(n)(1)(A).

The commenter stated that the CMAQ model has been peer reviewed[54] and is one of the best models available for modeling Hg deposition in the U.S. State petitioners' criticism of the fact that EPA's modeling effort did not include one coal-fired plant in Alaska and two in Hawaii is of no import.[55] There is but a single coal-fired power plant in Alaska. It is equipped with a

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[52] See UARG Comments, at 121; see OAR-2002-0056-2578 at 6-20 and 44-64.

[53] EPA's RELMAP modeling used outdated Hg chemistry algorithms and specified boundary conditions rather than use a global model to supply the boundary conditions for the U.S. model.

[54] See 70 FR 62204 (October 28, 2005).

[55] It is unclear what State petitioners seek to accomplish by requesting reconsideration of certain issues related to EPA's CMAQ modeling. The issues they raise do not affect, in any significant way, the results of EPA's modeling effort. If their purpose is to cast enough doubt on the CMAQ results that EPA decides not to use them, they offer no alternative modeling approach. If their goal is to have EPA return to modeling work presented in the Utility Study

spray dryer/fabric filter (FF) and has EPA-estimated Hg emissions of 14.9 lb/year. There are two coal-fired power plants in Hawaii. Both are 101 MW fluidized bed combustors (FBC) with FFs. EPA estimates their Hg emissions at 7.8 and 7.7 lb/year. The Hg emissions from these three units are extremely low as an absolute matter and are a vanishing small percentage of total Hg emissions in the U.S. In addition, there are no freshwater fisheries in Hawaii (based on EPA data), and the enormous domain of the marine fisheries off the islands is not impacted by the vanishingly small additions of Hg at the surface, particularly in light of the active volcanism in the region and the Hg associated that natural phenomenon. Had these plants been included in EPA's CMAQ analysis they would not have changed the conclusion not to regulate.[56]

Response:

The CMAQ modeling for these rules has been compared to similar modeling performed by EPRI with TEAM. Both CMAQ and TEAM are three-dimensional Eulerian regional photochemical grid models with very similar scientific complexity, atmospheric chemistry, and deposition. The CMAQ and TEAM Hg deposition applications utilized boundary condition inflow to the continental U.S. regional model domain obtained from a global transport model. The numerical structure and scientific content of the CMAQ model is similar in construct to the EPRI TEAM used in the analyses discussed above by the commenter. The results for both CMAQ and TEAM are similar in terms of predictions of Hg depositions and in terms of predicting the impact of utility-attributable Hg deposition in the base year and future year with a cap-and-trade program.

EPA agrees with the commenter that the CMAQ model has been peer reviewed. TEAM has been used in analyses reported in peer reviewed, "refereed" journals.[57] These uses do not represent model-specific peer reviews but they do reflect acceptance of the model for publication.

The CMAQ Hg utility-attributable Hg deposition results in the Steubenville, Ohio, area are consistent with those that were obtained using a receptor modeling approach. In addition, EPA agrees with the commenter on the exclusion of Alaskan and Hawaiian EGUs from the analysis because of their small number (3), the low-levels of Hg emissions, and their geographic distance from freshwater fisheries.

Comment:

Commenter 6634 stated that even if EPA's "utility-attributable emissions" construct were legal, the Agency's modeling does not bear a rational relationship to the reality it purports to represent. The Reconsideration notice requests additional comment on the Agency's atmospheric Hg fate and transport modeling using the CMAQ model. The commenter reiterated their earlier comments that CMAQ, like other deposition models before it, can be a useful tool to

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and to use those modeling results for its regulatory conclusion, those model results would be challenged as outdated and unrepresentative of actual Hg deposition in the U.S.

[56] In the notice of reconsideration, EPA has explained that meteorological data were not available for these units. Id. This is another perfectly valid reason for excluding them from EPA's modeling.

[57] See EPA-2002-0056-2584, -6704.

estimate national deposition rates and relative deposition intensity between regions. However, the CMAQ model is still not up to the task of delivering the precise deposition estimates that EPA pretends the model provides.[58] Consequently, the Agency's reliance on CMAQ to unequivocally state that no hotspots will result from the Hg cap-and-trade program is unjustified, as is its use of the model results as a central element of its claim that regulation is not "appropriate" under its new interpretation of CAA §112(n)(1)(A).[59]

There are many uncertainties in atmospheric Hg modeling,[60] and this is certainly true for the modeling done with EPA's CMAQ Hg model.[61]

Compelling evidence has recently been provided which suggests that a chemical reaction in CMAQ would likely result in an under prediction of the absolute impacts of coal-fired power plants. The CMAQ model includes a chemical reaction in which RGM is transformed to elemental Hg by the hydroperoxyl radical.

However, according to recent research, this reaction should not be included in atmospheric Hg models.[62] The probable impact of the inclusion of this chemical reaction in CMAQ is that the simulated impact of the emissions of RGM from coal-fired power plants is reduced because once RGM is reduced to elemental Hg, it is much less likely to be deposited.

Similarly, a second scientific issue may significantly affect EPA's conclusions about the impact of global Hg emissions in the U.S. The impact of Hg emissions outside the modeling domain is estimated by assuming "global background" concentrations of Hg at the boundaries of the CMAQ model domain. The bulk of the Hg entering the model at the boundaries is estimated to be in the elemental form.

Once the background Hg is transported into the domain, it can deposit by wet and dry mechanisms. However, to the extent that elemental Hg is converted to RGM, then it will be more likely to deposit. Calvert and Lindberg[63] have recently reported scientific findings that strongly suggest that two of the key chemical reactions converting elemental Hg to RGM in atmospheric chemistry models – including CMAQ – may be significantly slower than earlier thought. That is, CMAQ (and other models) may be significantly overestimating the impact of elemental Hg from global sources. This would imply that more of the Hg depositing is from emissions of oxidized Hg (mostly anthropogenic) and not oxidized Hg formed in the atmosphere

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[58] For instance, the commenter's reconsideration petition pointed out that the CMAQ model predicted higher deposition rates in a 2001 scenario with no utility emissions than a 2020 scenario with CAIR in place in several locations (and mistakenly stated that the REMSAD model also had this problem). EPA claims in its reconsideration notice that this phenomenon was due to emission reductions by 2020 from non-utility sources, but the Agency does not provide support for this assertion.

[59] See OAR-2002-0056-6270, at 43-45.

[60] Ryaboshapko, A, R. Bullock, R, Ebinghaus, I. Ilyin, K. Lohman, J. Munthe, G. Peterson, C. Seigneur, I. Wangberg, 2002. Comparison of mercury chemistry models. *Atmospheric Environment* 36 (2002) 3881-3898.

[61] Bullock, O.R. and K.A. Brehme, 2002. Atmospheric mercury simulation using the CMAQ model: formulation description and analysis of wet deposition results. *Atmospheric Environment* 36 (2002) 2135-2146.

[62] Gardfeldt, K. and M. Jonsson, 2003. Is biomolecular reduction of Hg (II) complexes possible in aqueous systems of environmental importance. *Journal of Physical Chemistry A* 2003, 107, 4478-4482.

[63] Calvert, J.G. and S.E. Lindberg, 2005. Mechanisms of mercury removal by 0_3 and OH in the atmosphere. *Atmospheric Environment* 39 (2005) 3355-3367.

from elemental Hg. If true, then the relative importance of U.S. coal-fired power plants would be even greater than estimated in the CMAQ modeling. We recognize that the development of CMAQ is an ongoing process and that Agency scientists have made great strides in improving this model in recent years. This does not alter the fact that there remains a great deal of work to be done to characterize the Hg atmospheric science, as well as other data (e.g., emission inventories) on which this model depends. With respect to peer review of the model, the Bullock and Brehme paper and the May 2005 peer review of the model by the CMAS both highlight several additional weaknesses of the model, in addition to those identified above, which limit its ability to predict precise deposition estimates for the Agency's deposition analysis and subsequent exposure analysis. Bullock and Brehme assess the accuracy of CMAQ in predicting Hg wet deposition and conclude that a number of factors, including a lack of precipitation data, hinder the predictive accuracy of the model. With respect to the performance of the model they state, "the evidence provided does suggest that there are physico-chemical processes affecting Hg wet deposition that are not yet defined and parameterized accurately in the model."

The CMAS peer review panel identified several weaknesses in the science of the CMAQ model which should be addressed including, with regard to the Hg module:

- Re-emission of volatile and semi-volatile compounds, such as Hg...are not yet addressed.
- There is a weak measurement base for evaluating the CMAQ-Hg, especially air concentrations and dry deposition of Hg.
- Weak and inconsistent coupling with global chemical transport models.

With respect to the use of CMAQ in CAMR, the panel concluded "Application of CMAQ to CAMR is not as robust (compared to its use in CAIR) mainly because of the knowledge gaps in atmospheric sources of Hg and also because of a lack of sufficient measurements of ambient concentrations and dry deposition of mercury."

In its response to the peer review, EPA states, "We agree that the wet deposition monitoring data available in North America do not constitute a strong evaluation database for evaluating CMAQ-Hg. However, for "routine" monitoring, that is all there is for now. We are also working with EPA researchers and others outside of EPA who are collecting ambient air measurements of gaseous and particulate Hg, including RGM, in intensive field studies, in order to perform evaluations with these data."

Because of acknowledged data gaps, a lack of measured data with which to evaluate the CMAQ model performance and scientific questions about a number of chemical reactions within the Hg module, the commenter continues to maintain that EPA cannot reasonably rely on CMAQ to predict deposition hotspots and absolute local deposition rates for the purpose of assessing the "utility-attributable" Hg pollution levels.

With respect to the Agency's work with EPA's researchers and others outside of EPA on studies to collect data which can be used to evaluate CMAQ, the commenter noted and submitted to the record EPA's preliminary findings from such an assessment in Steubenville, Ohio.

The commenter stated that EPA's own studies discredit the modeling approach EPA used in an attempt to justify the revised regulatory determination and delisting rule. EPA asserts that it "has interpreted CAA §112(n)(1)(A) as calling for an analysis of the hazards to public health reasonably anticipated to occur as the result of emissions by [EGUs]."[64] The commenter believes EPA's analytical approach to this fundamental question, however, is so fundamentally flawed that it cannot be relied on to support EPA's delisting decision. EPA has used, and continues to use, the CMAQ model to predict Hg deposition rates in different watersheds under various control scenarios. Indeed, in EPA's Notice of Reconsideration of its Delisting Rule, EPA contends that "model performance for CMAQ Hg deposition falls within what has been considered reasonable model performance for ozone and particulate matter model applications."[65]

But CMAQ does not yield results that are rationally related to the reality the Agency purports to be modeling. With respect to Hg pollution from electric utilities, particularly, EPA's own studies demonstrate that EPA's "[c]urrent models (including those used by EPA for CAMR analyses) estimate a much lower local/regional source contribution to Hg deposition"[66] than occurs in fact. Contrary to EPA's CMAQ based modeling runs for CAMR – which significantly under-predict local and regional deposition rates for electric utilities for the reasons cited in the preceding section – data produced from a multi-year study of Hg deposition and source apportionment from coal combustion in the Steubenville, Ohio, area show that "approximately 70 percent of Hg wet deposition at Steubenville site is attributable to local/regional fossil fuel (coal and oil) combustion sources." EPA has failed to account for this rate and amount of local and regional wet deposition from domestic electric utilities. To make matters worse, because "the best current scientific understanding is that wet Hg deposition and dry Hg deposition are roughly equal in magnitude,"[67] which indicates that the results are doubly inaccurate. Thus, in its CAMR analysis, EPA significantly under-predicted the rate and amount of both wet and dry Hg deposition from local and regional electric utilities.

In its briefing materials discussing the Steubenville Study results, EPA explains some of the reasons its prior CMAQ modeling failed to accurately predict local and regional Hg deposition rates and how the Steubenville Study corrects those errors.

First, the Steubenville Study used a new precipitation-event-based sampling method to collect samples instead of the MDN's weekly sampling technique, which is not designed for source apportionment studies. Second, the Steubenville Study used an improved analytical method with an extremely low detection limits to measure Hg co-pollutants, such as sulfur, selenium, and vanadium. Third, the Steubenville Study used state-of-the-art receptor modeling tools-including updated versions of EPA UNMIX and Positive Matrix Factorization to the Hg precipitation data to identify sources and source categories affecting the receptors. With these improved modeling techniques, EPA acknowledges that the Steubenville Study results are

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[64] See 70 FR 62199, 62206 (October 28, 2005).

[65] Id. at 62204.

[66] Preliminary Results from Steubenville Hg Deposition Source Apportionment Study, Briefing for Tim Oppelt, Presented by Tim Watkins (April 27, 2005) (Steubenville Study).

[67] See 70 FR 62204.

plausible, consistent with other studies (particularly South Florida deposition results), contradict EPRI claims of plume conversion of oxidized Hg to its elemental form, and will be replicated in the future and at other sites. Based on the Steubenville results, and the central importance of the CMAQ modeling to the Agency's reversal of its 2000 regulatory finding, EPA's continued reliance on its earlier CMAQ modeling results is arbitrary and capricious because doing so significantly underestimates the local and regional impacts of coal and oil-fired electric utilities.

The commenter stated that by downplaying the local and regional Hg pollution contribution from domestic sources, EPA's rule will continue to permit people to be exposed to unacceptable public health hazards. As a result of its deposition miscalculation, EPA has underestimated the "hazards to public health reasonably anticipated to occur" as the result of domestic electric utility emissions by arbitrarily and capriciously exaggerating the impact of global sources of Hg pollution and downplaying the significance of local and regional power plant emissions to Hg water pollution and fish contamination. EPA, in fact, acknowledges that the Steubenville Study has serious "implications for potentially vulnerable areas (i.e., "hotspots)," but then fails to correct its modeling error to accurately reflect the local and regional impact of domestic utilities. Consequently, EPA continues to underestimate the contribution of domestic electric utilities' Hg emissions to MeHg concentrations in fish tissue and the resulting risks to human health.

Based on the same modeling flaws, EPA also improperly limited its analysis of fish consumption pathways for human Hg exposure. To evaluate the public health hazards of domestic electric utility emissions, EPA "examine[d] the concentrations of MeHg in fish tissue that result from U.S. coal-fired power plant Hg emissions,"[68] because fish consumption is the primary Hg exposure pathway for most people. This alone excludes a major pathway of concern to many Native Americans-populations that EPA has previously asserted are of most concern. Compare 69 FR 4654, 4702, 4707, and 4709 (January 30, 2004)(identifying Native Americans as at greater risk for the adverse health effects from Hg due to increased exposure) with 70 FR 16024 and 16034 (dismissing Native American fish consumption data as "of limited value" and failing altogether to consider comments addressing certain Tribes' patterns of consumption of contaminated mammalian species). Several Tribes of Native Americans alerted the Agency to the fact that not only has their traditional subsistence fish consumption been adversely affected by Hg contamination, but that they are impacted as well by significant Hg contamination in "other food sources, such as muskrat, beaver, smallgame waterfowl," mink and river otter.[69] Their submissions demonstrate that impacts on species other than fish present significant public health risks to populations of greatest concern, not simply environmental effects. Yet EPA completely ignored these potential adverse health effects in its final rule, despite the mandates of EO 12898 which explicitly includes wildlife in addition to fish for evaluation in environmental justice issues for subsistence hunters and fishers.[70] The commenter believes this complete turnaround in the Agency's perspective on the concerns with respect to Native American subpopulations (not to mention the legal rights of the Native American Tribes) is not only

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[68] See 70 FR 62206.

[69] See OAR-2002-0056, at 1-2; See OAR-2002-0056-2483 at 1-2.

[70] See EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629 (February 16, 1994).

unanticipated, it is illegal.[71]

Once EPA limited the model to include only utility-attributable Hg emissions, it then further restricted its analysis of human exposure pathways to "focus on one fish consumption pathway of [Hg] exposure-freshwater fish caught by recreational and subsistence fishers," ignoring four other fish consumption pathways: (1) marine fish, (2) commercial freshwater fish, (3) fish produced through aquaculture, and (4) estuarine fish.[72] EPA's purported justification for its limited analysis-that freshwater fish caught by recreational and subsistence fishers was the only exposure pathway significantly affected by domestic emissions-is baseless and insupportable. EPA attempts to support its limited analysis by claiming that "individual exposure [from the four excluded fish exposure pathways – marine fish, aquaculture, near shore/estuarine fish, and commercially caught fresh fish] to Hg from power plants is [not] equal to or [does not] exceed the EPA RfD for Hg due solely to utility-attributable emissions."[73] But, even if this newly conceived "IDI" were legally relevant, this is a claim EPA cannot support because, as discussed above, its modeling for CAMR significantly under-predicts local and regional deposition from domestic utilities. As a result, EPA does not know what "utility-attributable emissions" to fish tissue Hg levels are or if human exposure exceeds the RfD. Thus, EPA' s fundamental modeling flaws invalidate EPA's conclusion that it is neither "appropriate" nor "necessary" to regulate electric utilities under CAA §112 in order to protect people from "the hazards to public health reasonably anticipated to occur as a result of emissions by electric utilit[ies]."

The commenter stated that EPA compounds its modeling error by utilizing an inadequate model for translating local deposition into "utility-attributable" fish tissue Hg. As the commenter pointed out in their Petition for Reconsideration, EPA unreasonably limits the fish data on which it bases its modeling of "utility-attributable" fish tissue Hg. In particular, EPA unreasonably limited the scope of the fish concentration analysis, by relying only on recreationally-caught fish. EPA's TSD reanalysis does not revise this in any way, but instead simply further discusses EPA's attempt to justify its conclusion that a freshwater recreational angler represents the maximum exposure. We have commented on this point in our petition, and direct the Agency's attention there, as well as to the additional comments below.

The commenter stated that EPA unjustifiably ignores Native American fish consumption habits and cultural pathways to Hg exposure, in making its regulatory determination. The general population ingests on average 17 grams of salmon or other fish per day and Native American populations that rely on fish for subsistence ingest up to 1,000 g/day. This great disparity requires a more careful analysis by EPA of the impacts to Native populations to emissions of Hg into the atmosphere. A person in the general population has the option of eating

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[71] The Penobscot and the Micmacs, for example, are Federally-recognized Native American Indian Tribes for whom the U.S. government and its agencies have a trust responsibility. Comments of the Penobscot Indian Nation at 1; Comments of the Aroostook Band of Micacs at 2; see also EO 13175: Consultation and Coordination with Indian Tribal Governments, 65 FR 67249 (November 6, 2000) (requiring EPA to develop an accountable process to ensure tribal input in the development of regulations that have Tribal implications) and EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629 (February 16, 1994).

[72] See 70 FR 62206.

[73] Id. at 62207 n. 4.

more fish if they want the medical benefits (e.g., eating more omega-3 fatty acids), or less fish if they want to avoid contamination, or no fish at all. The person in the general population, therefore, has the ability to weigh risks and benefits.

In contrast, the Native American person must take several additional factors into consideration, especially if s/he comes from Tribe on a river with anadromous salmon runs or from a coast with plentiful shellfish, such as the Penobscot and Passamaquoddy Tribes in Maine. Such Native Americans come from a culture where fish not only provides nutritional services, but also cultural, social, educational, and other services related to religion, identity, community cohesion, education about skills, stories, and environmental management, and other individual and community well-being requirements. The choices facing Native Americans require more risk balancing and making choices that directly affect cultural and religious practices.

The rivers in Maine relied upon by Native Americans for thousands of years to sustain them, their culture, and their religion now all have Hg advisories. A decision by a Tribal member not to eat salmon from these rivers means the loss of many medical benefits provided by high ingestion rates of salmon such as neurological benefits from fetal through elderly life stages, the cardiac benefits, and protection against diabetes. These Native Americans also lose the nutritional value of a fish-based diet and due to their low income levels often have no other choice but poor-quality replacements such as fast food. The cultural skills associated with learning about salmon, about environmental management, about catching and preserving food for the community, and about language and place names, and so on are at risk as these rivers retain their Hg contamination and advisories.[74]

In addition, the typical conceptual site model used to identify exposure pathways for a risk assessment of the impacts of Hg contamination on a population is wholly inadequate to assess the impacts of Hg emissions on Native American populations.

Because each exposure pathway is evaluated for how much environmental contact to Hg it contributes (known as exposure factors) the failure to include an actual pathway leads to a discounting of the risk and a potential increase in exposure of Native Americans to unsafe levels of Hg. Conventional outdoor/suburban exposure pathway scenarios should not be used to determine exposure pathways for Native Americans.

Native American exposure pathways to Hg contamination must emphasize more environmental contact resulting from hunting and fishing; gathering native foods, medicines, and plants; and reflect generally a culture that is living embedded within the environment, rather than being insulated from the environment via indoor lifestyles and store-bought foods and materials. Many of the Native American pathways are the same as outdoor/suburban pathways, but with higher environmental contact rates. For example, the soil ingestion pathway is included in both suburban and subsistence models, but soil contact is higher in a subsistence lifestyle.[75] Other

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[74] <u>See</u> Native American Tribes, “Comparison of General Population and Native American Decision Points for Fish Ingestion.”

[75] The limitation of exposure pathways to freshwater fish does not include the consumption of piscivorous wildlife. This also does not adequately address the combination consumption patterns of the Maine Indian Tribes – namely, freshwater and coastal fish along with piscivorous wildlife.

pathways, such as use of the sweatlodge, have no suburban analogue, and, thus, are unique to native lifestyles.[76] EPA has failed to account for the dramatic and potentially harmful continued exposure to Hg contamination its determination will have on Native Americans' health, culture and religion. This fundamental flaw in the analysis underlying the delisting rule adds to the rule's unlawfulness.

The commenter apparently believes that EPA's Statewide Hg allocations are based on fish tissue data. Therefore, they argue that the Statewide utility emissions allocations for certain States is not supportable because there is no fish tissue data for those States.

NLFTS and NLFA data were used to determine the 2001 base case MeHg levels. Methylmercury levels for other scenarios were calculated as the 2001 base case multiplied by the ratio of deposition in the scenario to deposition in the base case. For 2020 control options, this indicates a series of multiplications. Without analyzing fish tissue data from the aforementioned States, EPA cannot be sure it has accurately determined the base case numbers for those States. Similarly, all calculations based on those numbers are suspect.

The commenter stated that EPA unjustifiably ignores coastal fisheries impacts analysis. EPA seeks to avoid the reality that utility Hg emissions impact U.S. coastal areas and estuarine systems and the fish species that inhabit them, by drawing an artificial line between the open ocean and the coastal ocean, and pretending that ocean fish are not impacted by Hg deposition in the coastal regions. On the contrary, numerous species, including tuna, either migrate through the coastal zones or spawn in estuarine waters. The Atlantic bluefin tuna, for example, spawns in the Gulf of Mexico and then migrates northward along the eastern seaboard.[77] Numerous other popular sport fishes also feed, reproduce and find shelter in estuarine systems. Popular sportfish such as bluefish, king and Spanish mackerel and striped bass are all migratory ocean fish, yet all use estuarine systems as spawning grounds and nurseries.[78]

These sought after species are all subject to Hg consumption advisories in numerous coastal States and represent not only a significant economic resource but a source of Hg exposure to recreational fishers. Indeed, an EPA scientist recently conducted a regional analysis of the National Health and Nutrition Examination Survey.[79] This analysis demonstrated that women of child-bearing age living in coastal areas have blood Hg levels that are consistently higher than blood Hg levels of women residing in non-coastal areas. Women living in areas bordering the Atlantic coast had blood Hg levels more than three times higher than women in non-coastal areas. Also, Native Americans in coastal areas, like those in Maine, consume a combination of fresh water and estuarine fish, along with piscivorous wildlife.

The lack of an analysis of estuarine fish contamination and subsequent human exposure combined with EPA's underestimate of Hg deposition are yet another indication of EPA

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[76] Compare Native American Tribes, "Conventional depiction of exposure pathways" (slide attached to comments) and "Subsistence exposure pathways" (slide attached to comments).

[77] See Congressional Research Service Report for Congress. Atlantic bluefin tuna: International management of a shared resource. March 8, 1995. http://www.ncseonline.org/NLE/CRSreports/marine/mar-5.cfm.

[78] See http://www.chesapeakebay.net/info/fishl.cfm.

[79] See Mahaffey, K.R., 2005. NHANES 1999-2002 update on mercury and Fish Forum 2005. September 2005. http://www.epa.gov/ostwater/fish/forum/2005/.

miscalculating the contribution of domestic electric utilities' Hg emissions to MeHg concentrations in fish tissue and the resulting risks to human health.

EPA also continues to ignore significant scientific evidence that MeHg exposure contributes to cardiovascular disease and EPA's assessment of cost-effectiveness makes no mention of cardiovascular disease as a significant health endpoint despite published analyses detailing this effect. With regard to cardiovascular effects, the commenter refers to previous comments.

Response:

EPA used the best available Hg science information when applying CMAQ for these rules. As new Hg science information becomes available and accepted, EPA will incorporate it into CMAQ. The atmospheric chemistry utilized in CMAQ is based on laboratory studies and measurements. There have been some recent journal articles (e.g., Gardfeldt and Jonsson; Calvert and Lindberg) which question whether what is measured in the laboratory actually occurs in the atmosphere. Until atmospheric measurements are undertaken or there is widespread agreement in the scientific community that these reactions do not occur in the atmosphere, the chemistry based on laboratory studies is being utilized in CMAQ. Support for the commenter's statement in the footnote regarding 2001 vs. 2020 emission reductions is provided in the Modeling TSD (see Table 2).

The Steubenville study has been addressed elsewhere in this document.

As noted elsewhere in this document, CMAQ has been sufficiently peer reviewed. The CMAQ peer review process has been the same for Hg as it was for ozone and $PM_{2.5}$. In fact, the latest peer review of CMAQ focused on Hg and $PM_{2.5}$. The peer review panel received documentation and presentations from EPA ORD scientists on ozone, $PM_{2.5}$, Hg, and other aspects of CMAQ science. The peer review panel was also able to question in-person EPA ORD scientists on all aspects of the science contained in CMAQ. The peer review panel then prepared a report on the results of their peer review, which is contained on the CMAS web site (http://www.cmascenter.org). The peer review report is found on this web site under the "CMAQ Review Process" link. In addition the ORD response to this peer review is also found at this location on this web site. The EPA released an updated version of the CMAQ Hg model on the CMAS web site in March 2006 which partially addresses the concerns of the peer review. Future versions of CMAQ will address other aspects of the peer review.

The peer review panel raised three specific issues regarding uncertainties in the CMAQ modeling system: re-emission of volatile and semi-volatile compounds; existence of weak measurement base for evaluating the CMAQ Hg outputs; and, weak and inconsistent coupling with global chemical transport models. The current scientific uncertainty associated with the re-emission of compounds such as Hg in numerical modeling platforms is relatively high. Rather than inaccurately parameterize the re-emission and re-volatilization of Hg compounds in the current version of CMAQ, EPA chose to not include the elemental dry deposition pathway, which is currently believed to be on the order of the re-emission/re- volatilization deposition, effectively creating no net change in the absolute Hg deposition. Regarding the deficiencies in the current *ambient Hg monitoring networks (e.g., MDN), especially for dry deposition, EPA has addressed these concerns elsewhere in this document. Finally, the inconsistency in coupling the GEOS-Chem model outputs with the CMAQ modeling system is not believed to be a significant problem. CMAQ currently utilizes explicit Hg information (for 3 specific Hg species) from the GEOS-Chem model, which update on a 3-hourly basis (throughout the vertical model domain) during the modeling simulation. The use of such dynamic boundary conditions for incoming Hg species is considered to be state-of-the-science, and far superior to older methodologies utilizing static boundary conditions. As has been outlined elsewhere in this document, EPA continues to conduct state-of-the-art research in all of these areas and will continue to update and refine the CMAQ system to reflect these new scientific results.*

EPA disagrees that it has ignored the impact of utility-attributable Hg deposition on coastal and marine fish. In its Reconsideration TSD, EPA conducted a bounding analysis of both pathways and concluded, based on that analysis, that freshwater recreational fishing is the dominant exposure pathway for utility-attributable Hg. In our analysis of marine and estuarine fisheries, we consider species that are likely affected by utility-attributable Hg in nearshore areas as well as the open ocean (offshore areas). Although the commenter makes some good points about the human health exposure risks associated with high Hg species in marine and coastal areas, our analysis indicates that the utility-attributable component of this exposure is small. See Table 3 herein.

Regarding commenter's statements on the regional analysis of the National Health and Nutrition Examination Survey (NHANES), it is our understanding that NHANES is designed to provide national estimates of health measures. It is not specifically designed to provide estimates for geographic areas below the national level. The NHANES sample is highly clustered; each year approximately 5,000 people are selected from 15 primary sampling units (counties). Although primarily sampling units are selected at random, they are not selected so that they are distributed evenly throughout all geographic areas. The number of counties in some geographically defined areas may also be quite small. For these reasons, sub-national samples are statistically inefficient with respect to being representative of persons in a particular geographic area. This will be of particular concern for a health-related measure that varies by geography as some counties may be influential with regard to that measure resulting in estimates that are statistically unreliable. Thus, an analysis of NHANES data using geographic information should be interpreted with caution and the presentation of results of the analysis should include an acknowledgement of this limitation.

The commenter discusses salmon consumption in Maine but fails to note that salmon are generally low in MeHg and, furthermore, salmon are anadromous, spending much of their adult life in marine environments. The commenter has not suggested how much of the MeHg in salmon is from the time the fish spent in fresh water and how much is from the time the fish spent in marine environments. It is, therefore, not possible to determine from the commenter's statements how much of the MeHg is utility attributable.

In the Effectiveness TSD, EPA considers a range of fish consumption rates in addition to values representative of recreational fishers. Specifically, EPA modeled exposures for Native American subsistence populations using fish consumption rate data based on the Columbia River

Intertribal Fish Commission study (as cited in EPA's 1997 EFH). These Native American fish consumption rates include a mean of 60 g/day, a 95th percentile of 170 g/day and a 99th percentile (estimated) of 295 g/day, all far exceeding the 17 g/day value cited by the commenter. In Table 2 above EPA also estimates exposure associated with a 99th percentile survey fish consumption rate of 389 g/day. In response to comment that the 17 g/day "general population value" does not adequately represent higher-end Native American fish consumption, EPA would like to point out that the TSD included IDI values based on a wide range of consumption rates including higher-end values representative of subsistence behavior (e.g., 60 g/day – as a mean subsistence rate, 170 g/day as a 95th percentile rate and 295 g/day as a 99th modeled percentile subsistence rate). These higher-end consumption rates provide coverage for intensive subsistence behavior and do range higher than the 17 g/day value cited by the commenter. As explained above, individual examples of high consumption rates (e.g., 1,000 g/day as suggested by the commenter) do not form a reasonable basis for exposure analysis without additional information (e.g., percentile breakdowns) not provided by the commenter.

It is well established that the dominant exposure pathway for humans is through the ingestion of fish (see chapter 3 of volume IV of the Mercury Study Report to Congress). Thus, EPA does not expect that consumption of native foods, medicines, and plants will be a significant exposure pathway for Hg. Elsewhere in this document, we address the impact of consumption of fish-eating mammals.

Finally, regarding commenters argument about State allocations under CAMR, that argument is just wrong. Although we used fish tissue samples as part of the CAA §112(n) determination, we did not use sample sites as part of the CAA §111 CAMR allocation methodology. That methodology is based on each state's power plant operations, adjusted by coal type.

Comment:

Commenters 6479 noted that a model's reliability depends on sufficient peer review and verification through testing the model's results against actual monitoring. Neither has been accomplished for EPA's CMAQ modeling. Regarding peer review, EPA's assertion that the CMAQ has been sufficiently peer reviewed is incorrect when, in fact, EPA's CMAQ version still has yet to be released for public review and testing despite being applied to CAMR assessment. It is impossible for parties affected by the rulemaking to develop evidence to support their objections to the rule when the central model supporting the rule has not been provided. In the Reconsideration notice, EPA indicates that the model has been peer-reviewed by the CMAQ Review Panel (Panel).[80] Not only does this review fail to serve as a sufficient substitute for providing the public with notice of the substance of the model, but the peer-review process cited by EPA highlights the prematurity of the Agency's use of the model.

The commenter stated that the Panel not only described the understanding of Hg chemistry as "being in its infancy," but also provided eleven areas in which to improve the model, nine being classified as a high priority.[81] EPA nonetheless used the CMAQ model to

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[80] See 70 FR 62204 (October 28, 2005).

[81] See OAR 2002-0056-6479, Attachment 2.

finalize CAMR prior to addressing any of these high priority areas. With recent research indicating that the CMAQ models are generally predicting overall impacts that are "within a factor or two of observations" averaged over monthly periods (or low resolution), EPA's reliance on its CMAQ modeling at such an early stage of review is unreasonable.

Commenter 6490 stated CMAQ has certainly undergone rigorous peer review over the past several years, but that peer review has been limited to its role in modeling of PM and ozone and not toxic pollutants like Hg. In fact, a peer review panel report entitled "Final Report Summary: December 2003 Peer Review of the CMAQ Model" (August 2004) contains a recommendation that "[t]he CMAQ effort should remain focused on its main mission, [which is] urban/regional modeling of PM and ozone for SIP purposes."

EPA asserts that CMAQ underwent further peer review in May 2005 and cites a report issued by the reviewing panel. That this review occurred after CAMR was adopted is significant because it could not have been a basis for adoption of the final rule. Even so, the May 2005 review cannot be characterized as a real peer review, but rather should be characterized as providing the CMAQ peer review panel an opportunity to comment on use of CMAQ for Hg. In fact, EPA's version of the model has been written by EPA, tested by EPA, and peer briefings have been conducted by EPA. This clearly would not be considered a truly open process inviting critical and rigorous peer review.

Regarding the peer panel process, the Final Report: Second Peer Review of the CMAQ Model states in its summary, "This external CMAQ Model Peer Review Panel conducted its review in May 2005 on the basis of a day and a half of presentations by AMD staff and documents provided by them." EPA clearly considers this an adequate peer review, but the scientific community does not. Granted the timeline was short and an alternative review, although limited, was constructed, but it still alters from traditional peer review of publication after rigorous anonymous review by other experts that ultimately culminates in publication in a respected journal. The peer panel suggests that EPA address this difference in how EPA's peer review was conducted by requesting that EPA not use certain "reactions and/or rates" until they are "published in the peer-reviewed literature." It is also interesting to note that as of the date of these comments, the EPA version of CMAQ-Hg still has yet to be released for public review and testing despite being applied to CAMR assessment and finalizing the rule. This is a full eight months after the CAMR modeling with CMAQ was completed. Further, the model was used to finalize CAMR prior to the application of the high priority issues identified by the panel.

Although the seven selected peer panel members reviewing EPA's version of the model are indeed experts in the field and highly capable of performing a detailed peer review, a true peer review is usually conducted by experts with the ability of hands-on access to the tools and to review how the science is programmed and how tests are performed. Nonetheless, the panel summarized that the state-of-the-science Hg chemistry used in EPA's CMAQ model as "being in its infancy." They provided eleven areas to improve the model, nine of those areas were classified as a high priority, and most of those were focused on improving the understanding of Hg chemical mechanisms and measurement techniques so that the model can be correctly tested. There are 17 Hg chemical mechanisms programmed into EPA's version of CMAQ. The next generation of the model will likely include another eight Hg chemical reactions in an attempt to better reflect measurements.

Response:

The CMAQ Hg model was publicly available from the model developer (Russ Bullock) for several years prior to its use for CAMR. In fact, the model developer did provide the CMAQ Hg model to several organizations during that time period. The CMAQ Hg model and inputs used for CAMR were made available to the public on March 15, 2005[82] *and on the ftp site ftp://www.airmodelingftp.com (Peter Eckhoff, eckhoff.peter@epa.gov, can be contacted to obtain a user password and id to obtain the CMAQ model from this web site). Elsewhere in this document, EPA has responded to the issues related to CMAQ's peer review status and process.*

Despite the overall lack of Hg monitoring sites, especially Hg dry deposition monitoring sites, to evaluate CMAQ predictions, there is an adequate number of monitoring sites in the MDN to evaluate CMAQ Hg wet deposition predictions. The MDN currently only measures wet deposition because there is no adequate field methodology available for dry deposition. The CMAQ performance evaluation for wet deposition is provided in the Modeling TSD. For the majority of sites in the MDN, the CMAQ Hg wet deposition predictions are within ± 30 percent of the observed values at the monitoring sites.

Comment:

Commenter 6504 concurs with EPA's five-step approach to assess potential health impacts of Hg reductions: (1) quantify EGU Hg emissions before and after implementation of the Hg rule; (2) model changes in atmospheric dispersion, atmospheric speciation, and Hg deposition as a result of EGU Hg reductions; (3) model the link between changes in Hg deposition and changes in MeHg concentrations in fish; (4) assess types and amounts of fish consumed by U.S. consumers and extrapolate resulting changes in MeHg exposures; and (5) assess how reductions in MeHg exposure affect human health. EPA's assessment is based on a sophisticated model that provides more reasonable results than the simplistic models advocated by Petitioners. EPA's modeling results are consistent with the only other modeling of comparable sophistication – that of EPRI, which also concluded that reductions in power plant Hg emissions would have a negligible impact on human health.

Response:

EPA appreciates the commenter's approval of our methodology.

Comment:

Commenter 6490 stated the CAMR assessments do not adequately investigate the uncertainty impacts caused by known errors in the Hg emissions inventories and the percentage of oxidized emissions, state-of-science in atmospheric chemistry and deposition nature of Hg species, and the effect of accumulation of Hg emissions allowances.

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[82] See EPA-HQ-OAR-2002-0056-6140.

EPA has not taken into account the large quantities of Hg that will likely be traded under the CAMR cap-and-trade structure and has not adequately modeled the resulting changes in the geographic distribution of Hg emissions.

The model development, peer review, and performance testing was rushed and inadequate. Of special note, even though the CMAQ model has been tested and peer reviewed in the literature for ozone and fine particles, one cannot automatically extend the validity of that peer review to include the newly added routines such as those for Hg.

Assembling a "peer panel" to review the new Hg version of the model months after the CMAQ modeling for CAMR, and then not including any of the input from the panel in the final rule, renders the "peer review" meaningless as it pertains to the rule.

EPA has not produced a complete technical assessment of uncertainties involved in CAMR modeling accounting for the current state-of-the-science, inventories, modeling, and volatility of fuel prices. As is detailed in our comments below, the state-of-the-science and model development are barely beyond their infancy. Although progress has been rapidly made, it is still not advanced enough to avoid bracketing the analyses to account for uncertainties. Because the models are still being technically developed, there should also be some effort made to use a variety of models to capture not only long-range transport concerns, but also models that perform in the near-field matching the multitude of studies indicating that the vast majority of reactive and particle Hg deposits within 30 km of the source. Another area creating tremendous uncertainty that is not accounted for in the CAMR modeling is the emission inventory used by EPA. As documented in comments to the docket on June 24, 2004, and January 3, 2005, NHDES has found significant flaws in the total Hg emissions for the electrical generation units (EGUs) in New Hampshire and in the speciation of those emissions (details below). With these known errors uncorrected, the commenter highly questions the accuracy of the remaining dataset used in CAMR modeling. There are just too many known errors in the Hg emission inventory to have confidence in the CMAQ modeling results. At the very least, the effect of these errors should be assessed in an uncertainty analysis by EPA. The CMAQ model, which EPA uses to quantify current Hg impacts and to predict future reductions under CAIR and CAMR, needs reasonably accurate input data to avoid the "garbage in, garbage out" problem. As outlined below, the emission inventories and other data supplied to the model are flawed in several ways. These errors will cause EPA's modeling to either under predict or over predict the Hg emissions impact and will lead to erroneous conclusions regarding both the risks remaining after the implementation of CAIR and CAMR and the validity of EPA's CAA §112(f) "Residual Risk" analysis. Based on the problems the commenter has identified to date, the various flaws in the emission inventories will cause the impact to be under-predicted.

Response:

We disagree with the commenters' criticism of our atmospheric modeling analysis. Specific responses regarding the CMAQ Hg model and inputs used for CAMR, the peer review process, and the inventory used for CAMR are addressed elsewhere in this document.

Comment:

Commenter 6475 stated that both EPA and EPRI have used data from the MDN to assess the performance of their Hg deposition models. Although the MDN data are not perfect due to incomplete geographic coverage, a fairly short data record (10 years), and they only include wet deposition information, they are still the best information available for assessing model performance. Both EPA and EPRI models show reasonable statistical performance in reproducing annual wet deposition of Hg across North America. The CMAQ results seem to be biased somewhat lower than the TEAM results. Possible differences that may explain this behavior are that (1) EPRI included vehicle Hg emission in its inventory although EPA did not and (2) EPRI used actual cloud and precipitation data for the year being compared while EPA used prognostic models for those inputs. Regardless, the performance of both models is consistent with the current state-of-the-science for Hg dispersion modeling. There remain uncertainties about a number of model inputs, about the physical transformation of Hg species in the environment, and about Hg removal rates. Although work should continue to refine the models in these areas, the existence of these uncertainties in no way undercuts the scientific validity of EPA’s decision not to regulate EGUs under CAA §112.

Response:

EPA agrees that CMAQ adequately models Hg deposition, and that any uncertainties, which exist for any model, do not undercut EPA’s decisions in the final rule.

Comment:

Commenters 6479 and 6490 stated versions of CMAQ with Hg-handling routines have been recently developed, and there are several versions all on parallel development tracks. EPA has one version; a group of modeling researchers has been developing another version known as CMAQ-MADRfD; and other smaller efforts have taken place. To date, no one model has been determined to be the best based on performance when compared to measured ambient samples and, thus far, indications are that the models are predicting overall impacts that are “within a factor of two of observations” averaged over monthly periods (or low resolution). However, there is generally poor agreement with daily averages of critical reactive Hg measurements (Bullock, 2005). The ability to evaluate the fidelity of any model is severely limited by the lack of observation. We cannot yet define the sources and sinks of atmospheric Hg with sufficient completeness to confidently test model accuracy and completeness (Bullock, 2005).

In essence, the CMAQ model may contain most of the currently understood chemical mechanisms within it, but nobody really knows how well it performs because there is a clear lack of monitoring data to validate performance. Ambient Hg measurements are limited to one (wet) of the four deposition measurements (wet, dry reactive gases (RGM), dry elemental gases (GEM), and particle), and the time resolution of these samples are insufficient to perform refined time resolution performance testing. Compounding the problem of inadequate time resolution, the existing MDN monitoring network does not provide adequate geographic resolution against which even the wet deposition CMAQ results can be verified or validated. The MDN monitoring locations were selected to provide data on national Hg deposition trends. They are poorly located for model calibration, especially because there are few if any monitoring stations located downwind of utility sources where deposition data is critically important for model verification. Only a very rough testing of this one sector is possible. The rest relies upon educated guesses.

To estimate the remaining sectors of deposition, EPA relies on a single article (Miller, et. al., 2005) that EPA concludes: "wet Hg deposition and dry Hg deposition are roughly equal in magnitude" and that the "total national CMAQ Hg wet deposition is roughly equal in magnitude to the total dry deposition." However, a critical reading of the Miller article clearly indicates that at least two-thirds of Hg deposition takes place in the dry form. The Miller article actually states: "Precipitation, RGM and GEM dry deposition each contribute about a third of the total estimated mercury deposition." This point is repeated in the text and supported by a table summarizing deposition rates. EPA appears to have misinterpreted the statement that "net GEM and RGM fluxes were each greater than or equal to wet deposition in many areas." The authors meant that GEM and RGM each were greater than or equal to wet deposition, not GEM and RGM combined. Additional studies (Driscoll, et al., in preparation; Grigal 2002; and Xu, et al., 2000) confirm this and even suggest that, on average, three-quarters of the Hg that deposits, does so in the dry form. Because the CMAQ model performance was considered acceptable based on a matching with monitored wet deposition and the assumption that dry deposition was in equal proportion to the wet portion, it in fact was missing one-third to one-half of all deposition because wet and dry deposition are not equal in the northeastern U.S.

Further, the Miller article concludes that although particle deposition generally accounts for less than 1 percent of total deposition, cloud-water deposition (a form not predicted by CMAQ) becomes important at elevations above 3,300 feet above sea level, accounting for "up to one-half of total mercury deposition." Considering some wetland Hg hotspots are in locations where leaf fall and mountain runoff of MeHg feeds the water body, this avenue of contribution is significant and overlooked in EPA's assessment. Miller also discusses MeHg transfer from leaf biomass to aquatic systems which suggests that deposition calculations to water bodies should not be limited to the surface area of the water body and should include land areas that feed those water bodies. Even if transfer rates are slow, this significantly increases Hg input to affected water bodies (see Grigal 2002 and Miller 2005). It also introduces MeHg into the food chain over terrestrial areas because insects, birds, and mammal ingest MeHg with the biomass consumed.

The commenter recommends that EPA adjust its modeling parameters, including the use of a smaller grid cell size. Such adjustments will affect the modeled deposition patterns and hopefully better reflect field deposition and blood Hg measured patterns.

Response:

The CMAQ model contains the best science available to EPA to model Hg deposition. The CMAQ is a three-dimensional grid-based Eulerian model that includes advanced Hg atmospheric chemistry. EPA agrees that measurements to evaluate Hg deposition model performance are very limited. The predominate form of dry deposition in CMAQ results from RGM deposition. The rate of RGM is modeled in CMAQ for CAMR as being equivalent to the *dry deposition rate for nitric acid.*[83] *This is because RGM and nitric acid have similar properties in the atmosphere in regard to water solubility and relative concentrations in air and precipitation. In most areas of the country, CMAQ does predict Hg dry deposition that is greater than or equal to Hg wet deposition. In some of the higher rainfall areas of the country, the wet deposition predicted by CMAQ is larger than or equal to the Hg dry deposition. Natural emissions of Hg and re-emissions of past anthropogenic Hg depositions are in the form of elemental Hg and together were assumed to be roughly equal to dry deposition of elemental Hg in the CMAQ modeling for these rules. Thus, these opposing fluxes were not ignored, but were simply assumed to cancel each other out in the CMAQ modeling domain. This assumption was based on limited measurements that showed the dry elemental Hg deposition rate to be roughly equal to the natural and anthropogenic Hg re-emissions rate. Furthermore, the natural and anthropogenic Hg re-emissions rates are very difficult to quantify and spatially allocate to the appropriate location. Also, limited measurements of elemental Hg show that the amount of elemental Hg concentrations in the atmosphere has remained constant over time, thus, verifying the assumption that the emissions and deposition of elemental Hg are roughly equivalent. However, a newer version of CMAQ (v4.5.1), posted on the CMAS web site in March 2006, does contain explicit treatments for natural Hg emissions, re-emissions of anthropogenic Hg, and dry deposition of elemental Hg. Further discussion of the wet/dry deposition issue may be found elsewhere in this document.*

EPA agrees that neither the CMAQ model, nor any other air quality model that we know of, considers predictions of cloud deposition or the effects of leaf fall on wetlands. These types of processes would have to be handled in a full multimedia model. We are unaware of such a model at this time. As noted elsewhere in this document, EPA does plan to begin performing some Hg modeling with CMAQ at 12-km grid square resolution. The Effectiveness TSD sets forth three reasons behind EPA's using a 36-km grid square size for the modeling. First, the larger grid size would account for Hg deposition that enters a watershed through subsurface inflow and runoff, as opposed to a smaller grid size which may only account for direct inputs to surface water. Secondly, in larger water bodies, where there is substantial fishing activity, the fish species consumed by humans are likely migratory and the accumulation of Hg in these fish will come from deposition over a larger area. Third, many anglers may catch fish from a variety of water bodies in a watershed, thus, a larger grid size would account for this fishing pattern.

Comment:

Commenter 6497 presented a new modeling analysis using its global Chemical Transport Model to set initial and boundary conditions for its Eulerian TEAM Hg regional atmospheric transport and fate model. TEAM performance against data from the U.S. MDN dataset has been documented in published technical reports. Performance evaluation has been published in the peer-reviewed literature (Seigneur, et al., *Environmental Science and Technology*, 38, 555-569, 2004). TEAM, like the EPA CMAQ model, uses Eulerian model dynamics to simulate Hg chemistry and physics from emission locations to its deposition to the earth's surface. The commenter performed computer simulation runs for scenarios addressing all U.S. coal-fired power plant Hg emissions together: the 2004 base case; the 2020 cap-and-trade scenario; and the scenario where utility Hg is set equal to zero to simulate 100 percent control conditions. For

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[83] See EPA-HQ-OAR-2002-0056-6073, -6309.

2004 and 2020, a macroeconomic costing model, the Electric Power Markets Model of CRAI, was employed. This model uses least-cost principles to successively allocate control resources to individual generating units, assessing costs for each resource and the reduction in Hg emissions the resource brings about (thus, accumulating cost per pound of Hg removed from flue gas). Successively more expensive controls are applied to each unit until the required lower emission level is attained. A speciation post-processor accounts for differential removal of elemental or ionic Hg by each control device, or any reduction or oxidation known to occur based on coals burned and their chlorine, carbon, or other governing factors. The commenter used TEAM to demonstrate that the highest Hg deposition values in the U.S. are insensitive to utility Hg contributions. The commenter provided a detailed explanation of the methodology used and presented the results of the simulations in a series of tables and color-indexed maps of the U.S.

Commenter 6497 investigated whether the Eulerian regional-scale grid models used by EPA and EPRI have a tendency to over- or under-estimate Hg deposition with respect to either observational data or finer-resolution plume dynamics models. Both USEPA and EPRI have been employing Eulerian regional models for simulating both deposition patterns of Hg under current emissions, and how those deposition patterns might change under proposed utility Hg regulation. There is strong evidence that those models tend to overestimate near-source ground-level concentrations and deposition of Hg when compared to equivalent calculations using plume simulation local-scale models. The overestimate may range from moderate (multiplicative factor of 1.5) to large (factor exceeding 3). The commenter provided a detailed explanation to support the comment.

Response:

We believe CMAQ and TEAM are both state-of-the-art regional photochemical grid models. The TEAM modeling analysis provided by the commenter and the CMAQ modeling analysis performed by EPA for CAMR are very similar in scientific complexity, atmospheric chemistry, and deposition. Both applications utilize a three-dimensional Eulerian regional model with boundary inflow to the regional model from a global transport model. The results of both analyses are similar in terms of predictions of Hg deposition and in terms of predicting the impact of utility-attributable Hg depositions in the base year and in the future years with a cap-and-trade program. CMAQ does not overestimates observed Hg wet deposition at the MDN sites for the modeling. CMAQ contains the best science available to EPA to model Hg deposition. CMAQ contains much more sophisticated atmospheric chemistry and deposition algorithms than the ISC3 model. ISC3 has been replaced by the AERMOD for local scale dispersion model applications. The ISC3 outputs for wet and dry deposition were never verified for use in regulatory applications.

Comment:

Commenter 6475 stated that State and environmental commenters suggest that the 36-km grid size used for EPA's CMAQ modeling is too course to identify the full effects of local deposition.[84] In their petitions, they do not indicate what size grid they would find acceptable.[85]

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[84] EPA also requested comments on petitioners' claims about some apparent differences between model results for the 2001 zero-out case and the 2020 scenario. EPA has presented a reasoned explanation for these anomalies in the

Although it is true that EPA's CMAQ modeling was conducted using a 36-km grid size, but has available smaller grid scales including 18 km, EPRI's TEAM modeling used a 20-km grid size-about one-quarter the areal resolution of EPA's grid. EPRI's modeling reached the same conclusion as EPA's – coal-fired power plants do not create Hg hotspots.[86] Furthermore, as EPRI's prior comments explained, Eulerian regional models like TEAM and CMAQ have been shown to systematically overestimate by a factor of 1.5 to 3 both local wet and dry deposition when compared to estimated values from local-scale Gaussian plume models.[87] Thus, EPA's and EPRI's modeling provide reasonable (if somewhat overstated) estimates of local deposition. Finally, the watershed areas used by EPA are generally larger than the 36-km grid size of its CMAQ runs. Deposition fluxes at finer spatial scale are unlikely to affect the Hg deposition predicted for U.S. watersheds.

Response:

The highest Hg depositions predicted by the CMAQ model do occur in the 36-km grid cells in which the largest sources of reactive gaseous Hg are located. Thus, elevated levels of Hg deposition are predicted in these grid cells. The 36-km grid square resolution used in the CMAQ modeling is used to estimate the relative fraction of the Hg deposition at the HUC-8 watershed level attributable to power plants. As described in the Effectiveness TSD Section 2.1, the HUC-8 watershed-scale analysis is appropriate for estimating IDI values considering the exposure pathway. The question of the adequacy of the CMAQ 36-km grid cell modeling, therefore, is whether that scale modeling provides sufficient spatial detail to estimate deposition in a HUC-8 watershed. Because HUC-8 watersheds are generally larger than 36-km grid cells, averaging to the HUC-8 will generally result in averaging two or more CMAQ grid cells. Were EPA to use a finer resolution grid cell (12-km or 4-km), this averaging would still occur but across more grid cells. EPA has no reason to believe that finer resolution CMAQ modeling would render significantly different results after the grid cells were aggregated to the HUC-8 watershed.[88]

As explained in the Effectiveness TSD, EPA had several reasons to support usingHUC-8 and, therefore, a 36-km grid square size. First, the larger grid size would account for Hg

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notice. See 70 FR 6205 col. 1. The commenter agrees with EPA's explanation and offers no further comments on this issue.

[85] Commenters state that in many ways, petitioners' claims are an attempt to shift the burden of proving there are no hotspots to EPA. Commenters continue that the problem is that assertions of Hg hotspots have not historically been credible because the claimant failed to define what is meant by a "hotspot" and/or because of a lack of factual evidence supporting the claim. Thus, they argue there is no reason to presume that coal-fired power plants are currently causing Hg hotspots or will do so in the future under CAMR. They state that EPA and EPRI have presented overwhelming evidence showing that coal-fired power plants do not cause Hg hotspots for current year conditions (2001 and 2004 base cases, respectively), and will not in the future. No "in-trading" of Hg credits is expected to occur for purposes of any individual plant increasing Hg emissions. Most credits generated by bituminous plants will be banked for allocation to future generation, which will require Hg allowances to operate.

[86] See EPRI Comments at 6-11.

[87] Id. at 20.

[88] In preparation for ORD's Spring 2007 peer review of CMAQ, EPA's ORD plans to perform modeling with an updated version of CMAQ at 12 km resolution when EPA obtains all the necessary data (meteorology, emissions, land type, activity data) to confirm that the results aggregated to the HUC-8 are not very sensitive to CMAQ grid size.

deposition that enters a watershed through subsurface inflow and runoff, as opposed to a smaller grid size which may only account for direct inputs to surface water. Secondly, in larger water bodies, where there is substantial fishing activity, the fish species consumed by humans are likely migratory and the accumulation of Hg in these fish will come from deposition over a larger area. Third, many fishers may catch fish from a variety of water bodies in a watershed; thus, a larger grid size would account for this fishing pattern. Moreover, the highest 36-km grid cell depositions of Hg do occur in the grid cells with the largest sources of Hg emissions. Thus, elevated localized Hg depositions from large EGUs and other sources of Hg are captured in the 36-km CMAQ modeling domain.

Comment:

Commenters 6479 noted that EPA has requested comment on the use of the CMAQ in the Agency's public health analysis. State petitioners' earlier comments noted that EPA's modeling of Hg deposition is inadequate to assess the vital local and regional impacts of EGUs on specific watersheds, and suffers from several central flaws in development that render it unreliable as a basis for this rulemaking. The additional information that EPA provides in the Reconsideration Notices does not address the shortcomings in EPA's approach to modeling EGU health impacts. Until EPA corrects the flaws in its modeling, addresses the heterogeneity of deposition trends across the country and considers the impacts to areas of particularly high deposition, its rules will not be technically sound. As the modeling currently exists, known emission inventory errors, the lack of needed near-release speciation chemistry, and oversized grid cells all bias the modeling towards failing to identify hot-spots that exist and will persist under cap-and-trade provisions.[89]

Commenters 6479 also stated that local hot-spots are caused, in part, by the oxidation of Hg emissions in the area. The CMAQ model's use of incorrect emissions inventory data predisposes it to underestimate this oxidation and, therefore, to underestimate the impact of local sources such as EGUs on the development of hot-spots. This problem is compounded by a high priority correction that the Panel identified was so that the model would correctly apply near field chemistry to oxidize Hg emissions within the grid cell in which they were released. Without this chemistry, the model is further biased against predicting high rates of deposition close to sources. Oxidized Hg deposits much faster than gaseous Hg and if not chemically reacted promptly as the current state-of-the-science suggests is the case, the model would simply transport that Hg to the next grid cell in the model.

Commenters 6479 and 6490 noted that the way the CAMR CMAQ modeling was conducted assured the failure of replicating hotspots measured in the field. It is troubling to note that the ISC3 modeling results presented by EPA in the Docket suggests local impacts within 30 km of large Hg sources and contradicts the CAMR CMAQ modeling. The ISC3 modeling also contradicts EPA's conclusion that hotspots could not form should these sources purchase Hg allowances rather than reduce emissions. The 36-km grid cell resolution (36 km wide by 36 km long) used in the CAMR CMAQ modeling was much too large to replicate near-field impact (typically on the scale of about 10 km). Hotspots such as those in New Hampshire often include small lakes and ponds on the scale of a few sq. mi. CMAQ averages its impact over 500 sq. mi. (for each grid cell) and is likely to transport and dilute those emissions into adjacent grid cells

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[89] See OAR 2002-0056-6479, Attachment 2.

before depositing them over an even wider area many times larger. Regional models, especially those using such a large grid cell size are simply not designed to assess local impacts.

The commenters also noted that, in the Reconsideration Notices, EPA defends its selection of 36-km grid cells as adequate for Hg deposition modeling. This conclusion is only useful if one were to only assess the general widespread impact of Hg deposition over the large scale, not for the assessment of localized impacts (i.e., hotspots). In EPA's own modeling guidance, the use of smaller scale grid cells is required for ozone and $PM_{2.5}$ SIP modeling in order to reflect localized conditions that develop around source areas and complicated topography. In the past, grid cells of a maximum 5 km were required for modeling. More recently, because of the larger modeling domains used in ozone and PM modeling and the computational time required, grid cells of up to 12 km have been considered acceptable. Only in less complicated areas, and areas that provide transported pollutants into the modeling domain of primary interest, are the much larger 36-km grid cells considered valid as part of a nested grid.

The commenter believes that by supporting the use of 36-km grid cells for the full modeling domain, EPA is essentially discounting small scale variations in favor of the big picture and ignoring the documented existence of hot-spots in the smaller scale basis. There are various reasons why hotspots occur and are not adequately represented by 36-km grid cells. For example, annual precipitation varies widely over short distances in many areas of the northeastern U.S., causing substantial local variation in the wet deposition of Hg.[90] As a result, accurate calculation of the local deposition of Hg requires nearby receptors circling large power plants. Reliance on a large scale model such as CMAQ is clearly inadequate.

Commenter 6490 stated the use of 36-km grid cells in the CAMR modeling is completely inappropriate and incapable of assessing hotspot phenomena. Instead of replicating the maximum deposition patterns near the source, the model spreads the Hg out, evenly diluting it across the entire grid cell (about 500 square miles, sq. mi.). Even worse, the model does not apply its chemical and deposition routines until the next time period used in the model. In this case, Hg is spread out and diluted over areas as vast as 2,000 sq. mi. instead of a more realistic area of about 75 sq. mi. This dilutes the CMAQ predicted Hg deposition to about one-twenty-seventh of a more realistic dispersion and deposition analysis.

The commenter is particularly concerned about EPA's refusal to acknowledge the existence of EGU hotspots, and EPA's reliance upon their CMAQ modeling results. A significant point made by EPA's review panel in its July 2005 report with regard to application of CMAQ to Hg relates to the model's inability to predict localized effects, like hotspots. The panel states that: "Caution is also warranted in trying to make CMAQ applicable to a wider spatial range than it is now, i.e., going to very small or global scales." Thus, EPA's reliance on an as-yet undisclosed version of CMAQ to predict health and environmental impacts from a national cap-and-trade program for Hg, is premature and unsupportable.

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[90] There are several documented areas where precipitation varies by 50 percent or more within distances of 36 km or less, including the Tug Hill Plateau of New York (where annual precipitation varies from 38 to 60 in. in less than 36 km), the Catskill Mountains of New York (40 to 60 in. variation), the White Mountains of New Hampshire (34 to 60 in. variation), and the southwestern Green Mountains on the Vermont-New York border (38 to 60 in. variation). A.D. Randall, 1996, USGS Open-File Report 96-395, Plate 2 (Plate attached to comments as Exhibit. 7, OAR-2002-0056-6479).

The commenter has identified at least one emission inventory error that went uncorrected despite multiple attempts by the commenter to have it corrected. Based on published and accepted science, these errors would bias the results against development of local hotspots. Further, the peer panel identified a high priority correction needed for the model in order to correctly apply near-field chemistry to oxidize Hg emissions within the grid cell they were released in. Without this chemistry, the model is further biased against predicting high rates of deposition close to sources. Oxidized Hg deposits much faster than gaseous Hg, and if it is not chemically reacted promptly as the current state-of-the-science suggests, the model would simply transport that Hg to the next grid cell, up to 100 km (62 miles) away.

Recognizing that the detail of more localized effects may be lost with the 12-km grid cell resolution, EPA's new modeling guidance strongly recommends the use of weight of evidence techniques (using real field measured evidence) under questionable situations to support the conclusions of the modeling. To-date, such techniques have not been applied by EPA in the CAMR study. The weight of evidence work produced by Driscoll (in preparation) and Evers (2001, 2004, and 2005), conflicts with the CAMR CMAQ modeling conclusions for the northeastern U.S.

By supporting the use of 36-km grid cells for the full modeling domain, EPA appears to conclude that small scale variations are not significant even though, as a factual matter, hotspots only exist in the smaller scale basis. Any potential hotspots are simply diluted and averaged-out through the entire grid cell. In the big picture, known emission inventory errors, lack of needed near-release chemistry, and oversized grid cells all bias the CAMR modeling towards failing to identify hotspots that could develop under cap-and-trade provisions.

Response:

EPA used the best available inventory at the time for Hg deposition modeling. State and local agencies and Tribes, industry, and the public had a period of nine months during 2001 and 2002 prior to CAMR Hg deposition modeling to review the NEI data. During the development of the inventory data used in our modeling, New Hampshire provided an initial submission of data in June 2001. In June 2002, New Hampshire provided a complete point-source data replacement and some non-point revisions. Except as noted below, EPA used these data in the final inventory that was used in the Hg deposition modeling. The New Hampshire inventory data for Hg were incomplete in coverage and EPA supplemented the data submitted by New Hampshire. The New Hampshire data were used if provided by the State air pollution agency for all source categories except municipal waste combustors (MWC), medical waste incineration, and utility coal boilers; for these three categories, EPA used its own data. There are 152 facilities in New Hampshire that are in the CAMR inventory. Of these 152 facilities, there are 2 MWCs, 2 medical waste incinerators, and 2 coal-fired utility plants. New Hampshire only provided data for 32 of 152 facilities emitting Hg.

The State of New Hampshire provided, with their comments on the proposed CAMR and on the notice of data availability (NODA), additional tabular emission test data for the two coal-fired EGUs in the State. To provide consistency, the modeling of EGUs to support CAMR was *based solely on the 1999 information collection request (ICR) information and projections generated using IPM. In general, annual variability in utility emissions stems from changes in the coal type fired, air pollution control device configuration changes, and local meteorology – none of these parameters could be readily ascertained for the data submitted by the State of New Hampshire. Thus, it would not have been good scientific rationale to accept State-specific data for two facilities, when there are over 1,300 units in the database. Although adjustments for these two facilities (five units) may lead to increased deposition downwind of those locations as the commenter asserts, EPA has no viable means of quantifying this assertion. Furthermore, given these two facilities are located in CAIR States, and fire bituminous coal, we anticipate that Hg reductions would be effected through the installation of scrubbers and SCRs under either the CAIR program or existing State regulations. Thus, we do not anticipate that the difference in Hg emissions from either of these two facilities would significantly impact the results outlined in the final CAMR.*

The CMAQ-predicted Hg depositions are not heterogeneous throughout the country. The CMAQ-predicted Hg deposition is higher in the mid-Atlantic, Midwestern, and far western States than in other areas of the country. Thus, elevated localized Hg depositions from large EGUs and other sources of Hg are captured in the 36-km CMAQ modeling domain. For example, CMAQ modeling in New Hampshire showed that, averaged over the entire State of New Hampshire, the Hg deposition attributable to utilities (both within and outside the State of New Hampshire) is 0.9 mg/m^3*, or 5.9 percent of the average total deposition attributable to all sources (including global) in New Hampshire in 2001. Furthermore, the average deposition over the entire State of New Hampshire attributable to utilities drops 68.6 percent to 0.27 mg/m*^{3} *with the implementation of CAIR and CAMR in 2020. As explained in the Effectiveness TSD and elsewhere in this document, EPA had several reasons to support using HUC-8 and, therefore, a 36-km grid square size.*[91] *As noted elsewhere in this document, EPA plans to do some future Hg modeling at 12-km grid square resolution.*

Commenters suggest that EPA's modeling guidance for $PM_{2.5}$ *and ozone SIP purposes indicates that the size of the grid cells used for Hg modeling are too large. We note that the health effects associated with* $PM_{2.5}$ *and ozone are related to inhalation exposure, while Hg exposure is primarily through consumption of fish containing Hg. EPA took this difference into account in deciding the appropriate model scale, a fact which commenter does not acknowledge.*

As described in Section 7.2 of the Effectiveness TSD, ISC modeling was used in the Utility Study Report to Congress and was updated more recently to represent more locations with a wider range for meteorological regimes. The ISC modeling is generally consistent with CMAQ modeling as evidenced by the ISC modeling results in the Utility Study Report to Congress, which found utility-attributable Hg exposure within the same range as the recent and more sophisticated modeling supporting our CAA §112(n) decision. As described in Section 6 of the Effectiveness TSD, however, unlike ISC, CMAQ-based exposure modeling allows us to better assess the probability of various IDI values.

EPA addresses the comments on peer review of CMAQ elsewhere in this document.

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[91] Commenter also implies that a 75-square mile grid was "more realistic" but does not provide any support for this allegation. For the reasons stated above, the 36 km grid cell is appropriate for regional deposition analysis.

1.1.3.2 EPA's Method for Determining How Changes in Utility-Attributable Hg Deposition Would Result in Changes in Concentrations of MeHg in Fish Tissue

Comment:

Commenter 6475 stated that EPA has requested comment on several issues raised by environmental petitioners about the adequacy of the fish tissue information used by EPA in its technical analyses. A review of their petition suggests that the main reason environmental groups have sought reconsideration of these issues is to try to cast doubt of EPA's analysis of the consequences of various regulatory approaches.[92] In fact, environmental petitioners do not contend that the fish tissue information biases EPA's results one way or the other. Instead, the subtitle for this subsection of their petition merely states that "EPA cannot definitively translate predicted deposition into fish tissue concentrations."[93] Their claim is little more than an assertion that if one lacks fish tissue measurements in every water body then uncertainties will remain about the fish tissue levels in water bodies where measurements have not been taken.[94] Petitioners' claims do not warrant changing EPA's analyses, particularly given the many conservatisms that EPA has already incorporated into its benefits analysis to ensure that whatever results are produced will be bounding in nature. EPA's notice provides a reasoned response to petitioners' claims. It is not realistic to sample annually all lakes and rivers in the U.S. for Hg levels in fish tissue. EPA's statistical analyses of available fish tissue data verify that fish tissue concentrations within a watershed are similar. This is a reasonable way to confirm that a data set can be used more broadly. As EPA notes, the fish tissue data it possesses cover approximately 25 percent of all hydrologic unit codes (HUCs) which, in turn contain 50 percent of lakes and 25 percent of river miles in the U.S. Thus, the data are more extensive than petitioners suggest. Finally, the relatively limited amount of fish tissue data for western States is of little consequence because Hg deposition caused by coal-fired power plants is low in those areas.

Response:

EPA agrees that its public health analysis was reasonable.

Comment:

Commenter 6612 stated the utility-attributable Hg deposition should be updated with the new data that will soon be available in the peer reviewed published literature. This would then impact the contribution of Hg to the fish tissue data set and should be revised as well.

Response:

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[92] See Environmental Petition at 45-49.

[93] Id. at 45.

[94] Interestingly, these same petitioners have never previously been bothered about extrapolating the results from very limited testing of Hg emissions from coal-fired power plants to assert what level of control all coal-fired power plants in the industry are capable of achieving.

EPA is working with the best available peer-reviewed data sets for all of the analyses supporting this rule. As we stated in the final rule, we intend to continue to advance the state-of-the-science of Hg fate and transport. In order to continue to advance our understanding of the science related to Hg emissions, atmospheric transport, transformation, and end fate, EPA has been involved in monitoring Hg wet deposition across the U.S. for the past decade through its involvement in the MDN. Although this network does not monitor Hg dry deposition, this is primarily because there currently exists no readily deployable, quantifiable field methodology for collecting such information. EPA recognizes that collecting both wet and dry Hg deposition is a critical next step to validating numerical modeling results and further advancing the science and understanding surrounding Hg transport, transformation, deposition, and end-fate. To this end, EPA's Office of Air and Radiation/Office of Atmospheric Programs is currently working with the National Atmospheric Deposition Program (NADP), which has had tremendous success in evaluating the effects of Acid Rain on eastern ecosystems, to develop plans for implementing a Hg monitoring network similar to the existing MDN. In addition, EPA's Office of Research and Development is currently engaged in site-specific, comprehensive monitoring and deposition studies at several sites across the U.S. (e.g., Mauna Loa, HI; Cheeka Peak, WA; and Steubenville, OH) which are already contributing to our current knowledge base. Research underway at each of these locations is providing valuable information to the Agency's understanding of the science surrounding Hg transport and deposition. Developing a national network that would include both dry and wet deposition sites, similar to the MDN, which would be supplemented by a small number (e.g., 5-10) comprehensive sites in key locations, could be extremely useful in the advancement of the state-of-the-science; however, resources to establish and maintain such a network would be significant. As information is gained from existing and future data collection sites, EPA will work to integrate this information into its numerical modeling schemes (e.g., CMAQ) to continue to advance the Agency's ability to accurately simulate the emission, transport, transformation, and deposition of Hg in the U.S.

Comment:

Commenters 6280 stated that EPA's analysis and treatment of uncertainties does not provide for an ample margin of safety for public health. EPA's treatment of the data uncertainties associated with the public health analysis indicates that EPA did not provide an ample margin of safety in the Final Rule or adequately take into account the potential impacts to health in the promulgation of its standards of performance.[95]

First, although there may be some uncertainty in the exact proportion of Hg in the U.S. diet that can be traced to utility-attributable Hg in marine fish, EPA's treatment of this uncertainty is unreasonable.[96] EPA's public health analysis makes the assumption that none of the Hg in the U.S. diet is from utility-attributable Hg in marine fish. A reasonable approach would have involved EPA adopting either the best available reasonable estimate or a more protective estimate than that which it assumed. The Agency's abdication in the face of uncertainty led to an analysis that did not assess all of the potential impacts to human health that

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[95] See 42 U.S.C. §7411(a).

[96] It is especially problematic that EPA has not taken into account species of fish in near-shore waters and marine species whose juveniles live in fresh of estuarine water where deposition from U.S. sources is most concentrated.

could reasonably be expected to result from power plant emissions.

Second, according to the best available scientific evidence, Hg exposure may negatively impact adults susceptible to cardiovascular problems.[97] EPA did not account for the cardiovascular effects of MeHg and provided little specific rationale for this approach, stating simply that "[t]he findings to date and the plausible biological mechanisms warrant additional research."[98,99] However, more than half a dozen studies from at least four different research groups have been peer-reviewed and are useful for formal hazard assessment.[100] One such study indicates a 70 to 100 percent increase in acute myocardial infarctions and death from all causes in middle aged men at a MeHg exposure that is likely to be well within the range of exposure of adult men in the U.S.[101] When potential health impacts are of such a magnitude, ignoring them results in a major uncertainty and an underestimation of the health impacts that would result from the Final Rule.[102]

Finally, when linking IQ loss to Hg dose, EPA used an unreasonably low coefficient and understated the impact of MeHg on IQ by at least a factor of four compared to other published and frequently cited values. EPA's assessment of the linkage between maternal Hg and the baby's IQ was based on an unpublished report by Ryan (2005). This report was only recently completed in March 2005, and has not been widely circulated. Its conclusions are of questionable value due to several substantive problems, including at least three numerical errors, in the report. In view of these errors, EPA cannot reasonably rely on the report to support its conclusions about the health effects and social costs of human exposure to utility-attributable Hg emissions.

Response:

As discussed in the final Section 112(n) Revision Rule and above, the concept of an

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[97] See Stern Decl. ¶10 (OAR-2002-0056-6291, Exh. 14).

[98] The RIA also failed to provide a basis for EPA's exclusion of cardiovascular effects from consideration. The text of the RIA referenced Appendix C of that document for a more robust discussion of the cardiovascular effects of MeHg. In Appendix C, EPA attempted no specific synthesis from its review of the relevant studies, and did not directly link the Appendix to its ultimate decision not to consider cardiovascular effects in its impacts analysis, except in its introduction to the studies based on the Kuopio Ischemic Heart Disease Risk Factor Study (KIHD) cohort from Finland (RIA, Appendix C, pg. C-2). This series of studies, in fact, formed the strongest basis of application of MeHg-related cardiovascular risk to the U.S. population. EPA's attempt to limit the relevance of the Kuopio cohort findings to the single population studied fails to recognize that similarities among human populations are generally considered to be more important than the difference in inferring risk factors, especially in well constructed and highly controlled studies that address dietary and lifestyle factors. See Stern Decl. ¶¶17-18.

[99] See 70 FR 28642.

[100] See Stern Decl. ¶11 (OAR-2002-0056-6291, Exh. 14).

[101] See Salonen et al., supra; Stern, 2005 (OAR-2002-0056-6291, Exh. 14).

[102] Notably, one of the reviewers in EPA's Hg peer-review process also argued explicitly that cardiovascular effects should not be discounted. He referred to the "emerging evidence of the relationship between Hg exposure and cardiovascular effects" and stated, "Although the science is still in the formative stages, an examination of the potential public health impacts of Hg related cardiovascular risk should be included in the EPA benefits analysis." See Burke, in Burke, et al., Peer-review comments on Ryan (2005), as compiled in OAR-2002-0056-6050 at 6. Furthermore, one of EPA's own reports acknowledged, "Exposure to too much mercury via fish consumption can lead to neurological effects in the developing fetus, children, and adults and can increase the risk of heart disease in adults." See OAR-2002-0056-6291, Exh. 9.

"ample margin of safety" does not arise in CAA §112(n)(1)(A). See, e.g., 70 FR 16023. In the final rule, however, EPA nevertheless explained that even assuming, arguendo, that it had to proceed under the human health prong of the CAA §112(f) ample margin of safety inquiry, its conclusions regarding hazards to public health would remain the same. See 70 FR 16025; see also section 1.1.1.1.1 above. Contrary to the commenter's assertion, EPA properly considered relevant uncertainties in its analyses in the final rule. The existence of uncertainties does not necessitate that EPA adopt the most "protective" option. See Vinyl Chloride decision at 1153. Rather, uncertainties are to be considered as part of the Administrator's exercise of his discretion. Id. (See also Section 1.1.3.5.1 of this document for additional discussion.)

EPA agrees that there is uncertainty in the exact proportion of Hg in the U.S. diet that can be traced to utility-attributable Hg in marine fish. To address this issue, EPA made an estimate of this proportion in its Reconsideration TSD and incorporated it into its analysis of the impact of U.S. power plant Hg emissions. See Reconsideration TSD, Section 3, and Table 3 herein.

The relationship between the cardiovascular effects of MeHg exposure was explicitly discussed in the final rule. The weight of evidence for cardiovascular effects is not as strong as it is for childhood neurological effects and the state-of-the-science is still being evaluated. Although it is true that in some recent epidemiological studies in men, MeHg exposure is associated with a higher risk of acute myocardial infarction, coronary heart disease and cardiovascular disease in some populations (e.g., Salonen, et al., 1995; Guallar, et al., 2002), other recent studies have not observed this association (e.g., Yoshizawa, et al., 2002; Hallgren, et al., 2001). The studies that have observed an association suggest that the exposure to MeHg may attenuate the beneficial effects of fish consumption. In short, studies investigating the relationship between MeHg exposure and cardiovascular impacts have reached different conclusions. EPA continues to maintain that the findings to-date and the plausible biologic mechanisms warrant additional research (Stern, 2005; Chan and Egeland, 2004). As presented in Chapter 2 and Appendix C of the RIA for CAMR, the Agency is aware of and assessed all of the studies identified in the Stern Declaration. Based our assessment, the Agency concluded that the substantial uncertainties in available scientific information do not provide a sufficient basis for quantification of possible cardiovascular benefits for regulatory purposes.

EPA disagrees that it used an unreasonably low coefficient and understated the impact of MeHg on IQ. The study by Ryan (2005) was peer reviewed and made publicly available in the docket. The study was a statistical analysis that integrated the IQ dose-response data from the three major prospective studies investigating potential neurotoxicity of low-level, chronic Hg exposure: the New Zealand study, the Seychelles Child Development Study, and the Faroe Islands study.

EPA agrees with the commenter that there were numerical errors in the inputs to Dr. Ryan's model. Dr. Ryan has corrected these errors and re-run the model with the corrected inputs. The values used in the new modeling are presented in an updated version of Table 7 from Dr. Ryan's report, shown below. Model results are presented below in an updated version of Table 8 from Dr. Ryan's report. Corrected model code is also provided below.

The updated modeling results point toward a best estimate for the Hg-IQ dose-response coefficient in the range of -0.15 to -0.16 IQ points for every ppm of Hg in maternal hair. Selection of a specific result depends on the value of R, which is unknown. Examination of the data suggests that a value of R greater than 1.0 is most likely. Subsequent analyses make use of the results for R = 2.5, where the central estimate is -0.158 IQ points (95th percentile CI: -0.334, -0.037) for every ppm of Hg in maternal hair.

This change in the IQ dose-response coefficient does affect the overall benefits calculations, but the change is not of sufficient magnitude to change the overall conclusions of the benefits and costs in the global pool analysis. In the Reconsideration TSD, an estimate of the monetized benefits of eliminating Hg emissions from the U.S. power plants after 2020 was presented in Section 8. In that section, the total annual benefit could not be estimated because of uncertainty in the Hg exposure from the estuarine and aquaculture pathway, but a total upper bound estimate of $168 million per year was presented. Introducing a dose-response coefficient of -0.16, rather than -0.13, produces an upper bound estimate of approximately $210 million per year, a 25 percent increase in benefits. As stated in this TSD, though, this is considered an overestimate of the monetized benefits of eliminating U.S. power plant Hg emissions because it assumes that all commercial freshwater, estuarine, and aquaculture fish consumed by the general public are as contaminated as the 85th percentile of self-caught freshwater fish. The revised numbers do not change the conclusion that the costs of controlling the remaining Hg emissions in 2020 would exceed monetized benefits.

Ryan report, Table 7 (updated): *Scale factors, original estimated regression coefficients and associated standard errors and rescaled values (interpretable in the same scale as full scale IQ and hair Hg) for endpoints related to cognition and achievement.*

			Original Scale		***Rescaled to IQ***	
Study	***Endpoint***	***Scale factor***	***b***	***(se)***	***b***	***(se)***
Seychelles	*IQ*	*1.29*	*-.13*	*(.10)*	*-.17*	*(.13)*
	CVLT	*14.42*	*.013*	*(.010)*	*.19*	*(.144)*
	BNT	*3.13*	*-.012*	*(.046)*	*-.038*	*(.144)*
	WRAML	*5.17*	*-.021*	*(.029)*	*-.109*	*(.150)*
	VMI	*1.28*	*-.010*	*(.12)*	*-.013*	*(.15)*
Faroes	*IQ*	*5.17*	*-.024*	*(.011)*	*-.124*	*(.057)*
	Bender	*-1.42*	*.073*	*(.059)*	*-.104*	*(.083)*
	BNT	*1.37*	*-.190*	*(.063)*	*-.260*	*(.086)*
	CVLT	*2.91*	*-.058*	*(.032)*	*-.169*	*(.093)*
New Zealand	*IQ*	*.94*	*-.53*	*(.285)*	*-.50*	*(.268)*
	WISC-RP	*.94*	*-.54*	*(.330)*	*-.51*	*(.310)*
	TOLD-SL	*.94*	*-.60*	*(.300)*	*-.56*	*(.282)*
	MCC-PP	*1.5*	*-.53*	*(.210)*	*-.80*	*(.315)*

Ryan Report, Table 8 (updated): *Results of fitting a hierarchical model for cognition/achievement related scores. Estimated study-to-study variance components, estimated dose response coefficients (and their standard errors) as well as a 95 percent confidence interval are shown for different values of R (ratio of study-to study variability relative to endpoint-to-*

endpoint variability, $R = \sigma^2_{study}/\sigma^2_{endpoint)})$*. Last column of Table shows the DIC value, which is a measure of goodness of fit of a Bayesian model.*

R	σ_{study} ***(se)***	β_{IQ} ***(se)***	***95% Conf. Int***	***DIC****
3.0	*.0630 (.0744)*	*-0.160 (.076)*	*(-0.351, -0.030)*	*-6.043*
2.5	*.0559 (.0688)*	*-0.158 (.070)*	*(-0.334, -0.037)*	*-5.860*
2	*.0480 (.0620)*	*-0.154 (.065)*	*(-0.314, -0.045)*	*-5.689*
1.5	*.0392 (.0534)*	*-0.152 (.058)*	*(-0.291, -0.052)*	*-5.519*
1.0	*.0290 (.0432)*	*-0.149 (.050)*	*(-0.261, -0.057)*	*-5.314*
.5	*.0167 (.0283)*	*-0.146 (.042)*	*(-0.230, -0.067)*	*-5.092*
.4	*.0141 (.0245)*	*-0.146 (.040)*	*(-0.224, -0.069)*	*-5.046*
.25	*.0100 (.0180)*	*-0.145 (.037)*	*(-0.291, -0.072)*	*-5.006*

** Lower values of DIC indicate a better model fit.*

Updated WinBUGS code to generate results in Table 8

DATA FILE

```
list(nrow=13,nstudy=3,nendpoint=9,
b=c(-.53, -.54, -.60, -.53,  -.13, .013, -.012, -.021, -.010,  -.024, .073, -.190, -.058),
bse = c( .29,  .33,  .30,  .21,  .10, .010,  .046,  .029,  .12,    .011, .059,  .063,  .032),
scale1 = c(.94,.94,.94,1.5,1.29, 14.42, 3.13,  5.17,  1.28, 10.34, -2.84,  2.74, 5.82),
study = c(1,1,1,1, 2,2,2,2,2, 3,3,3,3),
endpoint=c(1,2,9,3, 1,4,6,7,8, 1,5,6,4),
scale2 = c(1,1,1,1, 1,1,1,1,1, 2,2,2,2))

# Study codes
# 1 is New Zealand (4 endpoints)
# 2 is Seychelles (5 endpoints)
# 3 is Faroes (4 endpoints)

# Endpoint codes:
# 1 is fullscale IQ (all three studies)
# 2 is performance IQ (WISC_RP in NZ)
# 3 is MCC_PP (McCarthy perceptual performance)
# 4 is CVLT-short delay (Seychelles, Faroes)
# 5 is Bender Visual (Faroes)
# 6 is BNT total (Seychelles, Faroes)
# 7 is WRAML design (Syechelles)
# 8 is VMI (Seychelles)
# 9 is TOLD-SL (New Zealand)

# The vector "scale1" corresponds to 15 divides by the observed standard deviation of
the
# corresponding endpoint.  This is value that b needs to be multiplied by in order to have
```

```
the
    # dose effect reflect an sd of 15.
    # The vector "scale2" converts the results from cordblood to hair mehg.
```

MODEL FILE

```
model{
    for (i in 1:nrow)  {
    # create the scaling variable and scale the endpoint specific dose
    # response estimates and standard errors
    scale[i] <-  scale1[i]/scale2[i]
    y[i] <- b[i]*scale[i]
    p.y[i] <- 1/(scale[i]*scale[i]*pow(bse[i],2))

        # specify model for observed data
    y[i]  ~ dnorm(mu[i], p.y[i])
    mu[i] <-  beta1[study[i]] + beta2[endpoint[i]]     }

    for (i in 1:nstudy) {   beta1[i] ~ dnorm(0,p.study)  }

    for (i in 1:nendpoint) { beta2[i] ~ dnorm(beta0,p.endpoint)  }

    # flat prior on overall mean
    beta0 ~ dnorm(0,.0001)

        # flat prior on precision of endpoint variance component
        p.endpoint ~ dgamma(.05,.0000001)
        # p.endpoint <- 100
        p.study <- p.endpoint/R
        # specify R
    R <- 3

    # compute sigma.endpoint and corresponding precisions
        sig.endpoint  <- 1/sqrt(p.endpoint)
    sig.study <- 1/sqrt(p.study)
    }
```

Finally, EPA is aware that Dr. Ryan is conducting further investigation of the Hg-IQ dose-response relationship, which consists of refinements to the statistical model. At this time we have no reason to believe these refinements would result in substantial changes to the estimates of the dose-response relationship or the fact that costs outweigh the overestimated monetized benefits.

1.1.3.3 EPA's Approach to Estimating Utility-Attributable Exposure

Comment:

Commenters 6479 stated that in EPA's analysis of the benefits of eliminating Hg emissions from U.S. power plants, EPA states: "As described above, the USEPA's Exposure Factors Handbook (USEPA 1997b) recommends a consumption rate of 6 g/day of freshwater, estuarine, and aquaculture consumption for the general public. Table 8.4 (found in the reference) lists the possible combinations of marine equivalent and freshwater equivalent fish that could be used to make up the 6 g/day." This is incorrect on several counts. First, the claim that EPA's EFH "recommends" this as a total consumption rate incorrectly implies that consumers should be guided by this rate. The "recommendation," however, is not guidance to consumers, but guidance to risk assessors on the most representative value to use in describing the consumption patterns of U.S. fish consumers. In fact, recent EPA and FDA guidance on fish consumption recommends consumption of as much as up to 12 ounces a week (49 g/day).[103]

The commenter stated that the recommended value in the EFH is not six g/day. Rather, the recommendation of the most appropriate and representative values for all fish are: "6.0 g/day for freshwater/ estuarine fish, 14.1 g/day for marine fish, and 20.1 g/day for all fish." Thus, the total consumption as per the EFH is not 6 g/day, but 20.1 g/day, more than three times the value assumed by EPA. Therefore, not only are the values assumed by EPA incorrect relative to EPA's own guidance, but EPA's assumption that the total intake from combined sources will not exceed the intake from any one of those sources, i.e., that consumers of freshwater fish will not add consumption of marine fish to their existing consumption of freshwater fish, is also incorrect relative to EPA's own guidance.

Response:

EPA agrees that EFH consumption value of 6 g/day of freshwater, estuarine, and aquaculture fish is not guidance to consumers, but, rather, a guidance to risk assessors on the most representative value to use in describing the consumption patterns of U.S. fish consumers. In fact, this is precisely why this value is used, because it represents the recommended amount to be used for analysis to represent the actual consumption pattern of the general population, as opposed to a recommendation of the amount which is safe to eat.

EPA disagrees that the value of 6 g/day has not been appropriately used. The value was introduced in a discussion of the aggregate consumption and was applied only to the consumption of freshwater and estuarine consumption. This consumption was then added to the assumed consumption of 14.1 g/day of marine fish. In other words, total consumption of all fish was estimated to be 20.1 g/day in precisely the manner the commenter has argued that it should be (see Reconsideration TSD, Section 3.1).

EPA properly looked at actual fish consumption patterns in the American population when analyzing Hg exposure. The Effectiveness TSD and the Reconsideration TSD analyzed a range of fish consumption rates (see Effectiveness TSD Table 6.4 and Reconsideration TSD Table 3.2), including rates that spanned the rate that the commenter stated would reflect the maximum consumption rate consistent with the EPA-FDA Joint Federal Advisory for Mercury in Fish (see http://www.epa.gov/waterscience/fishadvice/advice.html). Moreover, the commenter fails to note that the EPA-FDA Joint Federal Advisory for Mercury in Fish contains more

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[103] See EPA/FDA Guidance at http://www.cfsan.fda.gov/~dms/admehg3.html.

information than a fish consumption rate. In fact, the advisory recommends that certain populations avoid consumption of certain fish because they contain high levels of Hg (the great majority of which comes from non-utility sources), limiting consumption of another type of fish (albacore tuna), and eating up to 12 ounces per week of fish lower in Hg. The advisory further recommends that local fish advisories be followed. Thus, the EPA-FDA Joint Advisory should be taken as a whole. Finally, we note that the utility-attributable exposure to Hg from most commercial fish is quite low. For example, even if a pregnant woman consumed general seafood at a rate far higher than would be consistent with the EPA-FDA Joint Federal Advisory for Mercury in Fish, the utility-attributable exposure would not exceed an IDI value of 0.05 (<u>see</u> Reconsideration TSD, Table 3.2, noting that the highest IDI value of 0.05 corresponds to a consumption rate of 206.6 g/day).

<u>Comment</u>:

Commenter 6577 stated that EPA defines a Hg "hotspot" as "a Hg deposition point dominated by utility plant contributions whose removal would result in fish tissue levels dropping from above to below the Fish Tissue Criterion of 0.3 ppm." The commenter finds this "hotspot" definition to be self-limiting, implying no significant Hg impact on the environment when, in fact, the emitting facility may cause a Hg problem without including background Hg emissions. This is a meaningless concept because it would allow for any increment of Hg emissions from a specific facility providing the background fish tissue Hg concentration is not below 0.3 ppm. For example, if the Hg fish tissue level for fish found near a utility plant is 1.0 ppm, yet the fish tissue Hg content from background emission sources would still be 0.35 ppm after removal of the Hg from the nearby utility plant, this area would not be considered a "hotspot" because the fish would still remain over the 0.3 ppm concentration. Besides arbitrarily limiting the identification of local Hg impacts, this type of definition fails to take into account the substantial risk that could be posed by designating significantly elevated Hg concentrations as acceptable.

The inability to quantify a facility's Hg speciation percentages on an on-going basis supports the commenter's concern that a cap-and-trade approach is inappropriate compared to the standard MACT approach. The actual "hotspots" that could be allowed to continue to exist as a result of a cap-and-trade approach may present unacceptable health risks to some of the citizens of Pennsylvania.

In addition, EPA's health analysis was arbitrary and capricious in that it was based on a single, narrow pathway of exposure to Hg. EPA has acknowledged that the presence of elevated Hg levels in women of child-bearing age in the U.S. is reasonably attributable to MeHg in seafood.[104] However, EPA inexplicably restricted its health analysis to a single, extremely narrow pathway of exposure – "recreationally and subsistence caught freshwater fish."[105] This narrow approach underestimates the potential health impacts that would follow from EPA's regulatory approach. The Agency expressly excluded from its analysis fish that are commercially caught or raised. EPA also did not analyze either the amount of commercial fish consumed or the consuming population. EPA similarly excluded all marine fish from its

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[104] <u>See</u> 70 FR 16012.

[105] <u>See</u> 70 FR 28641.

consideration. Another significant source of dietary intake that EPA omitted from its analysis is estuarine fish. EPA's exclusion of these other pathways through which fish are consumed in the U.S. is, therefore, unsupported by the statutory requirements of the CAA, and the Agency's failure to provide a reasoned analysis to support their exclusion renders its conclusions unreasonable.

Response:

First, we note that commenter incorrectly summarizes EPA's definition of utility hotspot. It is not, as commenters allege, defined as "a Hg deposition point dominated by utility plant contributions whose removal would result in fish tissue levels dropping from above to below the Fish Tissue Criterion of 0.3 ppm." Rather, it is "a water body that is a source of consumable fish with Methylmercury tissue concentrations, attributable solely to utilities, greater than the EPA's Methylmercury water quality criterion of 0.3 mg/kg." See 70 FR 16026.

As discussed in Section 1.1.1.1.2 above, it was reasonable for EPA to focus on utility-attributable Hg exposure when undertaking its CAA §112(n)(A)(1) analysis. We also note that the hypothetical example put forward by the commenters appears either to misrepresent the Agency's definition of utility hotspots or to contain an arithmetic error.

Finally, the commenter states that the Agency restricted the exposure analysis to a single pathway. As explained in the Effectiveness TSD and the Reconsideration TSD, the analysis focused on freshwater non-commercial fish consumption but included a quantitative exposure estimate for the marine pathway (see Reconsideration TSD, Tables 3.2 and 3.3) and qualitative exposure estimates from the remaining three exposure pathways (see Reconsideration TSD, Sections 4-6).

Comment:

Commenters 6280 stated that the single pathway of Hg exposure that EPA considered is inadequate to fully assess the potential impacts to human health that could reasonably be expected to result from EGU emissions. EPA provides only two detailed statements to justify its exclusion of marine and commercial fish from its analysis. First, EPA stated that the results yielded by one of its "important analytical tool[s]" are "more uncertain in saltwater systems" than in freshwater ones.[106] EPA's second rationale was that:

> [i]mports account for over half of the U.S. commercial fish supply. Moreover, of the commercial fish landed domestically, the majority (61 percent) are caught in the deep ocean (3 - 200 miles offshore) in the Atlantic and Pacific Oceans, and the Gulf Coast. In 2002, the Pacific coast region alone accounted for 65 percent of U.S. total commercial landings, with Alaska and California accounting for the largest portion. In contrast, our modeling shows that U.S. utility-attributable mercury deposition is concentrated in the midwestern and northeastern portion of the U.S., that is, in areas geographically removed from the majority of

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[106] See Effectiveness TSD at 34.

commercial fishing activity.[107]

EPA's exclusion of marine and commercial fish from its analysis is arbitrary and capricious.

First, the "uncertainty" EPA cites is not a valid justification in a legal framework which requires the Agency to take into account any nonair quality health and environmental impacts associated with a standard of performance.[108] The record supports a conclusion that commercial and marine fish are a significant pathway of human exposure. Given that utility-attributable Hg deposits in areas where marine or commercial fishing occurs, human health impacts attributable to EGU emissions should be reasonably anticipated. EPA's blanket use of uncertainty to justify excluding the predominant pathways through which fish are consumed in the U.S. is, therefore, unsupported by the statutory requirements of the Act, and the Agency's failure to provide a reasoned analysis to support their exclusion renders its conclusions unreasonable.

Second, even if 61 percent of commercial fish are caught in the deep ocean, that still means that 39 percent are caught in near coastal waters, where domestic Hg emissions – including those from EGUs – significantly impact the Hg concentrations in fish.[109]

Third, even if 65 percent of commercial landings are in the Pacific coast region, a substantial portion of the remaining 35 percent are in the midwestern and northeastern areas where, according to EPA, Hg deposition from domestic utilities is "concentrated."

Fourth, the coastal Atlantic regions where Hg from U.S. sources is deposited are regions of "high primary productivity." This is significant, because the first step in bioaccumulation of Hg – uptake of MeHg by plankton – has been shown to have a high concentration factor compared to later steps.[110] Further, a number of commercially important marine fish in these Atlantic coastal regions – such as bluefin tuna, striped bass, and bluefish – have relatively high Hg concentrations.[111] Notably, bluefish caught in regions of the world expected to have significantly lower input of Hg from atmospheric deposition than the northeast coast of the U.S. show mean Hg concentrations approximately half what is observed in bluefish caught off the U.S. coast.[112] This difference is consistent with the concept that bluefish are impacted by regional sources of Hg pollution. These fish, and other popular ones such as king mackerel, red drum, and spotted sea trout, have mean Hg concentrations above the 0.12 ppm concentration that

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[107] See TSD at 34-35.

[108] See 42 U.S.C. §7411(a).

[109] Even though the CMAQ model used by EPA was limited to between 66 and 126 degrees west longitude and to between 24 and 52 degrees north latitude, it still extended far enough into the oceans, particularly off the eastern coast of the U.S., to show that substantial amounts of U.S. emissions deposit in these regions. Other models that extend beyond the continental U.S. also estimate a significant portion of U.S. emissions deposit in the coastal Atlantic regions. Indeed, EPA's own study assumed that there was a connection between emissions and saltwater fish concentrations. See OAR-2002-0056-6293, Exh. 20. This study stated that U.S. sources account for about 40 percent of total deposition to coastal locations in the South Atlantic study area.

[110] See OAR-2002-0056-6291, Exh. 5.

[111] See OAR-2002-0056-6291, Exh. 6; Froese, R., and D. Pauly. Editors. 2005. FishBase, World Wide Web electronic publication, www.fishbase.org, version (03/2005).

[112] Studies of Hg concentrations of bluefish caught in different regions of the world include: Hancock Dan, 1980, Mercury in fish and fish products, Department of Primary Industry and Energy Working Group on Mercury in Fish, Australia; OAR-2002-0056-6291, Exh. 7; OAR-2002-0056-6291, Exh. 8.

represents the lower acceptable concentration limit in EPA guidance.[113]

Fifth, EPA's lack of analysis of impacts from U.S. aquaculture is unreasonable. EPA argued that it may ignore exposure from aquaculture, i.e., farm raised fish, because "the overall impact of utility-derived deposition on U.S. aquaculture will be minimal." [114] Simultaneously, EPA admitted that it lacked "sufficient information to characterize the impact of utility emissions on aquaculture."[115] EPA cannot logically support both assertions and its attempt to do so renders its failure to consider Hg exposure from farm-raised fish arbitrary and capricious. This failure is highlighted by EPA's own modeling, which shows Hg deposition from U.S. EGUs impacting near off-shore coastal waters of the northeast and Gulf States.[116] These impacted coastal waters include areas used for fish farming, and EPA should have considered the impact of this Hg deposition on farm-raised marine fish – fish that are, by definition, non-migratory.

Having failed either to consider the impacts of Hg emissions from domestic EGUs on commercial, estuarine, and marine fish or to estimate the public health impacts on consumers of these fish, EPA acted arbitrarily and capriciously in determining that Hg emissions from these utilities do not present significant public health risks.

The commenters also stated that EPA's health analysis was arbitrary and capricious in that it was based on a single, narrow pathway of exposure to Hg. EPA expressly excluded:

- All marine fish. Approximately four million metric tons of commercial marine fish are landed in the U.S. annually.[117] Additionally, approximately 440 million saltwater fish are caught by more than 12 million recreational anglers annually.[118] EPA's failure to consider this huge marine catch in the U.S. – or this large affected population of saltwater anglers – is unsupported by the record.

- Fish that are commercially caught or raised. EPA also did not analyze either the amount of commercial fish consumed or the consuming population. Furthermore, EPA failed to explain its lack of analysis, stating only in conclusory fashion that "EPA does not believe" that freshwater commercial fish are a significant dietary pathway.[119] This omission is unreasonable. For example, the annual Great Lakes commercial fish harvest reaps approximately 17 million lb of fish.[120] EPA's failure to consider this pathway of exposure is especially troubling given that EPA's own modeling shows that much of the utility-attributable Hg deposition remaining in the year 2020 – after implementation of

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[113] See OAR-2002-0056-6291, Exh. 9, p. 53.
[114] See TSD at 35.
[115] See TSD at 35.
[116] See Air Quality Modeling TSD at 17, Figure 3.
[117] See OAR-2002-0056-6291, Exh. 9, p. 49.
[118] Id.
[119] See Effectiveness TSD at 34.
[120] See NOAA, Annual Commercial Landings Statistics, available online at http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html].

CAIR and CAMR – will be concentrated in the Great Lakes region.[121]

- Estuarine fish. Estuaries such as the Chesapeake Bay support large commercial and sport fisheries. The Chesapeake Bay commercial harvest alone produces an annual catch of more than 400 million lb of fish and shellfish.[122] The sole reason proffered by EPA for not analyzing the consumption of estuarine fish is that "any impact of utility-attributable Hg on estuarine environments will be limited."[123] Such a self-serving conclusion cannot support EPA's failure to adequately analyze the public health consequences, especially when EPA's own modeling runs show measurable post-CAIR and post-CAMR Hg deposition in the Chesapeake Bay region.[124] Furthermore, EPA has acknowledged that, based on a consumption of 32 ounces of fish per month, 42 percent of sites sampled in U.S. estuarine fishery regions have projected exceedances of Hg safety standards.[125] Mercury emissions from EGUs directly affect estuaries and, given that these water bodies are not well-mixed with ocean water, these impacts should have been included in EPA's analysis. Finally, as part of its analysis for large estuarine watersheds, EPA should have ensured that its modeling adequately represented intra-watershed Hg transport, not just direct deposition on the open waters of the estuary.

- Methylmercury in seafood.[126] However, in the Final Rule, EPA inexplicably restricted its health analysis to a single, extremely narrow pathway of exposure – "recreationally and subsistence-caught freshwater fish."[127] This narrow approach not only underestimates the potential health impacts that would flow from the Final Rule, but is also inconsistent with EPA's position in other rules.[128]

<u>Response</u>:

EPA assessed the utility-attributable Hg exposure due to marine (open ocean) fish qualitatively in the analysis supporting the Section 112(n) Revision Rule and quantitatively in the Reconsideration TSD. EPA continues to believe that the impact of power plant emissions on Hg concentrations in open-ocean environments will be limited because over half of the U.S. commercial fish supply is imported, and the majority of domestic commercial fish supply is caught in deep oceans that do not reflect present-day atmospheric Hg concentrations or deposition rates (Mason and Gill, 2005; Krapeil, et al., 2004). In addition, EPA could not support extension of the MMaps modeling framework applied to project reductions in fish Hg in freshwater environments to marine systems. Application of the MMaps model to marine environments would be an extension of the modeling framework beyond the realm for which it was intended for application and has not been empirically evaluated. The commenters assert

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[121] <u>Id</u>. at Figs. 2.3b and 2.4 (showing post-CAIR and post-CAMR Hg deposition being highest in the Chicago area (3-5:g/m3)).

[122] <u>See</u> NOAA, Annual Commercial Landings Statistics, supra.

[123] <u>See</u> Effectiveness TSD at 35.

[124] <u>See</u> Effectiveness TSD at Figs. 2.3b and 2.4.

[125] <u>See</u> NCCR, supra at 48.

[126] <u>See</u> 70 FR 16012.

[127] <u>See</u> 70 FR 28641.

[128] <u>See</u> 67 FR 44964-5 (July 3, 2002) (NESHAP for Chlor-alkali plants assesses Hg exposure from pathways other than fish consumption).

that uncertainty in the modeling framework is not a valid justification for excluding commercial and marine fish as a source of Hg exposure in EPA's analysis. In particular, high Hg concentrations in a number of commercially important marine fish harvested from the Atlantic ocean – such as bluefin tuna, striped bass, and bluefish – and associated human exposure are a concern for the commenters. EPA asserts that the power plant contribution to Hg in these fish (discussed in more detail below) is difficult to quantify with confidence at this time and is expected to be relatively small in pelagic marine species based on the analysis described in the Reconsideration TSD.

Predatory marine fish are a significant source of MeHg exposure for the U.S. population (Carrington and Bolger, 2004). Exposure is a function of both the amount of Hg in these fish and the quantities consumed in the U.S. In the case of marine fish, higher trophic level species tend to have comparable concentrations to top predators in freshwater ecosystems and the quantities of fish consumed are often larger. However, high levels of MeHg in marine fish are generally the result of bioaccumulation in larger, older fish species. Based on the rationale described in detail in the Reconsideration TSD, EPA expects that utility-derived Hg in these fish is a small fraction of their overall burden.

The commenters raise concerns regarding the contribution of coastal and marine fish (seafood) to human Hg exposures. The commenters cite high levels of Hg in certain marine species such as tuna and swordfish and assert that uncertainty in the exposure pathway is not a reasonable justification for not quantifying this pathway. EPA did not include the exposure pathway associated with marine (open-ocean) fish in the original quantitative analysis supporting the final Section 112(n) Revision Rule because the impact of power plant emissions on Hg concentrations in open ocean environments is thought to be limited. Over half of the U.S. commercial fish supply is imported, and the majority of domestic commercial fish supply is caught in deep oceans that do not reflect present day atmospheric Hg concentrations or deposition rates (Mason and Gill, 2005; Krapeil et al., 2004). EPA maintains its original stance that it is extremely difficult to determine the response of oceans to changes in Hg emissions from human sources due to limited scientific understanding at this time. However, the best available science suggests that the significance of changes in marine fish Hg concentrations in response to CAIR and CAMR will be small and will require on the order of decades to centuries to be achieved. The commenter cites a study of Hg concentrations of bluefish caught in different regions but does not provide any evidence that the variation in Hg concentrations is due to differential deposition rates as opposed to numerous other factors, such as methylation rates or bioaccumulation factors, that may affect Hg concentrations in bluefish.

Even if commenters are correct that in some parts of the marine ecosystem the utility-attributable fraction is somewhat greater than estimated, the resulting increase in the low IDI values (e.g., up to 0.05; see Reconsideration TSD Table 3.2), would be insignificant. Even IDI values for exclusive consumption of marine species with high MeHg concentration (see Reconsideration TSD Table 3.3) are low and we have no evidence that an increase as suggested by the commenter would be significant. Furthermore, the estimated IDI values due to marine exposure reflect conservative assumptions, suggesting that the true values would be lower.

Regarding commenters arguments about estuarine fish, we note that the level of *deposition in the Chesapeake Bay itself, which is one of the estuarine areas most affected by utility mercury emissions, is 8.5 percent. The watershed as a whole experiences even a lower percentage of mercury deposition attributable to utilities. The utility-attributable fraction in the estuarine ecosystem likely is even less after considering legacy Hg sources and non-air inputs into estuarine watersheds. See Reconsideration TSD, Section 4.3. As described in the Reconsideration TSD Section 4, the Agency believes that the state of the science currently does not support a national-scale quantitative analysis of the estuarine component of the exposure pathway but available data (including the small fraction of mercury deposition attributable to utilities in one of the estuaries most impact by utilities) support the conclusion that this pathway will likely be small relative to that from non-commercial freshwater fish.*

Regarding aquaculture, as found in the Reconsideration TSD, the Hg body burdens in farm-raised fish will be overwhelmingly the result of Hg biomagnification in fish feed, as opposed to bioconcentration from Hg in the water column, or from bioaccumulation of Hg in the limited amount of wild food sources that might be available to farmed fish. Thus, location of U.S. fish farms is largely irrelevant. EPA has sufficient information to make a determination that the aquaculture exposure pathway is small with respect to the recreational freshwater fish exposure pathway. The available information, however, is insufficient to include the pathway in a quantitative exposure analysis model. Because exposure is assessed at the population level, a particular pathway need only be considered if it adds significantly to the overall population body burden. The aquaculture pathway was not quantitatively assessed after it was determined to be small, and less than the magnitude of the population-level exposure from the recreational freshwater fish consumption. See Reconsideration TSD, Section 5.

Finally, as stated in the Reconsideration TSD, Section 6, with regard to freshwater commercial fish, EPA believes that this is not a significant pathway because 17 million lb/yr is small when compared to recreational freshwater fish consumption of 377 million pounds per year (lb/yr), or 22 times the Great Lakes commercial haul. Further, even though utility-attributable deposition is comparatively higher around the Great Lakes and the bordering areas (including the States of Michigan, Indiana, Illinois, and Ohio and other surrounding areas) in comparison with the rest of the U.S., it is still only a small percentage of Hg deposition from all sources. Because exposure is determined at the population level, the determination for including this pathway is whether adding it will significantly alter the cumulative distribution of total exposure rates. Because the commercial freshwater harvest is small compared to recreational freshwater consumption and the percent of utility-attributable deposition in the primary commercial freshwater harvesting area is not disproportionate to the areas for recreational freshwater harvest, EPA concludes that including the commercial freshwater pathway in the exposure model would result in a relatively small change in the general population level exposure estimate. In addition, it was reasonable not to include this pathway to address its effect on the higher-end groups (e.g., subsistence fishers) because most of the fish they eat is self-caught and it is highly unlikely, given the nature of their fishing activity, that a significant fraction, if any, of their consumption is comprised of commercially caught freshwater fish. As such, we believe that the IDI values for this pathway are bounded by the freshwater recreational/subsistence IDI values.

The commenters essentially argue that the utility-attributable Hg exposure would be *greater than estimated by EPA. Although the commenters did not necessarily raise this issue in the context of the alternative global pool analysis, for the reasons presented below we do not believe that this issue would be material to the final analysis or the conclusions. Even if utility-attributable Hg exposure is greater due to particular factors cited by the commenters, we have no evidence that the benefits of reducing EGU Hg emissions would exceed the estimates from the conservative approach that was designed to "overestimate the utility-attributable mercury exposure" (see Reconsideration TSD, Section 8.1). Because these overestimates of benefits still do not exceed costs, we conclude that the adjustments suggested by the commenters would not be material to our alternative cost-benefit analysis.*

Comment:

Commenters 6479 stated that EPA's failure to consider the bioaccumulative reality of Hg in the environment and to include the transport of Hg through the food chain to marine fish in assessing the impact of U.S. power plant Hg emission on marine fish likely resulted in a significant underestimation of the contribution of such emissions to Hg accumulation in marine fish.

The commenter stated that the initial steps of Hg accumulation in aquatic food chains (i.e., organisms lower in the food chain such as phytoplankton) very likely have the highest Hg concentration ratios. The organisms lowest in the food chain, therefore, show higher bioconcentration ratios of Hg than organisms of higher trophic status. Further, the ocean regions of highest net productivity are well known to be some of its coastal regions, including the North American northeast coast.[129] Coastal environments, then, are likely to be the regions where much, if not most, of the overall bioaccumulation of Hg in marine organisms occurs. Large predator fish (e.g., tuna) eat smaller fish (e.g., bluefish) which eat smaller fish (e.g., menhaden) which eat smaller fish, continuing down the food chain to phytoplankton, much of which grows in coastal regions of high primary productivity. Thus, food chain transport may be a significant pathway that transports U.S. Hg emissions to marine fish, and Hg uptake by coastal phytoplankton may contribute a large portion of the Hg that accumulates in larger predator fish consumed by humans. The resulting danger posed by marine fish was highlighted by recent research indicating that the average U.S. female of childbearing age would exceed EPA's Hg exposure limit by eating just one six-ounce can of commercially-available albacore tuna.[130] EPA's omission of such transport renders its review of Hg emission impacts on marine fish simplistic and raises the possibility that EPA significantly underestimated the contribution of U.S. utility emissions to Hg accumulation in marine fish.

Further, the commenter adds, by focusing on the proportional contribution of U.S. power plants to "open ocean environments,"[131] EPA ignores the reality that many species caught in the open ocean, including many important commercial species such as bluefish, spend important and

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[129] See EPA-HQ-OAR-2002-0056-6282 at Exhibit 5.

[130] See M. Hawthorne and S. Roe, "Toxic risk on your plate," Chicago Tribune (December 11, 2005); M. Hawthorne and S. Roe, "U.S. safety net in tatters," Chicago Tribune (December 12, 2005); M. Hawthorne and S. Roe, "How safe is tuna?" Chicago Tribune (December 13, 2005) (Attachment 5 of OAR 2002-0056-6479).

[131] See 70 FR 62206-7

sometimes repetitive portions of their life cycle in coastal and estuarine waters.[132] To properly consider the impact of power plant emissions to Hg levels in marine fish, EPA must not limit its inquiry to Hg deposition in open oceans. Instead, in its modeling, EPA must also address the direct deposition of Hg in coastal waters and estuarine waters as well as terrestrial deposition of Hg that is subsequently transported to rivers and ultimately to coastal and estuarine waters. EPA has still failed to address these impacts on exposure through marine fish.

Response:

EPA disagrees with the commenter that our analysis underestimates bioaccumulation of utility-derived Hg. EPA analysis was based on the abundance of utility-derived Hg relative to Hg from other anthropogenic and natural sources in the marine environment. There is no evidence that utility-attributable Hg is bioaccumulated preferentially relative to other sources of Hg. Thus, there is no reason to believe that EPA has underestimated its contribution to fish Hg levels. All of EPA's exposure analyses were based on measured fish Hg concentrations that represent higher trophic level species and, thus, account for maximum bioaccumulation between water column concentrations and fish tissues.

EPA concurs with the commenter that estuaries are important regions for the production and bioaccumulation of MeHg. However, EPA disagree that we omitted food chain transport of MeHg from our analysis. At this time there is no direct empirical way to estimate the relative contribution of MeHg produced in estuarine systems to concentrations in open ocean species. Instead, EPA based its screening-level analysis on exposure to Hg from estuarine and marine species rather than conducting detailed modeling of the fate and transport of MeHg in these environments. This bounding analysis likely overestimates exposure due to power plants from these exposure pathways. Nonetheless, the utility-attributable exposure is small and confirms the previous decision to focus the exposure analysis on non-commercial freshwater fish consumption. See Reconsideration TSD at Section 7. Such modeling is beyond the scope of our best available tools at this time. One alternate method that EPA used to approximate the time various fish species spent in estuarine systems relative to open ocean regions is based on the landings location data from the National Marine Fisheries Service (NMFS). Although this is a simplification of the true life history of estuarine and marine fish, it provides one way of approximating potential exposure to MeHg in both environments.

EPA acknowledges its assumptions about the location of MeHg formation for "open ocean" species. The source of MeHg in marine organisms is a major uncertainty in the scientific literature at this time. Accordingly, there was no way to directly model the fate and transport of MeHg in open ocean environments at this time. Instead we conducted a bounding analysis assuming a proportional relationship between deposition decreases and decreases in methylmercury concentrations in marine fish.

EPA disagrees with the commenter that it focused on exposure from open ocean fish while excluding the estuarine pathway. EPA conducted upper-bound analyses of exposure from both sources but distinguished between the two environments to allow for the differences in MeHg production and bioaccumulation that are highlighted by the commenter. This analysis is

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[132] See EPA-HQ-OAR-2002-0056-6280, Exhibit 11 (Block study).

subject the uncertainty in the science at this time and this uncertainty was accounted for in our decision-making process.

Comment:

Commenter 6475 stated that EPA's Reconsideration TSD attempts to calculate a reasonable upper bound estimate of how different U.S. populations with different fish consumption patterns are impacted by utility emissions. Overall, the assessment is not an unreasonable upper bound estimate. Throughout the document, EPA cautions the reader, appropriately, that the analysis includes a number of conservative assumptions that overestimate actual exposures. A significant conclusion of the document is confirmation that the recreational freshwater angler is the most exposed individual and that EPA was correct in focusing on one fish consumption pathway of Hg exposure in its prior analyses. Marine fish consumers, estuarine fish consumers, farm fish consumers and commercial fresh water fish consumers are all exposed to lesser degrees.

The commenter noted that, for its analysis of marine fish, EPA used a 16 "box" ocean model that divides all the earth's oceans into 16 well-mixed boxes. Although this is an obvious oversimplification of a much more complex system, it is reasonable, especially considering that most of the water off the U.S. Atlantic coast originates from the Gulf Stream, which is only minimally impacted by Hg emissions from U.S. coal-fired power plants.

Response:

EPA agrees that its public health analysis is reasonable.

Comment:

Commenter 6575 wished to commend EPA for undertaking further study of the exposure pathway through consumption of marine fish. As acknowledged in EPA's original analysis, there is a great deal of uncertainty about how changes in U.S. power plant emissions will affect the quantities of MeHg in the marine fish that Americans consume. Although the fraction of total MeHg in marine fish attributable to U.S. power plant emissions is likely to be much smaller than the corresponding fraction in domestic freshwater fish, the effects on human exposure could be significant because Americans eat much larger quantities of marine than of freshwater fish.

Indeed, EPA finds that consumption of marine fish alone is sufficient to expose 5 to 10 percent of the general U.S. population to levels of MeHg that exceed the RfD.[133] This implies that risk to these consumers would be reduced by all measures that reduce total MeHg concentrations in the marine fish they eat, including reduction of U.S. power plant emissions (unless these emissions have no effect whatsoever on marine fish MeHg concentrations). EPA's finding that the utility-attributable MeHg in marine fish is not sufficient by itself to cause these consumers' intake to exceed the RfD is irrelevant to determining the health benefits of reducing Hg emissions from utilities, because the utility-attributable MeHg increases their exposure which is already above the RfD. In addition, note that there may be public health benefits associated

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[133] See Reconsideration TSD, pp. 13-14.

with reducing exposure to individuals whose MeHg intake is below the RfD, as assumed in EPA benefits assessment and in some of the cases examined in the Northeast States for Coordinated Air Use Management (NESCAUM) report.

Response:

As discussed in Section 1.1.1.1.2 above, it was reasonable for EPA to focus on utility-attributable Hg exposure when undertaking its CAA §112(n)(A)(1) analysis. In the alternative global pool analysis, the Agency considered the public health benefits associated with zeroing out utility emissions after imposition of CAIR and, furthermore, CAMR. This analysis was designed to conservatively overestimate such benefits by assuming that all individuals were exposed above the RfD due to other sources. As described in Section 8 of the Reconsideration TSD, the overestimated benefits would be outweighed by the costs and would further support our finding that it is not appropriate to regulate utilities under CAA §112.

Comment:

Commenters 6479 stated that in its analysis, EPA dilutes and contorts the impact of exposure from estuarine fish. First, EPA cites data indicating that estuarine and coastal fish make up only 38 percent of total commercial fish landings in the U.S. See EPA Reconsideration TSD at 17. This statistic, however, is misleading because coastal and estuarine fish tend to be consumed in the regions in which they are caught, resulting in a greater proportion of total fish consumption and Hg intake in these regions. By calculating the impact of exposure from estuarine fish as part of the total national fish consumption, EPA has inappropriately spread the Hg impact of EGUs out over far too many people, diluting the local impact on populations in States that, in fact, have estuarine waterways. By including shellfish in the average of estuarine fish consumption, EPA has further diluted the impact of estuarine finfish because most shellfish, as widely known, characteristically have low Hg levels. The appropriate measure of the impact of power plants on exposure from estuarine fish, then, is the impact of consumption of estuarine finfish (e.g., bluefish, striped bass, flatfish) on coastal and estuarine areas, where estuarine fish consumption is most significant. EPA's failure to address this fundamental reality of fish consumption patterns and Hg exposure results in an erroneous reduction of the number of individuals the Agency determines to be at risk.

The commenter added that, although EPA correctly identifies land-based inputs of Hg as a significant source of contamination of estuarine fish, it identifies such sources as separate from the contributions of power plants. Given the clearly acknowledged deposition of Hg from power plants onto land surfaces, it follows logically that a portion of such Hg will be transported from local watersheds to rivers and ultimately to estuaries, either in solution or contained in microbiota that have absorbed the Hg during transport.[134] EPA apparently has not even attempted to model such inputs. Bluefish, a coastal and estuarine species with relatively high consumption in coastal areas, has been observed to have characteristically different Hg concentrations in different parts of the world, strongly suggesting that the impact of power plants on coastal and estuarine fish is not minimal. The observation implies that local conditions affect the Hg uptake of this (and likely other) species.

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[134] See Driscoll Decl., Exhibit 1 of OAR-2002-0056-6479.

The commenter also added that, regarding MeHg production and uptake in estuaries, EPA makes several arguments dealing with factors that purportedly mitigate MeHg levels in fish from these waters, such as tidal dilution and reduced MeHg production capacity in saline waters compared to freshwater. However, these arguments are irrelevant in light of the elevated concentrations of Hg observed in commonly consumed coastal and estuarine species notwithstanding whatever mitigating factors exist. EPA's tidal dilution argument is particularly problematic as the near-coastal ocean water that the Agency is claiming dilutes the relative impact of EGUs on estuaries is the same water that EPA's own modeling recognizes as being significantly impacted by EGUs.

The commenter stated that EPA further points out that coastal and estuarine waters receive significant Hg input from wastewater discharges rather than directly from atmospheric deposition. This observation, however, does not address the extent to which wastewater discharges reflect stormwater runoff that contains atmospherically deposited Hg. Finally, EPA argues that some coastal and estuarine species spend only a portion of their life cycle in these waters and the remainder in open oceans, thus, potentially decreasing the Hg burden they receive from these waters. This reasoning, however, applies only to some coastal and estuarine species. More importantly, EPA does not apply the same reasoning to marine fish caught in the open ocean. Many species of such fish spend a significant part of their life cycle in coastal and estuarine waters, and, thus, their Hg burden from U.S. utilities is greater than EPA estimates based on open ocean exposure only.

The commenter believes that a look at the potential impact of the Chesapeake Bay alone refutes EPA's dismissal of the estuarine pathway. By EPA's estimate, recreational freshwater fish consumption is about 377 million lb/year.[135] The total will be slightly larger when the subsistence catch is included, but the resulting recreational/subsistence total is approximately the same as, or less than, annual fish/shellfish consumption from Chesapeake Bay of 400 million lb/year.[136] In addition, compared to the U.S. as a whole and to the nation's recreational/subsistence catch areas, Chesapeake Bay experiences both a relatively high rate of Hg deposition and a high percentage of utility-attributable deposition.[137] As EPA noted, the Chesapeake Bay "is likely one of [the] estuarine ecosystems most sensitive to atmospherically deposited Hg from U.S. power plants because of the significance of coal fired power plants (20-30 percent of total in 2001) to overall atmospheric Hg deposition rates and its relatively small watershed to water surface area ratio (resulting in a greater importance of the atmospheric pathway compared to many other estuary ecosystems)."[138]

Given its high fish harvest and high utility-attributable Hg deposition, Chesapeake Bay necessarily makes a significant contribution to the U.S. dietary intake of utility-attributable Hg. Indeed, based on the above comparisons, Chesapeake Bay's contribution to the U.S. dietary

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[135] See Reconsideration TSD at 25.

[136] The Chesapeake Bay harvest is more than 400 million lb/year, according to NOAA's Annual Commercial Landings Statistics, as cited in commenter's petitions at 34. Alternatively, the Chesapeake Bay harvest can be calculated from the Reconsideration TSD at 20 and 22, which indicates that it is 6.5 percent of total U.S. commercial fish production of 4.4 millions tons/year, i.e., about 600 million lb/year for the Chesapeake Bay harvest.

[137] See, e.g., Effectiveness TSD, Figure 2.1, et seq., and TSD at 22.

[138] See Reconsideration TSD at 22.

intake of utility-attributable Hg must be approximately equal to or greater than the contribution from the recreational/subsistence freshwater fish pathway – in which case EPA's current approach is underestimating the impacts of utility-attributable dietary Hg by at least a factor of two.

Response:

EPA disagrees that their analysis dilutes and contorts the impact of exposure from estuarine fish by including estuarine fish and shellfish as part of the total national fish consumption. Our approach is wholly consistent and appropriate for a population level analysis like that undertaken pursuant to CAA §112(n)(1). The information supports our determination that the utility-attributable U.S. population-wide exposure to MeHg from estuarine fish and shellfish will likely be small relative to that from recreational self-caught freshwater fish.

Nonetheless, EPA has already addressed the fact that there could be some high consumption rates of locally caught estuarine fish. Because coastal finfish species of the same age/size and trophic level as freshwater fish have relatively lower Hg concentrations, the available information suggests the impact of estuarine fish with high Hg concentrations will be less than or equal to the impact from freshwater fish with high Hg concentrations assuming the same consumption rates. Based on the CMAQ deposition modeling conducted for this rule, the utility-attributable concentration is expected to be lower in estuaries. Therefore, IDI values from estuarine fish will be bounded by those for freshwater fish. See Reconsideration TSD, Section 4.4. As commenter suggests, we did look at estuaries on the East Coast that have higher utility-attributable Hg deposition than the national average.

EPA also disagrees with the commenters' assertion that EPA's analysis is misleading because it does not consider utility derived Hg inputs to estuaries from wastewater, urban stormwater runoff, and other land based inputs. EPA acknowledges that estuarine watershed modeling was not conducted for this analysis and is not possible at this time given our available modeling tools. However, the best available scientific research suggests that atmospheric Hg deposited on watersheds and Hg from non-air sources is retained for a long period of time, delaying the full impact of changes in ecosystem inputs of Hg on fish tissue concentrations for decades. Because current fish tissue concentrations represent ecosystem inputs from previous decades when such inputs were substantially greater than today, current fish tissue concentrations are generally greater than what would be expected at steady state from current ecosystem inputs. Using current fish tissue samples to predict the concentrations due to current utility-attributable atmospheric deposition will generally overestimate the utility impact. See, generally, Reconsideration TSD. Different watersheds across the U.S. receive a combination of land based and atmospherically based Hg inputs from many different sources (natural and anthropogenic) in addition to utilities. Because estuaries are typically highly populated regions with concentrated industry and trade in harbors, a myriad of Hg sources must be considered to estimate the utility derived contributions from the watershed. However, considering past inputs of Hg from wastewater and urban runoff as the result of Hg use by industry and also a variety of consumer products (i.e., paint, pharmaceuticals, thermometers, dental amalgams, fluorescent light bulbs, and batteries), it seems unlikely that atmospherically derived Hg inputs to the watershed from utilities will dominate historical accumulation of Hg in watersheds surrounding *most coastal regions. Accordingly, utility derived Hg in urban runoff is likely to be small relative to current and historic ecosystem inputs from effluent sources of Hg in wastewater and residual Hg in consumer products.*

In addition, EPA's screening level calculations allow the upper bound for reductions in fish Hg concentrations to be the amount contributed by utilities to direct deposition onto the estuary. As such, it provides an upper bound for utility-derived Hg contributions to fish by assuming that the only Hg coming out of the watershed will be atmospheric in origin. Neglecting for a moment other anthropogenic sources, this is clearly an overestimate because a significant fraction of all watershed Hg inputs are natural in origin. In our analysis, we mention the effects of watershed inputs, tidal dilution and other fluxes of Hg in and out of estuaries to acknowledge the uncertainty in the timing and magnitude of the response of fish tissue Hg concentrations to any changes in loadings. EPA disagrees with the commenters' assertion that tidal dilution will not be important to the overall fate and transport of Hg in estuarine systems. EPA's analysis shows that utility derived Hg in open ocean environments is limited. In addition, Hg concentrations in incoming tidal waters are typically lower than concentrations in the estuarine waters or incoming rivers. Hence, tidal inputs will effectively dilute the utility-attributable Hg in estuarine systems.[139]

Finally, EPA agrees with the commenter and continues to maintain that, as EPA noted, the Chesapeake Bay is likely one of the most sensitive estuarine ecosystems to atmospherically deposited Hg from U.S. power plants. However, for reasons stated in the Reconsideration TSD and repeated above, the available information suggests the impact from recreational/subsistence freshwater fish consumption is an upper bound estimate of the impact from estuarine fish.[140] *EPA also strenuously disagrees that EPA's analysis underestimates the impacts of utility-attributable Hg exposure by a factor of two. In particular, the consumption values used for the freshwater/subsistence analysis already reflect the consumption of freshwater, estuarine, and aquaculture fish. Utility-attributable MeHg concentrations in freshwater fish at the high percentile watersheds are larger than for fish from others sources (marine and estuarine). Therefore, higher exposure estimates are generated by assuming that the combined/whole consumption value is entirely from freshwater fish consumption rather than a combination of freshwater fish consumption and consumption of fish from other sources. It would be incorrect to add the exposure from estuarine fish to the exposure estimate from freshwater fish consumption, as estuarine fish consumption would likely be a substitute for freshwater fish consumption, likely reducing, not increasing, utility-attributable exposure.*

Comment:

Commenters 6479 stated that EPA similarly dilutes the local and regional impact of

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[139] See Reconsideration TSD, Section 4 and EPA-HQ-OAR-2002-0056-0056.

[140] The commenter has also argued that some species spend part of their life cycle in coastal and estuarine waters, and, thus, the Hg burden from U.S. utilities is greater than EPA estimates based on open ocean exposure only. This only concerns marine fish that spend part of their life cycle in estuarine or coastal water on the east coast of the U.S. or in the Gulf of Mexico and are then caught in the open ocean and eaten by U.S. consumers. Estimating the amount of fish that meet these criteria as a portion of the total U.S. consumption of marine fish would involve complex modeling and the commenters have not provided any information that suggests that accounting for this portion of consumption would substantially alter the results presented by the EPA.

commercial freshwater fish consumption on specific consuming populations by considering the exposure to these fish as part of the total national fish consumption, including populations that do not have access to such fish.[141] The Chicago Tribune recently reported that high Hg levels were found in Walleye, a species for which no consumer warnings have been issued. The article noted the irony in distinguishing between recreationally-caught freshwater fish and commercially caught freshwater fish-fish that may come from the same waters.[142] By disregarding this pathway of exposure, EPA is, therefore, ignoring recognized potential impacts to human health, in violation of the requirements of the CAA.

Response:

EPA disagrees that their analysis dilutes the local and regional impact of commercial freshwater fish consumption on specific consuming populations by considering the exposure to these fish as part of the total national fish consumption. As stated above, inclusion of the national fish consumption values was done for the population-level analysis and supports our determination that freshwater commercial fish consumption is not a significant exposure pathway. EPA agrees that recreationally-caught freshwater fish and commercially caught freshwater fish often come from the same waters but it disagrees that a separate analysis is required for specific consuming populations. EPA continues to maintain that most of the consumption by higher end groups (e.g., subsistence fishers) is self-caught and it is highly unlikely, given the nature of their fishing activity, that a significant fraction, if any, of their consumption is comprised of commercially caught freshwater fish. As noted in the Reconsideration TSD, at any given total fish consumption rate noted in EPA's analyses, introducing aquaculture, marine, or estuarine fish into the diet of a self-caught freshwater fish consumer necessarily implies reducing consumption of self-caught freshwater fish (e.g., in order to maintain the same total fish consumption rate). Because utilities contribute more Hg to freshwater fish species than to any other fish species supports the assertion that self caught freshwater consumption represents the primary source of utility-attributable Hg exposure.

Comment:

Commenter 6475 has a concern about EPA's discussion of the commercial fresh water fish pathway.[143] EPA reasons that "even though utility-attributable [Hg] deposition is comparatively higher around the Great Lakes and bordering areas…it is still only a small percentage of mercury deposition from all sources."[144] This is expected to decrease 7.5 percent after CAMR.[145] EPA also says that "the commercial freshwater fish harvest is small compared to recreational fish."[146]

The commenter believes that there are two problems with this statement. First, except for Lake Erie and western Lake Ontario, the Hg deposition attributable to utilities is not

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[141] See 70 FR 62207.
[142] See Hawthorne and Roe, supra.
[143] See Reconsideration TSD at 25.
[144] Id.
[145] See 70 FR 62207.
[146] See Reconsideration TSD at 25.

“comparatively higher” and decreases less than 7.5 percent under CAMR. It is unclear where EPA obtained the 7.5 percent figure, but even a casual review of EPA’s Hg deposition maps demonstrates that most of the Great Lakes have very little utility-attributable deposition today and will have even less under CAMR.

The commenter believes that another problem with EPA’s analysis is that it should have considered the types of commercial fish landed in the Great Lakes and their very low Hg content. The web site http://www.st.nmfs.noaa.gov/pls/webpls/MF_ANNUAL_LANDINGS.RESULTS demonstrates that, almost without exception, the commercial landings by individual species in all of the Great Lakes States in 2004 consisted of low-Hg concentration fish of trophic level 3.

The commenter stated that, elsewhere in its analysis, EPA concludes that replacement of recreational fresh water fish by ocean fish would result in a lower Hg exposure. Using the above landing data, EPA should have been able to conclude, similarly, that the replacement of recreational freshwater fish with commercial freshwater fish would have resulted in similar decline in Hg exposure.

Response:

Although EPA has concluded that including the commercial freshwater pathway in the exposure model would result in a relatively small change in the general population level exposure estimate and that the IDI values for this pathway are bounded by the freshwater recreational/subsistence IDI values, it is still unable to fully quantify this effect to draw the conclusion proposed by the commenter. Commercial freshwater fishing is not limited to just the Great Lakes region. The provided link does not provide commercial freshwater information for all 50 States. Also, the National Oceanic and Atmospheric Administration (NOAA) Great Lakes fish catch data covers U.S. fishers only; Canadian data are not included (see http://www.st.nmfs.noaa.gov/st1/commercial/landings/gl_query.html). This might be a problem if the Canadian catch ends up in the U.S. market. Therefore, the dataset is incomplete and a national analysis of commercial freshwater fishing cannot be conducted. It is EPA’s position that an analysis of the Great Lakes freshwater fisheries only, although informative, would provide an incomplete assessment of the national Hg content in commercial freshwater fish.

What is meant by “comparatively higher” is that deposition from utility sources is slightly higher over some parts of the Great Lakes than the surrounding land mass. The 7.5 percent utility-attributable deposition was calculated by averaging the CMAQ grid cells that fall either entirely or partly over the Great Lakes. The national deposition maps the commenter references are averaged deposition reported in CMAQ grid cells that fall either entirely or partly within 8-digit HUC watersheds, several of which cover the Great Lakes area.

Comment:

Commenter 6597 is deeply concerned by the results of a recent investigatory report by the Chicago Tribune documenting dangerously high Hg content in commercially-caught fish. Although the Tribune investigation results are of nationwide concern, Illinois is particularly troubled by those results because they are drawn from samples of fish purchased at consumer outlets in the Chicago metropolitan area. The documented danger to Illinois consumers of commercially-caught fish directly contravenes EPA's conclusion that the public health cost of Hg can be determined based solely on freshwater sport-caught fish consumption as an exposure pathway.

The Chicago Tribune series was published in three parts: "Toxic Risk on Your Plate," published December 11, 2005; "U.S. Safety Net in Tatters," published December 12, 2005; and "How Safe is Tuna," published December 13, 2005. As a basis for the series, Tribune reporters purchased fresh and canned fish at supermarkets throughout the greater Chicago region and tested it for Hg content. The test results showed that Hg levels in such fish are sufficiently high that, should consumers follow FDA guidelines with respect to them, they would risk exceeding FDA exposure guidelines. The guidelines specify that pregnant women, young children, and other at-risk consumers not eat shark, swordfish, king mackerel, or tilefish, and recommends that they eat instead up to 12 ounces of fish that are "lower in mercury" than these species; yet the Tribune's testing indicates that 12 ounces of many other fish species would cause many such consumers to exceed the exposure guidelines. The Tribune investigators also found that, although light tuna is categorized as being low in Hg, approximately 15 percent of cans of light tuna on supermarket shelves contain the much higher levels of Hg found in albacore tuna, which the FDA recommends be consumed in very limited quantities. Moreover, they determined that the Hg levels in albacore tuna were sufficiently high that the average woman of childbearing age could exceed FDA exposure guidelines by eating the recommended amount. Additionally, the investigators found that several species of fish for which FDA has issued no warnings at all – including grouper, orange roughy, and marlin – contain Hg levels higher on average than albacore tuna. Perhaps most importantly, the Federal government's testing of commercially-caught fish has been extremely limited. According to the Tribune, Federal officials have tested only 24 shrimp samples and 4 walleye samples since 1978.

In view of these facts, EPA's conclusion that exposure to EGU-generated Hg from commercially-caught fish is insignificant or merely a "small concern"[147], insufficient to warrant further analysis as an exposure pathway, is without sound basis. There is clearly insufficient test data to draw ultimate conclusions regarding the public health cost of Hg in commercially-caught fish, and the limited data that do exist strongly suggest that the public is at greater risk from eating these fish than current Federal guidelines acknowledge. The commenter, therefore, requests that EPA re-evaluate its de-listing decision based on consideration of all potential fish consumption Hg exposure pathways, including consumption of commercially caught fish.

Response:

At the national average level, the contribution of U.S. power plants to the Hg exposure from the commercially caught marine fish species noted by commenter is relatively small. See Reconsideration TSD, Section 6. Although the commenter did not estimate the utility-attributable fraction of the Hg in the fish samples by the Tribune, it is reasonable to believe that the utility-attributable fraction of the MeHg in those fish is relatively small. See Section 1.1.1.1.2 infra for an explanation for the focus on utility-attributable Hg.

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[147] See 70 FR 62207.

It is not clear if the data cited in the Tribune article were collected in a statistically unbiased manner to reflect typical fish consumed in the specific market (Chicago). Furthermore, the data from that specific market may or may not be representative of the national average. Finally, we note that the comment appears to be more relevant to the FDA's establishment of its guidelines than to EPA's analysis. EPA properly looked at actual fish consumption patterns in the American population when analyzing Hg exposure. The Effectiveness TSD and the Reconsideration TSD analyzed a range of fish consumption rates (see Effectiveness TSD Table 6.4 and Reconsideration TSD Table 3.2), including rates that spanned the rate that the commenter stated would reflect the maximum consumption rate consistent with the EPA-FDA Joint Federal Advisory for Mercury in Fish.

1.1.3.4 Utility Hotspots

Comment:

Commenters 6479 noted that EPA uses a large-scale modeling program to evaluate the presence of small-scale Hg pollution hot-spots in the Hg rules. Specifically, EPA has used CMAQ to determine that there will be no utility-attributable Hg hot-spots following the implementation of CAIR. However, this approach is flawed for several reasons. First, treating EGU emissions in a vacuum ignores the reality of how the toxin accumulates in the environment and impacts human health, and is fundamentally unreasonable. Second, an appropriate methodology for determining the presence of hot-spots of pollution should begin with actual measurements in the field and only then apply modeling to determine the sources of the contamination. Such measurements have indicated that hot-spots do indeed exist, particularly in the Northeast.[148] Local and regional decreases in Hg emissions near these hotspots have resulted in significant decreases of Hg deposition to the sediments of the affected water bodies, even during a period when global Hg emissions have remained relatively stable.[149] These findings contradict the importance which EPA places on global emissions. Third, estimates of Hg deposition at the researched hot-spots attributable to local and regional coal combustion are much higher than the amounts reflected in EPA's modeling.[150] These results support the conclusion that large decreases in emissions from regional coal-fired EGUs will generate large reductions in Hg deposition at pre-existing hot-spots. EPA's modeling underestimates both the impact of regional emission and the benefit of reducing those emissions and, therefore, fails to adequately assess either the costs of CAMR or the potential benefits of implementing regulation under CAA §112.

Response:

EPA disagrees with the commenter for several reasons. First, Section 1.1.1.1.2 and the final Section 112(n) Revision Rule discuss EPA's rationale for focusing on utility-attributable Hg emissions when determining whether it was appropriate or necessary to regulate Utility Units

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[148] See Driscoll Decl. at ¶5-6 (Exhibit 1 of OAR-2002-0056-6479) and see Evers Decl. at ¶6-7 (Exhibit 6 of OAR-2002-0056-6479).

[149] See Driscoll Decl. at ¶4, 9 (Exhibit 1 of OAR-2002-0056-6479).

[150] See Driscoll Decl. at ¶11 (Exhibit 1 of OAR-2002-0056-6479) and Evers Decl. at ¶10 (Exhibit 6 of OAR-2002-0056-6479).

under CAA §112.

We appreciate the commenter's support for the approach of taking field measurements of MeHg fish tissue concentrations and then using modeling to help determine the source of the MeHg in those fish (see Effectiveness TSD). Modeling is also needed to estimate future concentrations of MeHg in fish because field measurements represent historical emission levels, not future levels.

We agree that Hg deposition is expected to decrease as Hg emissions are reduced (see Effectiveness TSD at, for example, Table 3.6). The commenter, through the Driscoll declaration, asserts that Hg levels in fish may not decrease as the result of changes in atmospheric loading because of variability in the sensitivity of different ecosystems to inorganic Hg loading and their capacity for MeHg production. The geochemistry and attributes of systems with a higher percentage of wetland coverage in the watershed and with shallow forest soils that may erode deposited Hg to the watershed more quickly makes these systems particularly sensitive to inorganic Hg loading. In this case, Dr. Driscoll is using the term "sensitivity" to describe differences in the capacity of various ecosystems to methylate Hg, converting it to a bioavailable form. Dr. Driscoll states that his past research on variability in the factors that influence MeHg accumulation in fish suggests that many ecosystems will continue to have persistently high levels of MeHg in fish after CAMR because of the mediating effects of ecosystems on methylation. In addition, Dr. Driscoll points to the dual effect of sulfate on methylation rates in freshwater systems. In systems where methylation rates are limited by the available supply of sulfate, reductions in sulfate deposition associated with CAIR will likely reduce MeHg production and fish Hg concentrations. Alternately, in systems that naturally have high levels of sulfate, reducing deposition through CAIR may result in an increase in the methylation rates (and fish Hg) by reducing the inhibitory effects of sulfides (a by-product of sulfate reduction) on methylation rates. Dr. Driscoll is correct in asserting that there is no way to characterize these indirect effects of CAIR at this time and this should be an area of future research for EPA.

However, Dr. Driscoll fails to recognize that even if all emissions from utilities were eliminated, many ecosystems would still have persistently high levels of Hg in fish. Thus, defining a "utility-attributable" fraction of Hg in highly sensitive ecosystems like the ones mentioned by Dr. Driscoll is problematic and cannot be quantified at this time. However, EPA did begin to address the effects of variability among ecosystems and watersheds on MeHg production in Chapter 3 of the RIA for CAMR. Dr. Driscoll asserts that we cannot be certain of a decline in fish Hg concentrations as the result of CAMR, and that any decline will only be achieved after a significant lag time in most ecosystems. This is consistent with the ecosystem-scale modeling EPA conducted in the RIA (Chapter 3). Effectively, this line of thinking could lead to the conclusion that regulating anthropogenic Hg emissions may not have a significant impact on fish Hg concentrations but does not argue for any change in EPA's decision to reverse the findings that it is appropriate and necessary to implement a MACT standard for Hg.

Dr. Driscoll also points out that he has measured consistently high levels of total Hg in water bodies near urban centers. This is not unexpected as there are a variety of Hg sources in urban areas such as waste incinerators, runoff from municipal wastewaters, trace concentrations from vehicle emissions, and fuel combustion by a variety of industries (in *addition to coal-fired utilities). This does not affect EPA's estimates of utility-attributable Hg in various areas. In addition, Dr. Driscoll points out that the highest levels of total and MeHg in water bodies were observed in remote areas that are distant from point sources. He hypothesizes that this is the result of the co-binding of Hg with organic carbon in many of these systems, as well as inputs of MeHg from wetlands and topographical features that result in a higher portion of wetlands and drainage of Hg into water bodies. These are all relevant observations and useful as tools for predicting fish Hg levels in different areas from watershed and landscape characteristics. However, they are not relevant to determining a utility-attributable fraction of Hg in freshwater fish. Again, these mediating effects suggest that additional reductions of Hg emissions from utilities will do little to change fish Hg concentrations over the short term.*

We provide elsewhere in this document our reasons for using CMAQ over other models (e.g., REMSAD, HYSPLIT). Dr. Driscoll presents results in his declaration from the Industrial Source Complex Short Term (ISCST3) model to document near-field Hg deposition from local power plants. EPA chose to use CMAQ for its analyses because of the lack of Hg chemistry and the simplified meteorological parameterizations utilized in ISCST3. Finally, we note that EPA used modeling to estimate exposure after implementation of the CAA (i.e., CAIR and, furthermore, CAMR), because modeling, not measurements, are used for such predictions of future events.

Comment:

Several commenters (6475, 6504, and 6599) stated that, in the notice of reconsideration, EPA grants State petitioners' request for further comment on the Agency's definition of a "utility hotspot" and its analysis and conclusion that there will not be any utility hotspots after the implementation of CAIR. The commenters believe that EPA has brought some much needed structure to the "hotspots" debate by defining the term "utility hotspots." Analyses conducted by EPA and EPRI demonstrate convincingly that utility hotspots do not presently exist nor will they be created as a result of the trading programs of CAIR and/or CAMR.

The commenters stated that arguments about whether coal-fired power plants create Hg hotspots have long been plagued by failures to define what is meant by a "hotspot" or to tie the level of Hg at a given location with power plant emissions. As the commenters explained in comments on EPA's proposed rule,[151] claims of utility hotspots either presume that hotspots currently exist as a result of coal-fired power plant emissions or theorize that they will develop as a result of Hg trading. These claims are made without defining the term "hotspot," producing any plausible evidence that such "hotspots" exist, or providing a reasonable explanation of how "hotspots" would be created by a Hg trading program. EPA addressed the hotspot issue in a direct and reasonable way in the preamble to its final Section 112(n) Revision Rule. EPA defined a "utility hotspot" as a water body with utility-attributable MeHg levels in excess of the MeHg water quality criterion of 0.3 ppm. EPA's definition focuses on Hg levels in the environmental media that contributes to MeHg levels in fish-the principal means of human exposure-and requires that the Hg levels be tied to power plant emissions.

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[151] See UARG Comments, at 140-45.

The commenters state that utility hotspots will not be created by a Hg cap-and-trade program. Cap-and-trade programs promote economically efficient decisions to reduce emissions from sources. Units with the highest Hg emissions almost certainly will be among the first to be controlled because the cost per pound of Hg controlled will be the lowest at these units.[152] In addition, EPA's CAIR and CAMR rules are structured so as to cause large reductions in gaseous ionic Hg-the form of Hg that tends to deposit locally – during Phase I of CAIR. The addition of scrubbers to meet CAIR requirements will produce a co-benefit of reducing currently small levels of nearby ionic Hg deposition.

The commenters state that modeling performed by EPA and EPRI shows that Hg deposition will not increase in any area as a result of a cap-and-trade program.[153] This result makes sense when one recognizes that to meet a 15-ton Hg cap in 2018 all coal-fired power plants will need, in the aggregate, to achieve an 80 percent reduction in Hg. Current Hg testing shows that it will be difficult to achieve 80 percent control at an individual unit, much less across the entire industry. As a result, there is unlikely to be a large market for Hg allowances, and individual units will not be able to purchase large numbers of allowances to increase Hg emissions.

The commenters believe that the State petitioners' offer no compelling evidence that EPA's definition of a "utility hotspot" is faulty or that hotspots exist. State petitioners try to make much of the fact that EPA's definition of a "utility hotspot" focuses on whether power plants "cause" a hotspot not whether they "contribute" to hotspot. This argument is nothing more than a repackaging of their claims that EPA's determination under CAA §112(n)(1)(A) should not focus only on power plant emissions but must consider background levels of Hg. This argument ignores the plain language of CAA §112(n)(1)(A) and Congress' intent in including that provision in CAA §112. State petitioners also claim that a definition based on a water quality criterion ignores "documented" hotspots. As evidence of their claim, petitioners cite a loon study in New Hampshire which they argue demonstrates a hotspot in southeastern New Hampshire. The New Hampshire study does not prove petitioners' point. First, the study never uses the term "hotspot" nor attempts to define the term. The report merely contains information on Hg levels in loons across New Hampshire. State petitioners offer no explanation of why Hg levels in loon blood are a useful measure of "utility hotspots." Second, even accepting the usefulness of loon blood Hg levels in identifying utility hotspots, the report focuses only on loon blood levels in New Hampshire. Although the report shows some variation within New Hampshire, one has no way of knowing whether those differences are significant if one looked at larger areas such as across the U.S. Third, the report indicates that in the area of highest loon Hg blood levels there are two MWC units, two medical waste incinerators, and one coal-fired power plant. Thus, there are significant questions about whether the higher Hg levels in loons in this area are the result of power plant emissions or of the four incinerators or of some other source.

<u>Response</u>:

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[152] This economic behavior has been demonstrated in utilities compliance with the CAA Acid Rain program requirements. <u>See</u>, e.g., Swift, Allowance Trading and Potential Hotspots – Good News from the Acid Rain Program, *Environment Reporter*, Vol. 31, No. 19, at 954-59 (May 12, 2002).

[153] <u>See</u> OAR-2002-0056-2578, at 7; 70 FR 16017-8.

Although EPA may not necessarily agree with all the comments made, we do agree that our utility hotspots analysis was reasonable. EPA has addressed the issues related to New Hampshire elsewhere in this document.

Comment:

Commenter 6471 noted that, in assessing the level of utility-attributable Hg emissions after CAIR and CAMR, EPA concluded in the Final Rule that utility hotspots will not occur after implementation of CAIR. The Agency defined a "utility hotspot" as a water body with utility-attributable MeHg levels in excess of the MeHg water quality criterion of 0.3 ppm (mg/kg). In the Notice, EPA solicits comment on this definition and its conclusion.

Commenter 6471 believes that EPA's conclusion is well-supported. First, there is no evidence that an established "common understanding" of the exact meaning of utility hotspot predated the Final Rule. As EPA stated, it provided a specific definition for the term, in par, to help establish that common understanding. Second, the water quality criterion that EPA uses as the basis of its definition of a utility hotspot is, if anything, overly protective, as a result of the Agency assumptions about fish consumption habits. Finally, for the purpose of determining what reductions to require at Hg sources, a definition that would include water bodies where utility-attributable Hg emissions contribute to, but are not themselves the sole cause of, problematically high MeHg levels does not make sense because any individual source will be only a fraction of the cause of that hotpot.

Response:

Without necessarily agreeing with every statement made by commenter, we agree that our definition and analysis of utility hotspots were reasonable.

Comment:

Several commenters (6459, 6461, 6474, 6586, and 6611) stated that they support the definition of "hotspots" used by EPA in its final rule. The term is based on health criteria – water quality standards – and directly tied to power plant emissions. Although there is no existing Hg trading program to evaluate, many years of experience with the landmark SO_2 Acid Rain program has resulted in no hotspots of sulfate deposits. This suggests that Hg trading also will result in Hg deposition reductions in each State and will not produce hotspots. Some reasons for this outcome include:

Most of the Hg deposited in the U.S. – over 60 percent on average – comes from outside the country. EPA estimates that 144 tons of Hg from all global sources currently deposit in the U.S., only 11 tons (about 8 percent) of which is produced by U.S. utilities. After CAIR and CAMR are fully implemented, only 3.4 tons of Hg will be deposited by U.S. utilities within the U.S. On average, each of the nation's 400 coal-based power plants is responsible for only 0.02 percent of the Hg deposited, so trading by any single plant is not expected to be significant with respect to deposition.

Commenter 6474 added that specific controls anticipated to be adopted by utilities to comply with CAIR and CAMR are expected to preferentially reduce the forms of Hg that are of concern with respect to local deposition (non-elemental Hg), particularly oxidized Hg. EPA projects that utilities will install SCR and scrubbers to meet their SO_2 and NO_x requirements under CAIR and take additional steps to address the remaining Hg reduction requirements under CAMR, including adding Hg-specific control technologies, additional scrubbers and SCR, dispatch changes, and coal switching. Analysis performed by EPA concludes that implementation of CAIR alone will reduce oxidized Hg emissions by 62 percent.

Based on extensive scientific research and analyses to date, EPA confidently predicts that no Hg hotspots will be created due to the CAIR and CAMR cap-and-trade programs. EPA analyses indicate further that due to the substantial reduction in Hg deposited by utilities after full implementation of CAIR and CAMR there will not be any utility-attributable exceedances of EPA's MeHg water quality criterion for fish tissue anywhere in the U.S.

In addition, extensive modeling by EPRI indicates that EPA's Hg cap-and-trade program will reduce overall Hg deposition in each State, in essence providing a safeguard against creation of hotspots.

The commenter noted that EPA defines a "utility hotspot" as "a water body that is a source of consumable fish with MeHg tissue concentrations, attributable solely to utilities, greater than EPA's methylmercury water quality criterion of 0.3 mg/kg." EPA analyses indicate that the drastic reduction in Hg deposited by utilities due to full implementation of CAIR and CAMR will not cause any utility-attributable fish tissue concentrations to exceed 0.3 ppm (mg/kg) anywhere in the U.S. Therefore, CAIR/CAMR is designed to prevent any "utility hotspots" in the U.S.

To support this comment, the commenters refers the Agency to detailed comments on the NODA submitted on January 3, 2005, which provided information on the plant-by-plant Hg reductions that are projected by the EPMM model under the CAMR cap-and-trade program. This information further substantiates the contention that a Hg trading program would motivate the most significant emission reductions at the plants with the highest initial levels of Hg emissions, which increases the likelihood that CAMR's cap-and-trade program would reduce any (theoretical or so-called) "hotspots."

Response:

Without necessarily agreeing with every statement made by commenter, we agree that our definition and analysis of utility hotspots were reasonable.

Comment:

Commenter 6634 stated that EPA improperly ignored available evidence about the existence of hotspots near EGUs and the causal relationship between local emissions sources and local Hg contamination. EPA's approach to the reconsideration request for comments demonstrates the Agency's unwillingness to back away from its unlawful "utility attributable" construct, generally, which in turn leads to its misconstruction of definition of a "hotspot." More fundamentally, EPA's "belief" that no "utility hotspots" will exist after CAIR is implemented disregards research that has shown that domestic coal-fired EGUs have a greater impact on Hg contamination of local fisheries than do foreign sources of Hg. The commenter described below two examples of research into local Hg contamination that have shown the significant impact of local Hg air emissions from EGUs.

The commenter noted the Chesapeake Bay and Great Lakes Hotspots study. Dr. Mark Cohen, an air modeler with the National Oceanic and Atmospheric Administration, has undertaken air modeling research to determine what sources contribute the most Hg to the Great Lakes and the Chesapeake Bay. In his Great Lakes study, Dr. Cohen concluded that although regional and long range sources (100-1,500 km) contributed approximately 50 percent of the Hg deposition to the Great Lakes, coal fired power plants within the U.S. are the primary source of the Hg.

In his Chesapeake Bay study, Dr. Cohen concluded that local (within 0-100 km /0-60 miles) coal-fired EGUs contribute the most Hg to the Chesapeake Bay. Using 1999 emissions data, Dr. Cohen specifically identifies, in Maryland, the Brandon Shores, Morgantown, Chalk Point, and H .A. Wagner EGUs as the top four coal-fired sources of direct Hg deposition to the Bay.[154] In Virginia, Dr. Cohen identifies the Chesapeake Energy Center, Chesterfield, and Yorktown EGUs as the highest coal fired sources of direct Hg deposition to the Bay. Recent air modeling studies demonstrate that approximately 15-20 percent of the Hg emissions from the four coal-fired sources modeled (Brandon Shores, Chalk Point, Dickerson, and Morgantown) are deposited to the Bay watershed.[155]

Relatedly, recent fish tissue sampling in Virginia waters indicates high levels of Hg in striped bass and other species that are known to travel far up freshwater rivers and throughout the Chesapeake Bay. Some of the sampled fish contain levels of Hg in excess of EPA health standards.[156]

Currently, 10 different bodies of water within Virginia have Hg health advisories. All water bodies within the States of Maryland and Pennsylvania have fish advisories for Hg. When Dr. Cohen's findings are coupled with Maryland and Virginia fish Hg research, it becomes clear that local sources are contributing to the contamination of the fish that inhabit the States' local lakes and rivers, including the Chesapeake Bay. In Maryland, all waters are identified as having MeHg contamination including the portion of the Chesapeake Bay within that State. The seven coal-fired EGUs within the State, none of which are controlled for Hg or for both SO_2 and NO_x, essentially blanket the State and a large portion of the Bay with their emissions.

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[154] Dr. Cohen also identifies several waste incinerators as contributors to Chesapeake Bay Hg deposition. However, since the publication of his reports, EPA has regulated Hg emissions from waste incinerators. 59 FR 48198.

[155] Research for the Chesapeake Bay Foundation by Dr. Andrew Gray.

[156] Recent fish tissue data indicates that striped bass caught within Virginia waters have Hg levels in excess of EPA's safety standard, id., and water quality standard, Water Quality Criterion for the Protection of Human Health: Methylmercury, EPA-823-R-01-001, January 2001.

In Virginia, the Virginia Department of Health recently expanded its Hg advisories to include within the York River Drainage portions of; Herring Creek, the Pamunkey River, and the Mattaponi River.[157] Five Virginia coal-fired EGUs are within a 60 mile/100 km radius of this area with total Hg emissions of 1,163 lbs annually: Birchwood, Chesterfield, Cogentrix Hopewell, Cogentrix Richmond, and Yorktown. Similarly, within the Chowan and Dismal Swamp drainage, 66 miles of the Blackwater River, Great Dismal Swamp, and Lake Drummond are listed as contaminated with Hg. Seven Virginia coal-fired EGUs are located within a 60 mile/100 km radius of this area with total Hg emissions of 1,473 lbs annually: Chesterfield, Chesapeake Energy Center, Cogentrix Hopewell, Cogentrix Portsmouth, Cogentrix Richmond, Southampton, and Yorktown.

Understanding the importance of local and regional sources' contribution to the Hg contamination problem is crucial. Research conducted in Florida confirms that controlling local sources will reduce Hg loads to local waters despite foreign emissions. When local sources of Hg were controlled, fish taken from local waters exhibited reduced fish tissue Hg levels. This research calls into question the reasonableness of a pollution trading such as CAIR, because EGUs contributing to the Hg contamination of local lakes, rivers, and swamps could comply with the rule but continue to emit the same levels of Hg, by purchasing allowances from a source in another State or even across the State. In such a scenario, it is highly unlikely that the Hg contamination found in the Piankatank and Blackwater Rivers, for example, would be reduced as EPA projects. Hence, the proposed cap-and-trade program would not alleviate the continuing human health risks in these areas. A more appropriate solution to this increasingly severe human health problem is to develop regulations which require at every source, existing and new, to achieve MACT emissions levels pursuant to CAA §112(d).

Additionally, EPA's analysis of "hotspots" does not account for local data on fish consumption in specific areas, including the fact that many people fishing in these areas of contamination are either unaware of the Hg health advisories for fish they eat, or are aware of those advisories but still continue to consume contaminated fish. A recent survey of anglers was conducted by researchers from Virginia Polytechnic Institute for USEPA's Chesapeake Bay Program. Anglers in Baltimore Harbor, the District of Columbia, and the Tidewater Region of Virginia were interviewed to determine, among other things, their knowledge of human health advisories for fish and their fish eating habits. The interviewers found that in many instances anglers stated that they knew of health advisories associated with the fish that they caught, but still ate the fish and shared them with at-risk members of their families, e.g., women of childbearing age.

In the Tidewater Region of Virginia, 91 percent of those interviewed stated that they ate some of the fish they caught. Fifty percent of those surveyed stated that having a fresh fish dinner was a very important motivation for fishing and 19 percent of those interviewed stated that reducing the cost of food was a very important motivation for fishing. Rockfish/striped bass was identified as the fourth most consumed fish in the region. However, Maryland has issued a

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[157] Just north of the York River Drainage lies Dragon Run Swamp and the Piankatank River into which the swamp drains. The entire length of the swamp, 46 miles, and a portion of the Piankatank River are listed as contaminated with Hg. Many of the same EGUs which contaminate the Mattaponi and Pamunkey Rivers also contribute to the contamination in Dragon Run Swamp and the Piankatank River.

health advisory for striped bass caught in Maryland waters of the Bay and Virginia DEQ fish tissue metals data identify numerous instances of Hg levels in striped bass caught from the James River in Richmond to waters of the Chesapeake Bay on the Eastern Shore of Virginia exceeding EPA's water quality criterion of 300 ppb. Given the mobility of this species of fish, it is highly likely that striped bass caught anywhere in coastal Virginia is contaminated with Hg.

To further highlight the point, 50 trustees, members, and staff of the Chesapeake Bay Foundation (CBF) who reside in Maryland and Virginia have had their hair analyzed for Hg content. The highest levels of contamination were found in individuals from Tidewater Virginia and the Virginia Northern Neck, 1.6-3.61 µg/g. These individuals eat fish caught locally on a regular basis. For these people and their families, it is not tuna fish caught far out in the Atlantic Ocean which is contaminating them but fish from Virginia waters. The commenter provided documentation which he claims establishes the correlation between Virginia EGU Hg emissions and local Hg deposition and contamination, and the CBF hair sampling project directly illustrates the point that EGU emissions must be reduced to the lowest possible level to avoid human health impacts.

The commenter stated that, in reference to the Steubenville, Ohio, study, EPA's "belief' that there will be no "utility" hotspots after CAIR implementation also disregards the Agency's own recent studies that show much higher percentages of EGU Hg emissions are deposited locally than the Agency's models underlying CAIR and CAMR would indicate.[158] A multi-year study of Hg deposition and source apportionment in the Steubenville, Ohio, area shows that "approximately 70 percent of [Hg] wet deposition at Steubenville...is attributable to local/regional fossil fuel (coal and oil) combustion sources.[159]

<u>Response</u>:

EPA properly looked at actual fish consumption patterns in the American population when analyzing Hg exposure. The Effectiveness TSD and the Reconsideration TSD analyzed a range of fish consumption rates (<u>see</u> Effectiveness TSD Table 6.4 and Reconsideration TSD Table 3.2), including rates that spanned the rate that the commenter stated would reflect the maximum consumption rate consistent with the EPA-FDA Joint Federal Advisory for Mercury in Fish (<u>see</u> http://www.epa.gov/waterscience/fishadvice/advice.html). Moreover, the commenter fails to note that the EPA-FDA Joint Federal Advisory for Mercury in Fish contains more information than a fish consumption rate. In fact, the advisory recommends that certain populations avoid consumption of certain fish because they contain high levels of Hg (the great majority of which comes from non-utility sources), limiting consumption of another type of fish (albacore tuna), and eating up to 12 ounces per week of fish lower in Hg. The advisory further recommends that local fish advisories be followed. Thus, the EPA-FDA Joint Advisory should be taken as a whole. We also note the studies allegedly showing that consumers of high levels of locally caught fish may have high levels of Hg in their hair does not appear to account for the fact that the test subject may also be consuming fish caught elsewhere in the world. Therefore, one cannot simply assume that the Hg levels in the hair samples is primarily the result of

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[158] Research in New Hampshire undertaken by Dr. Charles Driscoll, confirms the Steubenville link between local EGU sources and local Hg contamination.
[159] <u>See</u> Steubenville Study.

consuming locally caught fish, and that, furthermore, that the MeHg in the locally caught fish are primarily the result of U.S. power plant emissions.

EPA has stated in the supporting documents to the final rules that the CMAQ model provides a state-of-the-science computational platform for analyzing Hg transport, transformation, and deposition. EPA reviewed the model referenced by the commenter (and used by Cohen), HYSPLIT, and concluded that HYSPLIT's lack of inclusion of global background Hg concentrations, among other limitations, were significant flaws in its assessment of utility-attributable Hg emissions and deposition. However, a review of the HYSPLIT results still concludes that there are a collection of sources, both EGU and non-EGU, which contribute to the identified high Hg deposition areas – a conclusion which is consistent with the CMAQ results. Thus, EPA maintains that a regulatory program like CAIR and CAMR, which targets the largest emitters in a region, is the best approach to reducing emissions from such sources.

The HYSPLIT model was evolving and undergoing frequent changes during our regulatory development timeframe and, therefore, did not provide the stable modeling platform as required for our regulatory analysis. EPA went through a process of forming a stable version of CMAQ that was reflective of best-available science and consistent throughout this process. CMAQ includes highly-advanced meteorological inputs (NCAR/PSU Mesoscale Meteorological Model, Version 5) and advanced Hg atmospheric chemistry. For three-dimensional boundary condition inflow of pollutants (including Hg) into the regional CMAQ modeling domain, EPA used the output of the GEOS-CHEM global model developed by D. Jacob at Harvard University. The GEOS-CHEM global model-predicted pollutant concentrations, including Hg, were input to the CMAQ model as boundary condition inflow to the CMAQ continental U.S. regional modeling domain. The HYSPLIT model does not include the input of global sources of Hg. However, the CMAQ- and HYSPLIT-predicted Hg depositions from only U.S. utilities were compared for the Great Lakes region. The resulting Hg depositions for each of the Great Lakes are similar for the two models, especially for Lake Erie, which had the highest Hg deposition. The average annual Hg deposition predicted by CMAQ and HYSPLIT are within 1 ug/m^2 for each of the Great Lakes. Also, review of HYSPLIT modeling results for Chesapeake Bay indicate that it is the "aggregate" emissions of Hg from multiple sources that significantly contribute to deposition in water bodies, which is similar to our findings with CMAQ. Therefore, both models (HYSPLIT and CMAQ) are consistent in their showing that aggregate emissions are what matters for evaluating deposition. Given these results, it would seem that both models would support the sufficiency of the CAIR/CAMR approach to broad regional reductions in Hg emissions in reducing these deposition impacts in water bodies. These similar results occur even though the two modeling techniques are different (CMAQ – Eulerian, HYSPLIT – Trajectory) and each model used a completely different meteorological year (HYSPLIT – 1996, CMAQ – 2001).

In Section 4.3 of the Reconsideration TSD, we recognize that Chesapeake Bay is likely to be one of the estuarine ecosystems most sensitive to atmospherically-deposited Hg from U.S. power plants because of the significance of coal-fired power plants (20-30 percent of total in 2001) to overall atmospheric Hg deposition rates and its relatively small watershed-to-water-surface-area ratio (resulting in a greater importance of the atmospheric pathway compared to many other estuarine ecosystems). EPA's analysis of projected Hg deposition rates after implementation of CAIR and CAMR shows some of the largest reductions in Hg deposition are *expected to occur in the Chesapeake Bay region. In particular, utility-attributable Hg deposition after CAIR is expected to be in the range of 8.5 percent (and will be reduced even further following CAMR) of the total deposition. The percent of total Hg deposition attributable to utilities for the Chesapeake Bay watershed is somewhat less than the 8.5 percent for the Chesapeake Bay itself.*

In addressing the Steubenville Study, EPA believes that such studies are very beneficial in helping to understand the overall transport and fate of Hg pollution. EPA's air quality modeling showed that about half of the Hg deposited in the area around Steubenville comes from U.S. power plants while up to 70 percent of Hg deposition in areas just east comes from U.S. power plants. However, the Steubenville study can't be directly compared with the CAMR CMAQ model results for several reasons. The results being compared were based on two different meteorological years (2001 for CMAQ; 2003 for Steubenville), which could lead to significant differences in the modeled versus monitored Hg deposition results because of climatological differences in the two years of interest (e.g., wet versus dry years, different wind flow patterns, etc.). However, given these concerns, the results appear to be generally consistent with our CMAQ modeling in suggesting that a significant fraction of the Hg deposited in the area comes from power plants. As power plants in the area respond to CAIR and CAMR by installing scrubbers, NO_x *control (SCRs), and Hg-specific controls, this fraction will be reduced – more than a 80 percent reduction in Ohio and about a 90 percent reduction in neighboring States of Pennsylvania and West Virginia.*

Finally, we note that the species raised by commenters (i.e., striped bass or other fish that travel up freshwater rivers) were excluded from the analysis due to concerns about the methods to attribute MeHg in these species to utility Hg emissions. A sensitivity analysis that included these fish did not lead to substantially different results (see Effectiveness TSD, p. 21).

Comment:

Several commenters (6486, 6491, 6504, 6558, and 6621) support EPA's quantitative definition of "utility hotspot" and agree that utility Hg emissions will not result in hotspots after implementation of CAIR. The commenters support EPA's adoption of a reasonable definition and methodology for assessing whether Hg levels in water bodies exceed certain health-based water quality standards, thereby giving rise to "hotspot" concerns. Further, EPA's approach properly requires a nexus between elevated Hg levels and power plant emissions – "utility hotspots" will only be found where a utility's Hg emissions cause an exceedance of a water quality criterion in a specific water body. Data show that utility Hg emissions will not result in "hotspots" after implementation of CAIR.

In 1995, Hg emissions from U.S. coal-fired power plants comprised less than 1 percent of the global pool. EPA's reported to Congress in its Hg study that domestic power plants were responsible for emissions equal to 46.9 Mg – less than 3 percent of total global emissions and less than 1 percent of global emissions from anthropogenic sources.

EPA's 1997 and 1998 Reports to Congress conclude that Hg emissions from U.S. coal-fired power plants result in negligible local deposition. EPA's 1997 Report was based on extensive modeling of Hg deposition from power plants and accounted for variables in Hg speciation, stack height, plant design and climate. The models predicted negligible local deposition. EPA presented even lower estimates in 1998 and, the year after, EPRI reported that its analysis suggested even less local deposition.

More recent data support the conclusion that Hg emissions from coal-fired sources do not create or exacerbate problems associated with local deposition. The analyses that were once cited by EPA in support of its concern over hotspots created or exacerbated by power plant emissions fail completely to link elevated Hg levels in particular water bodies to nearby power plants, much less quantify the amount of deposition. More recent data suggest that certain hotspots were likely caused by sources other than utilities, such as small-hospital medical-waste incinerators and nearby Hg mines. More recent reports also conclude that power plant emissions are not a significant source of local deposition. Associated health risks are in fact quite small.

Response:

Without necessarily agreeing with every statement made by commenter, we agree that our definition and analysis of utility hotspots were reasonable.

Comment:

Commenters 6490 and 6612 stated EPA's definition of "Utility Hotspot" is unacceptable because it is highly susceptible to error by starting with model predictions rather than field measurements. Numerous researchers (including Miller, Grigal, Driscoll, Evers, and others) conclude that due to several factors affecting methylization rates of deposited Hg, MeHg hotspots do not always form in areas with high Hg deposition rates, although some hotspots form where Hg deposition is not maximized. These factors include water chemistry and pH, water through-flow (residence time), regional topography, microscale meteorology, and precipitation patterns. It is possible that certain factors can change over the years, leading to increases in hotspot development.

Commenters believe that the term "utility hotspot" should be derived by reviewing deposition rates utilizing the upcoming published literature to assess "deposition hotspots" as opposed to attempting to estimate utility-attributable MeHg levels in excess of the water quality criterion of 0.3 ppm. Also, commenters assert that the proposed definition appears to inappropriately focus on the singular ability of utility impacts to cause an exceedance of the water quality criterion. This may not account for significant utility-attributable increments of Hg in fish, which in combination with Hg that is historical or from other contemporary sources, results in exceedance of the water quality criterion.

It is troubling that EPA's definition of utility hotspot seemingly ignores these known facts and instead, starting with field measured hotspots and working backward to identify sources contributing to them, it chooses to start with the determination that must originate from modeling a certain level of Hg input to a fish's Hg uptake. The methodology used by EPA to determine "utility hotspot" is incorrect and likely to propagate uncertainties and error because critical assumptions and controversial methods are applied too soon in the process. The use of modeling up front to determine utility contribution with the CMAQ model begins on questionable footing. The process should be to apply sound science up front and build from there. In this case, hotspots should be measured in the field (fish, bird, insect, etc. sampling) regardless of source contribution. One can conclusively measure impact on wildlife and determine that something must be done and search for the major contributors. EPA approach uses an arbitrarily high threshold in fish blood that must be exceeded with a modeling demonstration to determine if a utility source is culpable. The approach takes liberties in how long the fish bioaccumulate MeHg and takes no preventive action until the damage is done. EPA also states that they are confident that there will be no "utility hotspots" after CAMR is implemented, but no such statement is made regarding "real measured hotspots" in the field. These are problem areas that need to be addressed regardless of source.

The next step should be to assess what sources are most likely to contribute. CMAQ is a tool that handles transport into the region but is not capable of handling near-field sources. Nearby sources must be assessed with other models such as ISCST3. Utility hotspots should be a subset of hotspots where a significant portion of the contribution is from a utility. Instead, EPA chose to load the uncertainty up-front where errors could propagate through the entire analysis. The uncertainty begins with the oversized grid cells (36 by 36 km). The large grid cells disperse and dilute the Hg evenly throughout the entire grid cell, an effect that that does not reflect the deposition variations described above and effectively spreads-out and minimizes contributions of any individual source as it applies to EPA's definition of utility hotspot. This combined with known errors in the emission inventory that underestimate Hg emissions and underestimated the proportion of reactive Hg emitted all act to bias conclusions in a way that reduces individual facility contribution hotspots. EPA has other modeling that demonstrates that the vast majority of emitted Hg deposits within 30 km (18 miles) of the source (see ISC3 modeling results). This corroborates with field studies in Florida and other studies in process that conclude that when emissions are reduced locally, MeHg concentrations in the nearby biota show significant recovery. Unfortunately, there is no attempt by EPA to reconcile the CAMR CMAQ modeling with these results. Instead, the more favorable and non-validated CMAQ results were used alone to conclude hotspots will not occur. New Hampshire has documented hotspots published in the peer reviewed literature and supplied to the docket in previous comments to EPA (see Evers, 2001, 2004, and 2005) and additional evidence supplied in these comments (Driscoll – paper in preparation). Further, in a case study conducted in New Hampshire by Evers, when Hg emissions were reduced within New Hampshire as the result of the New Hampshire Mercury Strategy, Hg found in loon blood immediately dropped sharply in areas near the affected sources, during a period in which global emissions remained stable (Evers 2004; Seigneur, et al., 2003; and Pacyna, et al., 2003). The Evers' papers also document a hotspot in the immediate downwind vicinity of the largest coal-fired power plant in the State. Although dispersion modeling of the facility (submitted to the docket in January 2005) clearly indicates the culpability of the source, EPA's definition of utility hotspot is unlikely to identify it as primarily culpable of causing the hotspot because of the large number of sources (EGU, industrial boiler, incineration, natural, and global) that also contribute in some way. Under CAMR, the facility could simply buy Hg credits and the hotspot can remain, with no certainly that other sources will make up the difference.

Finally, one commenter expressed concern that additional materials relevant to this request for comments were entered into the docket just days before the commenter submitted his comments and were entered without notification to those who may be commenting. This is especially troubling considering the Federal Register notice clearly states that requests to extend the comment deadline will be denied. Such action suggests that EPA seeks to avoid having the new material reviewed and results in inadequate notice and opportunity to comment.

Response:

EPA's methodology for estimating exposure and looking for the possibility of utility hotspots takes into account variability in methylation rates and bioaccumulation factors. This approach effectively takes into account many of the factors mentioned by the commenter such as water chemistry, pH, residence time, and regional topography, in part by using measured field samples of MeHg in fish tissue (e.g., empirical data) to represent and reflect the real-word variability in methylation rates and bioaccumulation factors – an approach recommended by the commenter. Other factors such as meteorology including precipitation are included in CMAQ. A definition based on deposition as the commenter proposes would not take into account this important variability that ultimately affects the potential human exposure to MeHg.

For the utility hotspot analysis, EPA utilized measured fish tissue concentrations that were a part of the NLFA and NLFTS databases. Actual concentrations of Hg in fish are a more direct measure of human exposure due to fish consumption than deposition. Additionally, most of the data in the NLFA are fish tissue samples obtained by States to determine where levels of Hg are unsafe and fishing advisories should be established. Essentially, most of the data in the NLFA database are the direct result of a sampling procedure biased to reveal problem areas or high levels of Hg in fish. Thus, the analysis performed in the Effectiveness TSD itself could be classified as a direct and conservative analysis of hotspots. The reader is also referenced to our responses in Section 1.1.1.1.2 of this document.

Commenter's concern that a facility could simply buy Hg credits and the hotspot remain reflects a misunderstanding of the cap-and-trade approach. A facility can buy allowances only if another has reduced emissions, producing allowances to sell (i.e., "make up the difference").

The CMAQ model contains the best science available to EPA to model Hg deposition. The CMAQ model contains much more sophisticated atmospheric chemistry and deposition algorithms than the ISC3 model. The NYDEC model comparison findings to date show CMAQ to be the best performing regional photochemical model for predicting wet deposition at the MDN sites.

EPA agrees that there is currently a lack of Hg air quality and Hg dry deposition monitoring sites to evaluate CMAQ or any other model predictions. However, there is an adequate number of monitoring sites in the MDN domain to adequately evaluate CMAQ Hg wet deposition predictions. The CMAQ performance evaluation for wet deposition is provided in the Air Quality Modeling TSD. In this model performance evaluation, when averaged annually over all MDN monitoring sites, CMAQ underestimated Hg wet deposition by approximately 23 percent with a fractional error of approximately 30 percent. The four MDN sites in the western domain do not provide an adequate or representative basis for inferring model performance in *the western U.S. Although CMAQ tends to underpredict Hg wet deposition on average, the majority of sites in the MDN are within 30 percent of the modeled values. Such comparable results are extremely encouraging when evaluating ambient measurements and corresponding numerical grid model outputs. It is important to acknowledge how CMAQ is used in the public health analysis when considering the differences between MDN sites and CMAQ. In particular, the modeling for the public health analysis did not use model-predicted results on an absolute basis (i.e., μg/m^2). The CMAQ-predicted Hg deposition data were applied proportionally to change the sampled fish tissue concentrations to represent decreases in utility-attributable Hg deposition. Therefore, even if CMAQ underestimates absolute deposition by a certain percent, it does not necessarily mean that utility-attributable exposure will be underestimated. Instead, the relevant issue for the exposure analysis is how accurately CMAQ apportions deposition between utilities and other sources.*

As explained in the Effectiveness TSD and elsewhere in this document, EPA had several reasons to support using HUC-8 and, therefore, a 36-km grid square size. This document outlined three reasons for using a 36-km grid square size as opposed to a smaller size. First, the larger grid size would account for Hg deposition that enters a watershed through subsurface inflow and runoff, as opposed to a smaller grid size which may only account for direct inputs to surface water. Secondly, in larger water bodies where there is substantial fishing activity, the fish species consumed by humans are likely migratory and the accumulation of Hg in these fish will come from deposition over a larger area. Third, many fishers may catch fish from a variety of water bodies in a watershed, thus, a larger grid size would account for this fishing pattern.

EPA has addressed the issues specific to New Hampshire emissions inventory elsewhere in this document. The table below provides information on the estimated reductions in Hg deposition in New Hampshire as a result of CAIR and CAMR. As can be seen, regardless of the situation now, implementation of CAIR and CAMR will lead to significant reductions in Hg deposition in New Hampshire.

Table 5. Estimated Reductions in New Hampshire Hg Deposition as a Result of CAIR and CAMR.

State	*Average deposition is in μg/m^3 and is representative of concentration*				
	2001 average deposition from all sources	*2001 average deposition from EGUs*	*2001 percent of average deposition attributable to EGUs*	*2020 predicted average deposition from EGUs*	*Percent reduction in utility-attributable average deposition*
New Hampshire	*14.6*	*0.9*	*5.9 percent*	*0.27*	*68.6 percent*

With regard to the commenter's concern about the docketing of additional materials, the language of the comment letter is unclear as to whether the reference is to the "hotspots" issue (which immediately precedes the language in the comment letter) or the reconsideration in general. EPA has reviewed the docket and has not found any entries that would fit the *commenter's description that relate to the "hotspots" issue. Eleven entries were made to the "Supporting Documents" section of the CAMR docket between October 28, 2005 (the date of publication of the reconsideration notice in the* Federal Register*) and December 19, 2005 (the end of the public comment period). Only two of those entries (entries EPA-HQ-OAR-2002-0056-6449 and -6450) were made "just days" before the commenter submitted his comments (the comment letter is dated December 19, 2005). These two entries (which are, in fact, duplicative of each other) were entered on December 13, 2005 – the remaining nine entries were made between November 10 and 30, 2005. The two entries contain the results of IPM modeling and support Section 16 of the Reconsideration TSD (a short section that discusses how marginal costs would not significantly increase if a particular group of States did not participate in the CAMR trading program). Thus, these entries have nothing to do with the "hotspots" issue and there is no concern related to opportunity for "notice and comment" as indicated by the commenter. The remaining nine entries relate to (1) a discussion of figure 11.1 in the Reconsideration TSD, (2) two journal article references, (3) records of two meetings (with STAPPA/ALAPCO related to their "model rule" and with the National Mining Association), (4) three monitoring-related supporting documents, and (5) the transcript of the public hearing. It does not appear that, nor have commenters shown that, these entries have any bearing on the "hotspot" issue or on any of the other issues that were opened for reconsideration. Further, EPA is not aware of any process, past or present, whereby the public (i.e., the overall pool of "those who may be commenting") has been, or can be, notified when docket entries are made.*

Comment:

Commenters 6280 stated that EPA's MeHg water quality criterion is not sufficiently protective of consumers of seafood. EPA arbitrarily and capriciously relied on a MeHg water quality criterion (MeHg criterion or criterion) that is not adequately designed to protect consumers of fish.

The MeHg criterion is supposed to be designed to protect human health and is intended to be used by States in setting water quality standards.[160] "Because of the wide variability in MeHg accumulation among water bodies," EPA set the MeHg criterion "as a fish tissue level rather than as an ambient water concentration."[161] EPA set the criterion at 0.3 mg/kg (i.e., 0.3 milligrams of MeHg per kilogram of wet-weight fish tissue).[162] In setting the MeHg criterion, EPA assumed a "default" level of fish consumption of 17.5 g/day (i.e., two 8-ounce meals a month). That is to say, assuming people consume an average of 17.5 g/day of fish, the MeHg concentration in fish cannot be higher than 0.3 mg/kg if adverse health impacts are to be avoided. If people in fact consume more than the default level of 17.5 g/day of fish, then the MeHg criterion needs to be set lower than 0.3 mg/kg in order to avoid adverse health impacts. However, people, on average, do in fact consume more than 17.5 g/day of fish. In a study conducted in New Jersey, Stern, et al., (1996) estimated that the average fish consumption among fish consumers in New Jersey was 50.2 g/day, and the average in the population of

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[160] See OAR-2002-0056-6293, Exh. 24, at 44. Notably, although the establishment of the water quality criterion took place over several years, EPA failed to previously provide adequate notice of how criterion would be used, therefore limiting the opportunity for meaningful public input into the criterion.

[161] Id. at 43.

[162] Id.

women of childbearing age was 41.0 g/day. The corresponding 95th percentiles were 137.7 and 106.8 g/day.[163] EPA's own advisories confirm this. In advisories directed to pregnant women and others, both EPA and the U.S. Food and Drug Administration (FDA) endorse the consumption of "up to 12 ounces" per week of a variety of fish considered "lower in mercury."[164] This joint EPA-FDA advice, which emphasizes the benefits of omega-3 fatty acids from seafood, equates to a consumption rate of up to 52 ounces/month or 49 g/day – which is much higher than the default intake of 17.5 g/day that EPA assumed in setting the 0.3 mg/kg criterion. It is arbitrary and capricious for EPA to base its assessment of the health hazards posed by EGUs on an assumption that people eat less fish than EPA itself advises them to eat.

In addition, other EPA guidance recognizes that many Americans eat more fish than the default intake of 17.5 g/day that EPA assumed in setting its fish tissue criterion, and that the 0.3 mg/kg criterion needs to be adjusted downward in such cases to a lower value such as 0.12 mg/kg. For example, EPA's National Coastal Condition Report II assumes a fish consumption rate of four 8-ounce fish fillet meals per month (equivalent to 32 oz/month or 30 g/day) and shows 0.12 ppm or 0.12 mg/kg as the lower acceptable concentration limit of MeHg in fish tissue at this consumption rate.[165] Further, the seafood consumption rate averaged over the entire U.S. population clearly differs from the "consumer-only" seafood consumption rate averaged over that portion of the U.S. population that actually eats seafood. The New Jersey study cited supra showed mean intakes among fish consumers that was nearly three times EPA's default estimate.[166] In addition,[167] the petitioner cites two studies published in the 1980s that showed mean intake rates for "consumers only" ranging from 48 g/day to 111 g/day, where the latter value (111 g/day) was for women consumers only, aged 19-50.[168] Therefore, EPA improperly diluted the mean seafood consumption rate by including people who do not eat seafood.

Finally, the MeHg criterion fails adequately to protect the many Americans who are already exceeding EPA's RfD as a result of their seafood consumption.[169] In effect, these individuals' RfD for MeHg has already been exhausted by the dose they currently receive from fish consumption, so they cannot safely consume recreationally-caught freshwater fish that contain 0.3 mg utility-attributable Hg.[170] In short, MeHg exposure is a function not only of how much fish is consumed, but also of the MeHg concentration in the fish. To the extent that EPA underestimated the amount of fish consumed, the MeHg criterion of acceptable levels of MeHg

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[163] See OAR-2002-0056-6293, Exh. 18.

[164] See OAR-2002-0056-6293, Exh. 19.

[165] See OAR-2002-0056-6291, Exh. 9 at 48 and 53; EPA, OAR-2002-0056-6293, Exh. 16 at Vol. 2, Appendix B, Table 4-3 (showing how fish consumption must be decreased as the Hg concentration in fish increases or, conversely, how the 0.3 mg/kg fish tissue criterion must be lowered as fish consumption increases).

[166] See OAR-2002-0056-6293, Exh. 18.

[167] See Gassel (1997), at 38.

[168] See OAR-2002-0056-6293, Exh. 15.

[169] Anyone whose average seafood consumption exceeds any of the following levels is already above the RfD: 23.3 g/day of seafood that contains an average of 0.30 mg MeHg per kg of fish, or 28.0 g/day of seafood that contains an average of 0.25 mg MeHg per kg of fish, or 35.0 g/day of seafood that contains an average of 0.20 mg MeHg per kg of fish, or 46.7 g/day of seafood that contains an average of 0.15 mg MeHg per kg of fish, or 70.0 g/day of seafood that contains an average of 0.10 mg MeHg per kg of fish.

[170] For such people, EPA's computer modeling would need to identify watersheds that, after implementation of CAIR and CAMR, contain zero (rather than 0.3 mg) utility-attributable Hg per kg of recreationally-caught freshwater fish tissue.

concentrations in fish tissues is too high. The result is a level of MeHg exposure that is not protective of public health.

Response:

EPA disagrees that its MeHg water quality criterion is inadequate to protect consumers of fish. The water quality criterion is designed to protect fish consumption for a majority of the general U.S. population. EPA performed extensive analysis of actual consumption data and based its water quality criterion on an estimate of typical fish consumption. EPA then chose the 90th percentile value from the distribution of the data for over 15,000 individuals surveyed in a statistically representative national study (specifically, the U.S. Department of Agriculture's [USDA's] 1994-1996 Continuing Survey of Food Intake by Individuals), in order to establish the criterion at a level protective of the majority of consumers. EPA also disagrees that its water quality criterion for MeHg is not protective of consumers of seafood. The fish consumption rate used by EPA for deriving its MeHg water quality criterion includes intake of both freshwater and estuarine finfish and shellfish. EPA further accounted for the additional intake of marine species of finfish and shellfish when it developed the MeHg water quality criterion (representing a total fish consumption intake of 30 g/day).[171] The national recommended water quality criterion for MeHg is guidance for States and authorized Tribes to consider when developing their water quality standards. EPA's guidance strongly encourages States and authorized Tribes to consider more highly exposed population groups and to use more protective assumptions if warranted when developing their own water quality standards.

EPA agrees with the commenter that people consume varying amounts of fish. The Agency took this into account in estimating Hg exposure attributable to power plants (see, for example, Table 6.4 in Effectiveness TSD, and Reconsideration TSD). In that analysis, EPA modeled potential exposure for individuals consuming up 207 g/day (the 99.9th percentile for the general public) and 295 g/day (the 99th modeled percentile for Native American subsistence fishers) for saltwater and freshwater, respectively.[172] The fish consumption rate used to determine the MeHg water quality criterion of 0.3 mg/kg is set to be the 90th percentile of the general public (17.5 g/day uncooked, 11.7 g/day cooked). Thus, the water quality criterion is a useful tool for measuring hotspots because it uses a consumption rate towards the high end for the general public. We note, however, that the IDI analysis considers a wide range of consumption rates, including the range used in the water quality criterion.[173] Both the utility hotspot analysis and the IDI analysis support our decision that it is neither appropriate nor necessary to regulate Utility Units under section 112.

We note that the water quality criterion does account for other exposure pathways (e.g., marine fish) by including a relative source contribution (RSC) (<u>see</u> 70 FR 16014). As applied to

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[171] We note that this total consumption rate of 30 g/day is higher than the 20.1 g/day used in our alternative global emissions analysis. <u>See</u> Reconsideration TSD, Section 8. That is because the 30 g/day is a joint rate assuming the 90th percentile value, while the 20.1 g/day is the recommended value from the Exposure Factors Handbook (Section 10.10.1).

[172] As discussed elsewhere, in Table 3 of this document we also looked at the 99th survey percentile consumption rate of 389 g/day.

[173] Note that, even if a State were to adopt a lower MeHg water quality criterion, the underlying fish consumption rate would almost certainly be within the range considered as part of the IDI analysis.

this analysis, the RSC is conservative because it implicitly assumed that all MeHg exposure from the other pathways is attributable to power plants. Moreover, in the Reconsideration TSD, EPA conducted an analysis of the MeHg consumption in seafood in the context of the IDI analysis. This analysis confirmed EPA's original position that the utility-attributable portion from this pathway is small. In addition, EPA analyzed the impact on very high-end consumers, assuming that they were exclusively eating fish with some of the highest levels of Hg contamination. Based on this analysis, EPA continues to maintain its position that the utility-attributable portion of Hg in the seafood diet is not significant. Applying the Methylmercury Water Quality Criterion including the RSC conservatively overestimates the power plant contribution because it incorrectly and conservatively assumes that the entire RSC is utility attributable.

The commenter argues that no amount of Hg exposure due to power plants is safe for individuals already exposed above the RfD due to other sources. As described elsewhere, EPA believes it is appropriate to look at exposure due solely to power plants in evaluating whether it is appropriate and necessary to regulate power plants under CAA §112.

1.1.3.5 Cross-Cutting Issues

1.1.3.5.1 Regulation of Power Plant Hg Emissions under CAA §112 Beyond CAIR

Comment:

Commenters 6280 stated that EPA failed to take into account information centrally relevant to the Agency's cost-benefit analysis. On February 22, 2005, the NESCAUM sent a report to EPA's air docket analyzing the cost savings and public health benefits of controlling Hg emissions from power plants.[174] The Study was prepared by the Harvard Center for Risk Analysis, funded by the EPA, co-authored by an EPA scientist, peer-reviewed by two other EPA scientists, and yet–despite its central relevance – was not considered in the Final Rule. The NESCAUM Report reveals that EPA miscalculated the "nature of the risk involved" by underestimating the public health benefits of reducing Hg. Specifically, the NESCAUM Report indicates that the public benefit of reducing power plant Hg emissions to 15 tons per year ranges from $119 million annually (if only persistent IQ deficits from fetal exposures to MeHg are counted) to as much as $5.2 billion annually (if IQ deficits, cardiovascular effects, and premature mortality are all counted).[175]

On April 28, 2005, an unpublished report that was funded and completed by EPA's Office of Wetlands, Oceans, and Watersheds became available to the public.[176] This study found that a 30 - 100 percent reduction of Hg emissions would translate into a $600

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[174] See EPA-HQ-OAR-2002-0056-5749 (NESCAUM Report or Report).

[175] Commenter contends that EPA has argued that the uncertainty inherent in some of the risk calculations in the NESCAUM Report led to the Agency's decision not to consider its results. See OAR-2002-0056-6293, Exh. 21. However, although the NESCAUM Report indicates that the predicted benefits associated with cardiovascular effects should be viewed with caution and notes the need for additional studies, id. at 209, the NESCAUM Report's low number, $119 million, addresses only the highly documented costs of IQ deficits from fetal exposures to MeHg. EPA was unreasonable in not taking at least this lower number into account; NESCAUM Report at 189-190, Table 84.

[176] See OAR-2002-0056-6293, Exh. 20.

million to $2 billion cost savings.[177] The cost savings were largely attributable to reduced health risks, including cardiovascular risks.[178] The study further found that Hg sources in the U.S. account for about 40 percent of the total Hg deposition to the South Atlantic coastal locations studied.

Response:

EPA's position on the NESCAUM Report is presented in the Reconsideration TSD and below. As explained in the Reconsideration TSD, one of the concerns with the NESCAUM Report is that it relied on a then unpublished (and largely unavailable) study by Cohen, et al., to estimate a Hg-IQ dose response relationship. Since the Reconsideration TSD was issued, the Cohen, et al., study was published and the Agency has now had an opportunity to review that analysis and provides the following observations not available at the time that the Reconsideration TSD was issued. The approach taken by Cohen, et al., is, in general, a reasonable use of the available data to derive an estimate of the dose-response relationship. As discussed in more detail below, it is evident that the result is highly sensitive to the assumptions made in converting the log regression coefficients from the Faroe Islands study into linear regression coefficients. The approach taken by EPA and Dr. Ryan differed from that of Cohen, et al., in a number of respects, but one of the most important differences is that EPA obtained linear regression coefficients directly from the Faroe Islands research team, thus, eliminating the need to make assumptions to convert the log regression coefficients into linear coefficients. If the Cohen, et al., analysis were revised to incorporate the linear coefficients provided by the Faroe Islands researchers to EPA, it is likely that Cohen, et al., would produce a coefficient very similar to that estimated by Dr. Ryan and used by EPA in its benefit-cost analysis.

As noted by the commenter, the study by EPA's Office of Wetlands, Oceans and Watersheds is unpublished. Further this study was intended for Agency use to identify knowledge gaps and guide research, and was never intended to form the basis of regulatory decisionmaking. As a result, EPA did not rely on information from this study for the purposes of the Section 112(n) Revision Rule or CAMR. Instead, EPA looked at the same issues in the supporting documents (for example, see Effectiveness TSD and the Reconsideration TSD).

Comment:

Commenters 6280 stated that EPA failed to take into account information centrally relevant to EPA's analysis of the environmental impacts of Hg. The March 2005 edition of *Ecotoxicology*, which was published the same month the Final Rule came out, is dedicated to Hg and reveals that several of EPA's central premises are flawed. For example, these studies indicate that there is more Hg deposition to some areas of northeastern North America than previously projected; many animals other than fish have elevated Hg burdens; both local Hg emission sources and watershed characteristics are important to the creation of biological hotspots; and the current Federal monitoring of Hg needs to be expanded.[179]

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[177] See OAR-2002-0056-6293, Exh. 20 at 6.
[178] See OAR-2002-0056-6293, Exh. 20 at 6.
[179] See Evers Decl. at ¶ 4 (OAR-2002-0056-6291, Exh. 3); see also Driscoll Decl. at ¶ 3 (OAR-2002-0056-6291, Exh.4).

On April 21, 2005, a month after the publication of the Final Rule, an Air Resource Scientist from the National Oceanic and Atmospheric Administration made a presentation to a Mercury Working Group demonstrating the importance of weather in Hg deposition.[180] The presentation demonstrates that domestic sources account for approximately half of the total Hg deposition in the nation and are the predominant cause of Hg deposition in the eastern portion of the U.S.[181] This conclusion undermines EPA's approach in the Final Rule, which overstates the importance of the global pool of Hg emissions and fails to give sufficient weight to the importance of local deposition of Hg.

The May 2005 edition of *Environmental Health Perspectives* (which was posted on-line on February 28, 2005, after the close of the public comment period but before the Rule was published) indicates that EPA underestimated the health benefits to be gained from reducing Hg. In one study, scientists from the Mount Sinai School of Medicine examined national blood Hg prevalence data from the Centers for Disease Control and Prevention and found that between 316,588 and 637,233 children each year have cord blood Hg levels greater than 5.8 micrograms per liter – the level associated with loss of IQ.[182] They estimated that the resulting loss of intelligence and diminished economic activity amounted to $8.7 billion annually, with $1.3 billion each year being directly attributable to Hg emissions from power plants.[183] The scientists further caution that "these costs will recur each year with each new birth cohort as long as Hg emissions are not controlled."[184]

Commenter 6612 stated EPA's Reconsideration TSD includes a fairly detailed discussion of some of the key and arguable approaches utilized in the NESCAUM Report, but only mentions the study by Trasande, et al., (2005). The estimation of health costs conducted by Trasande, et al., utilized different approaches than either EPA or the NESCAUM Report, and warrants a similar level of review and comment by EPA.

<u>Response</u>:

The articles included in the March 2005 edition of <u>Ecotoxicology</u> deal primarily with the environmental fate and transport of Hg. Some provide new information about the levels of Hg in individual species; however, no new information is offered about the toxic effects of Hg exposures on these species. Although the content of the March 2005 edition of <u>Ecotoxicology</u> offers a deeper understanding of Hg movement through the environment in the specific ecosystems studied, it does not address the toxic effects of Hg exposures on individual species. Furthermore, studies analyzing Hg content in wild species are published frequently. None of the articles present information that lead to different conclusions than those previously drawn by EPA.

EPA believes that many of the assumptions made in the Trasande Article lead to an

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[180] <u>See</u> OAR-2002-0056-6293, Exh. 22, p. 9. Also available at: http://www.arl.noaa.gov/ss/transport/cohen.html.
[181] <u>Id</u>. at 39.
[182] <u>See</u> OAR-2002-0056-6293, Exh. 23 (Trasande Article).
[183] <u>Id</u>. at 593-94.
[184] <u>Id</u>. at 594.

extreme overstatement of the benefits of Hg reduction (or cost of Hg exposure). Most importantly, the article as originally published contained an error in the estimate of the linear dose-response curve that that overstated the estimates of that model by a factor of 10. After correcting for this error and correcting a few other points, the authors will publish a range of estimates from this analysis that is substantially lower. In fact, EPA's estimates fall within the range of the corrected estimates, even accepting the author's other assumptions. However, EPA believes that there are other assumptions embedded in the Trasande, et al., analysis that overstate the possible benefits from Hg reductions.

The assumptions regarding the amount of Hg in the supply of edible fish in the U.S. is likely overstated, leading to an overstatement of the costs of Hg exposure. In determining the amount of Hg in fish attributable to U.S. sources, the Trasande Article notes that 42 percent of the supply of edible fish in the U.S. is imported and that 2 percent of the Hg content of imported fish is due to American anthropogenic sources (41 percent of which are attributable to electric utilities). Hence, 58 percent of the U.S. supply is not imported. The article assumes that the U.S. anthropogenic Hg content of these fish is 60 percent (again, 41 percent of which are attributable to electric utilities). The article uses these figures to estimate that 36 percent of Hg in the U.S. fish supply is attributable to U.S. sources. Following their logic, leads one to assume that 15 percent is due to U.S. electric utilities.

There are significant uncertainties associated with estimates of contribution of various sources of emissions to the Hg contribution in fish, particularly for marine species. As noted previously, modeling what, if any impact, reduction in Hg deposition from U.S. electric utilities would have on Hg concentration in ocean fish is complicated by the non-linear relationships between changes in human emissions, atmospheric Hg deposition over the oceans, water column concentrations and fish Hg concentrations. Most Hg deposited on the surfaces of the oceans originates from sources other than utilities in the U.S. Once deposited on the surface of the ocean, atmospheric Hg originating from electric utilities and other sources undergoes a number of transformations that affect its distribution in the ocean and its relative bioavailability to organisms. Only a small fraction of the ambient Hg in the ocean is present as MeHg (Hayes, et al., 2006; Morel, 1998). Bioaccumulation at the base of the food chain is controlled by the MeHg concentration in water not the total Hg concentration in water. Thus, marine fish Hg concentrations are highly affected by factors influencing MeHg formation and concentration in the oceans. However, there is a paucity of field data on factors controlling MeHg formation and concentrations in marine environments and it is not clear where the majority of methylation occurs in the ocean (Mason and Gill, 2005).

Putting aside the above complications, there are a number of reasons to question the assumptions in the Trasande Article. The estimate that 42 percent of the U.S. edible fish supply is imported is based on landings. However, a more relevant piece of information is that marine species comprise approximately 96 percent of the market share of seafood, which includes freshwater and marine fin and shell fish (Carrington, Montwill, and Bolger, 2004). Given that the majority of these marine species are ocean species, their Hg content is likely influenced by the global Hg pool. One could make this same argument by examining the habitat of fish. For example, it is highly unlikely that 40 percent of Hg content in pollock, which has an 11 percent share of the seafood market, is due to U.S. sources. Well over 95 percent of the pollock supply in *the U.S. is Alaskan Pollock from the Pacific Ocean – U.S. sources are located east of the Pacific and the prevailing winds in the U.S. are easterly. Similarly, over 90 percent of the cod supplied in the U.S. is Pacific cod.*

EPA also questions the assumption that 60 percent of the Hg content in fish affected by domestic deposition is due to U.S. sources. Although there may be some areas in the U.S. that have a high proportion of the Hg deposition due to U.S. sources, it almost certain that this 60 percent assumption for the entire country is a gross overestimate. EPA's modeling suggests that of the 144 tons of Hg deposition in 2001, approximately 23 tons, or 16 percent, was due to deposition from U.S. and Canadian sources. The remaining 84 percent was due to deposition from sources outside of the U.S. and Canada. This percentage is expected to decline further with the implementation of CAIR.

In addition, there are several issues related the derivation of IQ decrements associated with exposure to Hg. First, the primary estimate of IQ decrements used by Trasande, et al., is based on the conclusion of the Faroe Islands researchers, using a logarithmic model, that a doubling of maternal Hg body burden results in a decrement in neurodevelopmental functioning of approximately 10 percent of a standard deviation. For IQ, which has a standard deviation of 15, this translates into a decrement of 1.5 IQ points. However, the NRC, in "Toxicological Effects of Methylmercury," discussed issues related to the dose-response function. The NRC cautioned against using a log-transformed (i.e., supralinear) dose-response function. The EPA believes that a linear model, which the authors do present as a sensitivity analysis, is more appropriate in this case.

For its analysis, EPA used a statistical analysis to integrate data from the three major studies investigating the potential neurotoxicity of low-level, chronic Hg exposure. The integrated statistical analysis produced a dose-response relationship with a central estimate of -0.16 IQ points per ppm of Hg in hair. This implies a relationship of -0.032 IQ points for each 1 ppb in cord blood. In the published version of the paper, Trasande's linear model used a dose-response relationship of 0.59-1.24 IQ point decrements for every 1 µg/L increase in cord blood Hg concentration. The authors have revised this value downward by a factor of 10 to correct for error in the conversion of the relationship between cord blood and neurodevelopmental effects. The author's mean estimate of the linear dose-response slope is now -0.093 IQ points for each 1 ppb of Hg in cord blood, or more than double the value used by EPA using the integrated data.

Finally, it should be noted that the results from Trasande, et al., overstate the economic benefits. First, Trasande, et al., is evaluating the immediate elimination of <u>all</u> *anthropogenic Hg (i.e., not just that from U.S. coal-fired EGUs). It does not include CAIR in its baseline, yet the correct measure of benefits from further regulating Utility Units must take into consideration existing requirements. Second, Trasande's environmentally-attributable fraction model is a relatively simple approach compared to the EPA's spatially explicit model of Hg deposition used for CAMR. Finally, unlike EPA's benefits analysis (*<u>see</u> *Reconsideration TSD, Section 8), the approach used by Trasande, et al., does not account for the either the response time in implementing Hg reductions or the response time of the environment to these reductions. The environmental response time alone has been estimated to be on the order of decades before the benefits of Hg reductions are fully realized.* <u>See</u> *Reconsideration TSD, p. 2; CAMR RIA at 3-36.*

Comment:

Commenter 6475 noted that EPA has requested comment on a number of studies that State and environmental petitioners mention in their petitions for reconsideration as being important to the Hg debate and possibly producing a different outcome to EPA's rulemaking. The commenter believes that petitioners' claims about these seriously flawed papers do not withstand scrutiny. The papers cited by petitioners[185] were either submitted to the docket only days before EPA issued its final rule on March 15, 2005 or were never submitted to the docket at all. The commenter suggested that one must wonder whether the timing of the release of these papers was aimed at maximizing their public relations value while avoiding any challenges to their scientific merit. Indeed, a review of the papers reveals that they contain questionable science and arrive at conclusions that aim to advance a given policy viewpoint even if the scientific evidence does not support that view.

The commenter noted that one report mentioned by both petitioners is the NESCAUM Report prepared by Rice and Hammett. Before addressing the merits of that report, two events in its history bear mentioning. First, the commenter and other industry groups sought a draft of this report well before its release in February 2005 because NESCAUM had chosen to selectively quote and summarize the report in its comments on EPA's NODA.[186] NESCAUM refused to make a copy available, claiming the report was undergoing "peer review." Second, there is no evidence in the rulemaking record that the report was actually "peer reviewed" as that process is defined by EPA. If individuals other than the authors reviewed the NESCAUM Report, there is no evidence that those persons were chosen so as to represent a wide variety of viewpoints as is required for formal peer reviews EPA conducts on documents it produces.

Commenter 6475 stated that the NESCAUM Report does not contain any new scientific work. Rather, the report relies on several outdated scientific studies and selectively uses and quotes from other reports to support the report's central thesis that large benefits can be obtained from controlling Hg emissions from coal-fired power plants. Among the main problems in the report are:

The report uses REMSAD modeling results that are over two years old and which overstate local deposition because the REMSAD runs used incorrect Hg atmospheric chemistry. The local and regional deposition predicted by REMSAD is twice as high as more recent Hg deposition results produced by EPRI using the TRUE model and EPA using CMAQ.

The NESCAUM Report assumes that the linear relationship between Hg deposition and MeHg that has been used for freshwater fish also applies to ocean fish. However, there is no evidence of such a relationship in marine environments. Indeed, the report itself notes that

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[185] See, e.g., NESCAUM Report; Clean Air Act: Observations on EPA's Cost-Benefit Analysis of Its Mercury Control Options, GAO-05-252, (February 2005); Mark Cohen, Source Attribution for Atmospheric Mercury Deposition: Where Does the Mercury in Mercury Deposition Come From?, NOAA, Air Resources Laboratory, U.S. Dept. of Commerce, (April 2005); Trasande Article; Douglas Rae and L. Graham, Benefits of Reducing Mercury in Saltwater Ecosystems: A Case Study, Office of Wetlands, Oceans and Watersheds, USEPA (2005) (saltwater fish report).

[186] See OAR-2002-0056-5477.

historic testing of tuna reveals little change in MeHg levels between 1971 and 1998 even though anthropogenic Hg emissions decreased substantially during this time period. The report even acknowledges that "the possibility exists that there may be no change in marine fish MeHg concentrations as a result of Hg emissions controls."[187] Yet, despite this statement the authors proceed to assume a linear relationship between deposition and MeHg levels in marine fish and to present their worst case results as the true indicator of the benefits of controlling Hg emissions from coal-fired power plants.

In calculating Hg exposures in the U.S., the NESCAUM Report used old data on fish landings and imports, not more recent data on fish consumption from the USDA. The report relies on Hg levels in pike to represent the exposure of high-end U.S. consumers. The pike data are so extreme that they should not have been used to represent any type of U.S. fish consumption. The Centers for Disease Control and Prevention (CDC) exposure study asked about the consumption of specific fish. Among the women and children responding in the first two years of the CDC study only three pike meals were reported out of a total of over 11,000 fish meals. In the next two years of data collection, no pike meals were reported out of over 6,600 fish meals.

The report uses a value for decrement in IQ from Hg exposure that comes from a New Zealand study. In that study, the change in IQ outcomes as the result of Hg exposure was found not to be statistically significant. In other words, the IQ changes found in the New Zealand test population could not be distinguished from random IQ scores in a population of such children. Thus, one cannot determine whether the change in IQ was due to Hg exposure or not. Even assuming the New Zealand report produces valid IQ-Hg correlations, a question still remains as to whether the observations on the ethnic groups of New Zealand are valid for U.S. children.

The NESCAUM Report attempts to quantify cardiovascular effects as a way to demonstrate that significant benefits will occur from reducing Hg emissions from coal-fired power plants. The link between Hg exposure and cardiovascular disease is extremely tenuous. The Salonen study that finds a cardiovascular effect is an outlier. The vast majority of studies have shown that fish consumers have a lower incidence of cardiovascular disease those who do not eat fish. Indeed, a series of reports in the November 2005 issue of the American Journal of Preventive Medicine conclude that fish consumption reduces the risk of cardiovascular disease. The authors of the NESCAUM Report even state: "Again, the external generalization of the Salonen [Hg-cardiovascular disease] data and the resulting application is extremely uncertain." Yet despite this stated concern, the authors proceed to base the "punch line" of their report on a benefits analysis whose largest benefit component is cardiovascular effects.

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[187] For instance, although in the body of its report the authors of the NESCAUM Report note that existing studies concerning cardiovascular events associated with adult Hg exposure "have not been subject to rigorous scientific analysis as a group" and are insufficient to rely on to determine any monetized benefits from avoidance of cardiovascular events due to decreases in Hg emissions, the report trumpets monetized benefits from the avoidance of cardiovascular events due to decreases in Hg emissions ranging from $48 million to $4.9 billion based on those very same reports. See NESCAUM Report at 107, 108. Elsewhere, the authors assume that decreases in Hg emissions from coal-fired power plants will lead to proportionate decreases in marine fish, even though they acknowledge that testing of tuna over a 27-year time frame showed little or no change in MeHg levels. See NESCAUM Report at 113.

The commenter stated that the Trasande Article suffers from many of the same infirmities as the NESCAUM Report. The report relies on outdated information and in many instances shows a lack of knowledge about Hg in the environment. Scientific weaknesses of the Trasande Article include:

Like the NESCAUM Report, the Trasande Article relies on New Zealand data to develop an IQ correlation. The IQ outcomes in the New Zealand work were not found to be statistically significant.

The report only uses the first two years of NHANES data. Data from the subsequent two years show a significant reduction in number of the women of childbearing age who had exposures above the MeHg RfD. For the years 1999 and 2000, 7.8 percent of the women tested had levels of Hg in their blood that were at or above the levels of EPA's RfD for MeHg. For the years 2001 and 2002, the percentage of women with blood levels above the RfD dropped in half to 3.9 percent.

The Trasande Article makes an adjustment for the use of cord blood data instead of hair data. The problem with this adjustment is that it results in double counting. Uncertainty about the cord blood relationship was already cited by EPA as a reason for adding a factor of three to the RfD uncertainty factor. The decision in the Trasande Article to essentially adjust the RfD without also changing the uncertainty factor results in double counting.

The report uses outdated dispersion modeling results that rely on old Hg chemistry information. This probably results in an overestimate in effects by at least a factor of five.

The report shows a lack of understanding about the movement of Hg in the environment. The report never mentions the time lags that occur between the reductions of Hg from a given source and the decrease in the levels of Hg in an environmental media. The report also confuses the form of Hg that converts to MeHg in water bodies.

Finally, the report overstates the Hg deposition inventory in the U.S. and the utility industry's contribution to that deposition. The result is another overestimate by at least a factor of 2.5.

The commenter stated that the saltwater fish report contains many of the same scientific problems as the Harvard and Trasande Studies. In addition, it is unclear whether the purpose of the saltwater fish report was to present a rigorous analysis of the benefits from reducing Hg emission from coal-fired power plants or whether it was intended to show hypothetically how such a benefits analysis could be performed. Regardless, the scientific weakness of the saltwater fish report includes:

The report claims that REMSAD modeling "determined that deposition is high in an offshore area of the South Atlantic." See Saltwater Report, at 6. Yet, the report provides no other information about who performed the REMSAD modeling, what assumptions were made about meteorological conditions, or whether the modeling included atmospheric Hg chemistry. Thus, it is impossible to provide meaningful comments on a key initial premise of the report-the reportedly high levels of Hg deposition off the southeastern U.S. coast. REMSAD modeling tends to overpredict the local deposition of Hg.

The report offers only a summary description of the global inventory of Hg it uses. The summary table presented on page ES-2 seems to overstate the impact of U.S. Hg emission reductions on the global deposition of Hg.

The report assumes a linear relationship between decreases in Hg deposition from coal-fired power plants and Hg levels in marine fish. The commenter believes that the factual evidence does not support this assumption. See Reconsideration TSD, at 2-4.

Even though the report acknowledges that there is time lag before steady-state conditions are reached in marine fish tissue concentrations after there is a reduction in Hg emissions (see Saltwater Report at 4), the report nevertheless assumes the time lag would not be so long that discounting would significantly reduce the estimated values.

The report relies on a “personal communication” as the sole basis for the assumption that the average deposition for coastal areas is about 40 percent. See Saltwater Report, at 17. This assumption plays a key role in all of the paper’s later analyses. The authors of the report offer no explanation why they did not use actual results from deposition modeling instead of this assumption.

Like the Harvard and Trasande Studies, the saltwater report relies on correlations from the New Zealand data for its IQ correlation. The New Zealand IQ outcomes were not found to be statistically significant. The IQ correlation factor used in the saltwater report is three times higher than the one used by EPA in the Reconsideration TSD.

The saltwater report assumes that a linkage between cardiovascular effects and Hg exposure exists. There is significant scientific debate about this effect and there certainly is not enough evidence to justify the inclusion of this effect in a benefits analysis. Finally, the vast majority of work by Cohen referenced by State and environmental petitioners are PowerPoint slides from oral presentations.[188] Without a transcript of Cohen’s oral remarks it is impossible to know whether petitioners’ characterizations of individual slides are consistent with Cohen’s actual remarks and conclusions. The commenter understands that a detailed report of Cohen’s work is undergoing review by a number of Federal agencies. Until that report is publicly released and interested parties have an opportunity to review and comment on it, Cohen’s modeling work should not factor into any CAA §112(n)(1)(A) decision. Thus, the reports cited in State and environmental petitions provide no reason for EPA to change its final decision not to regulate EGUs under CAA §112(n)(1)(A).[189]

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[188] See, e.g., State Petition, at 15; Environmental Petition, at 53-54. State petitioners also cite reviews by the EPA Inspector General and by the Government Accountability Office (GAO) of EPA’s January 2004 rulemaking proposal. Those reviews are no longer pertinent either because EPA has decided not to promulgate MACT standards for EGUs or because the reviews criticized the limited cost-benefit analyses conducted by EPA at the time it issued its proposed rule-those analyses were superceded by the far more detailed analyses included in EPA’s RIA which accompanied EPA’s final CAA §112(n)(1)(A) regulatory determination.

[189] The commenter believes that one article published after EPA’s final rule was issued in March 2005 warrants EPA’s consideration. Ted Gayer and Robert Hahn have published a thoughtful article on the cost/benefit

Response:

EPA acknowledges the comments on the NESCAUM/Harvard and Trasande studies, but does not necessarily agree with the commenter on all points. For clarification purposes, EPA's position on these studies is summarized below.

As stated in the Reconsideration TSD, EPA's approach to modeling exposure and health benefits of reducing emissions from power plants differs in some important ways from the approach that NESCAUM/Harvard chose. EPA believes that some of these differences simply reflect the large amount of uncertainty in the underlying science. Other differences reflect situations where the science and economics are fairly clear and EPA has concerns about the approach that NESCAUM/Harvard took. For example, the NESCAUM Report attempted to quantify the marine exposure pathway but used assumptions that are not supported by the literature on marine fate and transport of Hg, likely resulting in an overestimate by an unknown amount. NESCAUM/Harvard used REMSAD modeling which appears to over-predict Hg deposition from U.S. EGUs. Although EPA does not endorse the NESCAUM Report approach, at best it should be interpreted as producing an upper-bound estimate of the IQ benefits of reducing Hg emissions from power plants for two reasons. First, it does not appear that the NESCAUM Report took into account the timeframe for reduced exposure to MeHg into account. This omission alone leads to an overestimate of estimated benefits in the NESCAUM Report by at least factor of two. Second, EPA's integrated analysis of the three major epidemiological studies (Faroes, Seychelles, New Zealand) produced an estimated relationship between exposure and neurological problems that EPA feels is much more scientifically defensible than the estimated relationship NESCAUM/Harvard used, based, in part, on a then unpublished (and largely unavailable) study (see discussion of Cohen et al. below).

See above for EPA's response to the Trasande Article.

The study by EPA's Office of Wetlands, Oceans and Watersheds is unpublished. Further this study was intended for Agency use to identify knowledge gaps and guide research, and was never intended to form the basis of regulatory decisionmaking. As a result, EPA did not rely on information from this study for the purposes of the Section 112(n) Revision Rule or CAMR. Instead, EPA looked at the same issues in the supporting documents (for example, see Effectiveness TSD and the Reconsideration TSD).

See elsewhere for our discussion on the model used by Dr. Cohen (HYSPLIT) and why CMAQ is a better model for our purposes.

Comment:

Commenter 6497 presented detailed comments on EPA's analyses and calculations upon which the Agency based the conclusion "that the cost of requiring further reductions in the U.S. power plant Hg emissions beyond CAIR would significantly outweigh the benefits associated

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implications of EPA's Hg rule. Gayer and Hahn, "The Political Economy of Mercury Regulation," *Regulation*, Vol. 28, No. 2, Summer 2005.

with reductions in IQ decrement." Comments were made on the formulas used by EPA to calculate IQ decrement and to calculate the monetary value of the benefit (in terms of reducing IQ decrements) in eliminating utility-attributable Hg emissions. The commenter also compared the results of the EPA model to other model analyses – one by Trasande, et al., and one by Cohen, et al. The commenter states that use of IQ as a surrogate for neurobehavorial/neurocognitive effects is problematic. The commenter further states that the differences in the estimates produced by EPA's model as compared to the models of Cohen, et al., and Trasande, et al., suggest that a full evaluation of each of the model's assumptions and input values may prove useful.

Response:

EPA recognizes that the value per IQ point lost used in the analysis is considered a "cost of illness" measure rather than a measure of willingness-to-pay (WTP) to prevent a loss of an IQ point. The cost-of-illness approach simply measures ex post costs and does not attempt to measure the loss in utility due to pain and suffering or the costs of any averting behaviors that individuals have taken to avoid the illness altogether (EPA, 2000b). Currently, a reliable estimate of the WTP to avoid the loss of an IQ point is not available. We note, however, that the average changes in IQ are very small.

EPA's quantitative benefits analysis has focused on quantifying IQ decrements associated with prenatal Hg exposure. For this analysis, EPA is adopting IQ as a surrogate for the neurobehavioral endpoints that NAS and EPA relied upon for the RfD.[190] *The choice of IQ as the focus of the benefits analysis is very well-supported. IQ (as measured by the Wechsler Intelligence Scale for Children) is the only endpoint that was measured in all three epidemiological studies (Faroe Islands, New Zealand and Seychelles), and, thus, is the neurodevelopmental outcome for which we have the most information regarding Hg's effect. In addition, IQ is the best-studied and best-understood outcome evaluated in the three epidemiological studies, because IQ is a common metric that is routinely used in characterizing neurological development. As stated by David Bellinger in his report to EPA, IQ "is a composite index that averages a child's performance across many functional domains, providing a good overall picture of cognitive health. Despite some debate over the usefulness and meaning of the concept of IQ, an extensive body of data documents the predictive validity of Full-Scale IQ, as measured at school-age, and late outcomes such as academic and occupational success (Neisser et al., 1996)."*

We note that although the benefits analysis focused on IQ, the public health assessment (IDI analysis) used the RfD as its measure, and the RfD was based on several neurological endpoints. Specifically, the RfD was based on analysis of the Boston Naming Test, Continuous Performance Test, California Verbal Learning Test, and Finger-Tapping Test from the Faroe Islands study, with supporting analysis of the McCarthy Perceived Performance and McCarthy Motor Test from the New Zealand study and an integrative analysis of multiple endpoints from the Faroe Islands, New Zealand and Seychelles studies. All of the tests considered in the analysis underlying the RfD are all indications of neuropsychological processes involved in a

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[190] See Reconsideration TSD, footnote 14.

child's ability to learn and process information.

See above for EPA's response to the Trasande Article.

Finally, in regard to the Cohen article, EPA also disagrees with some of the assumptions made. Cohen, et al., use data from the Faroe Islands, Seychelles, and New Zealand studies in order to quantify the effect of prenatal Hg exposure on childhood IQ. This was done by using equations that involved averaging the linear regression coefficients from the cohorts for specific test domains and re-expressing the test scores in terms of standard deviation units. Test results from all neurodevelopmental domains were included in the model, including attention, intelligence, language, learning/achievement, memory, visuospatial, and motor skills. The overall IQ coefficient was calculated by Cohen, et al., as weighted average of the study coefficients, where different weights were applied for each of the three studies, and each of the seven domains.

A key element of the Cohen, et al., study methodology was to convert the log regression coefficients from the Faroe Islands study into corresponding linear coefficients. Because the slope of the log regression relationship varies at different levels of exposure, the corresponding linear coefficient can vary based on which portion of the dose-response relationship is chosen. For their primary estimate, Cohen, et al., chose an exposure range similar to that of women in the U.S., specifically the average slope value for the first quartile of the Faroe Islands cohort, spanning from1.3 µg/l to 13 µg/l Hg in cord blood. Using this extrapolation from log coefficients to linear coefficients as an input, the overall Cohen, et al., estimate is -0.7 IQ points per 1 µg/g increase of Hg in hair. When the exposure range from the 25th to the 75th quartiles (13.4 µg/l to 41.3 µg/l Hg in cord blood, respectively) of the Faroes cohort were used as the basis of the extrapolation, the Cohen, et al., estimate of the effect of Hg exposure on IQ was -0.2 points per 1 µg/g of Hg in hair. Finally, using the very lower end of the Faroes cohort exposure distribution (that of the lowest exposure, 1.3µg/l, to one half the first quartile value or 6.7 µg/l) for the linear extrapolation results in an IQ coefficient of -1.0 IQ points per 1 µg/g increase of Hg.

The approach taken by Cohen, et al., is in general a reasonable use of the available data to derive an estimate of the Hg-IQ dose-response relationship. However, it is evident from the results summarized above that the result is highly sensitive to the assumptions made in converting the log regression coefficients from the Faroe Islands study into linear regression coefficients. The approach taken by EPA and Dr. Ryan was more rigorous than that of Cohen, et al., in a number of respects, but one of the most important differences is that EPA obtained linear regression coefficients directly from the Faroe Islands research team, thus, eliminating the need to make assumptions to convert the log regression coefficients into linear coefficients. If the Cohen, et al., analysis were revised to incorporate the linear coefficients provided by the Faroe Islands researchers to EPA, it is likely that Cohen, et al., would produce a Hg-IQ coefficient very similar to that estimated by Dr. Ryan and used by EPA in its benefit-cost analysis.

Comment:

Commenter 6497 presented a review of studies investigating the hypothesis that exposure to MeHg via consumption of fish leads to a high risk of untoward cardiovascular events. Based on this review, the commenter concluded that given the contradictory nature of the findings in terms of consistency and strength of associations, as well as clear biological plausibility, strong evidence for this hypothesis is not evident. The large number of factors that can influence cardiovascular health and that often cannot be completely controlled for in study design and the striking cross-cultural differences in CHD rates contribute to overall weakness in findings. Thus, it does not appear that there is at this time "emerging evidence" that MeHg has major effects on cardiovascular systems at low doses of exposure nor is there good evidence for the hypothesis that fish Hg content diminishes the cardioprotective effect of fish intake (refer to the comment document).

Response:

As explicitly discussed in Appendix C of the RIA for CAMR, an analysis of the potential cardiovascular health benefits of reduced Hg exposure is not possible as the science on the impact of Hg on the risk of cardiovascular events remains uncertain. In particular, weight-of-evidence for cardiovascular effects is not as strong as it is for childhood neurological effects and the state-of-the-science is still being evaluated. Although it is true that in some recent epidemiological studies in men, MeHg exposure is associated with a higher risk of acute myocardial infarction, coronary heart disease and cardiovascular disease in some populations (e.g., Salonen, et al., 1995; Guallar, et al., 2002), other recent studies have not observed this association (e.g., Yoshizawa, et al., 2002; Hallgren, et al., 2001). The studies that have observed an association suggest that the exposure to MeHg may attenuate the beneficial effects of fish consumption. In short, studies investigating the relationship between MeHg exposure and cardiovascular impacts have reached different conclusions. EPA continues to maintain that the findings to-date and the plausible biologic mechanisms warrant additional research in this arena (Stern, 2005; Chan and Egeland, 2004). The Agency has concluded that the substantial uncertainties in available scientific information do not provide a sufficient basis for quantification of possible cardiovascular benefits for regulatory purposes.

Comment:

Commenters 6479 believe that EPA has repeatedly failed to perform an adequate cost-benefit analysis in the context of the Hg rulemaking. EPA failed to fully assess the cost benefits of regulatory alternatives to the proposed rules; failed to consider the value of health benefits resulting from decreased Hg emissions; and failed to analyze key uncertainties in its approach.[191] Following the final rules, EPA was similarly questioned about using old data in assessing the costs and benefits of ACI to control Hg emissions.[192] In the Reconsideration Notices, EPA requests comment on additional information purported to support EPA's earlier statements about the costs and benefits of the rules.[193] However, the additional information accompanying the Reconsideration Notices suffers from many of the same flaws as the earlier analyses and fails to adequately assess the costs and benefits of EPA's proposals in comparison to regulation of EGUs

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[191] See EPA-HQ-OAR-2002-0056-6280, pp. 5-6.
[192] See OAR-2002-0056-6479, Exhibit 3, p. 8.
[193] See 70 FR 62208.

under CAA §112.

Response

EPA disagrees that it has not performed an adequate cost-benefit analysis in the context of the Hg rulemaking. The CAMR RIA included a thorough analysis of the benefits of the expected Hg reductions due to the reduced contamination of recreationally-caught freshwater fish. The Reconsideration TSD expanded that analysis to include the benefits from reduced utility-related contamination of marine fish due to CAMR, as well as an evaluation of the total benefits including all contamination pathways. Both of these analyses used the best available science and data at that time and are publicly available.

The commenter cites an April 2005 Congressional Research Service report in support of its argument that EPA used old data for the costs of ACI. Without agreeing with commenters' allegations, EPA notes that it does not believe that cost alone should be determinant, particularly when available information indicates that ACI is not yet ready for full-scale, nationwide implementation.[194] *Further, site-specific costs may be significantly greater than the "averages" quoted, depending on coal rank, current ash disposal practices, etc.*

Comment:

Commenters 6479 noted that EPA's cost analysis contains two significant steps. First, EPA "presumed that the costs of regulating under CAA §112 are at least as great as the costs of regulating under CAMR."[195] Next, EPA assessed whether the elimination of all EGU Hg emissions after 2020 would result in benefits that outweigh the associated costs.[196] Id. Each of these steps is problematic. First, the presumption of the increased costs of CAA §112 regulation compared to CAMR is unsupported. Although EPA refers to the Cost TSD for an explanation of that presumption, that document contains no assessment of the costs of regulating under CAA §112. The extent of its relevant material is a two-page generalized discussion of the theory of why cap-and-trade is less costly than command-and-control. This discussion is insufficient to justify such a central prong of EPA's cost analysis, especially in the context of rapidly declining Hg control costs (industry trade association estimating that costs have declined as much as 75 percent since 2003 when EPA conducted its cost analysis).[197]

Second, the commenter believes that it is unreasonable for EPA to limit its analysis of the benefits from CAA §112 regulation to those that occur through the elimination of EGU

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[194] See EPA-HQ-OAR-2002-0056-6697.

[195] See 70 FR 62209.

[196] See 70 FR 62209.

[197] See OAR-2002-0056-6479, Exhibit 3, supra at 8 (Mercury control costs are likely to decline further because of impending particulate control requirements. The EPA Administrator is scheduled in December 2005 to proposed new NAAQS for fine particles, which are expected to be substantially more stringent than the current standards, resulting in expansion of the fine particulate nonattainment areas. This will result in the need to control direct emissions of particulates from EGUs independent of the need to control particulates better to achieve better Hg control. Because particulate controls have a beneficial effect on the cost and effectiveness of ACI, the incremental Hg control cost will be a fraction of the currently estimated cost with the less effective particulate control in use at many EGU's today.).

emissions after 2020. In essence, EPA is asking "what are the costs and benefits of reductions beyond those required by CAMR, as of 2020?" A CAA §112 approach, however, would not be in addition to CAMR, but would be in place of it and would achieve reductions as of 2008, not 2020 or 2025, which EPA has predicted is closer to the date when the 2018 cap may be achieved.[198] In fact, the commenter states that this is one of the key differences between the two proposals – although CAA §112 regulation has an initial compliance deadline of three years; EPA's own estimates indicate that the CAMR emission reduction caps may not be met until 2026 or later.[199] The appropriate question to ask in a cost benefit analysis then is: Are the costs and benefits of a CAA §112 approach as of 2008 greater or less than the costs and benefits of CAMR as of 2020 (or 2025)? EPA has already answered that question: the CAA §112 approach is better. Compare 70 FR 28642 (concluding that CAMR will result in a net loss to society) with 69 FR 4711-2 and Table 8 (concluding that EPA's MACT proposal would result in net benefits to society).

Response:

EPA believes that the commenter is not accurately comparing the two rulemaking efforts described in the comment. When considering the merits of regulating under section 112 beyond CAIR, CAIR must be considered as part of the baseline. The commenter misinterprets the analysis included by EPA in Section 8 of the Reconsideration TSD. This analysis looked at the costs associated with Hg emissions in 2020 after the implementation of CAIR, not CAMR. CAIR would be implemented regardless of the approach taken by EPA in addressing Hg emissions. Thus, EPA's analysis is appropriate for supporting the argument that the costs of reducing Hg emissions from power plants beyond CAIR under CAA §112 outweighs the health benefits of reduced utility-attributable Hg exposure.

Commenter also criticizes our use of 2020, instead of an earlier year (e.g., 2008). As discussed in Section 10 of the Reconsideration TSD, modeling of CAIR, CAMR and the Clean Air Visibility Rule shows that the majority of the RGM reductions will occur by the year 2010. Thus, although we appropriately looked at 2020 because it is after implementation of both CAIR and CAMR, the largest reduction in utility deposition of Hg occurs by 2010. Therefore, the benefits of going beyond CAIR at an earlier date (e.g., 2010) will not be substantially larger than for 2020, yet the costs could be substantially higher in earlier years because of the availability of technology.

Further, the commenter's comparison of the cost-benefit results included in 69 FR 4711-2 (notice of proposed rulemaking; NPR) with the cost-benefit results included in the final rules is flawed for two reasons. First, EPA's modeling of its proposed MACT did not include CAIR in the baseline, and, thus, did not account for emissions co-benefits between CAIR and any Hg rulemaking. Second, the benefits analysis presented in the final rulemaking includes only the monetized benefits associated with the reduction in lost IQ points from Hg exposure. The benefits quantified in the NPR for the proposed MACT standard included only $PM_{2.5}$*-related benefits from* NO_x *and* SO_2 *emissions reductions associated with reducing Hg emissions. The comparison made by the commenter then is not valid. It should be noted, however, that EPA did*

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[198] See OAR-2002-0056-6479, Exhibit 3, supra at 1.

[199] See 42 U.S.C. §7412; see also OAR-2002-0056-6479, Exhibit 3, supra.

consider the benefits of additional reduction in $PM_{2.5}$ *exposure in Chapter 12 of the final CAMR RIA. These direct* $PM_{2.5}$ *benefits depend heavily on the particular Hg control technology chosen by the industry. For example, if advanced sorbents are used without the addition of a fabric filter (FF), then the direct* $PM_{2.5}$ *benefits would be significantly reduced. Our analysis focused on the benefits of reduced Hg exposure because Hg control technologies are under development leading to substantial uncertainty regarding whether any particular level of* $PM_{2.5}$ *benefits will actually occur. It is also worth noting that other CAA programs effectively address* $PM_{2.5}$ *emissions from utilities.*

Moreover, under the traditional command and control approach specified in the strict CAA §112 approach, the economic incentives achieved in the national cap-and-trade programs cannot be realized. EPA maintains that the use of a cap-and-trade program to achieve a given level of emissions reductions will be less costly than a command-and-control approach to achieving the same level of reductions. Although as discussed elsewhere, the key reasons for this cost advantage are inherent in the qualities of a cap-and-trade program. The primary reason for this is that cap-and-trade programs, as opposed to command and control programs such as under CAA §*112(d), provide electric generating units the flexibility to pursue a least-cost compliance option to achieve the required emissions reductions collectively. Potential compliance options include fuel switching, installing pollution control technologies, and/or buying allowances from another source that has controlled its emissions below the number of allowances it was allocated. Further, under a cap-and-trade program, the largest emissions reductions are typically obtained from units that are relatively more cost-effective to control, enabling those units that are not cost-effective to control to use other mechanism, such as buying allowances, for compliance. This has been observed under the Acid Rain Program. In contrast, under CAA* §*112(d), each facility must meet a specific level of emission control, which can result in increased compliance costs, both at the individual electric generating unit (particularly for the smaller units that cannot benefit from economies of scale) and overall. In other words, if installing controls at every unit is the cheapest option, sources will choose it under a cap-and-trade approach – however, as discussed elsewhere, our IPM modeling predicts that will not be the case. Economic theory has shown that a marketable permit scheme will produce a least-cost solution for any level of pollution abatement (<u>see</u> Montgomery 1972; Baumol and Oates 1988[200]).*

<u>Comment</u>:

Commenters 6479 stated that EPA's cost analysis fails to address the cardiovascular impacts of Hg, and inappropriately deals with uncertainty related to these impacts. In the supporting documentation for the Reconsideration Notices, EPA reiterates its calculation that the costs for CAMR as proposed already exceed the monetized benefit in terms of neurologic effects from completely eliminating power plant emissions of Hg.[201] EPA, thus, concludes that the overall health benefits of further Hg emissions reduction are not justified. However, EPA has still failed to address the cardiovascular health effects from current levels of Hg emissions and thus, the cardiovascular health benefits of additional reductions. Although uncertainty exists regarding the exact nature of the dose response relationship between MeHg exposure and

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[200] <u>See</u> EPA-HQ-OAR-2002-0056-6705, -6706.

[201] <u>See</u> 70 FR 62208.

myocardial infarctions etc., an appropriate risk and cost-benefit analysis would quantify that uncertainty in the overall calculation of health impacts and benefits. Scientific literature suggests that levels of MeHg exposure at moderately elevated levels of exposure present in the current U.S. adult male population poses a relative doubling of the risk of having a heart attack.[202] With such a significant potential public health impact, adequate consideration of the uncertainty of the costs associated with the cardiovascular health effects of power plant emissions of Hg would likely substantially alter EPA's current cost-benefit analysis.

The commenter added that, the neurological benefit calculations focus on the impacts of Hg on individuals' earnings through changes to their IQ. It does not include other social benefits of higher intelligence resulting from lower Hg. Individuals, and society as a whole, value higher intelligence beyond the potentially higher income that results from higher IQ. None of the studies to date adequately address the overall societal value of higher intelligence, and consequently the value of Hg control is significantly underestimated as to neurological benefit.

<u>Response</u>:

The weight of evidence for cardiovascular effects is not as strong as it is for childhood neurological effects and the state-of-the-science is still being evaluated. Studies investigating the relationship between MeHg exposure and cardiovascular impacts have reached different conclusions. In some recent epidemiological studies in men, MeHg exposure is associated with a higher risk of acute myocardial infarction, coronary heart disease and cardiovascular disease in some populations (e.g., Salonen, et al., 1995; Guallar, et al., 2002). Other recent studies have not observed this association (e.g., Yoshizawa, et al., 2002; Hallgren, et al., 2001). The studies that have observed an association suggest that the exposure to MeHg may attenuate the beneficial effects of fish consumption. Several studies have concluded that the findings to-date and the plausible biologic mechanisms warrant additional research (Stern, 2005; Chan and Egeland, 2004).

EPA does not believe that an expected value estimate is the correct way of incorporating potential cardiovascular benefits. An expected value approach would only produce a weighted estimate between the case where cardiovascular effects are present and one in which they are not present. There is no reason to expect that a weighted estimate reflects actual benefits. To correctly measure the benefits and characterize uncertainty, first the benefits of reduced cardiovascular effects and the benefits of reduced IQ decrements should be measured separately. Second, the uncertainty associated with each estimate should be made explicit. In this case, the first step is not possible.

EPA recognizes that the value per IQ point lost used in the analysis is considered a "cost of illness" measure rather than a measure of willingness-to-pay (WTP) to prevent a loss of an IQ point. The cost-of-illness approach simply measures ex post costs and does not attempt to measure the loss in utility due to pain and suffering or the costs of any averting behaviors that individuals have taken to avoid the illness altogether (EPA, 2000b). Currently, a reliable estimate of the WTP to avoid the loss of an IQ point is not available. We note, however, that the average changes in IQ are very small.

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[202] <u>See</u> EPA-HQ-OAR-2002-0056-6282, Stern Declaration, Exhibit F.

Comment:

Commenters 6479 stated that EPA's cost analysis relies on a defective analysis. In its monetized comparisons between CAA §111 regulation and CAA §112 regulation, EPA relies on a defective analysis by Louise Ryan of Harvard. This unpublished analysis that Ryan completed in March 2005 (EPA-HQ-OAR-2002-0056-6048) purports to provide a quantitative link between Hg exposure and IQ impairment.[203] The analysis contains numerical errors that invalidate the analysis and its conclusions.[204] In its Reconsideration Notices and supporting documentation, EPA has neither acknowledged these errors nor revised the defective analysis. On the contrary, and despite its inability to assess the consequences of the error, EPA continues to rely fully on Ryan's analysis for the monetized comparison between CAA §§111 and 112 for the purpose of setting less protective standards under CAA §111 – even disregarding published and peer reviewed research because of Ryan's findings.[205]

Response:

Please see response elsewhere in this document regarding correction of the numerical errors in the inputs to Dr. Ryan's model.

Comment:

Commenter 6513 stated that although the Reconsideration Notice does not directly address the issue of sound science, this is a requirement that should underpin any action taken by the EPA, including possible revision of an existing rule based on information gathered as a result of the Reconsideration Notice. The commenter does not believe that a sufficient body of sound science exists to justify any change to CAMR based on the four points of reconsideration requested by petitioners. The commenter endorsed comments submitted by EPRI, especially those that address the inadequacy of recent health effects and Hg deposition studies. Because the science underlying Hg regulation is often contradictory and inconclusive, government agencies should approach its regulation in a flexible manner. For example, various studies offer broad ranges regarding threshold requirements to determine human health impacts of exposure to Hg and disputes surrounding the actual impact of anthropogenic Hg.

Stringent Hg regulation simply is not justified by the latest publicly available scientific studies. U.S. coal powered plants account for less than 1 percent of annual world emissions. This percentage will continue to decline as the U.S. implements CAIR, which calls for a 70 percent reduction in SO_2 and NO_x emissions over the next 15 years. Reductions in emissions of these two pollutants have the co-benefit of reducing Hg, even though the implementing technology is aimed at $S0_2$ and NO_x. Any reduction reductions in the U .S. forced by expensive rules that go beyond the co-benefits and set on an unrealistic timetable, before adequate Hg reduction technology can be brought into the marketplace, would quickly be made up by

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[203] See 70 FR 62209 and TSD at 28-32.

[204] See EPA-HQ-OAR-2002-0056-6282 at Appendix A.

[205] See OAR-2002-0056-5752. See also EPA letter to Senators Leahy, et al., dated April 5, 2005 (EPA letter responding to NESCAUM Report).

emissions increases in other countries. Stringent U.S. regulation, therefore, would be irrelevant with respect to reducing worldwide anthropogenic contributions.

Inaccurate and overstated impacts of Hg deposition into oceans and other bodies, and resulting in the presence of MeHg in fish consumed by humans actually create additional risks to human health rather than mitigate them. There is no conclusive study showing that methyl-Hg contained in fish poses a health risk to humans, particularly to children and pregnant women. In fact, there are several peer reviewed studies which indicate the opposite. Those studies have documented that if large portions of the population, however, are convinced to reduce or discontinue fish consumption in their diets, serious health risks will follow. This will be especially true for children and women of childbearing age. Fish constitute an important source of protein and fatty acids that are essential for a balanced diet and maintenance of a healthy lifestyle.

The commenter has historically been united in its advocacy that Federal regulatory agencies such as EPA must use sound science and risk prioritization. More specifically, the commenter policy has supported "scientifically sound risk analysis; risk-based prioritization; benefit-cost analysis; flexible, efficient, cost-effective risk management; and public participation in all phases of the process." The commenter policy also expressly supports a conclusion made by EPA in its document, "Reducing Risk: Setting Priorities and Strategies for Environmental Protection, 2 September 1990," which states:

> There are heavy costs involved if society fails to set environmental priorities based on risk. If finite resources are expended on lower-priority problems, at the expense of higher-priority risks, then society will face needlessly high risks. If the priorities are established based on the greatest opportunities to reduce risk, total risk will be reduced in a more efficient way, lessening threats to both public health and local and global ecosystems.

Accordingly, the commenter is concerned that EPA may be led to pursue a Hg emissions reduction goal that is a low-priority problem that represents little or no risk, but would nevertheless be squandering finite economic resources that are needed for economic growth and for meeting higher priority risks. Because EPA's Hg decisions could have the effect of dramatically reducing coal use in the U.S., generators trying to fulfill the nation's growing need for electricity would then be forced from abundant coal to scarce natural gas. The commenter supported the broadest spectrum of electric generation options, so that the least expensive can be used to provide affordable and reliable electricity to the manufacturing sector and the overall economy. Natural gas consumption to generate electricity increased 66 percent during the 1990s while domestic supplies have remained relatively constant. The natural gas market-and the many industrial sectors that rely on affordable natural gas-cannot withstand more Federal regulatory policies that push the use of natural gas to generate electricity.

<u>Response</u>:

EPA agrees that its original decision under the Section 112(n) Revision Rule was reasonable and that scientific information gathered from the Reconsideration Notice has not *caused us to change our mind.*

Comment:

Commenter 6575 recommended that EPA quantify the potential benefit of reductions in U.S. power plant emissions of Hg on cardiovascular health of Americans, including fatal and non-fatal heart attacks and strokes. As discussed in the original EPA analysis, there is credible, though not conclusive, evidence that exposure to MeHg through fish consumption leads to higher rates of adverse cardiovascular events. It is difficult to distinguish any adverse effects of MeHg on cardiovascular endpoints from the well-known beneficial effects of n-3 polyunsaturated fatty acids on these endpoints, because fish consumption is the dominant exposure pathway for both factors and, thus, exposures tend to be highly correlated. This implies that most epidemiological studies relating fish consumption to cardiovascular health should be interpreted as estimating the combined effect of the specific mix of n-3 polyunsaturated fatty acids, MeHg, and other compounds present in the fish consumed by the study population.[206] However, there are some studies[207,208,209] that have been able to distinguish the effects of MeHg and n-3 polyunsaturated fatty acids in fish and these provide evidence of harmful effects of MeHg on cardiovascular endpoints.[210]

The commenter recommends that EPA quantify, at least roughly, the uncertainties associated with two major components of the analysis: the magnitude of the marine pathway and the magnitude of the cardiovascular health effects. Because the plausible effects of these factors on public health and economic benefits of reducing Hg emissions are large, it is important to understand how likely it is that such large benefits would result from emission reductions. In a case such as this, where the benefits of reducing Hg emissions are likely to take the form of very small changes in probabilities of harm for individuals, it is reasonable to base the decision about how much to reduce emissions on the expected value of the benefits. The expected value can be calculated by multiplying each possible level of benefit by the probability that that level will be obtained, and then adding the resulting probability-weighted levels. The expected value of the benefits can be very sensitive to the probability that benefits much larger than their modal (most likely) or median value will be obtained, and so it is important to estimate as accurately as possible the probability that large benefits will result from emission reductions.

The commenter noted that, although quantification of probability is difficult, it is encouraged (and for some rules required) by OMB guidance (Circular A-4). One approach to

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[206] See König, A., C. Bouzan, J.T. Cohen, W.E. Connor, P.M. Kris-Etherton, G.M. Gray, R.S. Lawrence, D.A. Savitz, S.M. Teutsch, "A Quantitative Analysis of Fish Consumption and Coronary Heart Disease Mortality," *American Journal of Preventive Medicine* 29(4): 335-346, 2005.

[207] See Salonen, J.T., K. Seppänen, K. Nyyssonen, H. Korpela, J. Kauhanen, M. Kantola, J. Tuomilehto, H. Esterbauer, F. Tatzber, and R. Salonen, "Intake of Mercury from Fish, Lipid Peroxidation, and the Risk of Myocardial Infarction and Coronary, Cardiovascular, and any Death in Eastern Finnish Men," *Circulation* 92(8): 2355-2356, 1995.

[208] See Rissanen, T., S. Voutilainen, K. Nyyssonen, T.A. Lakka and J.T. Salonen, "Fish Oil-Derived Fatty Acids, Docosahexaenoic Acid and Docosapentaenoic Acid, and the Risk of Acute Coronary Events: The Kuopio Ischaemic Heart Disease Risk Factor Study," *Circulation* 102(22): 2677-2679, 2000.

[209] See Guallar, E., M.I. Sanz-Gallardo, and P. van't Veer et al., "Mercury, Fish Oils, and the Risk of Myocardial Infarction," *New England Journal of Medicine* 347: 1747-1754, 2002.

[210] See OAR-2002-0056-5749, pp. 37-47.

quantifying probabilities is to elicit probabilistic distributions from subject-matter experts. This approach has been applied to estimate the carcinogenic potency of chloroform[211], the sensitivity of global climate to increases in atmospheric carbon dioxide[212], and other quantities in exposure, dose-response, and risk assessment.[213,214,215,216,217,218,219,220,221] An alternative approach would be to estimate the magnitude of probability that would need to be assigned to the potential cardiovascular health effects, to the marine pathway, or to both together, in order for the expected benefits to be large enough to justify larger reductions in Hg emissions. If probabilities of such a magnitude are credible, then additional efforts to quantify these pathways may be important.

The commenter made the following two comments on some specific aspects of the NESCAUM Report identified in Administrator Johnson's April 5, 2005, letter to Senator Patrick Leahy and the EPA Reconsideration TSD:

IQ dose-response coefficient. We used a value of 0.6 IQ points per μg/g maternal hair Hg in the NESCAUM Report. This is the average of the central estimate (0.5)[222] and the central estimate (0.7).[223] The commenter regrets that the Cohen, Bellinger, and Shaywitz paper was not published when our report was completed and the authors chose not to submit a pre-publication version to the docket. As discussed in the NESCAUM Report, there is substantial uncertainty about the slope of the relationship between MeHg exposure and effects on IQ. Key issues

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[211] See Evans, J.S., G.M. Gray, R. Sielken, A.E. Smith, and J.D. Graham, "Use of Probabilistic Expert Judgment in Uncertainty Analysis of Carcinogenic Potency," *Regulatory Toxicology and Pharmacology* 20: 15-36, 1994.

[212] See Morgan, M.G., and D.W. Keith, "Subjective Judgments by Climate Experts," *Environmental Science and Technology* 29: 468A-476A, 1995.

[213] See Cooke, R.M., and L.H.J. Goossens, "Procedures Guide for Structured Expert Judgment in Accident Consequence Modeling," *Radiation Protection Dosimetry* 90(3): 303-311, 2000.

[214] See Goossens, L.H.J., and F.T. Harper, "Joint EC/USNRC Expert Judgment Driven Radiological Protection Uncertainty Analysis," *Journal of Radiological Protection* 18(4): 249-264, 1998.

[215] See Goossens, L.H.J., F.T. Harper, B.C.P. Kraan, H. Métivier, "Expert Judgment for a Probabilistic Accidence Consequence Uncertainty Analysis," *Radiation Protection Dosimetry* (Expert Judgment and Accident Consequence Uncertainty Analysis; special issue) 90(3): 295-303, 2000.

[216] See Hawkins, N., and J.S. Evans, "Subjective Estimations of Toluene Exposures: A Calibration Study of Industrial Hygienists," *Applied Industrial Hygiene Journal* 4: 61-68, 1989.

[217] See Hawkins, N.C., and J.D. Graham, "Expert Scientific Judgment and Cancer Risk Assessment: A Pilot Study of Pharmacokinetic Data," *Risk Analysis* 8(4): 615-625, 1988.

[218] See Kraan, B.C.P., and R.M. Cooke, "Processing Expert Judgments in Accident Consequence Modeling," *Radiation Protection Dosimetry* 90(3): 311-315, 2000.

[219] See Van der Fels-Klerx, H.J., R.M. Cooke, M.N. Nauta, L.H. Goossens, and A.H. Havelaar, "A Structured Expert Judgment Study for a Model of Campylobacter Transmission During Broiler-Chicken Processing," *Risk Analysis* 25(1): 109-124, 2005.

[220] See Walker, K.D., J.S. Evans, and D. MacIntosh, "Use of Expert Judgment in Exposure Assessment-Part I: Characterization of Personal Exposure to Benzene," *Journal of Exposure Analysis and Environmental Epidemiology* 11: 308-322, 2001. See also Walker, K.D., P. Catalano, J.K. Hammitt, and J.S. Evans, "Use of Expert Judgment in Exposure Assessment-Part 2: Calibration of Expert Judgments about Personal Exposures to Benzene," *Journal of Exposure Analysis and Environmental Epidemiology* 13(1): 1-16, 2003.

[221] See Walker, et al., 2003.

[222] See Crump, K.S., T. Kjellstrom, A.M. Shipp, A. Silvers, and A. Stewart, "Influence of Prenatal Mercury Exposure upon Scholastic and Psychological Test Performance: Benchmark Analysis of a New Zealand Cohort," *Risk Analysis* 18(6): 701-713, 1998.

[223] See Cohen, J.T., D.C. Bellinger, and B.A. Shaywitz, "A Quantitative Analysis of Prenatal Methyl Mercury Exposure and Cognitive Development," *American Journal of Preventive Medicine* 29(4): 353-365, 2005.

include how to compare results among the three cohorts that have been studied (two showing statistically significant effects on cognition, one showing no such effects), how to evaluate the different batteries of tests (and their implications for IQ) used in the three cohorts, and the question of whether the relationship is linear in the relevant exposure range. In light of these issues, Cohen, Bellinger, and Shaywitz (2005) propose a “plausible range of values” of 0 to 1.5 IQ points per µg/g maternal hair Hg, which includes values more than twice as large as the one used in the NESCAUM Report as well as the estimate from the unpublished “Ryan-Bellinger” study (i.e., Ryan, 2005) on which EPA relied. In the NESCAUM Report, the commenter proposed a slightly tighter range, between 0 and 1.0 IQ points per µg/g maternal hair Hg, and calculated benefits with and without a possible threshold exposure below which MeHg is assumed to have no adverse effect. Because the difference between the coefficients used by EPA and in the NESCAUM Report is small compared with the uncertainty about the appropriate value described in both the NESCAUM Report and by Cohen, Bellinger, and Shaywitz (2005), differences between EPA and NESCAUM results attributable to this factor are substantially smaller than the uncertainty about the total IQ-related benefit of smaller Hg emissions.

Discounting. As stated in NESCAUM Report, the commenter compared two Hg emission-reduction scenarios under the assumption that MeHg concentrations in fish and atmospheric deposition of Hg are in equilibrium and that MeHg concentrations in fish respond in proportion to changes in Hg deposition. To evaluate the benefits of implementing a regulation, it is appropriate to compare the present values of the benefits and costs, using discounting to account for differences in timing. EPA is correct in stating that the commenter’s estimates do not include any discounting to account for the response time. The importance of this factor is likely to be more important for the marine than for the freshwater exposure pathway because of the marine pathway is likely to have a longer response time.

Response:

EPA agrees with the comment regarding the challenges to evaluating the impact of Hg on cardiovascular endpoints, given the benefits of n-3 fatty acids found in fish for cardiovascular health. Studies that assess the cardiovascular effects of both Hg and n-3 fatty acids are particularly valuable.

As the commenter notes, the NESCAUM Report and the Cohen, et al., analysis take different approaches to estimation of the Hg-IQ dose response coefficient than that applied by the Ryan analysis prepared for EPA and used in the support documents for CAMR. Each approach has different advantages and limitations. EPA believes that the Ryan approach is the most rigorous and appropriate because it makes use of data directly from the three epidemiologic studies, including additional data provided by the Faroe Islands research team as input to this analysis. EPA disagrees with the commenter’s statement that the Hg-IQ dose response coefficient is not an important reason for the NESCAUM Report producing higher estimates of benefits.

In the Reconsideration TSD, EPA did provide an estimate of the magnitude of benefits from reduced IQ decrements from the marine pathway. As explicitly discussed in Appendix C of the RIA for CAMR, however, a similar analysis is not possible for cardiovascular effects as the *science on the impact of MeHg on the risk of cardiovascular events remains uncertain. Even if the benefits from reduced cardiovascular effects could be estimated, EPA disagrees that an expected value estimate is the correct way of incorporating this estimate. An expected values approach would only produce a weighted estimate between the case where cardiovascular effects are present and one in which they are not present. There is no reason to expect that a weighed estimate reflects the actual benefits. To correctly measure benefits and characterize their uncertainty, first, the benefits of reduced cardiovascular effects and the benefits of IQ decrements should be measured separately, and, second, the uncertainty associated with each estimate should be made explicit. In this case, however, due to scientific uncertainty surrounding the estimate of cardiovascular effects, the first step is not possible.*

Regarding the issue of discounting, EPA agrees that to evaluate the benefits of implementing a regulation, it is appropriate to compare the present values of the benefits and costs, using discounting to account for differences in timing.

<u>Comment</u>:

Commenter 6504 believes that EPA, in its final rule, conducted the proper assessment – determining whether the health benefits of Hg reductions exceed the costs. (In contrast, EPA's health benefit assessment in the proposed rule was based entirely on corollary reductions in non-HAP emissions.) The commenter, however, believes that EPA continues to understate the costs of the final CAMR and CAIR, such that the actual costs are much higher and outweigh the benefits even more than EPA predicts.

<u>Response</u>:

EPA agrees that it conducted a proper cost/benefit assessment, but disagrees that it has understated the cost of CAMR and CAIR.

<u>Comment</u>:

Commenter 6612 stated that because the goal of the MACT standard is not to find a "least-cost" solution but rather a "best technology" solution, a model based on "least-cost" is not appropriate. Whatever modeling approach EPA utilizes in its final analysis should be technology-driven and used to set a true MACT floor under CAA §112.

EPA need not limit its benefits analysis to any single quantifiable health benefit but rather should consider all pertinent anticipated benefits to human health. It may be especially important to include a discussion on the benefits to adult cardiovascular health as this effect has been correlated with MeHg exposures at or below levels associated with neurodevelopmental effects (<u>see</u> "Toxicological Effects of Methylmercury," National Academy of Sciences, 2003). It is also important to include any expected improvements in water quality and subsequent reductions of MeHg in fish tissue and piscivorous wildlife, realizing that a reduction in Hg emissions of at least 75 percent may be required before measurable environmental impacts can be detected.

Response:

CAA §112(n)(1)(A) authorized EPA to regulate Utility Units under CAA §112 only if the Agency finds that it is both appropriate and necessary to do so. For the reasons stated in the final Section 112(n) Revision Rule and attendant documents (including this Response to Comments; RTC) EPA concluded that Hg emissions from Utility Units after CAIR, and separately under CAMR, are not reasonably anticipated to cause adverse public health; therefore, it is not appropriate or necessary to regulate these units under CAA §112. As a result, MACT standard requirements and restrictions did not apply to the CAA §111 approach set forth in the separate CAMR.

In the Reconsideration TSD, EPA evaluated the IQ benefits of CAMR-related Hg reduction in recreationally-caught freshwater fish and marine fish, and it assessed the potential benefit from all fish consumption exposure pathways. Although EPA did not quantitatively assess the benefit of adult cardiovascular health from reduced MeHg exposure, the weight of evidence for cardiovascular effects is not as strong as it is for childhood neurological effects and the state-of-the-science is still being evaluated. Although some recent epidemiological studies in men, MeHg exposure is associated with a higher risk of acute myocardial infarction, coronary heart disease and cardiovascular disease in some populations (e.g., Salonen, et al., 1995; Guallar, et al., 2002), other recent studies have not observed this association (e.g., Yoshizawa, et al., 2002; Hallgren, et al., 2001). The studies that have observed an association suggest that the exposure to MeHg may attenuate the beneficial effects of fish consumption. In short, studies investigating the relationship between MeHg exposure and cardiovascular impacts have reached different conclusions. EPA continues to maintain that the findings to date and the plausible biologic mechanisms warrant additional research in this arena (Stern, 2005; Chan and Egeland, 2004).

EPA agrees with the commenter that it is important to monitor the effects of emissions reductions on the ambient environment and wildlife exposure. In addition, the commenter is correct in pointing out that it is often difficult to detect the changes in fish Hg concentrations that may result from relatively small changes in atmospheric Hg deposition without long-term monitoring data. However, EPA continues to maintain its original stance that it is extremely difficult to determine the response of oceans to changes in Hg emissions from human sources due to limited scientific understanding at this time. The best available science suggests that the significance of changes in marine fish Hg concentrations in response to CAIR and CAMR will be small and will require on the order of decades to centuries to be achieved.

Comment:

Commenter 6475 stated that EPA has requested comment on the cost-benefit analyses it prepared to support its decision not to regulate EGUs under CAA §112(n)(1)(A). As part of the final regulatory determination, EPA prepared a very detailed and well-reasoned RIA. The RIA shows that the benefits of reducing Hg emissions beyond the reductions that will result as a consequence of the implementation of CAIR are far outweighed by the costs of further regulation. This balance is tipped even further to the cost side following the implementation of CAMR.

The commenter believes that the benefits analysis in the RIA is conservative and overstates the benefits of Hg reductions. The main benefit identified by EPA results from the IQ loss from Hg exposure that is experienced by children of recreationally-caught freshwater fish consumers. EPA relies on a meta-analysis prepared by Ryan as the basis of its assumptions about the relationship between Hg exposure and IQ loss. This work pooled the results of the three main Hg epidemiological studies to derive an exposure-IQ relationship. Although the approach used by Ryan is certainly superior to using only the New Zealand data, there are still serious questions about the appropriateness of using IQ as a measure of the benefits of Hg reductions.[224] Even if one accepts IQ as a useful measure of the benefits of Hg reductions, there is still a question about how one deals with small decreases in Hg exposure where the person exposed already has Hg exposure levels that are well below the levels at which any Hg effect has ever been observed. The assumption that there is an IQ effect at any level of Hg exposure is highly conservative and overstates actual benefits. The Reconsideration TSD takes EPA's RIA analysis a step further.

The commenter stated that the Reconsideration TSD quantifies fish consumption pathways other than the recreational and subsistence freshwater fish pathway used in the RIA. The report shows that EPA's previous focus on the recreational and subsistence pathway was entirely justified and that State and environmental petitioner claims to the contrary are baseless. The recreational and subsistence pathway is still the pathway of highest exposure. The Reconsideration TSD also includes a benefits analysis that provides an upper bound for any benefits that may occur as a result of reductions in Hg emissions from coal-fired power plants. The TSD analysis conservatively assumes a zeroing out of all utility Hg emissions, a linear Hg-IQ relationship-in essence, everyone exposed is assumed to be above the RfD, and all fish consumed have fish tissue concentrations at the 85th percentile. With all these conservatisms, EPA estimated a total health benefit of $168 million. This upper bound estimate for the total elimination of Hg emissions from coal-fired units is far exceeded by the costs of regulating beyond CAIR. In fact, the benefits that result from implementing CAMR would be far less than the benefits of reducing utility emissions to zero.[225]

The commenter believes that this conclusion about the costs and benefits would not change if non-Hg HAP were added to the benefits analysis. EPA studied non-Hg HAP as part of its Utility Study. EPA's analyses showed that the health consequences of human exposures to these non-Hg HAP were very low. As a result, any benefits from their reduction would also be very low.[226] Nothing has changed with regard to the health consequences of these HAP following the issuance of the Utility Study. Thus, the additional benefits that would result from the coincidental control of these non-Hg HAP would be inconsequential to the overall benefits calculation.

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[224] See UARG NODA Comments at 50-51; EPRI NODA Comments at 69-78.

[225] The commenter believes that the costs of further control would still significantly outweigh the benefits even if the global pool of Hg were considered. The commenter agrees with the logic presented by EPA in the preamble to the final rule. See 70 FR 16028-9.

[226] The effects of the majority of these HAP were so insignificant that EPA indicated in the Utility Study that it no longer planned to consider them following the release of the Utility Study. EPA reiterated this view when the December 2000 notice was issued.

Response:

EPA did not reopen as part of the reconsideration process the RIA for CAMR; thus, we are not responding to comments discussing that RIA. We are responding to comments on the multi-pathway exposure analysis presented in the Reconsideration TSD, Section 8. EPA agrees that this estimate of IQ benefits is a conservative (high) estimate for a variety of reasons, including because of its implicit assumption that everyone exposed is assumed to be above the RfD and because of conservative estimates in the underlying exposure analyses.

EPA agrees that the recreational and subsistence pathway is the pathway of highest exposure. It also agrees that the upper bound benefits estimate for reduced IQ decrements due to the total elimination of Hg emissions from coal-fired units is exceeded by the costs of regulating beyond CAIR, and that the benefits that result from implementing CAMR would be far less than the benefits of reducing utility emissions to zero. EPA further notes that the estimate of the upper bound of health benefit from reduced IQ decrements (which was revised in this document to approximately $210 million) reflects a scenario in which the freshwater, estuarine, and aquaculture consumption is of fish which are as contaminated at the upper 85th percentile of self-caught freshwater fish. This is a dramatic overestimate of the upper bound estimate of the benefits of reduced IQ decrements from totally eliminating Hg beyond CAIR.

Comment:

Commenter 6478 stated that in its first phase, which lasts until 2017, CAMR is unapologetically a “do nothing” strategy, relying entirely on co-benefits of CAIR to make Hg reductions. In that period, according to EPA’s own data, 19 States could potentially see increases in Hg emissions as compared to 1999 levels, some by astronomical amounts, such as 177 percent in Colorado, 240 percent in New Hampshire, and in the nation’s most populous State, California, 840 percent. In its second phase, beginning in 2018 (28 years after the enactment of the MACT provisions in CAA §112), CAMR would finally require some additional reductions in Hg emissions. Even then, several States will still be allowed to emit at much higher levels than in 1999, including a 267 percent increase in California. It is, to put it mildly, difficult to imagine how such a rule can be said to render source-specific control standards under CAA §112 unnecessary.

Response:

EPA maintains that the national Hg cap-and-trade program provides the best system of emissions reductions. EPA designed CAMR so that the rule would build upon Hg reductions being achieved under CAIR. Under CAMR, national Hg emissions are capped at 38 tons beginning in 2010, and 15 tons beginning in 2018. Although this cap is based on projected co-benefit Hg emissions reductions under CAIR and represents projected nationwide Hg emissions under CAIR in 2010, it is a hard cap that cannot be exceeded regardless of the Hg emissions achieved in response to CAIR. In that sense, CAMR is not in any way a “do nothing” strategy, as the commenter suggests. In fact, in response to the existence of the hard cap of 15 tons per year in 2018, EPA projects that sources will actually over-control in the first phase (e.g., reduce emissions below the 2010 cap or 38 tons per year) as a result of the economic incentives *provided by the program.*

The cap-and-trade program provides a cost-effective mechanism for achieving Hg emissions reductions, and the caps guarantee that emissions reductions will be achieved from the current emissions level of approximately 48 tons. Because emissions allowances are a scarce commodity under a cap-and-trade program, due to the fact that current emissions exceed the national cap, these allowances have economic value, and it will likely make economic sense for sources in States with a surplus of allowances to sell these allowances to sources in States with a deficit that need them for compliance. Regardless of the decisions made by participants in the allowance market, CAMR, by placing a hard cap on Hg emissions and accounting for each individual ounce of Hg emitted, guarantees that significant reductions in nationwide Hg emissions will be achieved.

The commenter presents information relating to current emissions in certain States with their State-level CAMR budget in 2010-2017 and 2018 onward. The commenter correctly notes that several States will have 2010-2017 budgets that exceed current emissions and a small number of States will have 2018 budgets that exceed current emissions. What the commenter fails to note, however, is the relatively low baseline of current emissions or how the emissions budgets relate to actual emissions, deposition, or exposure. Baseline 1999 emissions in all three States are low (California emission were 8 pounds, Colorado emissions were 510 pounds, and New Hampshire emissions were 36 pounds compared with national emissions of 96,000 pounds). Projected 2020 emissions for California and New Hampshire do increase but remain at very low levels (California 2020 emissions are projected to be 58 pounds and New Hampshire 2020 emissions are projected to be 118 pounds) while projected 2020 emissions for Colorado decrease slightly. Our exposure modeling took this increase into account and we found that such a small increase from a small baseline is not significant. For example, in 2020 after the increased emissions less than 1 percent of the deposition in California is due to power plants, much less than found in other States today or in 2020.

Comment:

Commenter 6475 stated that even if one assumes that EPA was required to apply the ample margin of safety test, for the reasons outlined in the commenter's prior comments[227] and based on technical material placed in the docket by EPA, EPRI, EEI and others, EPA's decision not to regulate under CAA §112 should remain the same. There is little past guidance on how the ample margin of safety test should be applied in the case of a non-carcinogen like Hg. Most prior applications of the test involved carcinogens. Regardless, factual information in the rulemaking record demonstrates that public health is protected with an ample margin of safety without further regulation under CAA §112. The commenter's previous comments explain in detail why EPA's RfD for MeHg is extremely conservative.[228] The RfD is based on a series of highly conservative assumptions, including EPA's decision to use only one epidemiological study-the Faroes Island study-as the basis for its RfD,[229] its decision to derive the RfD using a

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[227] See UARG Comments at 14-31.

[228] See UARG Comments, at 13-21.

[229] EPA's decision to exclude results from the Seychelles Islands which found no adverse affects of Hg exposure on children.

statistical method that was six times more stringent than the one the Agency historically used, and the choice of uncertainty factor of ten even though the Faroes Island work studied the most sensitive human population-children born to mothers with relatively high Hg exposures during pregnancy. EPA's RfD is lower than any comparable value developed by other Federal or international agencies.

Commenter 6475 added that EPA and EPRI have both conducted detailed modeling of Hg emissions from coal-fired power plants and the effect of those emissions on MeHg concentrations in fish and, ultimately, on human exposure. The results of those modeling efforts are quite similar; the analyses found that Hg emissions from coal-fired power plants contributed less than 8 percent of the Hg deposited in the U.S. The vast bulk of the Hg deposition from power plants involves ionic Hg. A 10 percent reduction in national ionic Hg emissions from coal-fired power plants would result in a 0.75 percent reduction in U.S. Hg deposition; a 10 percent reduction in national elemental Hg emissions would lower U.S. Hg deposition by 0.03 percent. If Hg emissions from coal-fired power plants are reduced to 15 tons, Hg deposition in the U.S. would only be reduced by 7 percent. This small reduction in Hg deposition has little effect on women of childbearing age. Mercury exposures to this group would only be reduced by 0.5 to 0.75 percent and the decrease in the fraction of the population currently predicted to be above EPA's MeHg RfD would be reduced by 0.064 percent.[230] These results show that public health is protected with an ample margin of safety without any further regulation of EGUs. The fact that EPA has made power plants subject to CAIR and CAMR only provides further proof that public health is protected with an ample margin of safety without any CAA §112 regulation of EGUs.

Commenter 6475 added that EPA's modeling analyses also indicate that Hg deposition levels would be reduced by only 8 percent if all utility emissions went to zero.[231] EPA modeled the levels of MeHg in fish tissue attributable to EGU emissions under a number of scenarios. The model runs show that there is very little difference in fish tissue levels between runs based on zero Hg emissions from power plants, on Hg emissions from power plants following implementation of CAIR alone, and on Hg emissions from power plants following implementation of CAIR and CAMR. The straightforward conclusion one must draw from these results is that additional regulation of coal-fired power plants beyond CAIR does little or nothing to change fish tissue levels in the U.S. and, hence, to improve public safety.

<u>Response</u>:

As EPA has stated before, the concept of an "ample margin of safety" does not exist in CAA §*112(n)(1)(A). Thus, in determining whether it was appropriate to regulate Utility Units under* CAA §*112, EPA was not required to find that the level of utility-attributable Hg emissions remaining after imposition of the requirements of the Act would result in an ample margin of safety. <u>See</u> 70 FR 16025. Nonetheless, we agree with commenter that even assuming, arguendo, EPA were required to conduct the human health-based aspect of the CAA §112(f) inquiry (which does apply an ample margin of safety), we would likely conclude that CAIR, and even more so*

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[230] This minute effect would have been even smaller had one used the RfDs recommended by the World Health Organization (WHO) or the Agency for Toxic Substances and Disease Registry (ATSDR).
[231] <u>See</u> 70 FR 16019.

with CAMR, not only protects public health, but does so with an ample margin of safety. Id.

The RfD was derived based on the advice of the NRC, and is consistent with the recommendations of this premier scientific advisory body. The commenter is incorrect regarding use of data from the Seychelles study. As noted in the IRIS summary that described the derivation of the RfD, "EPA based this RfD for this assessment on several scores from the Faroes measures, with supporting analyses from the New Zealand study, and the integrative analysis of all three studies [Faroe Islands, New Zealand and Seychelles]." Further, the assertion regarding the stringency of the statistical method is incorrect, and we again note that the statistical approach used was that recommended and presented by the NRC in its 2000 report "Toxicological Effects of Methylmercury." The NRC report recommended the use of an uncertainty factor of 10 in the derivation of the RfD; EPA similarly used an uncertainty factor of 10. The commenter's view regarding sensitive populations is much narrower than the concept that is applied in developing RfDs and applying uncertainty factors to account for inter-human variability. Although it is true that the population studied in the Faroe Islands consists of children born to mothers with relatively high Hg exposures during pregnancy, it is not necessarily the case that the Faroe Islands population is the most sensitive; the human variability portion of the uncertainty factor addresses the possibility that portions of the U.S. population are more sensitive to MeHg than is the Faroe Islands population. Further, although it is true that typical Hg body burdens in the Faroe Islands cohort are generally higher than those in the U.S., there is overlap between the two exposure distributions; the lower-end body burdens in the Faroe Islands study are approximately equal to the median levels among U.S. women of child-bearing age, and the median levels.

Comment:

Commenter 6490 stated that EPA made incorrect reduction assumptions. EPA's tentative conclusion that most of the (Hg) reductions from CAIR will be achieved by 2010 is fatally flawed for New Hampshire because the State is not subject to CAIR. CAMR as designed by EPA, sets the final 2010-2017 budget for New Hampshire at 126 lb, which is 340 percent higher than EPA's 2001 base inventory for phase I (37 lb) and sets the second phase cap at 50 lb, which is also higher than EPA's 2001 base year emissions (by 135 percent). This allows New Hampshire EGUs to substantially increase Hg emissions under the rule. Moreover, because EPA base year inventory for New Hampshire is wrong, affected sources within the State will only have to make minimal Hg reductions (about 5 percent) before 2018.

Response:

EPA's assessment of the co-benefits from CAIR is assessed at the national level, rather than the individual State or CAIR-region level. In other words, the first phase cap of CAMR represents projected Hg emissions at the national level, once CAIR is in place in 2010.

EPA maintains that the national Hg cap-and-trade program provides the best system of emissions reductions. Under this program, national Hg emissions are capped at 38 tons beginning in 2010, and 15 tons beginning in 2018. The cap-and-trade program provides a cost-effective mechanism for achieving these reductions, and the caps guarantee that emissions *reductions will be achieved from the current Hg emissions level of approximately 48 tons. Because emissions allowances are a scarce commodity under a cap-and-trade program, due to the fact that current emissions exceed the national cap, these allowances have economic value, and it will likely make economic sense for sources in States with a surplus of allowances to sell these allowances to sources in States with a deficit that need them for compliance. Regardless of the decisions made by participants in the allowance market, CAMR, by placing a hard cap on Hg emissions and accounting for each individual ounce of Hg emitted, guarantees that significant reductions in nationwide Hg emissions will be achieved.*

We have addressed the commenter's concern related to New Hampshire in Section 1.1.3.1.1 of this document.

1.1.3.5.2 EPA's Selection of 2020 as the Date for Measuring the Remaining Emissions

Comment:

Commenter 6475 noted that EPA has also requested comment on its selection of the year 2020 as the time for measuring the Hg emissions that remain after the other provisions of the CAA have been implemented. The commenter agrees with EPA's choice of the year 2020.

Commenter 6475 added that time has proven that EPA was unduly optimistic when it chose 2010 as the date when all of the requirements of the 1990 CAA Amendments would be in place. Following publication of the Utility Study, EPA has promulgated a series of additional regulations that impact the amount of HAP, and more specifically Hg, that are emitted from coal-fired units. This current phase of CAA implementation includes CAIR, the Clean Air Visibility Rule (CAVR), and the requirement that States develop SIPs to implement the $PM_{2.5}$ and eight-hour ozone standards.

The commenter added that the implementation dates for these three programs vary with 2020 being the best estimate of when all three programs will be fully in place. The CAIR Phase II cap for SO_2 and NO_x is put in place in 2015. Prior banking of allowances will probably delay the full installation of all control equipment for SO_2 and NO_x reductions until 2020 or shortly later. CAVR requires States to develop BART implementation plans by December 2007 and for those plans to be implemented within five years of EPA's approval of the State plan. The regulatory impact analysis that EPA conducted for CAVR implicitly assumes that implementation of CAVR will mostly occur by 2015. States must develop SIPs to implement the $PM_{2.5}$ and ozone standards by Spring 2008. Full implementation of those SIPs will not occur until 2015. Thus, EPA's choice of 2020 for assessing the significance of any remaining Hg emissions from coal-fired power plants is reasonable and an earlier date should not be chosen.[232]

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[232] Petitioners suggest that because Congress gave EPA 3 years to complete the Utility Study, it somehow truncated EPA's ability to determine what regulations it would ultimately impose on coal-fired power plants as a result of other provisions of the 1990 CAA Amendments. The commenter believes that petitioners' claims are meritless. First, environmental petitioners' argument tries to ignore the fact that while CAA §112(n)(1)(A) specifies that the utility study should be completed within 3 years of November 15, 1990, it does not specify when EPA must make its "appropriate and necessary" determination. The petitioners' attempt to explain this statutory problem away by pointing to an irrelevant provision of CAA §112 only highlights the fiction of their argument. Second, petitioners' claim that EPA cannot consider recent regulations like CAIR in making its CAA §112(n)(1)(A) determination is

Response:

EPA concurs with the commenter that 2020 is the proper date for measuring remaining emissions.

Comment:

Commenter 6634 provided additional analysis by the Clean Air Task Force of EPA's IPM model outputs for CAIR and CAIR + BART reveals the significant extent of EGUs lacking advanced pollution controls for SO_2 or NO_x or both by 2015 and 2020. This analysis further confirms the unlawfulness and arbitrariness of EPA relying on CAIR or BART in order to avoid adopting MACT standards for the utility sector.

Analysis of the 2020 CAIR-only model under IPM was based upon an assumed 1,204 coal-fired generating units, with the breakdown of pollution controls as follows:

- FGD Scrubbers - 561 units of 199,700 MW
- SCRs - 405 units of 153,900 MW
- SNCRs - 93 units of 12,600 MW
- Activated Carbon Injection (ACI) - 2 units of 570 MW
- FBC - 4 units of 308 MW
- Retired or Fuel Switched - 3 units of 350 MW
- Units Lacking the Above Advanced Controls - 498 units of 93,300 MW.

Analysis of BART data revealed an additional 313 EGUs, with 58 of these units projected by the IPM modeling to continue lacking the above advanced controls. This represents 30,500 MW responsible for 766,300 tons of SO_2 emissions and 271,000 tons of NO_x emissions in 2020.

Analysis of the 2015 CAIR/BART combination model run output was based upon an assumed 1,173 coal- fired generating units, with the breakdown of controls as follows:

- FGD Scrubbers - 529 units of 192,200 MW

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logically inconsistent with the phrase "after imposition of the requirements of the Act." Petitioners have not challenged EPA's legal authority to impose CAIR on electric utilities; indeed they urged EPA to go further in regulating SO_2 and NO_x. Thus, petitioners have admitted that EPA has legal authority under the CAA to impose CAIR yet they claim EPA cannot consider that rule in the context of CAA §112(n)(1)(A). The commenter believes that petitioners' argument makes no logical sense and must be rejected.

- SCRs - 416 units of 165,600 MW
- SNCRs - 100 units of 13,400 MW
- ACI - 2 units of 570 MW
- FBC - 13 units of 745 MW
- Retired or Fuel Switched - 9 units of 1,140 MW
- Units Lacking the Above Advanced Controls - 442 units of 62,300 MW.

Analysis of the BART data alone revealed 55 EGUs at BART-identified plants projected by the IPM modeling to lack the above advanced controls. This represents 28,800 MW responsible for 784,000 tons of SO_2 emissions and 212,000 tons of NO_x emission in 2015.

EPA's own modeling and projections for the number of EGUs lacking advanced pollution controls for SO_2 and NO_x under CAIR and BART, in 2015 and 2020, reveal the unlawfulness and arbitrariness of EPA's reliance on expected advanced controls and resulting pollution reductions from CAIR to support its conclusion that utility MACT standards are neither appropriate nor necessary.

Whereas MACT for the EGU industry would require advanced pollution controls for HAP on every EGU in the country, EPA is relying – to avoid MACT – upon inadequate substitute rules that it knows will result in over 37 percent of all EGUs in the CAIR region lacking any advanced controls (even for NO_x and SO_2) by 2015, and, remarkably, over 41 percent of all CAIR EGUs lacking such controls by 2020. As EPA well knows, its December 2000 listing decision triggered a requirement to issue a MACT standard for the industry by 2002 – put differently, the CAA required MACT standards for all EGUs in the country years ago, and even given EPA's delays following the December 2000 regulatory determination and listing, MACT-level controls should have been in place no later than 2008.

Response:

The analysis presented by the commenter does not clearly summarize the methodology used in its analysis. EPA was unable to replicate some of the results presented by the commenter, and the commenter is overstating the number of coal units in these runs that would be subject to the requirements of CAMR. In EPA's final CAIR and BART run for 2015, there are 1,010 units that would be subject to CAMR. In EPA's final CAIR run for 2020, there are 1,127 coal units that would be subject to CAMR.

EPA's argument for revising its December 2000 finding is based in part on Hg emissions reductions projected under CAIR and their associated impacts. These emissions projections result from the modeling noted above. However, it is the projected impact of utility-attributable Hg emissions that remain after CAIR, rather than the number of controlled or uncontrolled units, that provided the basis for EPA's determination. The number of controlled or uncontrolled *units, although it impacts the level of emissions, is not directly relevant to this determination. See Section 1.1.1.2 of this document for EPA's legal discussion on consideration of CAIR in this determination.*

1.1.4 EPA's Decision Related to Nickel (Ni) Emissions from Oil-Fired Utility Units

Comment:

Commenters 6471 and 6475 believe that EPA correctly concluded that it was neither appropriate nor necessary to regulate Ni emissions from oil-fired power plants. The commenters state that EPA's 1998 Utility Study calculated low levels of health risks from Ni emissions using a screening level analysis that relied on conservative assumptions about the species and the toxicity of Ni emitted from oil-fired units. They state that EPA's risk assessments were based on a conservative assumption that half of all the Ni emitted from oil-fired power plants is as carcinogenic as the most carcinogenic form of Ni and that EPA's screening level assumption at least doubled the risk that EPA calculated for Ni emissions. Commenter 6475 cites more recent testing that found that the chemical speciation of Ni in oil fly ash revealed mostly nickel sulfate and nickel oxide compound mixtures and a noticeable lack of carcinogenic nickel subsulfide. Had EPA used more realistic Ni carcinogenicity assumption in the Utility Study it is doubtful that the risk from any oil-fired plant would have approached a one-in-a-million (1×10^{-6}) risk level.

Commenter 6475 noted that between the time EPA issued the Utility Study in February 1998 and published its final regulatory determination in March 2005, the movement away from oil-fired units has become clear. This movement away from oil-fired capacity should continue as the price of fuel oil increases. The commenter notes that the environmental petition does not contain any factual evidence showing that EPA's decision not to regulate Ni emissions was incorrect. Instead, their claims proceed from an assumption that the December 2000 action by the Administrator was final action that tied the hands of future EPA Administrators. The commenter stated that the December 2000 action was not final Agency action and was not a "rule" that could bind later EPA Administrators. The commenter states that the environmental petitioners have offered no reason for EPA to change its decision not to regulate Ni emissions from oil-fired units.

Commenters 6471 and 6474 noted that, in the Notice to Reconsider, EPA requested additional information related to the factors the Agency used to support its decision not to regulate Ni emissions from oil-fired EGUs under CAA §112. The factors identified by the Agency in the Notice include (1) the low level of risk presented by Ni emissions from oil-fired EGUs as documented in the February 1998 Utility Study Report to Congress; (2) uncertainty regarding the health impacts of Ni emissions from oil-fired EGUs; and (3) the trend toward a reduction in the utilization of oil for electric power generation. Commenter 6474 added a (4) noting EPA's lack of information about the Ni risks from the plants in Hawaii, much less all other oil-fired plants in the U.S.

Commenter 6471 is not aware of any information that would indicate that oil-fired EGUs pose a greater risk to human health than assumed by EPA in the Utility Study Report to Congress. To the contrary, the commenter submitted information indicating that the risks from Ni were significantly overstated in the Utility Study Report to Congress and that the trend away from oil-fired generation means that the risks are lower still. The commenter added that EPA acknowledged in the Utility Study Report to Congress that there was significant uncertainty regarding the risks from oil-fired plants, and noted that its analysis was conservative and tended to overestimate the risks from oil-fired plants. One conservative assumption by EPA was that 50 percent of the Ni emitted from oil-fired plants is as carcinogenic as nickel subsulfide. The commenter had earlier provided detailed comments with supporting references and citations providing evidence that EPA's conservative assumption has not been borne out by recent studies. These studies show that the level of sulfidic Ni being emitted from oil-fired EGUs is much less than assumed by EPA and may be zero. Had EPA assumed the Ni emitted from oil-fired plants was 10 percent as carcinogenic as nickel subsulfide instead of 50 percent – even with EPA's other conservative assumptions intact – it would indicate an increased cancer incidence of only 0.04 cancers per year, or one additional cancer case nationally every 25 years.

Commenter 6471 noted that the Agency's assumption in the Utility Study Report to Congress regarding the level of carcinogenicity of the Ni emitted by oil-fired EGUs was the major driver for the risk predicted from oil-fired units. Even using this incorrect assumption, in the commenters opinion, EPA predicted that only 11 of the oil-fired plants would result in a cancer risk of greater than 1×10^{-6}. Given studies showing no sulfidic Ni is emitted by oil-fired units, the commenter believes that EPA could recalculate the risk for those 11 plants and demonstrate cancer risks of zero or close to zero. With these new studies, there would be no significant cancer risk from any oil-fired EGU, thus, bolstering EPA's conclusion that it is neither appropriate nor necessary to regulate oil-fired EGUs under CAA §112. This is especially true given the high costs such regulation would impose on companies owning and operating oil-fired EGUs.

Commenter 6481 stated that the regulation of Ni emissions from these plants is entirely unwarranted. EPA concluded a decade ago that oil-fired units were responsible for one excess cancer case every five years. With respect to EPA's specific requests for input, it now appears that the11 plants that the Agency identified have reduced their oil generation and, thereby, their Ni emissions as well. All indications are that the overall trend away from the use of oil in the generation of electricity will be maintained. The commenter provided updated information on 4 of the 11 oil-fired plants identified in the Utility Study Report to Congress.

- New Boston 1 (Massachusetts) will operate for only 3 more years under a must-run reliability agreement.

- Mystic 7 (Massachusetts) will be shut down at the earliest possible time.

- T.G. Smith 3 (Florida) is the only unit still operating at this plant. The unit burns natural gas 95 percent of the time (on average) and has switched from No. 6 to No. 5 fuel oil to meet SO_2 limits. The plant operates at 2 to 5 percent of its 25 MW capacity and it operates only 200 to 300 hours per year.

- Alamitos (California) has, for many years burned, only natural gas; the facility combusts no residual oil.

Response:

EPA agrees with the commenter's statement that more recent information indicates that the potential health risk arising from Ni emissions from oil-fired units is likely substantially less than what was stated in the Utility Study Report to Congress and that the trend away from the use of oil is likely to continue.

Comment:

Commenter 6634 stated EPA's determination not to regulate Ni from oil-fired EGUs and other HAP emitted by coal- and oil fired EGUs is unlawful. The commenter further stated that EPA did not base its revised regulatory determination for oil-fired units on any new evidence discounting the cancer risk in humans from exposure to Ni air emissions, or on any new evidence discounting the cancer or other public health risks associated with exposure to other EGU non-Hg HAP emissions. Further, EPA did not take into account the fact that members of Native American Tribes, for example the Penobscot, live immediately downwind of an oil-fired EGU, Maine's Wyman Station. Nor did EPA assert that the reductions in oil use for electricity generation at existing operational units was permanently guaranteed as a function of air permit limits or other regulatory or contractual requirements. Instead, EPA based its revised regulatory determination on speculations about the future of the electricity production fuel mix.

The commenter stated that recent events demonstrate clearly the arbitrary, capricious, and unreasoned nature of EPA's decision making about whether to regulate Ni or other HAP from oil-fired units. Even as EPA was making its assertions that oil use was declining for the purpose of electricity generation, actual experience being documented for 2005 proved directly contrary to EPA's perspective on this point. A recently released study by the U.S. Department of Energy, Energy Information Agency (DOE/EIA), of fuel use in electricity generation for 2005 indicates that "[g]eneration from petroleum liquids was up 49.2 percent from [2004]. This sharp increase reflects generators being forced to use oil-fired peaking plants to meet high loads caused by the hot weather, and fuel switching caused by the high price and tight supply of natural gas due to the Gulf Coast hurricanes."

Response:

Commenter 6634 is correct in that the DOE/EIA report "Electric Power Monthly: December 2005"[233] contains the sentence "[g]eneration from petroleum liquids was up 49.2 percent from a year ago." However, the commenter failed to note that a few paragraphs later, the same report also states that "[l]iquid petroleum consumption [for electric power generation] decreased by 5.4 percent year to date, due to the high price of crude oil and petroleum products." The difference between the 49.2 percent increase September 2004 to September 2005 and the 5.4 percent decrease January 2005 to September 2005 vs. January 2004 to September 2004 is not fully explained in the DOE/EIA report but is believed to reflect the point-to-point

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[233] See EPA-OAR-2002-0056-6682.

usage increase due to the Gulf hurricanes of 2005 vs. the general downward trend in oil use for electricity generation over time (including periodic spikes). This downward trend in oil use for power generation was further reported in the January and March 2006 editions of the report.[234] *Further, EPA has found no indication in any of the DOE/EIA reports or tabular data that would lead one to believe that the earlier DOE/EIA projections of continued flat or negative growth in the use of oil for electric generation have changed in any manner.*[235] *In addition, there is still no indication that there are any new oil-fired EGUs planned*[236] *– only internal combustion engines and combustion turbines are listed on the DOE/EIA tables of new and planned U.S. EGUs with oil (and it is all distillate oil) as the energy source. EPA believes that commenter 6634 erred in selecting one data point resulting from an emergency situation and using it to project a reversal of the years-long decline in fuel oil use by the electric generating industry. EPA agrees that any future forecasts are, to some extent, "speculations about the future of the electricity production fuel mix" as noted by the commenter. However, the consistency of the various DOE/EIA projections for declining or flat fuel oil use by the electric generating industry leads EPA to believe that there is no scenario that will lead to increased use of fuel oil by the industry, regardless of whether such constraints are included in enforceable permits.*

The additional information provided by commenter 6481, along with additional data obtained from DOE/EIA regarding existing oil-fired EGUs in 2004,[237] *confirms the downward trend in the use of oil as a fuel for generating electricity. This new information indicates that 3 of the 11 plants and 31 of the 42 units have now taken, or will be taking within a limited number of years, some measure that could only lessen or eliminate emissions of Ni, including the fact that 15 of the units are, or will be within 3 years, in a "not operating" or "out of service" status. Therefore, as stated in the final Section 112(n) Revision Rule, EPA concludes that it is not appropriate to regulate oil-fired Utility Units under CAA §112 because we do not anticipate that the remaining level of utility Ni emissions will result in hazards to public health. We believe that the weight of evidence before the Agency makes it unnecessary to do any further modeling of oil-fired EGUs.*

EPA also notes that the facility cited by the commenter (the Wyman Station in Maine) is not one that was identified in the Utility Study Report to Congress as being a facility that would result in a cancer risk of greater than 1 x 10^{-6}.

1.1.5 Documents Identified by Petitioners that are dated After the Close of the Public Comment Period

In their petitions for reconsideration, petitioners alleged that EPA violated the Administrative Procedure Act (APA) and the CAA by failing to solicit comment on information of central relevance to the final rule. In particular, petitioners raised several pieces of "new" information concerning public health which they claim are of central relevance and became available following the close of the public comment period. In the Federal Register notice granting reconsideration on several issues, we invited petitioners and any other commenters to

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[234] See EPA-HQ-OAR-2002-0056-6683 and -6684.
[235] See EPA-HQ-OAR-2002-0056-6685, -6686, -6687, 6688, -6689, and -6690.
[236] See EPA-HQ-OAR-2002-0056-6691, -6692, and -6693.
[237] See EPA-HQ-OAR-2002-0056-6694.

submit these and other documents that they believe are relevant to Section VI of the final Section 112(n) Revision Rule or to any other issue on which we granted reconsideration. We indicated that we would consider any such documents and any other new information at the same time we considered all significant comments received during the comment period on the reconsideration issues. See 70 FR 62210. Accordingly, comments received that cited or otherwise referenced the documents raised by petitioners are addressed in the appropriate sections of this document. See, e.g., Section 1.1.3.5.1.

1.2 Clarification and Correction of Statements Made in Final Section 112(n) Revision Rule

Comment:

Commenters 6583 and 6585 noted that EPA states that Ojibwe Tribes do not reside in areas that appear to be significantly impacted by utility Hg emissions. However it is clear that something is polluting our waters and making the fish unsafe to eat due to Hg contamination. Studies performed by both the State of Minnesota and by the Band show fish tissue contamination levels higher than EPA's safe limit of 0.13 parts per million for women. The Minnesota Pollution Control Agency Reservation and the commenter have issued its own advisories. The commenter's own studies of sediments from concentrations are strongly correlated Reservation waters found that Hg sediment with water quality and landscape parameters. Commenter 6585 noted that the Leech Lake Band of Ojibwe has consumption advisories upon State of Minnesota advisories for Hg on 10 lakes that have been analyzed to date. These advisories limit the amount and type of fish a Tribal member may consume without an elevated risk to their health. In some instances area lakes have a "do not eat" advisory. This cripples the traditional, cultural, and spiritual needs of the Leech Lake Band of Ojibwe. Commenter 6583 stated that the Northern Lakes and Forests Ecosystem is particularly vulnerable to Hg deposition; both the geology and hydrology of the region contribute to a high methylation rate of the Hg deposited in these watersheds, and, therefore, a high bioaccumulation potential for aquatic biota. The commenters stated that utilities are now the biggest sources of Hg in Minnesota, expected to emit 58 percent of the State's emissions in 2005, and continue to rise with increased energy usage while Hg emissions from other sources in Minnesota have been reduced by 70 percent a from 1990 levels. Although fish tissue concentrations have decreased by 1.0 percent during this time, it is clear that these decreases have not been adequate to make fish safe to eat as often, as Band members expect, given their treaty-guaranteed rights to harvest, hunt and fish in this region. The commenter noted that if utilities are not emitting the Hg that is, ending up in Reservation, fish, the commenter is at a loss to explain who is. In addition to these concerns, the commenter is located in northeastern Minnesota; a location expected to see little utility Hg reduction under CAMR.

Both commenters noted that EPA further states that data from a study by the GLIFWC cannot be used for two reasons. First, EPA claims that the data cannot be used because information was not included on annual average consumption rate (only seasonal rates) or the percentage of those fish consumers that are women of childbearing age. EPA also notes that the study does not clearly identify the population percentile that the data represent and that the study covers individuals not, residing in the most impacted portions of EPA's study area. EPA further notes that the data are problematic because they are seasonal and cannot necessarily be translated into annual-averaged values. The commenters see several problems with EPA's statements.

The commenters stated that although the data may not be in the form that EPA prefers, conservative assumptions should be made so this important data can be used. EPA has a duty to protect the most vulnerable members of society, in addition to its trust responsibility to Tribes. If the data does not say what percentage of fish consumers are women of childbearing age, then EPA should assume that a high percentage of the consumers are in this sensitive age bracket, to be conservative and to protect public health. If women of childbearing age are not at the top end of the consumption chart, it is because they know the dangers that Hg can cause to their offspring. Saying that we can't effectively reduce Hg because women don't eat enough fish to justify doing so as like saying we don't need more police in a bad neighborhood because everyone is too afraid to leave their houses, anyway. It is also true that men can suffer ill effects from Hg poisoning. Recent findings indicate that consumption of Hg-contaminated fish can lead to heart disease.[238]

The commenters stated that EPA's argument that the individuals covered in the study can be ignored because they do not live in the most impacted portions of EPA's study areas is erroneous. The watershed characteristics of the pond du Lac Reservation actually promote methylation of Hg due to the high levels of dissolved organic compounds and sulfate found in Reservation waters. These two factors, lead to increased rates of methylation.[239] Mercury emissions from utilities in Minnesota are NOT expected to decrease as a result of CAIR, according to EPA's own models[240] and may actually increase due to increased energy consumption. By ignoring these factors, along with the knowledge that tribal people consume large amounts of fish, EPA is acting irresponsibly. The commenters also strongly urge EPA to address cumulative effects of toxic exposures in people who consume large quantities of other natural resources (i.e., venison, moose, bear, waterfowl, wild rice, blueberries) in order to protect sensitive members of the population.

The commenters stated that the fact that the consumption data collected by GLIFWC show seasonal averages rather than annual gets to the crux of the issue – Band of Ojibwe members do experience high seasonal consumption rates due to the nature of their fishing methods. The traditional method of harvesting fish takes place in the spring of the year, when the fish are spawning and are speared or collected by nets. Due to EPA's responsibility to protect the nation's most vulnerable populations, the Agency needs to consider the seasonality of the exposure in tribal people. EPA may be using the wrong methodology to address this issue but it is EPA's responsibility to find a way to use the data available. Data do not always fit the mold we desire, but that does not mean the data are bad or meaningless, only that we must find a new way to understand it.

Commenter 6583 would like to direct EPA to a study performed by the Wisconsin

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[238] See Elizabeth Weise, "Mercury Damage Irreversible", *USA Today*, 9 Feb 2004: D6.
[239] See OAR-2002-0056-6090.
[240] See EPA-HQ-OAR-2002-0056-2247, page 1.

DOE[241] that studied hair samples from 981 men and 1,051 women living in Wisconsin. The study found Hg levels ranging from 0.012 to 15.2 µg/g, with the guideline value of 1.0 µg/g being exceeded in 29 percent of the men and 13 percent of the women participating in the study. This study indicates that people in the Midwest are indeed at risk for Hg-related health effects.

Commenter 6585 stated that the fish available to the Leech Lake Band of Ojibwe are native species that come from local waters. However, these advisories only make humans aware of the danger. Research is showing that Hg equally affects the animal and plant kingdoms causing reproductive and neurological problems and even death. Living in northern Minnesota with our vast amount of water, the commenters are on a heightened alert. The people of Leech Lake rely on fish and other water related foods for their subsistence and cultural life style. In two area Tribal lakes for which the Minnesota Chippewa Tribe has data for the last five years, Taylor and Swamp, the scientific staff has measured 35 and 50 percent increases in fish Hg respectively. The Leech Lake Band has determined that the average annual consumption of 180 lb of fish is in line with Leech Lake's rights to exercise treaty rights for subsistence fishing. EPA's general populations mean consumption estimate is 49.6 lbs per year.

Response:

The commenter expresses concern that power plants deposition in Minnesota will not be reduced significantly after CAIR and CAMR but fails to note the CMAQ estimate that power plants currently represent 3.1 percent of total deposition in Minnesota (and 8.4 percent in Wisconsin). Given that such a small percentage of Hg deposition is currently from power plants, eliminating such deposition would have only a small impact on the fish advisories, exposure, and other issues of concern to the commenter. The commenter fails to take this into account, instead seeming to suggest that simply because power plants are a large fraction of the emissions within the State that they also represent a large fraction of deposition and exposure within the State. Intra-state variability is presented in the Effectiveness TSD.

As described elsewhere, variability in methylation rates are taken into account in the Agency's methodology through the use of fish tissue samples from various ecosystems.

We discuss elsewhere in this document and in Section 4 of the Effectiveness TSD why fish consumption rates provided in the GLIFWC survey are not appropriate for use in the risk assessment. These include:

- *They can not be converted into annual-averaged fish consumption rates which, as described in section 1.1.2, EPA is using for estimating chronic exposure risk (and which are required for use with the concentration-response function).*

- *EPA's public health analysis is based off of the RfD, and, therefore, this analysis appropriately focused on long-term consumption rates and we reasonably used annual consumption rate. The Hg blood concentration at any given point of time is affected by*

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[241] See Knobeloch, Linda, Henry Anderson, Wisconsin Department of Health and Family Services, Division of Public Health, prepared for State of Wisconsin, Department of Administration, Division of Energy, Environmental Research Program, August 2005, Population-Based Methylmercury Exposure Assessment.

> *the cumulative ingestion of MeHg over the course of several months due to the clearance half-life of Hg in the blood. (See http://www.epa.gov/iris/subst/0073.htm.) Although it is conceivable that there are particular windows of sensitivity to Hg during pregnancy such that peak exposures could be more relevant than the chronic body burden, EPA has no information addressing this specifically for Hg and the subtle neurodevelopmental effects that are of concern here.*

- *They can not be readily translated in terms of the population percentile they represent, which prevents their use in a population-level assessment of risk.*

- *The locations of the Native American Tribes referenced in the GLIFWC survey are generally not associated with the greatest EGU Hg impacts and, therefore, fish consumption rates for those Tribes would not be associated with the greatest risk benefits/risk impacts. In addition, application of the GLIFWC-referenced consumption rates in modeling exposures for parts of the study area (including Ohio which has some of the greatest Hg impacts), could be inappropriate because the GLIFWC consumption rates might not be representative of Native American populations living in Ohio.*

Although it is possible to use conservative assumptions in establishing annual-average fish consumption rate estimates from the GLIFWC data as suggested by the commentator, these values would still be of limited use because it would not be possible to know how reasonable those values are (e.g., they could be unreasonably conservative and not representative of any actual consumption behavior). The type of population-level risk assessment presented in the Effectiveness TSD needs to use consumption rate data that can be linked to population percentiles so that any "high" or "elevated" risk estimates that would be identified could be characterized in terms of their potential likelihood. Use of extremely high-end fish consumption rates based on conservative assumptions that can not be reasonably linked to a particular population percentile is not reasonable in the context of a population-level risk assessment. See EFH section 10.8 for a discussion of various Native American freshwater studies and an explanation of why the EFH recommends using 170 g/day as an upper percentile of Native American Subsistence Populations. This consumption rate is in excess of the consumption rate for Native American general population as explained by the EFH (see EFH page 10-27).

> *It should be emphasized that the above recommendations refer only to Native American subsistence fishing populations, not the Native American general population. Several studies how that intake rates of recreationally caught fish among Native Americans with State fish licenses are somewhat higher (50-100 percent) than intake rates among other anglers, but far lower than the rates shown above for Native American subsistence populations." (Citations omitted.)*

A number of subsistence fish consumption studies do reflect consumption of a mix of marine and freshwater fish. However, because the Effectiveness TSD focused on EGU-related risk associated with self-caught freshwater fish consumption, emphasis was placed on identifying reasonable population-level percentiles for subsistence fishers who almost exclusively engage in freshwater fishing. Although it is true that at lower percentile consumption rates, it is possible *that fishers, including subsistence fishers, mix self-caught freshwater fish with purchased freshwater and saltwater fish, two points need to be made in relation to this scenario: (a) data identifying the correlation between self-caught freshwater and purchased freshwater/saltwater fish consumption rates as a population-level distribution are not available, making it very difficult to model the correlation between these two sources of fish in assessing exposure, and (b) as fish consumption percentiles increase to high-end levels (e.g., 99th percentile and beyond), the likelihood of an individual supplementing his/her self-caught fish consumption with purchased fish decreases because they are getting progressively larger amounts of their dietary protein from self-caught fish, leaving less need to augment with purchased fish. In Table 3 herein we show how by adding high-end percentile marine consumption rates to the analysis increase the IDIs by only a very small amount. See section 1.1.2 for additional discussion of the fish consumption rates used in the public health analysis, including joint consumption of marine and freshwater fish.*

2.0 Summary of the Significant Public Comments on the Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Reconsideration

Comment:

Commenter 6513 disagreed with petitioners' claim that EPA should reconsider its decision to remove coal and oil-fired Utility Units from the CAA §112 (c) source category list. The delisting on the part of EPA allows introduction of cap-and-trade as a means of reducing Hg emissions, thereby providing the necessary flexibility for utilities to implement the most efficient emission reduction technologies. Furthermore, the current definition and classification contained within CAMR is based on interpretation of the CAA in light of the 1990 Amendments. The previous classification, however, was based on the 1970 version of the CAA. Removal of coal and oil-fired power plants from CAA §112(c) is, therefore, consistent with the intent of the 101st Congress, which enacted the 1990 amendments to the CAA. Removal of "Utility Units" from the list of sources to be regulated under CAA §112 paves the way for introducing the proven cap-and-trade program as a regulatory mechanism for reducing Hg emissions. The commenter believes that EPA has taken the right regulatory approach with CAMR, balancing deep reductions in Hg emissions where they are the most cost-effective with reducing costs to consumers. Such incentives will help assure compliance with the new rule, thereby expediting emission reductions. The commenter supports CAMR for establishing control requirements that utilize a market-based cap-and-trade approach under CAA §111. The cap-and-trade program creates incentives for continued development and testing of sophisticated Hg control technologies that are efficient and effective. U.S. manufacturers who develop this technology can then market the tools to other countries that may engage in Hg emission reduction, thereby enhancing our competitiveness while improving overall air quality. By making Hg emissions a tradable commodity, the system provides a strong motivation for some utilities to make early emission reductions.

CAMR, as written, is a common-sense approach to reducing power plant Hg emissions and we see no reason to change the final rule. Significant alteration of CAMR, especially one that hinders cap-and-trade or changes the allowance allocations, will force manufacturers to incur higher energy costs which will increase their electricity bill and their cost for natural gas. CAMR allows utilities to receive credit in meeting their Hg reduction targets through Hg emissions reductions that occur as a co-benefit for reducing SO_2 and NO_x emissions. For some coal ranks, however, co-beneficial Hg removal is very limited, possibly forcing utilities to purchase costly emissions allowances in order to comply if Hg specific technology isn't available even for the first phase. For such coals, changes to the cap-and-trade approach would be detrimental. Because Hg specific reduction technologies are not yet commercially available, CAMR provides time for industry to further develop and deploy those technologies instead of forcing companies to switch to alternative sources of electricity generation such as natural gas. Vendors are not willing to provide guarantees for technology that is currently available and would be mandated in the event a more stringent Hg emission standard were to emerge from EPA.

Response:

EPA appreciates the commenter's support of CAMR. To the extent the comment addresses EPA's removal of Utility Units from the CAA §112(c) list, that issue relates to the reconsideration of the final Section 112(n) Revision Rule and comments concerning that issue are addressed elsewhere in this document.

2.1 Discussion of Issues Subject to Reconsideration

2.1.1 2010 Phase I Statewide Hg Emission Budgets and the Unit-level Hg Emission Allocations on Which Those Budgets are Based

Comment:

Commenter 6635 supports EPA's conclusion that it adequately noticed both its general intent with regard to the Hg budget and allocation approach in the proposed rule. The commenter supports EPA's approach in establishing allocation ratios for lignite, subbituminous, and bituminous coal ranks as provided in EPA's final rule. Furthermore, the commenter supports EPA's approach in establishing the State EGU Hg budgets and unit-specific allocations on which those budgets are based.

Commenters 6557 and 6560 are supportive of Statewide Hg Emission Budgets and Unit-level Hg emission budgets that are based on the co-benefits from CAIR and take into account the Hg variability among different coal types.

Response:

EPA appreciates the commenters' support of its chosen approaches.

Comment:

Commenter 6476 noted that, in EPA's initial NPR[242] and supplemental notice of proposed rulemaking (SNPR),[243] the Agency provided State-by-State Hg emission budgets for the year 2018 – the year corresponding to the implementation of Phase II of EPA's Hg cap-and-trade program. EPA provided sufficient technical information in the rulemaking record to provide interested parties the ability to recreate EPA's State-wide budgets as well as the assumed budgets for individual units.[244] EPA did not include similar State budget information for the 2010 Phase I cap in its proposed rule.

The commenter and many others assumed in their comments on the proposed rule that the State budget allocations for 2010 would be calculated in the same way as the 2018 budgets. In fact, that is exactly what EPA did when it added the 2010 budgets to the final rule. The

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[242] See 69 FR 4652 (January 30, 2004).
[243] See 69 FR 12,398 (March 16, 2004).
[244] See OAR-2002-0056-0965; -1605; -0964; -1604.

commenter believes that the final 2010 State Hg budgets are a "logical outgrowth" of the original rulemaking proposal and that EPA did not need to reconsider this issue.

Regardless, the commenter's previous comments discussed allocation issues in detail. Those comments assumed that the same methodology would be used for setting State budgets in 2010 and 2018. The State budgets in the final CAMR are derived using the same allocation methodology. The commenter supports EPA's approach in CAMR and does not believe that approach should be changed.

The commenter stated that, in their petitions for reconsideration, State and environmental petitioners advance several arguments challenging the State budgets in CAMR. The commenter believes that those arguments are without merit. Both petitioners identify some cases where the State budgets for 2010 exceed the total 1999 Hg emissions calculated for all coal-fired plants in that State. They argue that this proves EPA has failed to meet its obligation under CAA §111(a) of establishing the "best system of emissions reduction."[245] Their claim is legally incorrect. At base, petitioners are really arguing that a "system of emissions reduction" under CAA §111(a) must require emission reductions at every plant, except perhaps the best controlled unit. Under petitioners' theory, EPA could never promulgate a cap-and-trade program and comply with CAA §111(a), because a cap-and-trade program sets a nationwide cap on emissions and then allows the marketplace to decide how that limit will be met. Under a cap-and-trade program, companies may over-control at some units so they can use the excess allowances to avoid having to add new control equipment at other units.

The commenter states that the definition of "standard of performance" in CAA §111(a) is silent on whether a cap-and-trade program is a "system of emission reduction." As EPA notes in the preamble to the proposed rule, the legislative history of CAA §111 does not shed light on whether a trading program constitutes a "system of emissions reduction" for purposes of CAA §111(a). Congress does indicate that existing sources should be given flexibility in meeting CAA §111 standards.[246] The House Report accompanying the proposed 1977 CAA Amendments stated that, for standards under CAA §111(d), the Administrator would establish "guidelines" defining the best system for each category of existing source, and States would then be responsible for determining the applicability of such guidelines to any particular source or sources.[247] Moreover, CAA §111 "standards of performance" must reflect the degree of emission limitation achievable through application of the "best system of emission reduction which (taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated."[248] EPA has determined that a cap-and-trade program is the best system to reduce Hg emissions from coal-fired power plants for a global air pollutant like Hg.[249]

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[245] See State Petition, at 27; Environmental Petition, at 3.

[246] See 69 FR 4697.

[247] See H.R. Rep. No. 95-424, at 195, reprinted in A Legislative History of the Clean Air Act Amendments of 1977, Vol. 4, at 2662 (1978).

[248] See CAA §111(a)(1), 42 U.S.C. §7411(a)(1).

[249] To the extent Hg health concerns exist, they are global in nature. Over 75 percent of the Hg that deposits in the U.S. comes from sources outside the U.S. Mercury emissions from U.S. coal-fired power plants constitute only about 1 percent of the global emissions of Hg. Much of the Hg emitted by coal-fired power plants is in the elemental form which enters the global pool and does not deposit locally. Modeling work by EPRI and EPA predict

That determination was within EPA's discretion under CAA §111.

Commenter 6476 stated that the environmental petitioners' argument also relies on an inapt comparison of 1999 estimated emissions to State budgets for 2010 that fundamentally misperceives how a cap-and-trade program works.[250] Petitioners begin by characterizing the 1999 estimates as "actual" emissions. The commenter believes that they are not. EPA's 1999 emissions estimates are based on two or three days of testing at 80 coal-fired boilers. The tests at those boilers were merely snapshots of Hg emissions at the tested units. The results for a given unit are not representative of the annual emissions for that unit. As the commenter showed during meetings of EPA's Utility MACT Working Group, many of the ICR sampling results were far from "normal" conditions at the unit.[251] Furthermore, there are over 1,100 coal-fired boilers in the U.S. Short-term testing at about 7 percent of those units, even if accurate for the units tested, is unlikely to yield accurate annual emission estimates for all 1,100 units.

The commenter added that, more importantly, the petitioners' comparison of 1999 emission estimates to 2010 State budgets ignores the fact that EPA's State budgets are not based on estimated or actual emissions. The State budgets were determined using the heat input of all coal-fired units in the U.S. Multipliers were used for subbituminous and lignite coals to account for differences in the ability of plants burning those coals to capture Hg using existing control equipment. The use of heat inputs to create State budgets has the effect of treating all plants as "average" and allocating Hg allowances accordingly. As a result, States in which plants with above average removal of Hg are located will receive more allowances relative to actual emissions than other States having plants that are not currently controlling Hg as effectively. In essence, the 2010 CAMR State budgets reward plants with higher than average current Hg removal efficiencies. This is an appropriate policy choice that was within EPA's discretion when it set up the Hg cap-and-trade program.

The commenter believes that environmental petitioners have engaged in a numeric game by selecting States with extremely low total Hg emissions to produce extreme percentage comparisons. The petitioners' exercise is nothing more than division by small numbers. The commenter noted that, as the attached RMB memorandum demonstrates,[252] petitioners' choice of States like Hawaii and California to argue that EPA's 2010 State budgets are faulty ignores the fact that the total Hg emissions from these States is only a tiny fraction of nationwide Hg emissions. Thus, environmental petitioners have failed to show that the 2010 State Hg budgets are inappropriate.

The commenter stated that State petitioners also contend that EPA failed to explain why the total Hg budget for 2010 increased from 34 tons per year in the proposal to 38 tons per year in the final rule.[253] EPA has always said that the Phase I cap should be set at the level of co-benefits that will result from the implementation of CAIR. As rulemaking comments by UARG,

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that reducing Hg emissions from coal-fired power plants from 45 tons to 15 tons will only reduce Hg deposition in the U.S. by about 7 percent of the total annual Hg deposition in the U.S.

[250] See Environmental Petition, at 3-4.

[251] See Docket No. A-92-55-II-E-20; see also UARG Comments, at 43-46.

[252] RMB's memorandum is Attachment 1 of OAR-2002-0056-6476.

[253] See State Petition, at 24.

EPRI, and EEI have shown, the 34-ton cap contained in the proposed rule overstated the level of Hg co-benefits that would result from the implementation of CAIR.[254] Modeling has shown that 38-tons or higher is a more appropriate value. The level of the Phase I cap was clearly an issue raised by prior rulemaking notices and EPA should not change the CAMR Phase I cap as a result of its reconsideration of CAMR.

Response:

Without necessarily agreeing with every statement made by the commenter, we appreciate the commenter's support of the approach taken in CAMR.

Comment:

Commenter 6559 noted that in EPA's fact sheet it states that the first phase of the rule will reduce emissions from 48 to 31 tons beginning in 2010. The commenter hopes that this is simply a typographical error, as the first phase cap was set at 38 tons in CAMR. In the unlikely event that this is a new cap, the commenter strongly objects.

Response:

The first phase cap under CAMR remains at 38 tons. The 31 tons of Hg referenced on the CAMR fact sheet represent projected 2010 emissions under CAMR, not the cap itself.

Comment:

Commenters 6282 stated that the provisions in the final rule concerning the 2010 cap on Hg emissions and resulting State and unit budget allocations are not a logical outgrowth of the proposed rule. At both the proposal stage and the final stage of CAMR, EPA set the first phase cap on EGU Hg emissions at the level of co-benefits achieved by CAIR.[255] The Final Rule, however, sets a phase one cap that would require almost 30 percent less reduction in EGU Hg emissions by 2010 than EPA originally proposed. The difference in the phase one caps – 38 tons instead of 34 tons – appears to be based on a change in EPA's estimate of the co-benefits expected from CAIR. Compare 69 FR 4698 (original estimate) with 70 FR 28606 and 28619 (final estimate). Nowhere does EPA explain the discrepancy between its original modeling results and its final modeling results. The preamble simply asserts that EPA's modeling revealed that CAIR will result in a co-benefit level of 38 tons in 2010.[256] Although EPA refers readers to Chapter 8 of the RIA for "further discussion of EPA modeling results,"[257] that chapter provides no insight into EPA's conclusion that the proper level of co-benefits in 2010 is 38 tons. In fact, Chapter 8 of the RIA says nothing at all about Hg emission levels in 2010. There is similarly no reasoned explanation in the Response to Comments which explains the change in the cap

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[254] See OAR-2002-0056-5497, at 15; OAR-2002-0056-5469, at 12; OAR-2002-0056-2578, at 100.

[255] See 69 FR 4698 (proposing such an approach); 70 FR 28617-9 (adopting such an approach in the final rule).

[256] See 70 FR 28619.

[257] Id.

levels.[258]

In the NODA, EPA explained that it was "considering" changing its assumptions concerning the success of SCR and FGD of removing Hg from subbituminous coal plants.[259] It is not clear, however, whether EPA did in fact change its assumptions, nor whether those assumptions were material. EPA's failure to provide an explanation of the modeling underlying its final rule has deprived the public of a meaningful opportunity to comment on the rule.[260]

EPA's conclusion that CAIR will achieve lesser co-benefits than originally predicted is particularly difficult to understand given that the final CAIR is stricter than the proposed CAIR. In particular, the final CAIR set 2009 as the deadline for phase one NO_x reductions rather than 2010. Thus, because the final CAIR is designed to achieve NO_x reductions faster than the proposed CAIR, one would expect the final CAIR to achieve greater Hg reductions in 2010, not fewer. No discussion of the implications of the changed final CAIR deadline is found in either the preamble or the RIA.

EPA's failure to explain the modeling underlying its final phase one cap and its use of an arbitrary and capricious allocation method for determining State-specific budgets under the cap indicate that the Agency has failed its duty to examine the key assumptions underlying the 2010 Hg cap in the Final Rule.[261] EPA should grant reconsideration to remedy the shortcomings in its analysis and to provide the public with an opportunity to comment on the actual level of co-benefits expected from the final CAIR and the first phase State Hg allocations.

Response:

Petitioners' arguments focus on an issue that EPA did not re-open: the level of the Phase I cap. As explained in Section 4.2, EPA did not grant reconsideration of the level of the Phase I cap because Petitioners had adequate notice of that issue in the proposed rule. EPA notes, however, that the reference in the final preamble concerning the level of the Phase I cap should have been to Chapter 7 of the RIA, not Chapter 8. In addition, contrary to the commenter's assertion, Chapter 7 contains a number of projections of Hg emissions under CAIR and CAMR under different regulatory and sensitivity scenarios. See RIA, Tables 7-3 and 7-4 for EPA's policy case projections of Hg emissions (total and speciated) under CAIR in 2010 and CAIR and CAMR in 2010.

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[258] In the Response to Comments, EPA never indicates that it was persuaded by comments to the proposed rule which asserted that the "true" level of co-benefits expected in 2010 from CAIR was not 34 tons but rather somewhere between 38 and 40 tons. See 69 FR 69871 (NODA) (summarizing comments received from Cinergy and the Edison Electric Institute); see also Response to Comments, Chapter 9, pages 9-cxiv to 9-cxvii (responding to commenters that said true 2010 co-benefit level was 38 tons or more). The Response to Comments document simply says that EPA has "examined" the commenters' analyses, and then refers readers to the preamble and to Chapter 7 of the RIA – which, like Chapter 8, is silent as to the level of Hg emissions in 2010.

[259] See 69 FR 69871, paragraph "h".

[260] See Nat'l Asphalt Pavement Ass'n v. Train, 539 F.2d 775, 779 n.2 (D.C. Cir. 1976) ("In order to have a 'meaningful opportunity to comment,' one must be aware of the information the agency finally decides to rely on in taking agency action.") (citation omitted).

[261] See Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 534-35 (D.C. Cir. 1983) (EPA has a "duty to examine key assumptions as part of its affirmative 'burden of promulgating and explaining a non-arbitrary, non-capricious rule'").

In the CAMR Notice of Reconsideration, EPA did re-open the 2010 Statewide Hg emission budgets and took comment on those budgets. Comments received are addressed in this document. As explained below, EPA properly apportioned State budgets.

EPA indicated in the Response to Comments document for the final CAMR that EPA had made changes to some of its co-benefits assumptions for subbituminous units with SCR and FGD controls, as proposed in the NODA. EPA also used a newer version of IPM for the final modeling. Documentation for this version of IPM (2.1.9) was included in the CAMR docket.

Comment:

Commenters 6282 stated that EPA's assessment of the co-benefits of CAIR is misplaced for States which are not allowed to participate in the annual CAIR program. These States can only opt into CAIR's ozone season program. This action would most likely result in the installation of additional NO_x controls on the units in these States. Research has indicated that sources installing only NO_x controls such as SCR systems without accompanying SO_2 or PM controls could actually contribute greater amounts of Hg to local hotspots of pollution due to increased oxidation of the units' emissions.[262] EPA has failed to address this significant potential problem in its analysis of the co-benefits of CAIR.

Response:

The petitioner is incorrect in suggesting that States not subject to the CAIR annual program can opt in to the CAIR ozone season program. Rhode Island, because it is the only State subject to the NO_x *SIP call that is not subject to CAIR for ozone, is the only State that can choose to join the CAIR ozone season program as a means of meeting its SIP Call obligations because we are phasing out the* NO_x *SIP Call trading program. Given that Rhode Island does not presently have any coal-fired generation that would be subject to CAIR and CAMR, the addition of this State to the CAIR ozone season program would not impact estimated Hg co-benefit reductions from CAIR. Further, it should be noted that this comment is counter to the petitioners' earlier comment (above) that suggested that starting the CAIR* NO_x *program in 2009 instead of 2010 should lead to additional co-benefit reductions because of the earlier installation of SCR. EPA includes SCR-only installations in the IPM analyses.*

Comment:

Commenters 6282 stated that EPA allocated its revised 2010 cap to the States using an arbitrary and capricious top-down method that was not a logical outgrowth of the proposed rule. In the proposed rule, no State allocations were issued for the first phase cap, so the allocations in the Final Rule have not been subject to public review and comment despite the central relevance of the individual State budgets to the cap and trade program.[263] Through the top-down approach in the Final Rule, EPA took its 38 ton cap and divided up the Hg allowances issued to individual States based on the total heat input for all affected units in a given State. In contrast, if a

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[262] See Section II.A., OAR-2002-0056-6282.

[263] See 70 FR 4700; see also 70 FR 12445.

"bottom-up" method had been used for determining State-specific annual budgets, the total amount of Hg allowances issued to a State could have been based on the ability of air pollution control equipment to reduce Hg emissions from the coal-fired utility boilers located in that State.

The commenter contends that a comparison of EPA's unit-specific 1999 emissions data to EPA's unit-specific emission budgets for the 2010 and 2018 budgets reveals that EPA's analysis was based on the emissions at many units actually increasing under CAMR. EPA's use of an arbitrary and capricious allocation method for determining State-specific budgets under the cap indicate that the Agency has failed its duty to examine the key assumptions underlying the 2010 Hg cap in the Final Rule.[264] EPA should grant reconsideration to remedy the shortcomings in its analysis and to provide the public with an opportunity to comment on the actual level of co-benefits expected from the final CAIR and the first phase State Hg allocations.

Response:

EPA believes that the petitioner's suggestion that the 2010 State budgets are not a logical outgrowth of the proposed rule is unfounded. EPA believes that it adequately noticed both its general intent with regard to the State Hg budget calculation approach and the specifics of the calculation procedure (see 70 FR 62215). Nevertheless, EPA opened for public comment the methodology for determining the Phase I State Hg budgets and the unit-specific allocations on which those budgets are based in the October 28, 2005 Notice of Reconsideration (70 FR 62213).

As was discussed in the final CAMR, these factors take into account: (1) data on Hg capture by control figuration and coal type, (2) data on coal characteristics impacting Hg capture, and (3) Hg emissions by capacity. Although we realize that these factors do not in all cases accurately predict relative rates of Hg emissions from Utility Units with NO_x *and* SO_2 *controls, the values we have assigned to the factors will succeed in equitably distributing allowances to the States and Tribes on the basis of the affected industry within their borders. Although the petitioners are unclear about what they mean by a "bottom up" approach, EPA assumes that they are suggesting adjusting heat input for each unit by a unit-specific adjustment factor. The commenter provides no analysis that the use of such an approach would significantly change State budgets, and such an approach would be extremely complex and subject to variations in data quality on Hg capture among units. EPA believes that the use of gross coal-adjustment factors is reasonable for the reasons outlined above.*

The petitioners' statement that EPA's analysis was based on the emissions at many units actually increasing under CAMR does not make sense. The petitioners compare State budgets and hypothetical unit allocations.

Comment:

Commenter 6460 stated that in developing the Hg budget program, EPA put sources not

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[264] See Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 534-35 (D.C. Cir. 1983) (EPA has a "duty to examine key assumptions as part of its affirmative 'burden of promulgating and explaining a non-arbitrary, non-capricious rule'").

in the Acid Rain Program at a disadvantage. EPA used only one year's worth of data to determine the Hg budget allocation. Meanwhile, sources in the Acid Rain Program had several years' worth of data for EPA to base an allocation and budget. This resulted in a more representative allocation budget for facilities participating in the Acid Rain Program. For example, the base line year coal usage for the SD Warren facility in Maine was 3 times lower than the coal used during the following years, resulting in a very low Hg allocation. This issue is resolved if this facility is subject to the National Emission Standards for Industrial, Commercial, and Institutional Boiler and Process Heaters (Boiler MACT) rather than CAMR. Failing that, the commenter requests that EPA allocate Maine with 110 ounces (0.003 tons) of Hg in 2010 and 43 ounces (0.001 tons) in 2018, based on the 3 highest coal usage years between 1998 and 2002 at the SD Warren facility in Maine. (SD Warren burned 105,780 tons of coal in 2000, 101,260 tons in 2001 and 73,218 tons in 2002.)

Response:

EPA Region 1 has been in contact with both the State of Maine and the facility to determine whether the unit (SD Warren #21) should be exempt from CAMR and subject only to the Boiler MACT, as the commenter asserts. The information provided in the commenter's letter is not sufficient for EPA to make a determination that the unit should be exempt from CAMR, and EPA has not received any supplemental information at this point that would support the unit being exempt. EPA does not currently believe it is appropriate to exempt SD Warren #21 or to alter Maine's allocation. This issue may be revisited later through a separate applicability determination.

Comment:

Commenter 6651 stated that EPA's approach for deriving the State Hg emissions budgets creates inequities for States that have Utility Units which, for reasons totally unrelated to the Hg rule, switched to a lower rank coal since 1999. Such units are also, in relation to other Hg Budget Units, unfairly prejudiced. The commenter has two units that made the decision in 2001 to switch from bituminous to subbituminous coal, to reduce NO_x, emissions to comply with new anticipated regulatory requirements. The engineering and design for the switch were started in late 2001. Construction of improvements necessary to facilitate the switch began in early 2002 and was completed in 2003. After several test burns in 2003, subbituminous coal became the sole fuel source for these units beginning in 2004. There are no plans to switch back to bituminous coal in the future. Such an occurrence is extremely unlikely, because the move was made to meet more stringent permanent NO_x requirements for these units (and will be needed to help in complying with upcoming regulatory programs like CAIR, regional haze and perhaps even the attainment of certain National Ambient Air Quality Standards).

Using EPA's methodology, the baseline heat input for these units was only multiplied by 1.0 when computing the number of hypothetical allowances. This in turn reduced the State Hg emissions budget for Georgia, lowering it beyond the point that reflects current operating realities. As these units will be combusting subbituminous coal when the Hg reduction requirements become effective in 2010, Georgia (and such units) is unfairly penalized.

EPA should not punish units that switched fuels to comply with earlier environmental requirements not related to the Hg rule, by allocating them insufficient allowances that fail to recognize the rank of coal that will in fact be combusted in such units when the Hg reduction requirements become effective. This is especially true where, as here, EPA's decision impacts not only certain Utility Units but also the State(s) where such units are located. Moreover, there may be Utility Units that have done the opposite of the commenter – i.e., that have instead switched to a higher rank coal since 1999. Because EPA has used 1999 as the determining years for Utility Units, their owners have been unjustly enriched, at the expense of other utilities, because they (unlike the commenter) received more allowances than needed to comply with Phase I of CAMR.

EPA should correct this inequity by revising the Statewide Hg emissions budgets to reflect Utility Units that have switched to a lower-ranked coal since 1999, but by the time CAMR was first promulgated (i.e., by May 18, 2005). Such revisions would not increase the Phase I (or II) total Hg budgets, but would simply change the allowance budgets for the States in a manner that more accurately reflects operational realities for affected sources.

As an alternative to this approach, EPA should revise its Model Rule at 40 CFR 60.4142, using years 2001-2005 instead of 2000-2004 as the basis for deriving the initial allocations for Utility Units within their borders. For States that adopt the Model Rule verbatim, that approach allows for use of the most current data available when computing and submitting allocations to EPA next year. Heat input data for 2005 will be readily available by the time the States are required to submit their Hg allowance allocations to EPA in October of 2006, and there is no reason not to use the most current data readily available when making such determinations.

Response:

EPA is finalizing the use of 1999 coal-type data as the basis for the adjustment of baseline heat input for the purposes of establishing State budgets. EPA believes that the use of ICR data for the purpose of making heat input adjustments in the calculation of State budgets provides a reasonable representation of current coal-use patterns. Further, the hypothetical unit allocations included in CAMR for the purposes of calculating State budgets are, in fact, hypothetical, and States are free to allocate to individual sources using any methodology they choose, provided they meet the overall timing and budget requirements. EPA's example allocation approach allows States to apply coal adjustment factors for each individual year of heat input data. EPA is retaining the use of 2000-2004 as the baseline years for existing units in this example approach, though States are certainly free to use other baseline years. Further, the commenter has not demonstrated that another time period would be better or that using a different time period would significantly impact that State's budgets (as opposed to the individual unit allocations that a State might employ).

Comment:

Commenter 6581 requests that EPA revisit the issue of small State Hg budgets in western States such as Montana, which has the nation's largest coal reserves, to ensure that there is sufficient capacity to allow new coal-fired generation to come on line. Such low State budgets, especially beyond 2018, will likely restrict development of new coal-fired generation in those States, as new units will either have to meet much more aggressive emissions standards (to meet State Hg reduction targets) or purchase Hg allowances in a market scenario that is uncertain at best. As a result, new generating facilities will not be able to come on line without being put at an economic disadvantage relative to plants in States with larger budgets (and, therefore, larger new unit set aside pools). Given that these western States have the largest, most economic coal reserves in the nation, and, therefore, could become major electricity suppliers to growing markets in other States; this is an inequitable end result.

Response:

EPA designed CAMR so that the rule would build upon Hg reductions being achieved under CAIR and continue to allow for growth in coal generation. Under this rulemaking, coal generation will continue to grow in places where it is economical. EPA derived its State budgets using historic heat input data, a method that the Agency believes is appropriate. Although individual State budgets were not calculated to account for potential State growth, new sources that are not covered by a new-unit set aside still have the option of purchasing allowances on the allowance market created by CAMR.

Comment:

Commenter 6589 stated that AES Hawaii Inc.'s Unit A and Unit B Hg allocation determination was not based on typical heat input. AES Hawaii operates two units listed in EPA's Inventory and Emissions Databases – Unit Mercury Allocations. These two units are the only units listed for the State of Hawaii, and, thus, the total allocation for these units are the total allocation granted to the State of Hawaii found in EPA's Inventory and Emissions Databases – State Mercury Allocations. It appears that the unit allocations for the two units operated by AES Hawaii, Inc. were based upon heat input for the 1999 operating year and not on the average of the highest three years of a five-year span as was done for a majority of all other units. The 1999 operating year was not typical of operating years for these units at AES Hawaii, Inc. and does not represent expected operating potential for future years. Based upon our analysis, the allocation for the two units at AES Hawaii, Inc. is approximately 15 percent less than what it would have been had the average heat input of the highest three years of the five-year span been used.

Because there are no other coal-fired units with Hg allocations listed in Hawaii, a shortfall in allocation for these two units represents a concern not necessarily realized by other States. With oil prices what they are and are expected to be, AES Hawaii's two coal-fired units are expected to continue to be dispatched at a base-load capacity. In addition, both of AES Hawaii, Inc.'s units operate with very high availability to produce a reliable source of electricity to the people of Oahu.

The commenter requests that the Hg allocation for its two units, and, thus, the State of Hawaii, be reconsidered. Basing of Hg allocations on the heat input of the three highest years in a five-year span appears to be a better method than basing the allocation entirely on the heat input of a single year. However, considerations should also be made regarding the continued increases in fuel prices and the potential increased use of coal as a source of energy to meet our nation's electrical energy needs and decrease our dependence on foreign oil. Realizing the total cap would not change, more efforts are necessary to ensure an equitable distribution of allocations for individual units.

Response:

The commenter suggests that EPA has underestimated the State Hg budget for Hawaii based on an incorrect estimation of the heat input value for units located in Hawaii, but does not provide any corrected data. For that reason, EPA cannot reasonably assess the need for adjusting Hawaii's State budget.

In determining the appropriate heat input value for each unit, EPA first looked to the Acid Rain database. Where information for a particular unit was available in the database, the EPA identified the 3 years during the time period 2000 - 2004 which showed the highest heat input value, determined the average of those 3 heat input values and assigned that average as the heat input value for that unit. For units not included in the Acid Rain database (e.g., units not located in the contiguous 48 States and units below a certain size), EPA relied on the 1999 ICR data in determining an appropriate heat input value to assign to the unit. The EPA believes that either approach results in a valid heat input value being assigned to each unit, but, nevertheless, provided an opportunity both in response to the March 16, 2004 SNPR and in the context of this reconsideration for the owner/operator of a particular unit to submit information, including relevant data, demonstrating the need to assign a different heat input value to that unit.

Comment:

Commenter 6612 stated the 2010 Phase I Statewide Hg emission budget for Michigan of 2,606 lb is a cap that will not result in any real reductions in Michigan. Michigan Hg emissions from CAMR subject EGUs were estimated at 2488.4 lb in 2002 (TRI data). At least for Michigan, the Phase I cap will not provide adequate (or even any) reductions, and, therefore, incentives for reductions by Michigan's EGUs. The Statewide budgets were established by fuel types burned in the EGUs, but the focus must be on needed Hg reductions and the budget numbers are presently too high. The method for budget allocations must be modified if the cap-and-trade program is to ensure protection of the public health.

The unit-level Hg emissions allocations became the State's emissions budget with the basis being a hypothetical proportionate share of the baseline heat input to total heat input of all affected EGUs. Michigan still believes an energy output model is the preferred method to determine the State-specific budgets and allowances. This model would, in effect, reward the companies that are utilizing renewable energy sources and conservation techniques and would encourage new technology for energy generation. Because using the "energy out" model encourages cleaner technology development, it encourages alternatives to coal and oil combustion other than the current move to natural gas as the solution to cleaner energy.

Response:

EPA believes that its methodology for setting State budgets is reasonable. Under the cap-and-trade program, the individual State budgets represent the total number of allowances that can be issued to sources in each State. Initial distribution of allowances will not impact the location of emissions reductions under a cap-and-trade program, because the economic incentives provided by these programs are such that emissions reductions will be achieved by sources that can reduce emissions at the lowest cost.

It is important to note that the unit-level allocations included in the final CAMR are hypothetical allocations for use in calculating the State budgets. Individual States can allocate allowances to individual sources using any methodology they choose, provided it meets the timing requirements and State budget limits finalized by EPA. Individual States also have the option of implementing more stringent Hg emissions reduction requirements under CAMR.

Using output data to allocate allowances would only reward cleaner or more efficient generation if combined with an allocation approach that updates baseline data periodically. Use of historic output data would not encourage cleaner generation because behavioral changes would not impact allowance allocations. However, updating data in this manner results in the subsidization of increased electricity generation, and the associated market distortions. If allocations were based on periodically updated output data then increased electricity generation would result in increased future allocations and, thus, would in effect be subsidized.

<u>Comment</u>:

Commenter 6507 requested EPA address the issue of inadequate State emission budgets in some Western States and provided the following reasons:

National Hg Emissions Cap – EPA used the ICR database to determine baseline Hg emissions at coal-fired power plants in 1999 to be 48 tons. Future emission caps and allowance allocations were derived from this number. In fact, as discussed below, the 48 ton baseline was achieved by aggregating "estimated" emissions from existing sources utilizing limited measurements at certain individual emission sources. Although using an estimated total may be appropriate to set national policy on future emission caps, the commenter believes it is inappropriate to set allowance allocations to individual sources because current Hg measurement methods are not accurate to the "allowance" level (ounces of Hg).

Under the ICR, Hg emissions were estimated based on limited (three one-hour samples) measurements conducted at about 7 percent of the sources, and applying certain "emission factors" for several "groups of sources" (of similar configuration of existing pollution control equipment for controlling conventional air pollutant emissions). (The commenter understands that this was the best Hg measurement method available at that time.) Those emission factors led to a "calculated" national Hg emission total of 48 tons, which was in turn used as the baseline to determine Phase I and II national emissions caps. Although large measurement uncertainties were reported and acknowledged, the 48 ton number was subsequently used as the "absolute" national Hg emissions. The common understanding was that the rule would set certain percentage reductions (around 30 percent in Phase I and 70 percent under Phase II) below that

1999 national emissions total, that the Phase I reductions would occur via co-benefits, and enable Hg specific emission control technologies to develop and mature in time for use in Phase II.

State Hg Emissions Budget and Allowance Allocations – EPA's allowance allocation methodology has two problems. The first problem is related to the Phase I cap and its choice based on anticipated co-benefits – EPA's preamble repeatedly states that Phase I reductions will be achieved via co-benefits in the CAIR region, and that there will be no need for Hg-specific controls during the first phase. (CAIR requires 29 eastern States to retrofit NO_x and SO_2 controls to make progress on attaining the $PM_{2.5}$ NAAQS).

The commenter's earlier comments raised questions about EPA's assertion and pointed out that there would be very little additional co-benefit in the West in Phase I as most Western sources are already scrubbed. The final CAMR did not address that issue and consequently, the Phase I budgets for Western States like Arizona are so low that sources in the State will have little choice but to buy expensive credits or apply Hg specific controls 8 years earlier than anticipated (due to lack of new co-benefits). Buying allowances from outside the State may not be feasible in some of the States which are considering the adoption of the recently released STAPPA/ALAPCO Model Rule instead of the cap-and-trade program.

Under the final CAMR, State emission budgets were created under a scheme based exclusively on historic "heat-input" at the plants. EPA chose historic heat-input data at individual sources (average of the highest three annual values over a five-year period, 2000 to 2004) and aggregating those to State level and nationally, and apportioning Hg emissions caps to determine State-by-State emission budgets. However, utilizing the "highest" three annual-average (over a 5-year period) coal consumption numbers at individual plants to calculate aggregate total coal consumption produces corresponding Hg emissions higher than 48 tons (compared to a single year heat-input based emissions). Because, Phase I and II caps were already set with respect to the 48 ton baseline number, larger emission reductions are required to comply with the caps than what would have been needed compared to using a single-year (1999) coal consumption basis. This process resulted in ratcheting the required emission reductions to be more for some plants and less for others. Accordingly, some States' budget went up and others went down, compared to what would have resulted by utilizing a single year heat-input value or by adjusting the total Hg cap accordingly.

The second problem with allocations relates to the perpetual nature of the State budgets. As EPA acknowledges, the West is growing rapidly as a consequence of population shifts as well as faster economic development. Moreover, due to escalating natural gas prices, coal consumption is increasing to offset reduced gas use for power generation. Therefore, heat-input associated with coal use in Western States is continually increasing, while their Hg allowance allocations are frozen via EPA's use of historical heat-input data.

The State budgets (and consequently, allowance allocations to individual sources) are set in perpetuity, similar to the Acid Rain allowance allocations under the 1990 CAA, Title IV. That scheme penalized sources that reduced their emissions early (prior to the baseline period). Similarly, EPA's approach on Hg allowance allocations penalizes sources that have already achieved their co-benefits early. This is contrary to EPA's stated policy that Phase I Hg reductions will be achieved via co-benefits. In short, sources that have achieved their co-benefits early are being forced to retrofit Hg-specific controls 8 years before other sources.

No adjustments to State Hg emission budgets will be made as new plants are added to meet the increasing demand for electricity. As a consequence of setting State budgets in perpetuity, sources in States with growing economies will have to buy allowances from other States or continuously reduce emissions when new sources are added or capacity utilization increases at existing sources. A MACT standard approach would have avoided such situations.

Setting the allocations in perpetuity also ignores continued and future shifts in population and changes in coal consumption. As EPA acknowledges in the reconsideration notice, the West is growing much faster than the rest of the country, and much of the new electricity needed is expected to come from increased use of coal. Consequently, sources in Arizona and the West would be economically disadvantaged by having no choice but to buy Hg allowances from the East or apply Hg-specific controls sooner than at sources in the CAIR region.

One approach to rectify this situation is to require periodic reassessment and, as necessary, reallocation of State emission budgets. The commenter recommends that EPA consider reviewing and updating the State budgets every five years, based on Hg emissions data from prior five years. Such updating can accommodate shifts in population and electricity generation and enable newer, cleaner and more energy-efficient sources to replace older, higher emitting sources.

Allocations based on Unit of Electricity Generated – The final CAMR also establishes NSPS for Hg emissions per unit of electricity generated, i.e., lbs/GWH. Thus, new emissions sources must both meet the NSPS limitation and hold adequate allowances to offset their emissions. However, as new sources are added to meet the electric demand, the size of the State budget remains unchanged. Thus, the allocations to existing sources will decline as new sources are added. Consequently, rapidly growing States like Arizona will be forced to buy allowances from those States with surplus allowances.

Response:

EPA did not rely on using estimates of total emissions to set allowance allocations to individual sources. Rather, EPA apportioned the national emissions caps to individual States, using historical heat input data from sources in each State, adjusting for coal type as discussed earlier in this section and in the final rule. The 2010 cap was set at EPA's best estimate for co-benefit emissions reductions under CAIR, and the 2018 cap was set based on EPA's best estimate of what could be reasonably achieved by the power sector by that timeframe.

The 2010 cap under CAMR, set at 38 tons, accounts for the co-benefit reductions that occur in the east under CAIR, but reflects nationwide Hg emissions as of 2010. Although sufficient emissions reductions to achieve the 2010 cap can be expected under CAIR, the existence of a hard cap in 2010 will create the incentive for additional reductions beyond co-benefits, so that sources can bank allowances for future use. EPA believes that its approach for apportioning the national cap to individual States is a reasonable one.

The commenter's discussion of the calculation of State budgets using heat input shows a misunderstanding of the approach taken by EPA. EPA did not apply an emission rate to heat input to determine State budgets and then have to adjust the budget accordingly to conform with the 38 ton and 15 ton caps. Rather, as discussed in the final CAMR, EPA used each State's share of total heat input, and gave each State a share of the national cap based on its proportion of the total nationwide adjusted baseline heat input. This approach of proportionally sharing out the total budget, whether based on a State's 1999 heat input, or the average of three later years, ensures that the State budgets do not exceed the total cap, because not more than 100 percent of the cap can be apportioned. In other words, EPA did not have to adjust the emissions reduction requirements after calculating State budgets using its baseline data.

The commenter is correct in stating that State budgets will not be increased as new sources come online and the power sector continues to grow. One of the advantages of a cap-and-trade approach relative to a MACT approach is the ability to implement a permanent hard cap on aggregate emissions. The ability of States to participate in an interstate trading program will allow for the continued growth of coal-fired electricity generation. EPA believes that there will be a viable allowance market with allowances available for purchase for compliance.

Although individual State budgets are set in perpetuity, EPA does not actually set individual unit allocations. States have the option of allocating to sources however they choose, and can choose to use an updating method to allocate allowances if they desire. EPA does not believe that it is necessary to update individual State budgets and that the cap-and-trade program will allow for the movement of allowances to where they are needed. Further, updating allowance allocations annually based on emissions data for the prior 5 years, as the commenter suggests, would create a disincentive for sources to control emissions, because higher emissions would lead to a greater allowance allocation. For this same reason, updating allocations using emissions data would not provide incentives for development of cleaner and more efficient energy sources as the commenter asserts, because such an allocation process does not in any way reward energy efficiency or clean generation.

Comment:

Commenter 6620 stated that if Hg emission limits are revised by EPA as proposed in this reconsideration, the Texas Hg allowance allocation should be appropriately redefined. However, the redefined budgets are not part of this proposal and it is unclear when they will be available. EPA needs to provide clarification if new budgets will be made available, and if budgets are redefined, clarify which Hg allowance allocations will be due November 17, 2006.

Commenter 6620 also stated that the proposed changes to CAMR do not set a deadline when they will have to be implemented by States. Texas must adopt the initial CAMR program that was finalized on May 18, 2005, before any changes can be implemented based on the current proposal. Therefore, it would not be feasible to require the changes to become effective immediately. Texas will not be able to conduct State rulemaking prior to the deadline for the State plan submittal once the Federal rule is finalized in March 2006. Additionally, requiring States to submit a final State plan without the benefit of reviewing the final EPA promulgated rules may require further State plan revisions to bring State plans in agreement with the final rule. This would require additional EPA review and additional State resources. EPA needs to provide clarification on the implementation of any changes to CAMR to allow States to incorporate them into their State plans in a timely manner.

Response:

EPA has revised the State budgets in response to comments that provided specific heat input data that demonstrated a need to assign a different heat input value for the unit in the calculation of baseline heat input. Addition of this heat input data results in small changes to budgets in seven States. These revised State budgets are presented in Section 2.1.1.2 of this document. EPA includes the final State budgets for CAMR in the rulemaking.

State plans for implementing CAMR must be submitted to the Administrator by no later than November 17, 2006. (See 40 CFR 60.24(h)(2).) Those plans must include allocations for existing units for the first three years of the program (i.e., 2010, 2011, and 2012). EPA did not propose to extend that deadline as part of this reconsideration and, therefore, is not extending the deadline. The EPA believes that any changes to State plans needed to respond to the revised State budgets can be completed in time to meet the deadline. The EPA does, however, have the authority to extend the deadline in appropriate circumstances and will do so if necessary (see 40 CFR 60.23(a)(1)). Any such extension will likely be granted on a case-by-case basis upon a showing by a particular State that it is impracticable to meet the deadline.

Comment:

Commenter 6621 stated that EPA should encourage States to have a new unit allocation system that allows for review of the allocations to be reviewed every 3-5 years (depending upon local circumstances) to accommodate new generation needs. The commenter recommends that EPA accommodate State decisions to create a pool of "new unit" allocations where the State believes this is necessary for new units and where the State does not take those allocations from the existing units' allocations.

Response:

As EPA noted in the final CAMR, States are free to allocate allowances however they see fit in accordance with their own policy goals, provided the timing requirements of CAMR are met and the total State budget is not exceeded.

Comment:

Commenter 6490 made the following comments:

Failure to Account for Accumulation of Allowances: When the annual CAMR budgets are compared to EPA's 2003 TRI point source Hg air emissions data for electric utilities, the 1st Phase (2010-2017) State-specific CAMR budgets are greater than the State-specific 2003 Hg emissions from electric utilities for 16 States (Arkansas, California, Colorado, Connecticut, Maine, Massachusetts, Michigan, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Texas, Utah, Washington and Wyoming), and the Phase II (2018 and thereafter) State-specific CAMR budgets are greater than the State-specific 2003 Hg emissions from electric utilities for 4 States (California, Colorado, Maine, and Washington). Because the State-specific CAMR budgets for these States are greater than the actual annual Hg emissions in these States, a pool of excess Hg allowances can be generated from 2010 through 2017 with a potential of over 4,600 lb/yr and potential total of 18 tons of excess Hg allowances accumulated over this 8-year period. This potential accumulation of allowances was not accounted for in the modeling assessment.

Flawed Results: To the extent that EPA's Hg emission inventories for other States are flawed, EPA's modeling will either under-predict or over-predict the Hg emissions impact throughout the U.S. This will lead to erroneous conclusions regarding both the risks remaining after the implementation of CAIR and CAMR and the validity of EPA's CAA §112(f) "Residual Risk" analysis.

Incorrect Inventory: In Table 7 of EPA's Emissions Inventory TSD,[265] EPA assumed in its modeling that the 2001 Hg emissions from coal-fired power plants located in New Hampshire totaled 37 lb when the actual emissions measured by stack testing were 119.49 lb. These total emissions were under-estimated by 81 percent. EPA also assumed in its modeling that in 2001, New Hampshire's coal-fired power plants emitted 18.8 lb of oxidized Hg (50.8 percent), while New Hampshire stack test data indicates that 92 percent or approximately 110 lb of oxidized Hg was emitted. EPA oxidized Hg emissions were underestimated by 83 percent. The commenter has tried repeatedly to get EPA to correct these emissions, but it still has not been done. Emissions of oxidized Hg results in Hg deposition relatively close to the source. Large oxidized Hg emission sources can create Hg deposition hotspots; however, incorrect Hg emission estimates and the failure to assess such uncertainties failed to show such hotspots in the CAMR modeling.

Response:

EPA maintains that the national Hg cap-and-trade program provides the best system of emissions reductions. Under this program, national Hg emissions are capped at 38 tons beginning in 2010, and 15 tons beginning in 2018. The cap-and-trade program provides a cost-effective mechanism for achieving these reductions, and the caps guarantee that emissions reductions will be achieved from the current level of approximately 48 tons, regardless of whether a State adopts the model Federal Trading Rule. Because emissions allowances are a scarce commodity under a cap-and-trade program, due to the fact that current emissions exceed the national cap, these allowances have economic value, and it will likely make economic sense for sources in States with a surplus of allowances to sell these allowances to sources in States with a deficit that need them for compliance. The commenter is incorrect in stating that EPA modeling does not account for excess allowances. All allowances under the CAMR cap-and-trade program are accounted for in EPA's IPM modeling. Finally, regardless of the decisions made by participants in the allowance market, CAMR, by placing a hard cap on Hg emissions and accounting for each individual ounce of Hg emitted, guarantees that permanent and

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[265] "Emissions Inventory and Emissions Processing for the Clean Air Mercury Rule." March 15, 2005. EPA-HQ-OAR-2002-0056-6129.

significant reductions in nationwide Hg emissions will be achieved. Additionally, EPA's IPM modeling in support of CAIR and CAMR indicate that units in southeastern New Hampshire are anticipated to install both scrubbers and SCR systems in response to CAIR, CAMR, CAVR, and other title V, NO_x SIP Call, and State-based programs. As a result, the oxidized Hg emissions from these plants would be readily removed by such air pollution control device configurations (see EPA-HQ-OAR-2002-0056-6141).

EPA believes that its modeling represents the best available data at the time of the CAMR rulemaking. The Hg inventory used for CAMR underwent extensive external and internal review. Emissions data in the CAMR inventory were based on source testing and fuel analyses for several source categories and provide a consistent view of the nation's emission profile at the time of rulemaking. Utility coal estimates in the CAMR inventory were based on source-specific data obtained through the 1999 ICR – the most comprehensive inventory effort ever undertaken for an industrial sector. The inventory data used in CAMR was available for review by State and local agencies, industry, EPA, and the public for a period of 9 months in addition to the period of time available for review and comment following proposal of CAMR in January 2004.

We have addressed the commenter's concern related to the New Hampshire inventory in Section 1.1.3.1.1 of this document. We have addressed the commenter's concern related to allowances being in excess of actual emissions in Section 1.1.3.5.1 of this document.

Comment:

Commenters 6633 stated that EPA's re-allocation of Hg allowances from retired units will result in unnecessarily higher national emissions. The commenter stated that EPA's allocation scheme includes the provision that EGUs which are permanently retired will continue to receive a Hg allocation equivalent to the allocation they received while in operation. The commenters disagree with EPA's assertion that this approach is an incentive for companies to retire old units that might otherwise continue to be operated.

First, from a public health perspective, a power company making an economic decision to retire a particular old, dirty unit or facility should not be granted a windfall of additional Hg allowances which would allow them to increase or maintain their Hg emissions at another facility, or that they can sell.

Second, EPA's assertions about the incentive value of its proposed approach ignore the record, which demonstrates that Hg control technologies are available and economical for all existing and new EGUs.[266] If a utility company decides to retire a plant, the decision will more likely be based on the economics of reducing SO_2 and NO_x emissions, than on the cost of Hg controls. For example, the capital cost of a FGD unit is on the order of $250 million, while the capital cost of an ACI system is $1 million.

According to EPA's most recent analysis using the IPM[267], 70 EGUs are projected to

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[266] See CATF, NRDC, et al., Comments on Proposed Rule at 11-48 to 11-63.

[267] See USEPA, 2005 Integrated Planning Model run of CAIR/CAMR/CAVR found at http://www.epa.gov/airmarkets/mp/

retire by 2010 (see Table 5). According to EPA's rule, the allowances allocated to these retired units will continue to be allocated even after the unit is no longer operating. In 2010, when the 70 units are projected to retire, the total number of allowances that for these retired units is 14,657 ounces or 916 lb of Hg. Instead of retiring these units, EPA will continue to allocate them to the parent utility company, to be used by other sources or to be banked or sold. In 2018, the number of allowances allocated to these in perpetuity to retired units is 5,814 ounces or 363 lb. Instead of issuing allowances to retired units, EPA should permanently retire these allowances for the public good and reduce the national cap accordingly each year. Any retired unit that commences operation should be treated as a new source, subject to both the NSPS and the new source set-aside requirements.

Response:

EPA stands by its point that maintaining allowance allocations to retired units crates an incentive to retire less efficient units instead of continuing to operate them in order to maintain an allowance allocation. Further, States are not required to adopt EPA's example allocation methodology under CAMR, and can allocate allowances as they see fit. To the extent the comment addresses our determination concerning best demonstrated technology (BDT), we discuss that issue elsewhere in this document.

Comment:

Commenter 6574 understands and appreciates EPA's rationale for the proposed revision of the NSPS standard for the subbituminous (wet) subcategory, noting that upon re-evaluation, EPA is proposing a higher limit. The commenter requests that EPA apply the same logic to existing wet-scrubbed subbituminous units and increase the number of allocated Hg allowances for these units. If the re-evaluation of data indicated that new wet-scrubbed, subbituminous units should be allowed a higher NSPS limit, then it seems appropriate that existing units of the same type should also receive the same treatment in the form of increased allocation of Hg allowances.

Response:

EPA disagrees, and, as noted elsewhere in this document, is maintaining the coal adjustment factors included in the final CAMR.

Comment:

Commenter 6581 requests that EPA develop a system that will allow new coal-fired generation to be built in Indian Country in such a manner that neither disadvantages these projects in the market, nor further reduces the Hg budgets of the States such as Montana, in which these projects are located. The commenter also stated that the March 2005 CAMR does not contain a mechanism to provide allowances for new coal-fired generation in Indian Country either as part of the national cap or within State allocation budgets. The uncertainty created by the Agency's decision not to create a Federal allowance set aside for new units in Indian country increases both the risks for companies looking to develop generating assets in Indian country and the costs of such development. Both of these results run directly counter to the intent of the recently enacted Energy Policy Act of 2005, which specifically provides incentives to Tribes to develop their energy resources.

Response:

EPA is aware of the commenters concerns and appreciates their comments. However, this issue is beyond the scope of the final action on reconsideration. This issue will, however, be addressed, along with other relevant issues, in the forthcoming proposed CAMR Federal plan which, when finalized, will comprehensively address units located in areas not covered by an approved and currently effective State and/or Tribal plan.

2.1.1.1 Allocation Factors

Comment:

Commenter 6477 stated that in order for any regulation to effectively and efficiently address coal fired power plant Hg emissions, it must take into consideration both coal chemistry (primarily the chlorine content) and Hg variability between coals both as a total concentration and elemental fraction. Doing so will result in a regulatory approach that addresses both the environmental impacts of near-field deposition of oxidized Hg and the long-range atmospheric transport of elemental Hg. Lower ranked coals (e.g., subbituminous) typically contain lower levels of chlorine and, as a result, emit proportionally higher levels of elemental Hg compared to bituminous coals. Existing commercially available emissions controls are less effective at removing elemental Hg and, thus, there is less Hg emission reduction co-benefit for sources using subbituminous coal containing low chlorine content and emitting predominantly elemental Hg. Accordingly, lower ranked coals require application of a multiplier as used in EPA's final CAMR to allocate Hg emission credits, because it is more difficult to achieve co-beneficial reductions in Hg emissions from lower ranked coals than from bituminous coal. CAMR appropriately recognizes the above described distinctions in coal chemistry by proposing to use allocation adjustment factors for each coal rank. These allocation factors are intended to compensate for differences in the efficacy of Hg control based on coal type.

Response:

EPA appreciates the commenter's support with regard to the allocation factors used in the final CAMR.

Comment:

Commenter 6486 generally does not believe that EPA should revise its Phase I Statewide Hg emission budgets or the unit-level Hg allocations on which those budgets are based. The commenter believes that reconsideration of this issue is not warranted, but were EPA to revise its approach, the Agency should adopt the industry compromise multipliers.

As evidenced by the clear notice in the proposed rule, there is absolutely no basis to Petitioners' claims that the fuel-type multipliers (and, thus, the resultant State-wide budgets) were not adequately subject to notice and comment. However, because EPA has expressly requested comment on the methodology and allocation approaches set forth in the final rule, the commenter reaffirmed the positions they have taken throughout the rulemaking process, and urged EPA either not to revise this aspect of CAMR, or to modify the multipliers in accordance with the industry compromise.

The vast majority of the coal-fired generators in the U.S. agreed to compromise multipliers of 1.0, 1.5, and 3.0 for bituminous, subbituminous and lignite, respectively, and the commenter supported these multipliers as representing a reasonable compromise and as having a sound technical basis, although a higher multiplier for subbituminous can be justified based on the available data as well. The commenter reiterated previous analyses supporting both their suggested multipliers and the industry compromise.

Commenter 6486 also stated that EPA's final Phase I national budget for Hg is supported by the available data. In the proposed CAMR rule, EPA explained that it intended to establish a Phase I cap effective in 2010 based on Hg reductions that are expected to be achieved as co-benefits of CAIR. EPA did not, however, specify exactly what that cap would be, because it did not have data sufficient to establish what the CAIR Hg reductions would be. EPA suggested that the cap might be in the range of 34 tons. During the public comment period, the commenter submitted an analysis that suggested a more realistic Phase I cap – i.e., one that was based on what the likely actual co-benefits would be – would be more in the range of 36.5 to 38 tons. To the commenter's knowledge, there is nothing in the administrative record to rebut the commenter's analysis, nor is there any better assessment of what the Hg co-benefits from CAIR are likely to be. As such, the commenter believes that EPA's decision to set the Phase I budget at 38 tons – as the most likely level of co-benefits from CAIR – is amply supported by the record and should not be modified.

Response:

EPA appreciates the commenter's support of its chosen approach. EPA is maintaining the coal adjustment factors of 1.0 for bituminous coals, 1.25 for subbituminous coals, and 3.0 for lignite coals for use in the calculation of State budgets. As was discussed in the final CAMR, these factors take into account: (1) data on Hg capture by control figuration and coal type, (2) data on coal characteristics impacting Hg capture, and (3) Hg emissions by capacity. Although we realize that these factors do not in all cases accurately predict relative rates of Hg emissions from Utility Units with NO_x *and* SO_2 *controls, the values we have assigned to the factors will succeed in equitably distributing allowances to the States and Tribes on the basis of the affected industry within their borders. EPA continues to believe that these factors are reasonable based on currently available test data.*

Comment:

Commenter 6636 stated support for:

- Taking into account the Hg variability among different coal types: EPA's final adjustment factors of 1 for bituminous, 1.25 for subbituminous, and 3 for lignite coals based on the fact that Hg varies by coal ranks; Hg reacts differently to NO_x and SO_2 control equipment; and that the heat input varies by coal rank;

- Statewide Hg Emission Budgets: Under CAMR, Texas' Statewide budget (i.e., cap) for Hg emissions in Phase I is 4.657 tons. Texas' Phase II budget is 1.837 tons; and
- Unit-level Hg emission budgets that are based on the co-benefits from CAIR: Given the additional costs that EGUs will undertake to implement the NO_x and SO_2 reductions required by CAIR, and because no Hg-specific control technologies are commercially available for lignite-fired EGUs, it is important that EPA finalized CAMR with due regard for the Hg reductions associated with CAIR. According to EPA, CAMR requires no additional controls during Phase I because Hg reductions are expected to be a co-benefit of CAIR-required NO_x and SO_2 reductions.

Response:

EPA appreciates the commenter's support of its approach.

Comment:

Commenters 6581 and 6588 support EPA's approach to emissions reductions from EGUs that takes into account the Hg variability among different coal types. The commenters are supportive of Statewide Hg Emission Budgets and Unit-level Hg emission budgets that acknowledge the co-benefits of Hg emission reductions resulting from CAIR. The commenters support the adjustment factors derived by EPA which take into account the Hg variability among different coal types (1 for bituminous; 1.25 for subbituminous; and 3 for lignite). However, this differentiation will have the opposite effect of EPA's intention if EPA does not require States as part of the national cap-and-trade program to periodically update baseline heat input calculations used to allocate allowances to individual EGU's to reflect current coal use by coal type.

Response:

Without necessarily agreeing with every statement made by commenter, we appreciate the commenters' support of the approach taken in CAMR for setting State budgets. As stated previously and in the final rule, States can allocate their State budget to individual units as they choose.

Comment:

Commenter 6558 stated CAMR appropriately recognizes the distinctions in coal chemistry by proposing to use allocation adjustment factors for each coal rank. Adjustment factors of 1 for bituminous, 1.25 for sub-bituminous, and 3 for lignite coals were proposed in the NPR. These allocation factors are intended to compensate for differences in the efficacy of Hg control based on coal type. Lower ranked coals (e.g., subbituminous) typically contain lower levels of chlorine and as a result emit proportionally higher levels of elemental Hg compared to bituminous coals. Thus, co-beneficial Hg emissions reduction with existing commercially available emission controls is less effective on subbituminous coal containing low chlorine content and emitting predominantly elemental Hg.

Response:

EPA appreciates the commenter's support of its chosen approach.

Comment:

Commenter 6501 supported an adjustment to the allocation of emissions budget based on coal type used by the emitting source, but stated that the adjustment factor for lignite is inadequate. Substantial data was provided to EPA during the public comment period of the proposed CAMR regarding the higher Hg content, Hg speciation, lower heat content, and lack of demonstrated Hg control technology for lignite, which support at least an adjustment factor of 3 (compared to 1.25 for subbituminous). EPA has recognized that these "factors do not in all cases accurately predict relative rates of Hg emissions from Utility Units with NO_x and SO_2 controls. A full consideration of the greater difficulty in controlling emissions from lignite and the higher Hg content of lignite coal calls for a higher adjustment factor for lignite.

Texas lignite is among the U.S. coals with the highest Hg content and can emit relatively high levels of Hg, with up to 80 percent being elemental Hg. The commenter cited month-long monitoring by the Energy and Environmental Research Center (EERC) that has shown an unusually high degree of variability in Hg concentrations in Gulf Coast lignite. EERC found high Hg concentration and variability coupled with very low chlorine levels in the flue gas make control of Hg from plants burning Texas lignite perhaps the most difficult of any coal type burned within the U.S.

The commenter stated that although the 1999 ICR data confirms the differences among coal types and the difficulty of reducing Hg emissions from lignite, it failed to adequately account for the significant difference in lignite compared to bituminous and subbituminous coal. ICR data showed different levels of Hg content and chlorine content among the various coal ranks. A high chlorine content has been consistently shown to increase the fraction of the more easily removable oxidized form of Hg in the total Hg emission, while a low chlorine content is associated with the emission of predominantly elemental Hg that is substantially more difficult to remove. The high calcium content of western coals (lignite and subbituminous) appears to further reduce the oxidizing effect of the low chlorine content by removing part of the chlorine throughout the combustion process.

Thus, the higher content of Hg and lower content of chlorine in subbituminous and lignite coals have a more significant effect on the amount of Hg emissions, as compared to bituminous coal. Reducing Hg in emissions from bituminous coal plants, on the other hand, can depend more on process configuration because the significantly higher chlorine content can oxidize Hg more easily. The differences in Hg and chlorine content, therefore, support different adjustment factors based on coal type.

Although EPA projected that technologies would be available by 2010, EPA also recognized that Hg-specific control technologies are not available now for "wide-spread usage." The performance of technologies, however, is substantially reduced and highly variable for coals with relatively low chlorine content. AEMS, LLC confirmed this finding when it conducted an analysis of EPA's data for NMA and found the performance of the best technologies to be substantially reduced and highly variable when firing coals with low chlorine content, as with lignite. Based on the original MACT standards proposed, AEMS, LLC found that 62 percent of lignite coals (71 percent for Gulf Coast lignite) would be unable to comply with EPA's proposed MACT standards. The analysis further found that estimates on Hg removal may overestimate the Hg removal that could actually be achieved by lignite units.

The commenter stated that EPA underreported the Hg content of lignite coal and, thus, failed to fully consider this factor in developing its adjustment factors. In its proposed rule, EPA refers to a March 10, 2004 memorandum to the docket, entitled "Allocation Adjustment Factors for the Proposed Mercury Trading Rulemaking" (March 2004 Memorandum), for a more thorough description of how the Agency developed the allocation adjustment factors. In this memorandum, EPA explains that the allocation ratios are based on the Hg content of coal and the effectiveness of control technologies in reducing the Hg: "To develop allocation ratios, EPA balanced these two factors: (1) data on mercury capture by control figuration and coal type, and (2) data on mercury content of coal."

On Hg capture rates, the memorandum states that EPA examined the single best performing control configurations by coal type in the ICR data to arrive at average Hg removal levels. Numerous comments were submitted to EPA criticizing the ICR data relied on by EPA. Among other things, the commenter contends that the ICR data lacked quality control on testing methods, bad insufficient and biased sampling of steam generating units, failed to use an established reference method with known variability, and failed to account for sampling errors due to poor sampling locations. The AEMS analysis found that the ICR data overrepresented units with more sophisticated controls. For example, although units with FF technologies represent 9 percent of the plants in the U.S. population, they were 29 percent of the ICR sample. The data are also characterized by a high degree of variability in measured Hg emissions and control efficiencies. This high variability is illustrated by the "negative" Hg removal rates that were measured in 24 percent of the tests-that is, the stack emission rate was found to exceed the Hg content of the coal. This high variability is not adequately accounted for in the limited testing conducted for the ICR. The ICR data were limited to around 80 plants, using a limited number of fuel types. The wide variability of coals and process conditions also are not accounted for in the ICR sample data.

Based on current technology, EPA's original projections show that controlled lignite units would emit Hg emissions at levels that significantly exceed controlled bituminous plants. EPA's adjustment factor would have to be increased by a factor of 10 to account for this expected difference. This disparity becomes even greater when the data is corrected for the higher Hg content in Gulf Coast lignite. EPA's proposed adjustment ratio of 3 does not adequately account for the significance of this expected difference in after-control emission levels.

The commenter stated that EPA's alternative proposed approach to developing adjustment factors – reliance on proposed MACT levels – confirms the need for a higher adjustment ratio for lignite. In EPA's March 2004 Memorandum, EPA proposed alternative allocation adjustment factors using the proposed MACT emission rates that were also included in the NPR. EPA proposed MACT emission limits of 2.0 pounds per trillion British thermal units (lb/TBtu) for bituminous plants, 5.8 1b/TBtu for subbituminous plants and 9.2 lb/TBtu for lignite plants would, according to EPA, result in an alternative EPA adjustment factors of 1 for bituminous, 2.9 for subbituminous, and 4.6 for lignite coals. The adjustment ratio of 4.6 for lignite to bituminous better reflects lignite's higher Hg content and the greater difficulty of controlling Hg emissions from lignite.

In this regard, the commenter support the adjustment factors corresponding to the MACT limits included in the AEMS, LLC analysis when it corrected some of the flaws with the ICR data base and EPA's application of those data. The resulting AEMS adjustment factors of 4.9 for lignite, 1.1 for subbituminous, and 1 for bituminous are better supported by the Hg content and technology performance data collected by EPA. The commenter stated that EPA is incorrect to place greater reliance on the ICR's emissions per capacity estimate in deriving the final adjustment factors.

In the State and Indian Country Emissions Budget TSD,[268] EPA again explained how it developed the adjustment factors discussed above. In this document EPA states that it considered three factors: "(1) data on mercury capture by control figuration and coal type; (2) data on coal characteristics impact Hg capture, and (3) Hg emissions by capacity." EPA then goes on to state: "As presented in Table 2, subbituminous coals have over 1.25 times the emissions per capacity compared to bituminous coals, and lignite coals have close to 3 times the emissions per capacity compared to bituminous coals."

The commenter questioned the validity of EPA's estimate of emissions per capacity for lignite coal. EPA estimates emissions per capacity by dividing its estimate of total Hg emissions for each coal type by the Agency's estimate of total generating capacity for each coal type. Because EPA lacks sufficient direct measurements of Hg emissions from power plants, EPA estimates total Hg emissions for each coal type by applying an emission reduction ratio to the 1999 ICR data on Hg content of each coal type. Unfortunately, EPA's estimate of total lignite emissions in 1999 fails to correct for EPA's underreporting of Hg content in Gulf Coast lignite coal. Had EPA corrected its estimate of the total Hg emissions in lignite coal, the Agency would have included a significantly higher estimate of total emissions from lignite coal. This in turn would have resulted in a much higher estimate of the Hg emissions per capacity for lignite coal than 0.65 1b/MW.

Although EPA states that it considered these new Hg values when developing the CAMR new source limits, the ICR data included in the record were never officially corrected, nor was EPA's estimate of emissions per capacity for lignite corrected to reflect this higher Hg content and the proportionally higher Hg emissions. Changes to the data would have resulted in new estimates that would have compelled a higher adjustment factor for lignite.

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[268] "Technical Support Document for the final Clean Air Mercury Rule: State and Indian Country Emission Budgets." March 15, 2005. EPA-HQ-OAR-2002-0056-6154.

In EPA's Response to Comments, EPA notes that one commenter (5564) provided ICR fuel sampling data to show that the amount of Hg was significantly understated in Gulf Coast lignite because of the test method (ASTM D3684) used in the analysis. EPA responds to this comment by stating: "EPA is aware of the issue but believes that the value is limited in that the final emission limits were based on Hg emissions to the atmosphere rather than on any calculation based on the Hg content of the coal being used." Similarly, EPA has gone so far as to state that the Hg content of coal was not a "direct" factor in determining allocations. EPA, however, fails to explain why the Hg content of the coal would not directly affect the absolute amount of Hg emitted. This is especially troubling given that the Agency's estimate of "emissions per capacity" in Table 2 of the State and Indian Country Emissions Budget TSD is derived from the Agency's estimate of the Hg content of the different coal types divided by the generation capacity for each coal type.

EPA fails to provide any evidence in the record to show that it relied directly on air emission data to derive its adjustment factors. The commenter believes that this is not surprising. The ICR-3 data on stack emissions are significantly more limited, covering approximately 80 plants, than the data collected on Hg content of coal under ICR-2 which includes tens of thousands of different samples. In addition, approximately a quarter of the direct stack testing showed negative removal rates for control technologies, raising significant questions over the relative accuracy of the stack tests that were applied. EPA appeared to correctly understand that the stack emission data in ICR-3 is too small a set of data points and too uncertain to form the basis for establishing adjustment ratios for purposes of allocating Hg allowances among different coal types.

Although EPA is correct to use adjustment factors to account for the differences in coals, substantial evidence in the record, including more recent "corrections" to that database which, as EPA states, the Agency has no reason to doubt, would support a higher adjustment factor for lignite coals to account for the higher Hg content in lignite coals and the greater difficulty in reducing Hg emissions from lignite.

Response:

EPA maintains that the coal adjustment factors for the purpose of establishing State emission budgets included in the final CAMR appropriately recognize that subbituminous and lignite coals have the lowest Hg capture with existing technologies; represent more emissions per capacity; and, in the case of lignite, also have higher Hg coal content. As discussed elsewhere in this document, EPA is finalizing coal adjustment factors of 1.0 for bituminous coals, 1.25 for subbituminous coals, and 3.0 for lignite coals. As the analysis below demonstrates, the factors proposed by the commenter would unjustifiably over-compensate lignite coals.

Although the commenter points to the emissions-by-capacity calculations for bituminous, subbituminous, and lignite coals as being flawed because they do not incorporate corrections to data for Gulf Coast lignite, the commenter does not acknowledge that the allocation factor chosen by EPA for lignite is higher than the factor that would result from strictly taking the results of the emissions-by-capacity calculations from the ICR, as the commenter suggests that

EPA has done. Also, as presented in Table 6, EPA projects that the States in which the commenter has generation operations (North Dakota, Texas, Louisiana, and Mississippi) will all have an emissions budget in 2010 that is greater than Hg emissions under CAIR in 2010 (the base case for evaluating CAMR). Additionally, it should be noted that EPA's modeling has shown minimal coal switching as a result of CAMR. This suggests that EPA's rules will not have an inordinate impact on producers and consumers of western and gulf region coals.

Under a cap-and-trade program, allowance allocations raise essentially distributional issues, because a source's least-cost compliance behavior will be the same regardless of the number of allowances held. Thus, the results observed in EPA's modeling would be applicable regardless of the chosen allocation approach under CAMR. We also note, as Table 6 demonstrates, the commenter is expected to receive an excess of allowances during the first phase of CAMR. For all of these reasons, EPA continues to believe that the argument that the coal adjustment factors in CAMR will disadvantage lignite coal remains entirely unfounded.

Table 6. CAMR Budget and Projected Hg Emissions under CAIR in 2010 for States Noted by Commenter 6501 (tons).

State	***CAMR Budget 2010 (tons)***	***Projected Hg Emissions under CAIR in 2010 (tons)***
Louisiana	*0.601*	*0.4045*
Mississippi	*0.291*	*0.2117*
North Dakota	*1.564*	*0.9452*
Texas	*4.657*	*3.1541*

Comment:

Commenter 6590 stated that in the final CAMR, in its opinion, EPA retained its unjustified allowance allocation adjustments for lower coal ranks, whereby subbituminous and lignite coal units are granted allowance allocation preferences of 1.25 and 3. Bituminous coal units are granted no preference, but they do lose allowances they would otherwise receive under a rational 1 to 1 allocation to fund the subbituminous and lignite preferences, while maintaining the Phase I 38 ton cap.

Response:

As noted elsewhere in this document, EPA is maintaining the coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule.

Comment:

Commenters 6495 and 6590 stated that EPA's allowance allocation factors are not relevant factors that can be rationally considered by the Agency in distributing allowances. EPA's new "aggregate emissions" factor is wrong for a majority of units. In the final CAMR, EPA added a new factor to replace one of the three factors it purports to "balance" in deriving its allocation adjustment factors[269] (although the commenter notes that the new mix of factors produced exactly the same results as the mix of the old factors: 1, 1,25, and 3). This new factor relies upon an estimate of actual Hg emissions per capacity (lb/MW) by coal rank. Under this analysis, subbituminous coal units in aggregate had higher emissions per capacity than bituminous units in aggregate. However, because average bituminous coal Hg content is about 50 percent higher than average subbituminous coal Hg content (see State and Indian Country Emissions Budget TSD at 4), the commenter knows this "aggregate fact" cannot be true in general, and is, therefore, irrelevant.

EPA's data on coal unit emissions controls confirms that EPA's aggregate emissions number is not valid in general and, therefore, is misleading as used. EPA's document "Control of Emissions from Coal-Fired Electric Utility Boilers: An Update"[270], which EPA relied upon to develop the aggregate emissions numbers in the State and Indian Country Emissions Budget TSD provides information about coal-fired capacity by air pollution control configuration. Table 2 of that document shows that 62 percent of the sources have only standard particulate controls (ESPs) (either with or without NO_x controls which are irrelevant for Hg removal in the absence of SO_2 controls). Figure 3 of that document, also relied upon in the State and Indian Country Emissions Budget TSD, shows that bituminous units generate about a 29 percent removal rate with a CS-ESP (and less with a HS-ESP, although the commenter ignores the lower removals of HS-ESPs because they are not necessary to make the point). Subbituminous units are credited with about a 3 percent removal for CS-ESP.

Because 62 percent of the industry has only ESP controls (and perhaps NO_x controls), the commenter reasonably assumes that both the bituminous and subbituminous units generally break down along these lines. Using average Hg in coal for bituminous units (Table 1 in the State and Indian Country Emissions Budget TSD) of 8.59 lb/TBtu, and subtracting 29 percent to account for ESP Hg removals, shows that the majority of bituminous units emit at a rate of 6.10 lb/TBtu. Because this is above the average Hg coal content for subbituminous coals of 5.75 lb/TBtu, it is clear that the majority of bituminous units emit more Hg than subbituminous units. If we remove 3 percent from subbituminous units to account for ESP removal, the difference is 6.10 lb/TBtu for bituminous units vs. 5.57 lb/TBtu for subbituminous units. This is about a 10 percent difference. Consequently, EPA's new factor purporting to show that bituminous units are in aggregate the lowest emitting units on an installed MW basis is flatly wrong for the majority of units. Indeed, the opposite is true: the majority of subbituminous units have lower emissions than the majority of bituminous units.

This information tells us two things. First, there is no reasoned basis on which EPA can rely on an aggregate factor that is not true for the majority of the units under consideration, and in fact proves the opposite (that the majority of bituminous units have higher emissions than the majority of subbituminous units). Having relied upon an irrational factor, EPA must now discard it and try again, (because EPA "balanced" all three factors in unspecified ways, the role of this factor in the final result is not clear).

Second, EPA must now "rebalance" these factors while acknowledging that a factor it

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[269] See State and Indian Country Emissions Budget TSD.

[270] See EPA-HQ-OAR-2002-0056-6141.

considers important (relative level of emissions among coal rank units) now tips in favor of awarding bituminous units extra allowances over subbituminous units, because emissions from a majority of those units are higher than emissions from a majority of subbituminous units. Consequently, EPA's rebalancing should acknowledge that this factor supports additional allocations to bituminous coal, and, if additional allocations are not granted to bituminous coal, EPA will need to explain why that result is appropriate despite this factor.

Moreover, and more fundamentally, the commenter stated that EPA's decision to focus on aggregate emissions in general is inconsistent with a fundamental EPA policy not to punish units or classes for having already controlled emissions of the pollutant at issue. Because bituminous coals have higher Hg content than subbituminous coals, the only way aggregate emissions from bituminous units could be lower than aggregate emissions from subbituminous units is that some bituminous units have already installed co-benefits technology that reduces Hg emissions.[271] Consequently, to use the lower actual controlled emissions from bituminous coal units as a basis to take allowances away from those coal units, and grant a windfall allocation to subbituminous and lignite units, penalizes bituminous units for having installed control technology.

The commenters believe that, although any allocation scheme that punishes prior good actors that have installed control technologies that reduce emissions, and are, thereby, part of the solution, is never good policy, and is generally unsupportable under a reasoned decision-making standard. EPA has addressed this equitability issue in its articulated policy, as applied in CAIR. In addressing NO_x allowance allocation rules in its recent rehearing notice in CAIR, EPA acknowledged that allocating emissions based on actual historic levels of emissions is punitive to those that have installed controls: "In contrast to allocations based on historic heat emissions, the [heat input] factors would also not penalize coal-fired plants that have already installed pollution controls."[272] That policy is both reasonable, and fully applicable to CAMR as well as CAIR. Divergence from that sound and articulated policy in CAMR would necessarily require fuller justification than EPA has provided.

EPA has acknowledged that its relative control capability factor is irrelevant under a cap-and-trade system. The commenter stated EPA's first, and apparently primary, factor justifying the allowance allocation adjustments, contends that the relative effectiveness of controls for Hg emissions by coal rank justifies awarding extra allowances to coal ranks with lesser removal capability.[273] Specifically, EPA maintains that because Hg removals using PM, NO_x, and SO_2 controls vary by coal rank, and reductions using these technologies on bituminous coals are greater than on subbituminous or lignite coals, allocation preferences are warranted for the lower coal ranks.[274] In prior comments, the commenter has maintained that the Hg control capabilities

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[271] Because standard ESP removals will not even lower aggregate bituminous emissions below average subbituminous Hg in coal, only installation of co-benefits controls can account for the lower aggregate bituminous emissions.

[272] <u>See</u> 70 FR 72268, 72276 (December 2, 2005).

[273] Although EPA cites three factors as the basis for its allocation ratios in the State and Indian Country Emissions Budget TSD, EPA only cites the factor relating to relative control issues among the coal ranks in the preamble to CAMR.

[274] <u>See</u> 70 FR 28622, EPA's assertion that Hg removals vary significantly by coal rank for NO_x, SO_2, and PM controls is not entirely accurate. Subbituminous units get good Hg removals through installation of FF, with EPA

of the various coal ranks is an irrelevant factor to consider in allocating allowances under a cap-and-trade program, because the least expensive units will control emissions no matter the allocation, making control issues concerning specific units or classes of units (such as those firing lower rank coal) totally irrelevant. In fact, the entire point of a cap-and-trade program is to make individual control issues (and individual compliance issues) irrelevant, and direct controls towards the most cost-effective units. Units that are less cost effective to control (including older or smaller bituminous units, and subbituminous units that do not install FFs) will purchase allowances at that lower compliance cost.

Although EPA did not respond to this contention in the final CAMR, it has acknowledged no less than three times that the commenter's position is correct, and, therefore, must abandon the relative control capability factor as not relevant to allowance allocation apportionments.

EPA first acknowledges that control issues are irrelevant under a cap-and-trade system in the final CAMR preamble itself, where EPA states that "Many of those [Hg] reductions are projected to result from large units installing controls and selling excess allowances. Under the cap-and -trade approach the commenter is projecting that Hg reductions result from units that are most cost-effective to control, which enables units that are not cost-effective to control to use other approaches for compliance, including buying allowances, switching fuels or making dispatch changes."[275] In other words, EPA acknowledges that the relative ability of any coal rank to control its Hg emissions is irrelevant because more difficult to control units using lower coal ranks will not in fact control their Hg emissions at all. Rather, they will be buying allowances form other units that are more cost-effective to control.

It is illogical for EPA to acknowledge on the one hand that units using lower rank coals will be expected to buy allowances from units where controls are more cost effective, and then allocate extra allowances to these lower rank coal units because the controls EPA acknowledges they will not install do not perform as well. For EPA's irrational assumption to be valid under a cap-and-trade system it would have to be true that lower rank coals are more difficult to control and it would also have to be true that these more-difficult-to-control units would still be sufficiently cost-effective to control that controls would actually be installed. EPA's allocation adjustments based on this control factor is even more illogical under CAMR, where EPA acknowledges that CAMR Phase I reductions will be made as a result of CAIR co-benefits regardless of whether EPA promulgates a CAMR rule at all.[276] Thus, the driver behind where Hg control technologies will be installed (and sufficient allowances produced for industry compliance) is not even CAMR (and any relative ability to control Hg), but CAIR. And because CAIR does not regulate Hg, relative ability to control Hg by coal rank cannot be relevant.

EPA acknowledges this fact a second time in the State and Indian Country Emissions

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estimating 72 percent or greater removals. This compares favorably to bituminous FGD removals (less than 70 percent), and costs between these two control technologies are similar.

[275] See 70 FR 28619.

[276] In the final CAMR, EPA states "The CAIR-CAMR approach, which does not impose any Phase I Hg reduction requirements beyond those required to control SO_2 and NO_x emissions under Phase I of CAIR, sets the Phase I Hg emissions cap at 38 tons." See 70 FR 28618.

Budget TSD, where it states: "Allowance allocation decisions in a cap-and-trade program raise essentially distributional issues, as economic forces are expected to result in economically least cost and environmentally similar outcomes regardless of the manner in which the allowances are initially allocated." See State and Indian Country Emissions Budget TSD at 5. This correct summary of how a cap-and-trade program works acknowledges that the relative ability of users of one or two coal ranks to control their Hg emissions is not at all relevant to where controls will be installed, and consequently control performance issues by coal rank cannot be relevant to how allowances should be allocated. And it undercuts any notion that would support a preferential allocation to more difficult to control coal ranks, while taking away allowances from the bituminous units which EPA's own modeling shows will be making the vast majority of the investment in emissions controls to reduce Hg.

EPA acknowledges that control issues are irrelevant under a cap-and-trade system for a third time in its grant of rehearing on certain aspects of CAIR. There, EPA stated:

> In a cap-and-trade system, however, the methodology used to allocate allowances in any given year would not affect where the control technologies are installed. Rather, the determinant would be the cost of adding controls compared to the cost of buying, or profit from selling, allowances. Controls are expected to be installed where it is relatively less expensive, without regard to which units receive the initial allocation of allowances...[277]

If various allowance allocation methodologies will not have any impact on where Hg emissions controls are physically installed, then the physical ability of emission control systems to perform on various coal ranks cannot possibly be relevant to how those allowances are, or should be, allocated.

These passages confirm that relative control issues for coal ranks are irrelevant to an allocation methodology, because higher cost units that are more difficult to control will not control, and lower cost units that are easier to control will control. Indeed, in the case of CAMR, where EPA specifically expects, based on detailed modeling, that almost all the first stage CAMR reductions will come from bituminous units that install expensive co-benefits controls, EPA has concluded as a matter of fact that lower rank coals will not physically be installing controls in general, and, therefore, cannot adjust allocations based on the performance of controls that will not be installed.

In CAIR, EPA further acknowledged that this result is perfectly equitable. There EPA stated:

> EPA also notes that, while the Petitioner [for rehearing] states that the CAIR final allocation methodology [for SO_2, with no allocation adjustments] is "inequitable" because lower emitting units would buy allowances from higher emitting units that install controls, it is unclear why such a result would actually be inequitable. On the contrary, the owner of each of the units involved would be choosing to adopt the most economic compliance strategy in light of the unit's emission control costs and the market value of

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[277] See 70 FR 72276

> allowances. The ability of the owners to make such choices reflect the flexibility provided by a cap-and-trade program.[278]

It is not plausible for EPA to contend that no allocation adjustment is warranted on equitable or policy grounds for units that are more expensive to control for SO_2 in CAIR (due to lower SO_2 emissions) and then allocate extra allowances to lower rank coal units in CAMR precisely because such units are more difficult and expensive to control. Indeed, EPA's [correct] SO_2 allocation position in CAIR underscores the notion that units that are more expensive to control actually receive a benefit in the form of a less expensive compliance option and that that result is itself inherently equitable.

Response:

The commenters make various assertions concerning an "aggregate emissions factor," without clearly explaining what they mean by the term. EPA does not characterize the coal adjustment factors as such, because they are not based on aggregate emissions alone. As was discussed in the final CAMR, these factors take into account: (1) data on Hg capture by control configuration and coal type, (2) data on coal characteristics impacting Hg capture, and (3) Hg emissions by capacity. As noted elsewhere in this document, EPA is maintaining the coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule.

To date, sources have yet to install emissions control specifically for the purpose of reducing Hg emissions. For this reason, EPA believes the commenter's claim that EPA's allocation methodology will disadvantage sources that have already installed controls is unfounded. Further, EPA believes that the commenter mischaracterizes EPA's considerations during the process for determining a NO_x *allowance allocation approach under CAIR. EPA noted in the June 10, 2004 CAIR SNPR and in the CAIR Notice of Reconsideration that, "in contrast to allocations based on historic emissions, the factor would also not penalize coal-fired plants that have already installed pollution controls" (see 69 FR 32869, 70 FR 72276). This language explains that allocations using historic heat input adjusted for fuel type, while providing additional allowances to coal-fired units that will likely install controls under CAIR, would not simultaneously penalize coal-fired units that had already made investments in emissions controls. An approach based on historic emissions, on the other hand, would also provide additional allowances to units that would likely have to install controls, but would simultaneously penalize units that had already done so. Although EPA makes this argument in support of its chosen approach for* NO_x *allocations, the Agency does not raise this point to establish a criterion for evaluating allowance allocation approaches. Rather, it simply notes that its chosen approach for* NO_x *allocations can provide an advantage to one set of coal-fired units without disadvantaging another set of coal-fired units. Finally, while referencing the CAIR* NO_x *allocation approach, the commenter fails to note that EPA adopted allowance allocation adjustment factors for* NO_x*. In that case, the commenter was a beneficiary of such a decision.*

EPA's analysis projects continued growth in bituminous coal use under CAIR and CAMR. See the CAMR RIA for discussion of this analysis.

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[278] See 70 FR 72276

EPA believes that the analysis submitted by the commenter in support of a higher coal adjustment factor is incomplete, primarily because it does not consider the impact of the significant difference in Hg control between the capacity of units with FFs and/or wet or dry scrubbers. It is this significant difference in Hg reductions from the current scrubbed capacity between bituminous- and subbituminous-fired units that results in greater overall emissions by capacity in subbituminous units. The commenter also ignores the fact that bituminous-fired scrubbed capacity is projected to increase significantly under CAIR.

EPA believes that the commenter's comparison of the Hg State-budget calculation approach with the CAIR SO_2 allocation approach (which is based on title IV) is not an appropriate one, because of the additional considerations that impacted the choice of an SO_2 allowance allocation approach under CAIR, namely, the need to preserve the title IV allowance system that was created by statute. See the CAIR Final Notice of Reconsideration for additional discussion of this issue (http://www.epa.gov/cair/pdfs/reconsideration20060315.pdf).

Although EPA agrees with the commenter that allocation of allowances is not relevant to individual units' control decisions under a cap-and-trade program, allocation of allowances does have implications for the distribution of compliance costs among sources. In other words, an individual source will make the same compliance decisions regardless of how many allowances it receives, but its cost of compliance will depend on the value of allowances it is allocated. For this reason, EPA believes that the use of allocation adjustment factors remains reasonable as a means of addressing potentially large discrepancies in compliance costs.

Comment:

Commenter 6613 stated that the Final Rule's treatment of allowance allocations is unfair and also bad public policy in that it could have the effect of discouraging new energy development. The preamble to the Final Rule recognizes that State allocation methods should take new sources into account and states that "[p]roviding allowances for new sources would address a number of commenter concerns about the negative effect of new units not having access to allowances. Commenters supported a new source set-aside and one commenter pointed to EIA forecasts for coal to grow by 112 gigawatts (GW) by 2025. EPA economic modeling projects growth in coal by 2020." However, EPA merely gave lip service to these concerns, but failed to require the States to implement this example or require any type of new source set-aside or al1ocation method.

The commenter believes that EPA has the authority to require States to allocate allowances to new sources. EPA promulgated the Final Rule's cap-and-trade program under the authority of CAA §111, and specifically CAA §§111(a) and 111(d)(l). CAA §111 (a) defines "standard of performance." CAA §111(d) (1) authorizes a SIP-like procedure which establishes standards of performance for existing sources and not new sources. See 42 U.S.C. §7411(d)(1). Therefore, although EPA might need to defer to States regarding the allocation of allowances to existing sources, EPA has not cited any authority that would require EPA to defer to States the method of allocation of allowances to new sources. The commenter is aware of the case law that holds that under CAA §110 a State is granted the liberty to adopt whatever mix of emissions limitations it deems best suited to its particular situation as long as the State's choice is in compliance with the national standards for ambient air. See Train v. Natural Resources Defense Council, 421 U.S. 60, 79 (1975); see also Virginia v. EPA, 108 F.3d 1397, 1409-10 (D.C. Cir.), modified on other grounds, 116 F.3d 499 (D.C. Cir. 1997). However, this holding has not been applied to cases involving CAA §11 l, and the creation of a cap-and-trade program is not analogous to the setting of a national ambient air quality standard under CAA §110. Therefore, the commenter believes EPA has the authority to require States to adopt a specific allowance allocation method for new sources.

In fact, EPA states in the preamble to the Final Rule that the Final Rule "allows States to modify the model [cap-and-trade] rule language to best suit their unique circumstances with regard to allocation methodologies" and that this will "not jeopardize the environmental and other goals of the program." The goals of the program include "equitable treatment of owners and operators of regulated sources." Clearly an allocation system that allows States to deny al1ocations to new sources, forcing those sources to buy them on the open market, does not meet the goal of equitable treatment of owners and operators of new sources. The uncertainty that surrounds how each State will choose to allocate allowances to new sources is also unfair to new sources that are in the planning or permitting stages.

EPA could easily prevent the inequitable treatment of new sources by designing the Hg cap-and-trade program differently. EPA is already requiring States to adopt a model cap-and-trade rule if the State wants to participate in the cap-and-trade program. As part of the required rule, EPA could include a specific allocation system, such as the example allocation and regulatory text provided in the Final Rule that reserves a certain percentage of allocations for new sources. These allocations should be provided to new sources at the same cost as initial allocations were provided to existing sources. For example, if existing sources are initially given allocations for free, then new sources should receive initial allocations for free. If existing sources had to pay a certain amount for initial allocations, then new sources could be required to pay the same amount.

EPA could also design a Hg cap-and-trade system similar to the CAA Title IV SO_2 Acid Rain Trading Program that is truly national in scope. Rather than leaving allocation of allowances up to States, EPA could set up a national allocation method based on heat input or other factors. Then EPA could allocate initial allowances to existing sources and also create set-asides that would allocate allowances specifically to new sources in an equitable manner. This would create national regulatory certainty and equity, and insure development of new energy supplies. As EPA believes, CAA §111 authorizes a cap-and-trade program, EPA should design that cap-and-trade system in a way that makes it the best system of emission reduction. A best system of emission reduction would be one that treats existing and new sources equitably and with regulatory certainty, no matter what State a new source is located in.

Response:

The commenter makes several arguments, some of which relate to issues that were not re-opened for reconsideration (e.g., EPA's authority to require States to adopt a particular allowance allocation scheme). We respond only to those aspects of the comment that relate to *the issues on which EPA did re-open – the Statewide Phase I emission budgets and the unit-level Hg allocations on which those budgets are based.*

EPA designed CAMR so that the rule would build upon Hg reductions being achieved under CAIR and continue to allow for growth in coal generation, and, as the commenter notes, EPA's modeling of CAMR suggests that growth in coal generation will continue under the rule. Regarding allocations, EPA maintains that each State can choose to allocate to sources in a manner that best suits its individual policy goals. This includes that State's choice to include a new unit set-aside that is larger or smaller than the one provided by EPA in its model rule approach, or to omit a new unit set-aside entirely. (It should also be noted that the Acid Rain Program does not include a new-unit set-aside.) Individual States that have the policy goal of promoting increased generation are likely to include a new unit set-aside in their model rule. Furthermore, new sources that are not covered by a new-unit set aside still have the option of purchasing allowances on the allowance market created by CAMR.

Comment:

Commenter 6499 stated that based on additional information on the Hg content of lignite and the difficulty in controlling the emissions resulting from its combustion, EPA should revise upward the fuel adjustment factor for lignite. The commenter has collected more lignite analysis data that confirms that the ICR-2 Hg content was under-reported and has participated in National Environmental Technology Laboratory (NETL) sponsored control technology tests that indicates EPA's fuel adjustment factor of 3 for lignite should be revised upward. In the 2005 Texas Legislative session, the Legislature passed a bill, signed by the Governor, which requires the Texas Commission on Environmental Quality (TCEQ) to adopt EPA's model CAMR program by reference. The TCEQ is on a fast track to have rules adopted by August 2006, so that they can allocate Hg allowances and submit the State CAMR plan in the fall of 2006. It also is developing a compliance plan and capital budget to support meeting its allowance allocations, and a revision of the fuel adjustment factor for lignite would have a significant impact on these plans.

Response:

As noted elsewhere in this document, EPA is maintaining the coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule. The adjustment factor of 3.0 for lignite incorporates analyses of the data referred to by the commenter (submitted during the public comment period following proposal of CAMR in January 2004).

Comment:

Commenter 6649 stated that EPA used a logical approach to apportion the allowances for each State. The allocation adjustment factors are a key component of the methodology used to derive the allocations and, thus, the State budgets. The commenter continues to believe that in order for any regulation to effectively and efficiently address Hg emission reductions, it must take into consideration both coal chemistry (primarily the chlorine content) and Hg variability between coals both as a total concentration and elemental fraction. Doing so will result in a regulatory approach that addresses both the environmental impacts of near-field deposition of oxidized Hg and the long-range atmospheric transport of elemental Hg.

CAMR appropriately recognizes distinctions in coal chemistry by proposing to use allocation adjustment factors for each coal rank. These allocation factors are intended to compensate for differences in the efficacy of Hg control based on coal type.

Response:

As noted elsewhere in this document, EPA is maintaining the coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule. However, EPA does not believe that these factors will affect the nature or location of Hg emissions reductions under CAMR.

Comment:

Commenter 6584 is opposed to USEPA's use of adjustment factors in the setting of State Hg budgets (Phase I and Phase II), and in its model rule Hg allocation methodology. The commenter supports the establishment of State budgets, and EGU allocations in the model rule, on a "coal-neutral" basis (i.e., with no adjustments made to State Hg budgets or model rule EGU emission allocations based on coal rank). The commenter added that although the commenter believes that there is a legitimate rationale for separate standards under a technology-based MACT regime, the commenter does not believe that this rationale translates to a cap-and-trade program for Hg.

The commenter suggested that, under a cap-and-trade program, units that are harder to control for Hg will have the option to go to the market to support their compliance needs. EPA does not need to a priori, and in perpetuity, establish State Hg budgets that are pre-biased based on what may ultimately be proven to be an unfounded view of the future effectiveness of pollution controls for the various ranks of coal. It would be much more equitable for EPA to establish "coal-neutral" State budgets now, that treat all coals the same, and let the marketplace decide how to adjust where the allowances go over time-based upon evolving technologies.

The commenter stated that EPA's current State budget and EGU allocation approach potentially provides a permanent windfall of allowances to lower rank coals, should good control technologies for these ranks of coal be developed. Recent field testing from the U.S. DOE/National Energy Technology Laboratory (NETL) included promising control technologies for PRB and Lignite coals. Several units achieved 90+ percent Hg removal efficiencies using brominated ACI at injection rates ranging from 1.2 to 4.3 (lb/MMacf) pounds per million actual cubic feet. These units included GRE Stanton Boiler 10 (lignite), Detroit Edison St. Clair Unit (PRB blend), Sunflower Electric Holcomb (PRB), and AmerenUE Meramec Unit 2 (PRB). A coal neutral methodology, to treat all coals equally, is particularly important for EGUs that compete in States that are part of regionally competitive power pools, where power can be sourced from many different States.

Commenter 6584 also stated that there is a risk with EPA's current State budget and EGU allocation methodology that EPA is potentially creating a self-fulfilling prophecy where there may be less development of highly effective control technologies for lower rank coals due to the relatively high emission allocations made to these coals under EPA's current methodology. A coal-neutral approach will encourage more broad-based technology development for all ranks of coal, as well as potentially more evenly spread control installations, and environmental benefit, across the country versus the current proposal.

The commenter noted that a comparison of State-level data from EPA's 1999 ICR with the Agency's proposed State Hg budgets reveals a very wide range of reduction requirements among the States. For example, Pennsylvania's 1999 ICR Hg emissions were approximately 4.98 tons with EPA proposing a State budget for Pennsylvania of 1.78 tons in Phase I (64 percent reduction) and 0.70 tons in Phase II (86 percent reduction). In contrast, States with lower rank coals receive much more generous State budgets. For example, Texas' 1999 ICR Hg emissions were 5.02 tons with EPA proposing a State budget for Texas of 4.66 tons in Phase I (7 percent reduction) and 1.84 tons in Phase II (63 percent reduction).

With individual States such as Pennsylvania contemplating the development of their own State Hg regulations outside of the CAMR trading framework, it is also very important that EPA reconsider how State Hg budgets are set. Specifically, EGU emissions in States that adopt their own regulations and prohibit emissions trading cannot exceed their State Hg budget. As can be seen in the above comparison of the Pennsylvania and Texas State budgets, EPA's current State budget methodology is very punitive to Pennsylvania in comparison to other States. Because some individual States are developing their own regulations outside of the CAMR trading regime, it would be more equitable for EPA to set State budgets on a coal-neutral basis in recognition of the fact that EGUs in some States may not be able to use the trading program as a compliance option.

Response:

As noted elsewhere in this document, EPA is maintaining the coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule. As is discussed in the State and Indian Country Emissions Budget TSD, these adjustment factors are based on the expectation that, for different coal ranks, Hg reacts differently to NO_x *and* SO_2 *control equipment.*

The economic incentives provided by a cap-and-trade program, rather than the allocation of allowances, will determine the speed and nature of technological development for controlling Hg emissions, because sources have an incentive to achieve emissions reductions and sell allowances on the market if they can do so cost-effectively. Participation in the CAMR cap-and-trade program will provide States (and their sources) the most flexibility in meeting the requirements of the rule. Even if States elect not to participate in the cap-and-trade program, EPA believes that the State allocations are reasonable.

Comment:

Commenter 6489 vigorously supported the harmonization of CAMR and CAIR to the maximum extent practicable and has consistently supported the Clear Skies allowance allocation ratios which make distinctions based on coal type. In its comments on the proposed rule, the commenter supported the industry consensus Phase I multipliers of 1.0 for bituminous, 1.5 for subbituminous, and 3.0 for lignite. However, the commenter specifically stated that under Phase II, the multipliers should revert to 1.0 for bituminous, 1.0 for subbituminous, and 1.0 for lignite. The commenter stated that these coal-neutral allocations reflect the extraordinary measures that sources will need to take to attain the low levels of Hg emissions mandated for 2018.

The commenter urged EPA to give full and adequate consideration to maintaining the proper balance between benefits and burdens of this rule. No region should be allocated a disproportionate burden of a rule which provides nationwide benefits and no region should gain the benefit of a rule without bearing its fair share of the regulatory burdens. Because EPA's modeling demonstrates that most of the control retrofits will occur in the CAIR States, so too will the cost of compliance. EPA's final rule will result in a transfer of wealth between regions that serves neither the interests of environmental protection nor equity. At a minimum EPA should revise the existing Phase II multipliers to 1.0 for bituminous, 1.0 for subbituminous, and 1.0 for lignite beginning in 2018. EPA should also reconsider whether that allocations multipliers for Phase I should more closely approximate those of Phase II. One consideration is that EPA correctly determined that ACI did not have sufficient demonstrated experience to be designated as commercially available.

Response:

EPA did not re-open for reconsideration the issue of the Phase II State budgets and the unit-level emissions allocations on which those budgets are based. EPA, therefore, does not respond to commenter's assertions concerning the Phase II allocation factors. As for the allocation factors, as noted elsewhere in this document, EPA is maintaining the Phase I coal adjustment factors of 1.0 for bituminous, 1.25 for subbituminous, and 3.0 for lignite in the final rule. The commenter does not provide analysis in support of its suggestion that the use of the coal adjustment factors finalized by EPA would create significant regional disparities in terms of cost.

Comment:

Commenter 6495 continues to believe that EPA's CAMR does not provide for a balanced regulatory approach to reduce Hg emissions from electricity generating units. EPA's continued focus in the final CAMR on Hg speciation and capture ability by coal rank under a trading rule suggests that EPA continues to consider regulatory approaches that will produce an economic benefit to subbituminous and lignite coal producers at the expense of bituminous coal producers; will result in adverse economic impacts including loss of employment to an important class of workers in Eastern and Midwestern States, including Alabama, Ohio, Illinois, Indiana, Kentucky, Maryland, Pennsylvania, Virginia and West Virginia; and will result in the loss of both State and local income and real estate tax base that the bituminous coal industry provides in the States where it is located.

The commenter recognizes the difficult regulatory decisions EPA has to make in this rule, and the potential for those decisions to impact coal producers in various regions of the country differently. The commenter also recognizes that a significant part of the Hg reductions that must be made under this rule, or any other Hg mandate, will come from bituminous coal. However, the commenter believes that good science, coupled with a sense of fairness can yield significant Hg reductions under this rule. The commenter also believes that it must be done in a way that does not compromise the continuing economic vitality of the bituminous coal producing regions, and that it ensure continued security of domestic energy supplies by keeping bituminous coal available throughout the U.S.

In the final CAMR EPA retained its unjustified allowance allocation adjustments for lower coal ranks, whereby subbituminous and lignite coal units are granted allowance allocation preferences of 1.25 and 3. Bituminous coal units are granted no preference, but they do lose allowances they would otherwise receive under a rational 1-to-1 allocation to fund the subbituminous and lignite preferences, while maintaining the Phase I 38 ton cap.

EPA's allocation "methodology" produces results that reward lower rank coal units for doing nothing. EPA asserts in the final rule that the allocation adjustments "are considered to be reasonable," and that "the "factors will succeed in equitably distributing allowances." The commenter's analysis of EPA's 1999 emissions estimates and EPA's final Phase I unit allocations shows that this is simply not true. The discussion below is based on unit-specific 1999 Hg emission estimates provided by EPA at the web link http://www.epa.gov/ttn/atw/combust/utiltox/unitxunit2.xls and on the final unit-specific Hg allowance allocations that EPA used to derive the State emission allowance budgets: http://www.epa.gov/ttn/atw/utility/final_camr_unithgallo_oar-2002-0056-6155.xls.

The cited data indicate that 79 percent of lignite units have allowance allocations in excess of their 1999 emissions. Sixty-two percent of lignite units have allocations that are 40 percent larger than their 1999 emissions. Ten percent of lignite units have Phase II allowances in excess of 1999 emissions, ensuring perpetual compliance with no requirement to control Hg emissions. EPA has not only made lignite a compliance coal, it has created wealth for its users, who can, in the aggregate, not only avoid any CAMR compliance costs, but can actually profit from the regulation by selling excess allowances (or banking them to ensure compliance under Phase II). These lignite users can reap all of these rewards without contributing one ounce of reductions under CAMR, and are, to our knowledge, the only regulated class to ever emerge from an EPA rulemaking in a better financial position than if the rule had never been issued.

There is no plausible statutory authority or policy basis for such a result, and it is certainly not, as EPA claims, "equitable." Lignite is a regulated coal under CAMR, and EPA is obligated to ensure that lignite users shoulder their share of the national CAMR compliance burden, and not, as EPA's allocation adjustment factors would have, allow these users to (1) avoid all compliance obligations, and (2) benefit from the value of numerous excess allowances those users do not need. To take away allowances from bituminous coal users to fund this lignite windfall, so that bituminous users can literally buy them back to comply, further underscores the irrationality of EPA's allowance allocation methodology.

The subbituminous allocation results show a similar, if less dramatic, disparity. Forty-four percent of subbituminous units receiving an allowance adjustment factor of at least 1.13 were awarded allocations in excess of their 1999 emissions. Sixty-three percent of these units were awarded allowances that exceeded 1999 emissions by 20 percent or more, 37 percent received allocations 40 percent greater than 1999 emissions, and 21 percent received allocations at least 100 percent in excess of 1999 emissions. Although subbituminous coal may not quite be a compliance coal in aggregate, it is reasonably close to that preferred and unjustified status under EPA's allocation methodology.

The commenter believes that these results largely ensure court reversal. But the commenter cautions that EPA cannot cure this problem simply by removing the windfall allocations and returning them to the bituminous units from which they were taken. If EPA does so, it would have no principled basis to support the allocation adjustment factors (such a methodology would amount to one based upon EPA's three factors, as adjusted to correct for windfall allocations, which is no methodology at all). Rather, the broad and systemic nature of the irrational results produced by EPA's allocation methodology indicates that EPA's entire approach is wholly flawed. As a consequence, EPA must abandon its "three factors" approach, to ensure that each coal rank bears a similar compliance burden and that no coal is favored over others.

The commenter also noted that some bituminous coal units have allocations that exceed their 1999 emissions. However, that is not relevant because bituminous units do not receive an allocation preference under EPA's approach. In contrast, both subbituminous units and lignite units have received an outright allocation preference, and the irrational effects of granting that preference do matter, and are a relevant factor the Agency must consider. As EPA itself states in the final CAMR, EPA is obligated to ensure that the allocation "factors will succeed in equitably distributing allowances," and that is particularly true where EPA is granting certain classes, but not others, regulatory preferences.

<u>Response</u>:

For the reasons described in the final rule and elsewhere in this document, the adjustment factors are reasonable in light of the record before the Agency. Although the commenter asserts that bituminous coal users are being disadvantaged by the final rule, they fail to provide evidence of this disadvantage.

The commenter suggests that the use of allowance allocation adjustment factors will promote use of lignite and subbituminous coals at the expense of bituminous coals, resulting in "adverse economic impacts including loss of employment to an important class of workers in Eastern and Midwestern States, including Alabama, Ohio, Illinois, Indiana, Kentucky, Maryland, Pennsylvania, Virginia, and West Virginia; and will result in the loss of both State and local income and real estate tax base that the bituminous coal industry provides in the States where it is located."

For this result to occur, the method by which allowances were distributed would have to impact the compliance behavior (including fuel choice) of affected sources. As the commenter *notes in a later portion of the comment addressed elsewhere in this document, the commenter agrees with EPA's statement, from the CAMR State and Tribal Budgets TSD, that "Allowance allocation decisions raise essentially distributional issues, as economic forces are expected to result in economically least cost and environmentally similar outcomes regardless of the manner in which allowances are initially allocated." The commenter should agree, then, that by this principle, the use of fuel factors should not result in coal-switching that would disadvantage bituminous coal. Additionally, because EPA bases allocations on historic behavior, units that switch from bituminous coal to subbituminous or lignite coal would not be rewarded with additional allowances.*

What is more relevant to the bituminous coal industry is how compliance behavior under CAIR and CAMR will affect use of bituminous coal. As can be seen in the RIA for the final CAMR, use of bituminous coal is expected to increase relative to subbituminous and lignite coals, because, with more stringent SO_2 *and Hg controls in place, it becomes more economical for many units to install scrubbers to control* SO_2 *and Hg, and switch back to local bituminous coals. As noted in the RIA, "The pollution controls can achieve up to a 95 percent* SO_2 *removal rate, which allows industry to rely more heavily on local bituminous coal in the eastern and central parts of the country that has a higher sulfur content and is less expensive to transport than western subbituminous coal."*

The commenter suggests that it would be more equitable for EPA to implement an allowance allocation methodology based on pure (unadjusted) historic heat input. EPA maintains that the use of coal-adjustment factors for determining State budgets with the example allocation methodology in the model rule will provide for the equitable distribution of allowances. EPA has conducted additional analysis that compares allocations based on adjusted heat input with allocations based on pure heat input in the context of CAMR. In comparing these two allocation approaches, EPA used the same methodology that was used to compare EPA's chosen allocations approach for NO_x *and* SO_2 *with alternative approaches for the CAIR Notice of Final Action on Reconsideration (see 70 FR 25328). This analysis compares the extent to which State budgets reflect projected emissions under CAIR as well as under CAIR and CAMR.*

EPA followed the approach presented in the CAIR Statewide NO_x *Budgets Calculations TSD (see http://www.epa.gov/cair/pdfs/0053-2228.pdf) which states "To quantitatively evaluate whether the fuel factor approach is providing States with annual* NO_x *budgets that more closely reflected their projected emissions, EPA calculated the arithmetic mean of the (absolute) difference between a States coverage ratio and 1.0 (i.e., the value representing a State's projected emissions matching the State's CAIR* NO_x *budget). In other words, EPA calculated how far off the State's coverage ratio was from 1.0, and then averaged these values for each approach." Under this approach, the closer this mean value is to zero, the more the allowance allocation approach minimizes disparities between State budgets and emissions.*

For Hg, EPA compared the State budgets to projected emissions for CAIR, which is the appropriate baseline for evaluating the CAMR State budgets (rather than the 1999 ICR data), as well as projected emissions under CAMR. Using projected CAIR emissions for 2010, the resulting average absolute differences were 0.57 for the coal-adjustment factor approach under

CAMR, and 0.63 for the pure heat input approach suggested by the commenter. Using projected CAMR emissions for 2010, the resulting average absolute differences were 0.58 for the coal-adjustment approach under CAMR, and 0.68 for the pure heat input approach suggested by the commenter. This analysis suggests that while the two allocation methods yield results that are similar, the adjusted heat input approach used by EPA in the final CAMR minimizes the discrepancies between State budgets and State emissions more effectively than a pure heat input approach. This analysis can be found in the docket in the spreadsheet titled "CAMR – Mercury Budget Equity Analysis Summary."

Finally, it is important to note that the hypothetical unit allocations used to calculate CAMR State budgets do not represent what actual unit allocations will be under CAMR. As EPA noted in the final CAMR, States are free to allocate allowances however they see fit in accordance with their own policy goals, provided the timing requirements of CAMR are met and the total State budget is not exceeded.

2.1.1.2 Alaska

Comment:

Several commenters (6501, 6502, 6505, 6578, 6652, and 6653 expressed concerns regarding the calculation of emissions from the Healy Clean Coal Project (HCCP) facility and the resulting Hg budgets assigned to HCCP and Alaska. The commenters believe the Phase I and II Hg budgets are based on flawed data and unreasonably limit operation of the HCCP as well as any future coal-fired power generation in Alaska.

The commenters stated that Alaska currently has two EGUs large enough to be affected by CAMR: Golden Valley Electric Association's (GVEA) conventional coal fired unit (Healy Unit #1), and HCCP. Both of these units are located at GVEA's property in Healy, Alaska. Apparently, EPA based Alaska's emission cap only on the emissions from HCCP. Consequently, Alaska's Hg allocation under the phase I cap should be increased to 0.010 tons because the original calculation failed to include the contribution from GVEA Healy Unit #1. No other jurisdiction's allocation needs to be changed to accommodate this. Alaska should also be granted an additional 0.004 ton allocation under the phase I cap to reflect the achievable operation of the HCCP. This additional allowance should be allocated to Alaska if and when HCCP achieves ongoing operation at greater than 51 percent capacity.

HCCP was designed to be one of the cleanest operating coal fired facilities in the country. The State of Alaska, AIDEA, and the U.S. DOE made a considerable investment (totaling more than $300 million) to develop and construct the HCCP using advanced clean coal technology. It would be unreasonable to expect, as EPA has proposed, what would amount to a 50 percent reduction in Hg emissions by 2010, and a further reduction of 60 percent by 2018, from this facility. EPA acknowledges that EGUs will require significant investment in the installation of pollution control technology to reduce SO_2 and NO_x emissions, and that these technologies also realize collateral reductions in Hg. The facility has already installed clean coal technology to reduce SO_2, NO_x, and PM emissions (i.e., spray dryer absorber, FF, slagging combustor). Because these types of emission controls already installed on HCCP provide a co-benefit control, it is not in the public interest to jeopardize the ability to operate this facility that already incorporates clean coal technology with additional, costly controls for Hg. AIDEA recently has made significant investment in the HCCP facility and is implementing a plan to bring it to commercial operation. EPA's CAMR would adversely affect the ability to do this.

The phase I and II Statewide Hg emission budgets for HCCP and Alaska are based on data that are not representative of the commercial operation of the HCCP. Data collected during the 1999 ICR were used to develop rules aimed at regulating EGU. Of particular importance were the data on heat input (HI) reported for each "affected source." The HCCP was the only unit identified as an affected source in Alaska during the 1999 ICR data call.

During the 1999 ICR data call, the HCCP was still in its DOE Demonstration Test Phase of operation and did not operate in commercial mode for more than 3 months during this period. This method of operation is not representative of the base-load operation of the HCCP and, therefore, cannot be used to represent EGU operation in Alaska. Examination of the HCCP data collected during the 1999 ICR shows that the Hg budget for HCCP/Alaska is based on a total HI of 2,900,975 MMBtu/yr. The HI was determined using the reported fuel consumption during the 1999 ICR data call of 144,055 dry tons of coal, which had an average heat content of 10,068 Btu/lb on a dry basis. EPA subsequently adjusted the HI from EGUs that burn subbituminous coal by a factor of 1.25 to place all EGUs on the same basis; therefore, the HI for HCCP was adjusted to 3,626,219 MMBtu/yr.

This HI rating is incorrect because it is based on data that are not representative of the HI from actual commercial operation of the HCCP. The HCCP was operating in the test phase during 1999. The facility has entered into an agreement with an Alaska utility to bring the plant into commercial operation, anticipated to be in 2007. Because the HCCP was not yet operating in commercial mode in 1999, the HI should be based on the nameplate capacity of the HCCP boiler (658 MMBtu/hr) with the assumption that the HCCP boiler will be operating at full baseload conditions during commercial operation. Thus, the correct HI of HCCP is 5,764,080 MMBtu/yr. This represents a potential fuel consumption of 286,231 dry tons of coal per year.

Comparison of the potential HI to that of the ICR data illustrates that the Hg budgets assigned to HCCP and Alaska represent 50 percent of what HCCP and Alaska would have been allocated if EPA had used the HI capacity of the HCCP as it is intended to operate. This failure to adjust for the anticipated commercial operation of HCCP resulted in lower Hg budgets for HCCP and Alaska than should have been allocated. The determination of HI based on operation during the testing phase of HCCP, resulted in a total Hg budget issued to HCCP/Alaska of 0.005 tons per year (tpy) or 10 lb/yr from 2010 to 2017 and 0.002 tpy or 4 lb/yr from 2018 and thereafter. At a minimum, HCCP and Alaska's Hg budget should be increased based on the corrected HI to reflect HCCP operation at full load. After making the standard adjustment for subbituminous coal, the corrected HI for HCCP is 7,205,100 MBtu/yr. The corrected HI corresponds to a total Hg budget issued to HCCP and Alaska of 0.010 tpy, or 20 lb/yr, from 2010 to 2017 and 0.004 tpy, or 8 lb/yr, from 2018 and thereafter.

EPA estimated HCCP produced 14.8 lb of Hg in 1999 using the facility's reported coal consumption statistics and the measured Hg content of fuel burned. The amount of Hg emitted from the HCCP's boiler stack was estimated using a capture ratio generated from source test data. Based on this emission estimate, it would be extremely difficult for HCCP to comply with its Phase I Hg unit allocation based on the budget assigned to HCCP and Alaska, despite having both NO_x and SO_2 emission controls installed. The fact that the coal consumption data used in calculating this annual emission rate is based on HCCP operating at half of its potential only serves to exacerbate this conundrum. HCCP's dilemma is incongruent with the intent of CAMR which assumes facilities will be able to realize all of the necessary Hg emission reductions necessary to meet the Phase I caps and put off installing Hg control devices until after 2010.

Increasing the Hg budgets issued to HCCP and Alaska is necessary to help alleviate this shortcoming. It would also have a substantial impact on how a compliance strategy is developed to adhere to the unit allocation for HCCP that is assigned out of HCCP and Alaska's Hg budget when the cap-and-trade program is implemented.

HCCP is also unique in that it is designed to burn low Btu coal, including coal refuse, with state-of-the-art emissions controls for NO_x, SO_2, and PM_{10}. EPA estimated HCCP's emissions from Hg data collected at other facilities that purportedly burned the same rank of coal as HCCP (i.e., subbituminous coal) and had some of the same emission controls. However, in estimating annual Hg emissions for HCCP, and subsequently Alaska, EPA did not consider that HCCP is designed to burn coal refuse as its standard fuel. The other facilities to which HCCP was compared when estimating Hg emissions burned subbituminous coal. This also was not considered in the 1999 HI data for HCCP. EPA data indicate that Hg content of waste coal can be several times higher than run-of-mine (ROM) subbituminous coal. Consequently, the annual Hg emissions from HCCP have the potential to be very different than EPA originally estimated. This factor not only impacts the Hg baseline, it may have an impact on the phase II limit because the Hg baseline emission rate was used to set the Phase II limit. This needs to be an additional parameter considered when increasing the Hg budgets to Alaska and the corresponding unit allocations to HCCP.

This suggested adjustment for coal refuse is conservative considering that subbituminous coal refuse, being a lower rank than bituminous coal, is likely to have an even higher Hg emission factor than bituminous coal refuse, thereby increasing the ratio and the resultant Hg emissions budgets needed for HCCP and Alaska. The commenters' provided information that also shows that a FBC boiler has a much lower Hg emission factor than a pulverized coal (PC) boiler, further adding to the conservatism of the commenter's suggested adjustment for coal refuse.

The commenters further stated that HCCP and Alaska's Hg budgets are disproportionately small in comparison to other States and will prevent future coal-fired power generation in Alaska. Further, recent data on coal consumption and electric power generation from the Energy Information Administration (EIA) suggest that the Hg budgets for HCCP and Alaska should be even higher than that of EPA's analysis as corrected for HI. The Hg budgets for HCCP and Alaska should be no less than 0.015 tpy, or 30 lb/yr, in 2010 and 0.006 tpy, or 12 lb/yr, in 2018. This is based on a ratio of Alaska coal consumption (393,000 tons) for electric power compared to the U.S. as a whole (1,016,268,000) for 2004.

At the very least, the EIA data illustrate that the HCCP and Alaska Hg budget does not reflect the current trend of energy production in Alaska, as well as Alaska's percentage of U.S. electric utility generation as a whole. The commenters provided information showing Alaska coal consumption for electric power indicates an increase of 15 percent from 2003 to 2004 alone (342,000 tons to 393,000 tons), a rate of increase far greater than all other States and regions except Delaware (which is nearly the same as Alaska). The proposed Hg limit severely restricts, if not prevents altogether, the future development of coal-fired utilities in Alaska. Under 40 CFR 60.4142(c)(1), EPA requires each State to set aside 5 percent (beginning in 2010) and 3 percent (beginning in 2018) of the State's existing budget for new EGUs. Because EPA's proposed budget for Alaska is based solely on HCCP and does not take into account the impact to HCCP of a set-aside of the allowed emissions for other facilities, this could further whittle away at the already miniscule Hg budget for Alaska. Any reduction of the proposed limit to provide a set-aside for other facilities would jeopardize the ability of HCCP to operate. Thus, any budgets developed for Alaska by EPA that are based on the unit allocation for HCCP must be increased by 5 percent beginning in 2010 and by 3 percent beginning in 2018 in order to allow HCCP to operate.

In addition, the commenters conducted a comparison of the coal consumption data by electric utilities (provided by EIA) to EPA's Hg allocations by State. The comparison demonstrates that the Hg allocations track the coal consumption by electric utilities very well. More importantly, however, it also illustrates that the Hg allocations to Alaska, Maine, and New Mexico are severely underallocated.

The commenters also reviewed the 2003 and 2004 coal production data provided by EIA. These data indicate that Alaska's coal production in 2004 was 1,512,000 tons, or 0.14 percent of the U.S. total. By contrast, Alaska was allocated only 0.01 percent of the U.S. Hg budget for Phase I. This further demonstrates that Alaska's Hg budget is insufficient. Given that the coal consumed by electric utilities in Alaska is produced in Alaska, the underallocation of Hg is particularly harsh for the State. This has additional ramifications when it is considered that Alaska had the highest increase in coal production of any State (40 percent) in 2004, nearly three times that of any other State in the U.S.

Moreover, Alaska has some of the largest coal fields in the world and has a need for coal-fired power in the face of declining commercially accessible gas fields. It is unreasonable to effectively shut down coal-fired power generation in Alaska at the outset, as the existing budgets would do, due to a flawed analysis and by an allocation based on a single facility using clean coal technology. Coal-fired power generation in Alaska requires an emissions limit that is magnitudes above the currently proposed limit of 0.005 tpy, or 10 lb/yr, reduced to 0.002 tpy, or 5 lb/yr, in 2018 and thereafter.

<u>Response</u>:

EPA has added the heat input values for Healy Unit #1 reported by the commenter, and made the appropriate adjustment to State budgets. However, EPA is not making any corrections for HCCP (i.e., Healy Unit #2). Although the commenters note that HCCP was operating in a *test phase in 1999, and, thus, not at potential capacity, the commenter notes in its comment letter that HCCP has not operated since 1999, but is scheduled to operate at a higher capacity starting in 2007. EPA can not adjust the heat input value for HCCP based on this information. EPA calculated State budgets based on historic heat input for all units, not potential or projected heat input. EPA cannot treat any units with exception on this matter.*

The original CAMR State budgets and the revised State budgets based on the addition of the Healy Unit #1 heat input data are provided in Table 7. State budgets that change as a result of this revision are highlighted. Because of the small total adjustment and the digit at which the budgets are rounded, only six other State budgets are affected.

Table 7. Original and Revised CAMR State Budgets.

	2010		***2015***	
	Original CAMR	***Revised***	***Original CAMR***	***Revised***
Alaska	*0.005*	*0.010*	*0.002*	*0.004*
Alabama	*1.289*	*1.289*	*0.509*	*0.509*
Arkansas	*0.516*	*0.516*	*0.204*	*0.204*
Arizona	*0.454*	*0.454*	*0.179*	*0.179*
California	*0.041*	*0.041*	*0.016*	*0.016*
Colorado	*0.706*	*0.706*	*0.279*	*0.279*
Connecticut	*0.053*	*0.053*	*0.021*	*0.021*
Delaware	*0.072*	*0.072*	*0.028*	*0.028*
Florida	*1.233*	*1.232*	*0.487*	*0.487*
Georgia	*1.227*	*1.227*	*0.484*	*0.484*
Hawaii	*0.024*	*0.024*	*0.009*	*0.009*
Iowa	*0.727*	*0.727*	*0.287*	*0.287*
Illinois	*1.594*	*1.594*	*0.629*	*0.629*
Indiana	*2.098*	*2.097*	*0.828*	*0.828*
Kansas	*0.723*	*0.723*	*0.285*	*0.285*
Kentucky	*1.525*	*1.525*	*0.602*	*0.602*
Louisiana	*0.601*	*0.601*	*0.237*	*0.237*
Massachusetts	*0.172*	*0.172*	*0.068*	*0.068*
Maryland	*0.490*	*0.490*	*0.193*	*0.193*
Maine	*0.001*	*0.001*	*0.001*	*0.001*
Michigan	*1.303*	*1.303*	*0.514*	*0.514*
Minnesota	*0.695*	*0.695*	*0.274*	*0.274*
Missouri	*1.393*	*1.393*	*0.550*	*0.550*
Mississippi	*0.291*	*0.291*	*0.115*	*0.115*
Montana	*0.378*	*0.377*	*0.149*	*0.149*
Navajo Nation	*0.601*	*0.600*	*0.237*	*0.237*
North Carolina	*1.133*	*1.133*	*0.447*	*0.447*
North Dakota	*1.564*	*1.564*	*0.617*	*0.617*
Nebraska	*0.421*	*0.421*	*0.166*	*0.166*

New Hampshire	*0.063*	*0.063*	*0.025*	*0.025*
New Jersey	*0.153*	*0.153*	*0.060*	*0.060*
New Mexico	*0.299*	*0.299*	*0.118*	*0.118*
Nevada	*0.285*	*0.285*	*0.112*	*0.112*
New York	*0.393*	*0.393*	*0.155*	*0.155*
Ohio	*2.056*	*2.056*	*0.812*	*0.812*
Okalahoma	*0.721*	*0.721*	*0.285*	*0.285*
Oregon	*0.076*	*0.076*	*0.030*	*0.030*
Pennsylvania	*1.780*	*1.779*	*0.702*	*0.702*
South Carolina	*0.580*	*0.580*	*0.229*	*0.229*
South Dakota	*0.072*	*0.072*	*0.029*	*0.029*
Tennessee	*0.944*	*0.944*	*0.373*	*0.373*
Texas	*4.657*	*4.656*	*1.838*	*1.838*
Utah	*0.506*	*0.506*	*0.200*	*0.200*
Ute Indian Tribe	*0.060*	*0.060*	*0.024*	*0.024*
Virginia	*0.592*	*0.592*	*0.234*	*0.234*
Washington	*0.198*	*0.198*	*0.078*	*0.078*
Wisconsin	*0.890*	*0.890*	*0.351*	*0.351*
West Virginia	*1.394*	*1.394*	*0.550*	*0.550*
Wyoming	*0.952*	*0.952*	*0.376*	*0.376*
Total	*38.000*	*38.000*	*15.000*	*15.000*

Comment:

Several commenters (6502, 6487, 6488, 6578, 6588, and 6650) requested EPA remove Alaska from the cap-and-trade program. If Alaska remains in the cap-and-trade program, the commenter requested an increase in the Alaska State trading budget by 0.021 tons to provide for anticipated growth. EPA clearly has the authority to exempt Alaska from the requirements of the cap-and-trade program. First, Alaska's demographics and the lack of interconnected distribution system throughout the State mean that coal plants typically are much smaller than those constructed in the lower States. Second, EPA has identified FGD scrubbers and SCR as "proven technologies" for the initial Hg control strategy. However, these technologies have never been proven to be technologically or economically effective for the size and location of coal plants expected in Alaska. EPA has previously exempted certain facilities in Alaska from NSPS requirements based on technological or economic feasibility.

If EPA decides not to exempt Alaska, then an increase in the Hg budget for the State is imperative. A State budget based on historical use of coal disfavors States with relatively low installed coal burning capacity and undeveloped coal resources – such as Alaska – and will effectively outlaw new coal-fired generating capacity because there is disincentive for States to trade. The commenters added that under the cap-and-trade program, Hg allowances could be available from other States. In its final CAMR, EPA, however, provides no assurances that allowance trading will occur or that States will participate in the program. A recent survey by an Alaska utility interested in constructing a new coal fired power plant has confirmed that neither surveyed States nor surveyed coal fired plants in the lower 48 States anticipate they will have credits available and likely would not opt into the interstate trading program, if and when they did. Many States, particularly States with larger Hg allowance budgets, will likely choose not to participate in the cap-and-trade program. Instead, these States will likely choose to retain their Hg allowances as a means to ensure that new coal-fired generation locates within their borders, thereby retaining a fundamental industrial base in that State. With interstate trading unlikely combined with an extremely low budget, the program essentially bans the planning and construction of new coal fired, generating plants in Alaska. The location of electrical generation facilities is of less concern in the contiguous 48 States because electricity can be readily transmitted among the States. However, this transmission network does not reach Alaska.

The commenter stated that if States choose not to participate in the Hg cap-and-trade program, Alaska could be effectively barred from obtaining electrical power from coal-fired generation because Hg allowances will not be available. This result would be particularly ironic given that EPA does not reasonably anticipate the Hg emissions from units located in Alaska (or Hawaii and the U.S. Territories) pose hazards to public health. EPA has already determined that there are no public health reasons for the CAMR cap-and-trade rule to apply in Alaska.

The CAMR cap-and-trade program was modeled after the Acid Rain Program. Congress instituted a number of safeguards especially for sources in States with lower installed capacity and expected higher rates of growth. These safeguards included:

- A holdback of allowances for auction;
- Bonus allowances to accommodate growth in “clean” States; and
- Fixed price allowances especially for new plants.

EPA has provided none of the safeguards and safety valves in place under the Acid Rain Program. The resultant negative effect in Alaska of an extremely low Hg budget compounded with a lack of safeguards is magnified by the comparatively small plants with a reduced scale of economy for purchase of Hg credits. Although EPA did include in its model rule a new source set-aside, it provided no assurances that such allowances will be created by States. More important, for Alaska with 10 lb and 4 lb allotted in 2010 and 2018, respectively, a set-aside is effectively meaningless.

The commenters stated that Alaskan electric utilities are currently planning for new EGU equipment to replace existing, aging equipment and to increase overall generating capacity and reliability. As part of this planning process, these utilities are evaluating the use of coal-fired generation as a possible option to provide this new capacity. However, the commenters have determined that Hg allowances may not be available for this electrical generation because of Subpart HHHH. The Alaska State Hg trading budget for phase I is 0.005 tons per year of Hg. This budget is inadequate for the existing affected coal-fired generation in Alaska because the budget determination did not include both Hg Budget units located in Alaska. As a result, obtaining enough Hg allowances from the Alaska budget to accommodate new coal-fire generation does not appear to be feasible. Current estimates by Alaska utilities are that approximately 1,000 MW of new generation will be constructed in Alaska to replace existing, aging equipment and to meet the increase in electrical demand. Most current generation is gas; however, natural gas prices have risen and reserves are becoming scarce.

Based on a typical coal Hg content of 0.0812 parts per million by weight (ppmw) for Alaska Railbelt coal and optimistically assuming a Hg emission control efficiency of 90 percent, a Hg allowance allocation of 0.021 tons per year would be required. To meet this need, the commenters request that the Alaska State trading budget be increased by 0.021 tons to provide for anticipated growth in electrical generation capacity. The commenters' request is consistent with the U.S. Congress and EPA's past recognition of the differences between Alaska and the contiguous 48 States. This recognition is reflected in many air quality programs, such as the decision to exclude Alaska from the Acid Rain Program (because Alaska has an isolated electric grid and utilities), the special provisions for Alaska in the Ultra Low Sulfur Diesel (ULSD) Program, EPA's proposal to exclude certain areas of Alaska from the requirements of 40 CFR part 60, subparts EEEE and FFFF, and EPA's decision to limit the applicability of 40 CFR part 63, subpart YYYY, in certain areas of Alaska. All of these decisions were based on unique situations that are not encountered in the contiguous 48 States. Alaska has never engaged in interstate power pooling that Congress envisioned would be a model for allowance trading. The commenters anticipate that EPA will continue to recognize the uniqueness of Alaska in the reconsideration of the State EGU Hg budget and make the changes requested above.

The State of Alaska relied upon recent hair and blood biomonitoring to renew the consensus dietary recommendations that all Alaskans, including pregnant women, women who are breast-feeding, women of child bearing age, and young children continue unrestricted consumption of fish from Alaskan waters. The U.S. Food and Drug Administration (FDA) has acknowledged that Hg levels in Alaska fish are far below the average levels upon which the FDA issued their national fish advisories on January 25, 2001. There is no compelling reason to require control of Hg emissions in the State of Alaska.

<u>Response</u>:

Although EPA does have the authority to exclude particular units from an NSPS based on technological or economic feasibility, it does not have the authority to exempt Alaska, or any other State or Territory from CAMR. CAMR was promulgated under the authority of CAA §§111(b) and 111(d). Rules promulgated under the authority of those sections apply to categories of sources located in States. CAA §302(d) defines the term "State" as "a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, and American Samoa and includes the Commonwealth of the Northern Mariana Islands". Commenters have not provided any information that leads EPA to conclude that it is either technologically or economically infeasible for electric generating units located in Alaska to comply with CAMR.

Even if EPA had the authority to exempt Alaska from CAMR, it does not believe that it would be appropriate to do so. As noted in the preamble to the final CAMR, achieving Hg reductions nationwide is wholly consistent with the Agency's mission to leverage the monies spent domestically on global reductions of anthropogenic Hg emissions. As explained elsewhere in the final CAMR preamble and the supporting docket, in order to significantly impact *nationwide Hg deposition and, thus, human exposure to MeHg, the U.S. must be a leader in incentivizing global Hg emissions reductions.*

The ability of States to participate in an interstate trading program will allow for the continued growth of coal-fired electricity generation. EPA believes that there will be a viable allowance market with allowances available for purchase for compliance. As noted elsewhere in this document, EPA has added the heat input values for Healy Unit #1 reported by the commenters, and made the appropriate adjustment to State budgets.

Commenter's statement regarding the State of Alaska's renewal of the consensus dietary recommendations was lifted from the State of Alaska websites http://www.epi.hss.state.ak.us/bulletins/docs/b2002_11.htm and http://www.epi.hss.state.ak.us/bulletins/docs/b2005_05.pdf. The referenced biomonitoring/fish tissue data and assessment methodology represent Alaska's findings and recommendations and have not been reviewed by EPA. Furthermore, the 2004 joint FDA/EPA national Hg advisory (which replaced the 2001 advisory) relied on EPA's RfD as the basis for the joint advisory – as opposed to any other basis that may have been used by FDA in 2001.

The commenters state that SCRs and scrubbers "have never been proven to be technologically or economically effective for the size and location of coal plants expected in Alaska," presumably because "coal plants typically are much smaller than those constructed in the lower States" and the fact that the climate in Alaska, particularly in winter, is cold. However, commenters have not provided information to support their claim nor to indicate that such controls would not be equally effective on Hg in Alaska as they are in other States. Further, available information (<u>see</u> http://www.epa.gov/airmarkt/epa-ipm/needs_2004.xls) indicates that SCR is being installed on coal-fired units with an electrical generating capacity as small as 10 MW (a facility in Montana) and both wet and dry FGD systems are installed on coal-fired EGUs in Montana and North Dakota, States known for their cold winters.

<u>Comment</u>:

Commenter 6639 requested EPA to authorize a variance for Alaska from the phase I Hg cap rules. This variance should allow for construction of new coal-fired facilities with the understanding that as feasible technology becomes available, these facilities would purchase allowances from utilities in other States, as well as apply this technology to their own facilities. This program of issuing variances could be administrated either by EPA or the State of Alaska's Department of Environmental Conservation. The target would be to have all large coal-fired utilities in Alaska under the cap by 2018, as required by the regulation.

This approach meets the long-term objective of capping and ultimately reducing emissions of Hg from coal-fired utilities nationwide. It also allows continued planning for new utility facilities in Alaska in a logical manner. It should be noted again that Alaska is a large State in size and that facilities will likely be spread over vast distances that would prevent the significant build up of Hg concentrations in any location, especially given that the request for the waiver is only for operations until 2018.

Response:

EPA does not believe that it is appropriate to provide a variance for new sources in Alaska that would provide temporary exemption from the requirements of CAMR. The ability of States to participate in an interstate trading program will allow for the continued growth of coal-fired electricity generation. EPA believes that there will be a viable allowance market with allowances available for purchase for compliance. As noted elsewhere in this document, EPA has added the heat input values for Healy Unit #1 reported by the commenters, and made the appropriate adjustment to State budgets.

2.1.1.3 Idaho

Comment:

Several commenters (6451, 6452, 6453, 6454, 6463, 6464, 6465, 6466, 6467, 6468, 6469, 6470, 6483, 6517, 6522, 6525, 6638, 6656, 6657, 6659, 6660, 6661, and 6663) requested a voluntary cap-and-trade program for Hg emissions for the States. They also believe it is imperative that the cap for Idaho remain at zero to prevent further Hg contamination in that area. Several other commenters agreed with this statement but added that the cap-and-trade program should be voluntary and not a mandated standard for the States. Some of the commenters believe that Idaho's Department of Environmental Quality (IDEQ) should not participate in the Federal program of Hg reconsideration. These commenters want to continue to prohibit coal-fired power plants from being built in Idaho.

Response:

Participation in the EPA-administered CAMR cap-and-trade program is not a requirement; however, if a State opts not to participate in the EPA-administered program, Hg emissions in that State must not exceed its emissions budget as assigned by EPA through the rule. Note that final CAMR State budgets are presented in this document in Section 2.1.1.2.

Comment:

Commenter 6579 stated that at the time the notices were published, the IDEQ was in the process of gathering public comments on the proposal to opt into the cap-and-trade program by State rule. As a result of the notices and hundreds of comments, IDEQ elected to put promulgation of the rule on hold until the reconsideration issues are finally addressed, and then commence a negotiated rulemaking. If the reconsideration issues are finally resolved within the next six months, then the earliest the rulemaking could be accomplished and presented to the Idaho legislature for approval would be at the end of the 2007 legislature – sometime in March or April 2007. Consequently, assuming a six month finalization of the reconsideration, the commenter requests that the November 17, 2006, deadline for SIP submittal be extended until June 2007. If the reconsideration issues are not finally resolved within six months, then the commenter requests the due date be even further extended, the commenter seeks a response as to whether a State could opt in to the cap-and-trade program at a later date. If the State could opt in at a later date, then when must an affected source demonstrate to IDEQ that they hold allowances equal to their emissions to ensure Idaho meets applicable deadlines to demonstrate compliance with our zero emissions budget?

Response:

EPA is maintaining the State Plan submission deadline that was specified in the Final CAMR (70 FR 28606), which is November 17, 2006. EPA believes that this is necessary for timely implementation of the emissions reduction requirements of CAMR by 2010 and the development of a successful cap-and-trade program.

2.1.2 Definition of "Designated Pollutant" Under 40 CFR 60.21

Comment:

Commenters 6276 and 6633 stated that it is unlawful to apply CAA §111(d) to HAP listed pursuant to CAA §112. Before the final rule, EPA explained that CAA §111(d) only applied to "designated pollutants," and that HAP listed pursuant to CAA §112 could not be considered "designated pollutants." In particular, 40 C.F.R. §60.21(a) previously defined "designated pollutant" to mean "any air pollutant, emissions of which are subject to a standard of performance for new stationary sources but for which air quality criteria have not been issued, and which is not included on a list published under section 108(a) or section 112(b)(1)(A) of the Act." In turn, CAA §112(b)(1)(A) was, before the 1990 Amendments, the provision under which HAP were listed for regulation;[279] today, the list of pollutants to be regulated is contained in CAA §112(b)(1). Based on this statutory and regulatory structure, EPA has explained that CAA §111(d) is unavailable for listed HAP:

> Section 111(d) of the CAA allows EPA to approve state plans to regulate emissions from existing sources of "designated pollutants," i.e., pollutants not listed as criteria pollutants under CAA section 108(a) nor as hazardous air pollutants (HAP) under section 112(b)(1), but to which a standard of performance for new sources applies under section 111.[280]

EPA has explained the scope of CAA §111(d) similarly on numerous occasions.[281]

In previous comments, the commenters have pointed out that EPA's prior understanding of the CAA and the Agency's regulations conflicted with its desire – in the present rulemaking – to regulate power plants' Hg emissions under the authority of CAA §111(d).[282] EPA's response was to change its regulations in the final rule without proposing such amendments. Specifically, EPA stated:

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[279] See 42 U.S.C. §7412(b)(1)(A) (1990) ("The Administrator shall, within 90 days after December 31, 1970, publish (and shall from time to time thereafter revise) a list which includes each hazardous air pollutant for which he intends to establish an emission standard under this section.").

[280] See 70 FR 9872-3 (March 1, 2005)

[281] See, e.g., 66 FR 67096 (December 28, 2001); 66 FR 48355 (September 20, 2001); 65 FR 16323-4 (March 28, 2000).

[282] See OAR-2002-0056-5762.

> We recognize that we may have made statements concerning section 111(d), since the 1990 Amendments, but those statements did not recognize or account for the two different amendments to section 111(d), as enacted in 1990. We are also amending 40 CFR 60.21, as part of the final CAMR. That regulation, which was promulgated in 1975, interprets the 1970 CAA and defines a "designated pollutant" for purposes of section 111(d), as excluding any pollutant that is listed on the section 112(b)(1)(A) list. There is no section 112(b)(1)(A) in the current act, as amended in 1990. We are therefore revising 40 CFR 60.21 because it does not reflect the current language of section 111(d), as amended in 1990.[283]

In other words, EPA's final cap-and-trade rule changed the definition of "designated pollutant" to include any pollutant "that is on the §112(b) (1) list and is emitted from a facility that is not part of a source category regulated under §112,"[284] without offering the public prior notice or an opportunity to comment. EPA's reopened CAMR now seeks comment on the changed rule text.

The commenters stated that it is unlawful – that is, it is contrary to the text, larger context, and structure of the Act – to regulate listed HAP under CAA §111(d). For that reason, EPA must rescind the regulatory change to 40 C.F.R. §60.21 upon the completion of reconsideration.

Response:

As explained in the January 30, 2004 NPR (69 FR 4652), both the House of Representatives and Senate amended CAA §111(d) in 1990 and both amendments were enacted into law. In the NPR, EPA interpreted the two different amendments to CAA §111(d) and solicited comment on its interpretation. EPA then finalized its interpretation of the conflicting House of Representatives and Senate amendments to CAA §111(d) on March 15, 2005. EPA's interpretation is set forth, in full, in the final action revising EPA's December 2000 appropriate and necessary finding and removing Utility Units from the CAA §112(c) list (see 70 FR 15994; the Section 112(n) Revision Rule). EPA incorporated its interpretation of CAA §111(d) into CAMR by reference to the final Section 112(n) Revision Rule. EPA also explained in CAMR that it was revising the term "designated pollutant" at 40 CFR 60.21 because that definition was promulgated in 1975 and interpreted the 1970 CAA, not the 1990 CAA. The revisions to the term "designated pollutant" in the final CAMR reflect EPA's interpretation of the conflicting amendments to CAA §111(d) enacted in 1990, which EPA both proposed and finalized. Based on EPA's interpretation of the conflicting amendments, 40 CFR 60.21, as promulgated in 1975, was no longer valid.

The commenters argue that EPA must rescind the amended definition of designated pollutant, as contained in the final CAMR, because they disagree with EPA's interpretation of the conflicting amendments set forth, in full, in the Section 112(n) Revision Rule and incorporated by reference into CAMR. EPA did not re-open for reconsideration its

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[283] See 70 FR 15994, 16032 n. 63 (March 29, 2005); see also 70 FR 12591-2 (March 15, 2005) ("correcting" March 1, 2005 notice and stating that "[t]his summary of CAA section 111(d)(1) is inaccurate and incomplete.").

[284] See 70 FR 28649 (to be codified at 40 C.F.R. §60.21(a)).

interpretation of the conflicting amendments. Rather, the sole issue referred to by the commenter that EPA re-opened for reconsideration is whether the amended definition of "designated pollutant" is consistent with EPA's interpretation of the conflicting amendments to CAA §111(d), and the commenters provide no input on this issue. <u>See</u> *70 FR 62,215. In addition, commenters' reliance on prior EPA statements concerning 40 CFR 60.21, as promulgated in 1975, is unavailing, because EPA explained in the final Section 112(n) Revision Rule that those statements did not recognize or account for the two different amendments to CAA §111(d) enacted in 1990.*

<u>Comment</u>:

Commenter 6476 noted that, the changes to the definition of a "designated pollutant" first appeared in EPA's final CAMR. They were not presented in EPA's proposed rule or supplemental notice. The commenter believes that the changed definition of "designated pollutant" could hardly have surprised any commenter. The definition of "designated pollutant" contained in the final rule simply implements EPA's legal analysis on the best way to interpret two conflicting amendments to CAA §111(d) found in the 1990 CAA Amendments. EPA presented its analysis in the preamble to the proposed rule and commenters had adequate opportunity to express their agreement or disagreement with it.[285] The commenter agreed with EPA's conclusion that the best way to reconcile the two provisions was to conclude that when a source category is regulated under CAA §112, a CAA §111(d) standard of performance cannot be established to address any HAP emitted by that source category.[286] Because EGUs are subject to CAA §112 regulation only if EPA makes the requisite "appropriate and necessary" finding under CAA §112(n) (1) (A), EPA was free to conclude that it would regulate Hg emissions from coal-fired power plants under CAA §111 instead of CAA §112. The definition of "designated pollutant" is legally appropriate and should not be changed.

<u>Response</u>:

EPA agrees with Commenter's analysis that its interpretation of the conflicting amendments is reasonable and that the revision to the definition of "designated pollutant" is appropriate based on that interpretation.

<u>Comment</u>:

Commenter 6612 stated CAA §111 was not developed to regulate HAP, and hence, a HAP has never been regulated under it. CAA §112 was developed to regulate HAP and contains provisions to protect public health from air toxics. Expanding the definition of "Designated Pollutant" under CAA §111 to try and cover HAP (after the fact) is not acceptable and has no basis in the CAA.

<u>Response</u>:

As explained above, the sole issue raised by the commenter that EPA re-opened for

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[285] <u>See</u>, e.g., OAR-2002-0056-3459, at III-1.
[286] <u>See</u> UARG Comments, at 129-31.

reconsideration is whether the amended definition of "designated pollutant" is consistent with EPA's interpretation of the conflicting amendments to CAA §111(d), as set forth in full in the final Section 112(n) Revision rule. The commenters provide no input on this issue. See 70 FR 62215. Moreover, although it is true that EPA has not previously regulated HAP emissions pursuant to CAA §111, EPA does not believe, based on its interpretation of the conflicting amendments to CAA §111(d) enacted in 1990, that it is precluded from doing so in appropriate circumstances. As explained above, EPA amended the definition of the term "designated pollutant" in the final CAMR to reflect EPA's interpretation of the conflicting amendments to CAA §111(d) that were enacted in 1990. Based on EPA's interpretation of these conflicting amendments, 40 CFR 60.21, as promulgated in 1975, was no longer valid.

2.1.3 EPA's Subcategorization for Subbituminous Coal-Fired Units in the Context of the New Source Performance Standards (NSPS)

Comment:

Commenter 6476 noted that EPA's proposal to modify the criterion for subcategorizing subbituminous units is reasonable and the commenter supports the change. The availability of an adequate water supply can affect the design of a coal-fired EGU, including whether a wet or dry scrubber is installed. A wet scrubber uses almost twice as much water as does a dry scrubber. This water usage is lost to the atmosphere during the scrubbing process. In water-constrained areas, water loss is an important design consideration because water is, by definition, a relatively scarce resource.

At a coal-fired EGU, the most-important water usage equipment is the cooling system the plant employs. As provided by the commenter, once-through cooling systems are used in locales with "abundant" water supplies; recirculating cooling systems are used in locations with limited water supplies. The type of cooling system used at a given facility is a good indicator of water availability. The commenter believes that the dividing line EPA has chosen for subcategorizing subbituminous units under §111(b) - 25 inches of rain per year (in/yr) - matches fairly closely the dividing line between where companies install a once-through cooling system or a recirculating system. Thus, EPA's choice of 25 in/yr as a subcategorization criterion is reasonable and comports with current industry design practices.

Commenter 6476 further noted that State petitioners object to EPA's subcategories. However, §111 "does not set forth the weight that be should assigned to each of these factors, [and courts have] granted the agency a great degree of discretion in balancing them." For decades, EPA has established NSPS subcategories based upon fuels and other considerations such as boiler equipment, just as it has done in CAMR. For example, EPA historically used its authority to set different NO_x NSPS for various coals (bituminous, subbituminous, lignite) and boiler designs for Subpart Da utility boilers. Yet it was also "within EPA's discretion to issue uniform standards for all utility boilers, rather than adhering to its past practice of setting a range of standards based on boiler and fuel type."

Commenter 6559 continues to strongly support subcategorization by coal type, and further supports the subcategorization by BDT for wet- and dry-FGD for subbituminous coal.

The absence of water in the West is a critical consideration in the development of any coal-fired EGU, including IGCC plants or coal-to-liquids facilities.

Commenters 6557 and 6560 believe that the finalized CAMR NSPS subcategories were appropriately based on the different types of coal that are used in different types of generating equipment.

Commenter 6477 supports EPA's proposed emission limits for new units to reflect the installation of dry flue gas desulphurization (FGD) systems in arid areas that, on average, receive less than 25 in/yr of precipitation. Conversely, in wetter areas of the country, EPA proposed emission limits that reflect the installation of wet FGD. Due to the general scarcity of water in the western States, new units will most likely choose dry scrubbing technology. Therefore, EPA is appropriately acknowledging the lower Hg removal efficiency as a co-benefit of dry FGD technology.

Several commenters (6459, 6461, and 6611) stated that electric cooperatives are users of all major coal types and continue to support EPA making full use of categories and subcategories to adequately address differences in abilities to reduce Hg based on such things as coal chemistry that varies with coal type. The commenter believes that subcategorizing standards for new units must reflect the level of emissions reductions that are practical and attainable in each subcategory using the wide range of coal in each rank. They must be set at levels that are achievable by new units – even though, as EPA states, new source limits are of short-term value because the CAMR Hg caps will ultimately limit Hg emissions. They must also reflect best "similar" source performance under the worst reasonably foreseeable circumstances. To fully understand the capabilities of the best performing plants, EPA must consider not only the fuel variability that may be used at the new facility, but also the variability from other causes such as sampling and monitoring, and plant operation.

The commenters state that, regarding existing units, there is no one fuel in sufficient quantities and availability that can be used by all parties. Care must be taken to ensure that mandatory reductions in Hg emissions do not lead to loss of fuel diversity, higher energy prices, or a strain on electric reliability; all of which are inconsistent with sound energy policies. Also, cooperatives strongly believe that fuel switching is not a reasonable or practical alternative for many units to meet the new emission limits. Fuel switching implicitly favors certain fuel types and sources over others. Also, in many cases, plants cannot readily switch and, therefore, may have no option but to shut down. This result is inconsistent with the goals of the CAA.

Response:

EPA agrees that the subcategorization approach described in the October 2005 reconsideration notice is appropriate.

Comment:

Commenters 6479, 6577, and 6633 stated that the subcategorization regulatory approach results in a situation where the established limits are not based on BDT, which is contrary to

CAA §111. As a result of the requirements of CAA §111, EPA is required to promulgate a rule with NSPS limits based upon BDT and reflecting the best technological system of continuous emission reduction. Subcategorization based on technology defeats the very purpose of establishing NSPS limits, because those limits would not be based on the best system of emission reduction. Commenters 6479 and 6633 contend that the resulting subcategorization scheme was, therefore, unlawful both because it led to NSPS that did not reflect BDT for the industry, and because, taken to its logical conclusion, it would achieve absurd results that could not have been intended by Congress, as it "could result in separate standards for every possible type of emission reduction system, a clear violation of the plain meaning and congressional intent behind the definition of standard of performance in CAA §111." Commenters 6479 further state that EPA has previously acknowledged that it is legally impermissible to subcategorize based on technology. Commenter 6577 believes that it is fundamentally unreasonable for the Agency to promulgate a rule with different NSPS standards for different types of systems of emission reduction.

Commenters 6633 stated that rather than take the opportunity presented by this reopened rulemaking to correct the deficiencies in its final NSPS, EPA has instead chosen to deny that it actually adopted the alleged approach on the one hand, while on the other hand, issuing a "revised" subcategorization scheme for one coal rank that makes clear the illegal nature of the entire scheme. EPA states first that, although the final "subcategories for subbituminous coal-fired units...appear to be based on the type of pollution control device used it was not [EPA's] intent to subcategorize on the basis of control technology." Instead, EPA now asserts that it would like to expand the basis for the two subcategories of subbituminous units to include whether there is sufficient water available to run a specific control technology in a specific location on a subbituminous unit. Of course, and in fact, that assertion proves the original point, namely that the subcategorization scheme was and continues to be based on control technologies available for specific coal ranks. According to the commenter, EPA does not offer any reason for subcategorizing based on the weather apart from its relationship to the kinds of controls that are typically used in such areas. Further, the commenter believes that EPA's circular backpedal has led it right back to the place from which it started – an illegal subcategorization scheme based on control technology.

Commenters 6479 stated that EPA's use of regional rainfall as a determinative factor in setting NSPS limits for EGUs is arbitrary and capricious. EPA has included a new factor in assessing best demonstrated technologies for certain units burning subbituminous coal: a determination of control type based on regional rainfall. The commenter believes that this factor is simplistic and without foundation, because water availability is more dependent on the suitability of local water bodies than on regional rainfall. In fact, a number of existing subbituminous-fired units in regions of the U.S. receive, on average, less than 25 in/yr precipitation. These units, their reported locations, and the commenter's estimates of the average precipitation at that location, are as follows:

- San Juan: San Juan County, NM (<15 in/yr)

- Laramie River: Platte County, WY (<25 in/yr)

- Jim Bridger: Sweetwater County, WY (<10 in/yr)
- Craig: Moffat County, CO (<20 in/yr)
- Coronado: Apache County, AZ (<15 in/yr)

The commenter stated that the existence of these subbituminous coal-burning units that already employ the technology that EPA has determined to be unavailable to them highlights the arbitrary nature of using mean annual precipitation as a gauge for determining NSPS limits. In fact, the regional rainfall standard used by EPA essentially draws a line down the middle of the country, subjecting EGUs in much of the western half of the country to a looser NSPS standard than those in the East, regardless of their location on or nearby the many water bodies that are found in that half of the country. Furthermore, the commenter believes that the entire analysis of water availability is irrelevant to a BDT determination in light of the high Hg removal effectiveness demonstrated for the combination of a dry scrubber, activated carbon injection (brominated for low chlorine-content coal), and FF.

Commenter 6509 stated that regional rainfall should not be used as a basis for assigning Hg control stringency.

<u>Response</u>:

EPA reiterates that the subcategorization of subbituminous coal-fired units is based on its consideration of the non-air quality environmental impacts arising from the limited availability of water in some areas of the country. CAA §111 explicitly authorizes EPA to consider such factors in establishing NSPS. In this particular case, the availability, or lack thereof, of water also directly affects the achievability of the NSPS. Subbituminous coal-fired units with access to an adequate supply of water can achieve a greater reduction in Hg emissions than can units without such access. The subcategorization scheme merely reflects this reality.

EPA notes that the subcategorization scheme for subbituminous coal-fired units is for new (including modified and reconstructed) sources, not existing sources. These new units will be competing with other uses for the limited supply of water available in certain areas. As a result, the constraints that will be placed on such new units in this regard are far greater than those that may, or may not, have been placed on existing units. The fact that some existing sources in the West that currently have wet scrubbers installed could, if new, qualify for the "dry" NSPS limit is not material to the design considerations for a new facility. EPA acknowledges that some new units that may be built in areas that would allow them to qualify for the "dry" NSPS may, nevertheless, have access to a sufficient supply of water to use a wet FGD device, but believes that this will generally not be the case. Given the demand on the water supply in these areas, EPA believes that it will be increasingly more difficult for new units locating in such areas to obtain access to a water supply sufficient to facilitate the use of wet FGD. EPA also believes that using the available water in such areas to operate a wet FGD system is not the best use of this limited resource. The phase I and II caps will drive additional emissions reductions where doing so is economical.

Although EPA agrees that annual precipitation is not the only factor involved in water availability, absent other information, EPA believes that the approach taken is confirmed by the design considerations noted by commenter 6476. Commenters 6479, 6509, 6577, and 6633 have not provided any suggestions for a workable alternative to the approach taken by EPA.

Comment:

Commenter 6489 recognized EPA's intent in establishing two subbituminous coal subcategories. It agrees that EPA has recognized an important factor: if a specific control technology is not available to a specific subcategory of units, then the emission standard for that category must not be based on the performance of that control technology. In EPA's current rule, this consideration applies only to new units. Although not a factor in this rule, this distinction is even more critical for existing units that have already been constructed and, thus, have no option to relocate. However, the commenter argues that although trying to recognize the limitations of installing wet FGD in areas with limited water supply, EPA's decision does appear arbitrary.

EPA has subcategorized only subbituminous units based on water availability and not extended this practice to bituminous- and lignite-fired units. After a review of permits available at promulgation of CAMR, EPA concluded that all subbituminous coal-fired units located in the western portion of the U.S. are planning on utilizing dry FGD systems. EPA has not, however, recognized that sources may wish to build bituminous- or lignite-fired units in these same areas and would suffer the same water restrictions. If a wet FGD system is not available for a subbituminous coal-fired unit located in a certain area, then it is just as unavailable for a new bituminous- or lignite-fired unit located in that same area. Just because EPA did not identify any new projects proposing to use lignite or bituminous coal does not mean that sources may not wish to build them in the future. The commenter noted that there currently are several bituminous coal-fired units in the western U.S. that employ wet FGD systems. Subcategorizing new subbituminous coal-fired units based on water availability, but not subcategorizing new units burning bituminous or lignite fuels in this manner does appear arbitrary.

Commenter 6510 stated that the adverse environmental and economic impact of water consumption by electric utilities is not unique to subbituminous-fired units. The commenter agrees that water consumption by electric utilities in arid regions is a significant non-air quality environmental impact, and that curtailed availability of water during drought may limit the operational status of these utilities. However, the commenter found no evidence that the environmental impact of water consumption, or the potential for drought-related disruption to electricity supply, is related to the rank of coal that is burned. Instead, these adverse impacts are specific to arid geographic regions. Accordingly, the geographic location of a new unit should be the sole basis for subcategorization of the NSPS.

Response:

We do not think subcategorizing units burning bituminous and lignite coals on the basis of geographic location is warranted. CAA §111(b)(2) authorizes EPA to distinguish among *classes, types, and sizes within categories of new sources for purposes of establishing standards of performance. In this regard, we evaluated the need for subcategorization based on water availability for units firing bituminous, subbituminous, or lignite coals. Based on this evaluation, we determined that the emission limits associated with BDT for bituminous-fired units were generally the same whether those units were located in wet or arid regions. The same is true for lignite-fired units. As a result, we determined that it was unnecessary to subcategorize units firing bituminous and lignite coals on the basis of water availability as the standards for each subcategory would be identical.*

The same is not true for units burning subbituminous coal. The ICR data indicates that a FF achieves the greatest reduction in Hg emissions from EGUs burning subbituminous coal. Thus, the use of a FF is BDT for controlling Hg emissions from EGUs burning subbituminous coal. Based on the available information, and the exercise of its best engineering judgment, EPA does not believe that the use of a wet FGD device will have a negative impact on the ability of the FF to effectively reduce Hg emissions. The ICR data does, however, indicate that the use of a spray dryer system (i.e., a dry sulfur removal system) does have a negative impact on the Hg removal performance of the FF. As a result, EPA has determined that BDT for reducing Hg emissions from EGUs burning subbituminous coal is a FF in conjunction with wet FGD. EPA recognizes, however, that for new EGUs being built in arid areas, the use of wet FGD will not always be feasible due to restrictions on the availability of water in such areas. As a result, EPA has established two subcategories of EGUs burning subbituminous coal. Those subcategories are based on the availability, or lack thereof, of water, as reflected by the amount of rainfall a particular area receives. Although this basis for subcategorization is primarily intended to address concerns regarding the availability of water, EPA believes that it also accounts for a number of other factors, including geography. Commenters 6489 and 6510 have not provided any suggestions for a workable alternative to the approach taken by EPA.

Comment:

Commenter 6489 indicated that EPA’s use of mean rainfall may not be an accurate indicator of the availability of water for use with a wet FGD system. Annual rainfall in a year can be limited to specific times of the year and much of the year can remain relatively dry. Sources do not generally have the ability to collect and store large amounts of rainwater for use within their facilities. As a result, what really determines water availability is the proximity of a source to a large water body from which its can consistently withdraw water. These water bodies can include lakes, streams, or even oceans. In addition, a new source could be located close to a specific water source, but have the amount of water withdraw limited either by physical capacity of the stream, specific policy limitations (i.e. using the water for agricultural or other purposes), or even water quality issues. These restrictions are not necessarily limited to the western portion of the U.S. As a result, the totality of the limitations that make a wet FGD system unavailable to a new coal-fired source would not be recognized by simple subcategorization based on annual rainfall. Furthermore, EPA’s structure of the final rule does not include any language giving State and local permitting authorities discretion to make case-by-case judgments on this issue. As a result, it is not clear to the commenter that they would have that authority.

EPA should also recognize that although operation of an FGD system can consume large amounts of water, a cooling tower (depending upon size of the unit) likely consumes more water than the FGD system. As another gauge of water availability, EPA could look to see if a source has sufficient water available to support the installation of a cooling tower.

Response:

As noted above by commenter 6476, EPA's proposed criteria for establishing the "wet" vs. "dry" NSPS limit coincides with the selection of cooling system for the boiler, i.e., units that do not use cooling towers will generally be located in areas experiencing mean annual rainfall of less than or equal to 25 in/yr and, thus, will be eligible for the "dry" NSPS limit. Moreover, we disagree with the commenter to the extent it suggests that States should determine on a case-by-case basis which emission limit applies. States cannot alter the stringency of the emission limits applicable to new units other than to adopt a more stringent limit. Thus, only units located in areas with a mean annual rainfall of less than or equal to 25 in/yr are eligible for the "dry" NSPS limit and States cannot extend the availability of this limit to units located in areas which do not meet this criterion. A source is, however, free to employ any emission control regime it can demonstrate is capable of achieving the required reduction in emissions. A new bituminous or lignite coal-fired unit is, thus, free to use either a wet or a dry scrubbing system so long as the owner/operator can demonstrate that the system can achieve the required reductions.

Comment:

Commenter 6612 stated that Michigan has one EGU that burns subbituminous coal and has dry FGD. Michigan currently has no EGUs that burn subbituminous coal with wet FGDs. Dictating that EGUs have to have a wet versus a dry FGD based on mean annual precipitation is even more arbitrary and capricious than using a control device as a basis for subcategorization only. This does not appear to be an approach that will fix a perceived problem. There can be multiple reasons for an EGU choosing to install a dry FGD over a wet FGD for a new unit that are totally independent of rainfall (and Hg reduction). These include water availability and resource management from aquifers, surface water bodies, water quality for withdraw, and water quality of receiving waters for discharges from these units. Also, there are different technologies that can be employed for reducing Hg emissions from EGUs. EPA has dictated two co-benefit approaches in writing the NSPS for subbituminous coal the way it is proposed. Does this mean that units such as circulating fluidized beds (CFBs) that do not employ dry or wet FGDs for SO_2 reduction have no Hg NSPS, and emissions are, therefore, unlimited? The commenter is not in favor of the new approach as proposed.

Response:

FBC units (including CFB units) are considered to be "dry FGD" units and, therefore, would be subject to that NSPS emission limit. Further, EPA is not "dictating" what controls a given unit has to install. Rather, we have determined that subbituminous coal-fired units should be subcategorized based on water availability, and we have determined that an appropriate indicator for water availability is an annual precipitation greater than 25 in/year based on USDA 30-year data. We have further determined that a wet FGD system is BDT for *subbituminous coal-fired units located in areas with annual precipitation greater than 25 in/yr and a dry FGD system is BDT for subbituminous coal-fired units located in areas with annual precipitation less than or equal to 25 in/yr. Facilities are free, however, to utilize the control of their choice.*

Comment:

Commenter 6620 stated that EPA's proposal to revise its basis for subcategorization of new subbituminous coal-fired units is dependent upon whether the mean annual precipitation of the geographic area is more than 25 in/yr based on the USDA 30-year data. However, the proposed rule is unclear if these 30-year data are fixed or a rolling average. The proposal is also unclear as to its definition of "geographic area" when looking at rainfall totals to make determinations. As written, the geographic area could be interpreted to mean county, region of a State, Statewide, or even a broader area. The commenter indicated that EPA needs to provide clarification on these two issues for States to effectively enforce CAMR.

Response:

EPA's intent in this regard is to adhere to the parameters of the USDA's database and to use the most currently available data. The USDA data are currently available for the fixed period 1961 - 1990 and can, and for the purposes of the NSPS are to, be used down to the geographic area of an individual county. The new 1971 - 2000 Annual Precipitation map at 800 meter resolution can be viewed at http://mistral.oce.orst.edu/www/mapserv/NRCS-Review/. Monthly data for this time period should be available by early Summer 2006. Thus, it is EPA's intent that the geographic area be the county or counties in which the unit is to be located and that the data used in making the determination be for the most recently publicly available time period (currently 1961-1990 but 1971-2000 later in 2006). The 30-year data period is fixed (i.e., not a rolling average) and the data period is updated every 10 years.

Comment:

Commenter 6507 does not support a precipitation-based NSPS limit. Much of the Western U.S. will fall in the lower precipitation area category, and, hence, be eligible for the higher NSPS limit. The proposed change could lead sources to opt for the higher emission limit even if they can accommodate wet scrubbers. The commenter is also concerned that as new units are added in the West, allowance allocations to existing units would further decline because the over-all State budget will not change. Increasing the NSPS limit will only make a bad situation worse.

Response:

EPA believes that the commenter has, in fact, stated one of the reasons for establishing the cap-and-trade approach. With the declining cap, units (and the States doing the allocation of the allowances) will have increasing incentive, over and above that provided by the NSPS, to plan for the least amount of Hg emissions possible. We believe that this will minimize the circumstances in which a unit will install dry technology when wet may be available. The issue of fitting new units within a given State's allocation is one that will have to be addressed by the

State regardless of where the new units are located.

Comment:

Commenters 6479 and 6633 indicate that the Agency should implement a fuel-neutral regulatory approach, which is consistent with that proposed by EPA in February 2005. In this action, EPA found that a fuel-neutral approach is consistent with the CAA's purpose to encourage the most effective means to reduce emissions. Moreover, the commenters state that the Agency notes that a fuel-neutral approach provides an incentive to use the most effective combination of add-on control technologies, clean fuels, and boiler design to meet the emission limit. That approach is consistent with the future-looking and technology-forcing nature and purpose of §111 - and the larger purpose of the CAA, generally, to encourage the most effective means for controlling emissions from new units. (See Lignite Energy Council v. EPA, 198 F.3d 930, D.C. Cir. 1999; CAA §111 "looks toward what may fairly be projected for the regulated future, rather than the state of the art at present.") Therefore, all fuels must have the same NSPS limits in order to provide the level of emission limitation required by the CAA.

Commenter 6577 stated that EPA's use of its February 28, 2005, proposed SO_2 and NO_x, NSPS to justify a different result from its Hg rule is misguided. In the context of NO_x and SO_2, EPA did not find that the control technology would control all coal types identically as a general matter. On the contrary, it found that if a more stringent NSPS limit were established, some coal types would not consistently be able to meet it. The Agency justified its fuel-neutral standard not on the ground that all fuels can meet it equally well, but on the ground that it is consistent with the CAA's purpose to encourage the most effective means to reduce emissions. In sum, the fuel subcategorization scheme in CAMR is neither consistent with the Agency's approach in the proposed NSPS rule for SO_2 and NO_x, nor with the purposes of the CAA, and is, therefore, arbitrary and capricious.

Response:

As noted in the final CAMR, as initially structured, 40 CFR part 60, subpart Da subcategorized based on the sulfur content of the coal (essentially based on coal rank) for SO_2 *emission limits and based on coal rank for* NO_x *emission limits. This approach was selected because of the differences in the relative ability of the respective control technologies to affect emissions reductions on the various coal ranks. EPA has recently finalized a change in the format of the* NO_x *emission limits and established common* SO_2 *emission limits regardless of coal rank based on its conclusion that available control technologies are capable of meeting the limits regardless of the rank of coal being burned. This is not the case with Hg controls. We believe that, similar to the situation with* SO_2 *and NOx control technologies in 1978, currently available Hg control technologies are not capable of achieving the same level of control for all ranks of coal and that this fully justifies the use of subcategorization by coal rank for the Hg emission limits. If, at some point in the future, the performance of control technologies on Hg emissions advances to the point that the rank of coal being fired is irrelevant to the level of Hg control that can be achieved (similar to the point reached by controls for* SO_2 *and* NO_x *emissions), EPA may consider adjusting the approach to Hg controls accordingly. At the present time, however, EPA believes that it has looked toward what may fairly be projected for* *the regulated future and properly established the subcategorization.*

Comment:

Commenter 6489 indicated that he had articulated in previous comments that there is a very fine line between some sources of subbituminous coal and those of western bituminous. The 1999 ICR required sources to report, among other things, the heat content, and Hg and chlorine concentration of the coals that they burned. The commenter pointed out in its comments that for some western coal-producing counties, sources reported nearly identical values for western bituminous and subbituminous fuels. The only difference apparently was that some sources called the fuel subbituminous and some called it bituminous.

Response:

EPA believes that a distinction must be made on some basis. Regardless of how the "line" is drawn, there will likely always be some situations where the decision is not clear-cut. However, EPA continues to believe that reliance on the rank of coal as reported by the facility to the DOE/EIA is appropriate. Under Public Law 93-275 (section 13(b) of the Federal Energy Administration Act of 1974), each coal-fired facility is required to report to the DOE/EIA on a monthly basis, using form EIA-423, a number of coal-related items, including coal rank (bituminous, subbituminous, lignite, waste), the mine type, and the State and county the mine is located in along with the quantity of coal received and the Btu, sulfur, and ash contents of the coal. EPA believes that, because there are potential civil and criminal penalties for false reporting to DOE/EIA, this information is adequate for determining the rank of coal used for purposes of establishing the appropriate emission limit. If the facility believes that their supplier is incorrectly reporting the coal, the facility is free to go to the supplier and suggest that they "reexamine" the coal classification for purposes of the DOE/EIA, and subsequent EPA, reporting. Commenter 6489 has not provided any suggestions for a workable alternative to the approach taken by EPA.

2.1.4 Statistical Analysis Used for the NSPS

In the petitions for reconsideration of CAMR, some petitioners stated that EPA had applied an inappropriate statistical analysis and that the statistical analysis contained numerical inconsistencies and other arithmetic errors. We granted reconsideration on this issue and sought comment on EPA's "statistical approach." 70 FR 62217 ("EPA seeks comment on this statistical approach.") In framing the issue concerning the statistical analysis in the October 2005 reconsideration notice (see 70 FR 62216-17), EPA provided certain background information, including a summary from the final CAMR of EPA's selection of BDT and the units considered in the BDT analysis. EPA included the BDT discussion in the "statistical analysis" section of the reconsideration notice as background only and did not intend to re-open the BDT issue for reconsideration. EPA recognizes, however, that commenters may have been confused as to whether the BDT issue was re-opened on reconsideration. For that reason, EPA responds to the significant comments that it received concerning BDT made in the context of the statistical analysis. In Section 2.1.4.1 below, we address the comments that specifically relate to EPA's statistical analysis, which EPA expressly re-opened on reconsideration, and in Section 2.1.4.2, we respond to those significant comments received concerning BDT and the units to be included in the new-source BDT analysis.

2.1.4.1 Statistical Analysis

Comment:

Commenters 6557 and 6560 stated the statistical analysis used for the revised NSPS adequately and appropriately accounted for the variation of Hg content in lignite. Gulf Coast Lignite must remain a viable fuel option for Texas EGUs; therefore, the NSPS must be derived based on the variation of Hg content in different coal types, so that fuel switching among different coal ranks does not occur.

Response:

EPA appreciates the commenters' support of the approach taken.

Comment:

Commenter 6581 believes that the finalized CAMR NSPS subcategories should be based on the different types of coal and equipment used to generate electricity. It is in the interest of the security, stability, and affordability of national energy sources, that lignite remain a viable fuel option for Montana, North Dakota, and Texas EGUs; therefore, the NSPS must be derived based on the variation of Hg content in different coal types, so that fuel switching among different coal ranks, in particular from lignite to western subbituminous, does not occur. To that end, the commenter concurs with the Gulf Coast Lignite Coalition and the Lignite Energy Council of North Dakota that the statistical analysis used for the revised NSPS adequately and appropriately accounted for the variation of Hg content in lignite.

Commenter 6476 noted that, EPA set new source limits for Hg emissions from coal-fired power plants by (1) determining the "best system" of control for each subcategory of plants, (2) using control information from all plants equipped with that control technology, and (3) performing statistical analyses to account for the variability in Hg content in the coal burned by those plants. The commenter agrees that this is an appropriate method of setting new source standards. However, the commenter believes that the new source limits that EPA included in CAMR were based on an analysis that contained some inconsistencies and errors. Although the statistical analysis that supports the revised NSPS in the notice of reconsideration corrects most of these earlier problems, it still fails to produce accurate upper 90th percentile values of the Hg content in coals on an input heat basis (lb/10^{12} Btu). As a result, the newly proposed NSPS standards are lower than they should be.

Commenter 6476 added that EPA's most recent analysis identifies the upper 90th percentile Hg in coal concentrations from the 1999 ICR data. It then identifies the upper 90th percentile input heat values and divides the Hg concentrations by the respective input heat values to produce a lb/10^{12} Btu value. In the commenter's view, a more technically correct way to derive the 90th percentile values is first to express each coal sample in lb/10^{12} Btu by dividing the

Hg content by the coal's heating value, to rank those coal results and then to select the 90th percentile value. The commenter provided alternative NSPS emission limits based on its approach.

Response:

EPA appreciates the commenters' general support for the approach taken. With regard to commenter 6476's alternative approach to calculating the 90th percentile values, EPA has reviewed its statistical analysis and believes that, although commenter's approach is a feasible alternative, EPA's approach is equally feasible and yields similar results. Therefore, EPA has not changed its approach.

Comment:

A number of commenters provided comment to the effect that EPA's statistical analysis was flawed.

Commenters 6282, 6479, and 6577 stated that EPA applied an inappropriate statistical analysis to its artificially lowered control efficiency level to define the 90th percentile confidence limit for removal efficiency. The proposed rule did not employ this statistical method which contains numerical inconsistencies and arithmetic errors and other problems (including estimating when using small sample sizes and assuming a normal population, using the mean of several observations as a single observation, and using a lower bound for efficiency when it will be compared to a rolling average over an extended time period) that have not been subject to public review and comment. EPA is mandated to determine the degree of emission limitation achievable through application of the best system of emission reduction adequately demonstrated. The record before the Agency contained ample emissions data showing the very level of emissions limitation which had been achieved by the best sources in each of EPA's subcategories. EPA's application of its statistical analysis in the statutory context of CAA §111 to produce an NSPS limit that is actually less stringent than the reductions achieved by any of the plants in a subcategory using ESP's selected BDT lacks any rational basis. In fact, the control efficiency level produced by EPA in the first three steps of its analysis already reflects a level of Hg reduction less stringent than that achieved in practice by many units (and even higher than the Hg content in the coal burned at other facilities) because it is based on an average of the control efficiencies of several of the units in a subcategory. Producing a 90th percentile confidence limit only further weakens the control efficiency levels. EPA asserts only that the statistical analysis was conducted to determine the appropriate achievable Hg emission level for each coal type without offering any justification for why the actual performance of the most efficient units was not sufficient for this determination. The statistical analysis produces clearly inappropriate results, reflecting control efficiencies dramatically lower than the actual performance levels of existing units.

Commenter 6472 stated that the stated goal of the revised statistical analysis is to estimate the lower 10th percentile of the control efficiency for deriving a Hg emission limit. The commenter believes that the proposed method is not statistically correct. In addition, with the very limited data that are used, it is impossible to estimate the lower 10th percentile accurately.

Nor is it necessary, because a rolling average of a year's worth of data will be used to determine compliance. Any transient drop in efficiency will not result in a violation because of the long term moving average calculation.

Commenters 6633 stated that EPA's revised NSPS are arbitrary and capricious because they are based on a statistical analysis that does not rationally represent the reality it purports to reflect. The commenter believes it is well established that EPA's use of a model is arbitrary if that model bears no rational relationship to the reality it purports to represent (see Columbia Falls Aluminum Co. v. EPA, 139 F.3d 914 – 923, D.C. Cir. 1998). EPA's statistical analysis underlying its coal-fired EGU Hg NSPS does not represent the performance of the "best demonstrated technology" for controlling Hg. EPA's reliance on this statistical method in establishing the NSPS limits is, therefore, unlawful.

The commenter indicated that, despite previous comments outlining the deficiencies in EPA's approach to setting NSPS, the Agency again applied an inappropriate statistical analysis to define what the Agency refers to as "the 90th percentile confidence limit for removal efficiency." The analysis produces clearly invalid results (in one case a negative control efficiency), with the final NSPS far weaker than the actual performance of best performing existing units.

After pre-selecting BDT, EPA provides tables listing Hg data for coal-fired boilers used for determining BDT specific to five coal classes. For each coal class, EPA has estimated the 90th percentile for percent reduction of BDT using the following formula:

Confidence limit = arithmetic mean – (t x standard deviation) (Equation 1)

EPA states that this formula is based on the one-sided t-statistics test. EPA does not provide a reference for this equation and the commenter believes it to be in error as it does not appear in any standard statistical textbooks (the commenter cited George W. Snedecor and William G. Cochran, Statistical Methods, Iowa State University Press, 7th Ed., 1980). EPA's equation produces an estimate that is overly conservative (too small). If one assumes that the data closely follows a normal distribution, then the 90th percentile for percent reduction of BDT should be estimated as the 10th percentile of a normal distribution having the specified mean and standard deviation. The equation for this quantity is:

10th percentile of normal distr. = arithmetic mean – (1.282 x standard deviation) (Equation 2)

Note that Equation 1 and Equation 2 are both based on the assumption that the underlying data distributions follow the normal distribution; however, EPA provides no supporting statistical tests for this assumption.

As another approach, for measured quantities such as removal efficiency where values theoretically cannot be less than zero, it may be more reasonable to assume the data follow a lognormal distribution. The equation for the 10th percentile of a lognormal distribution is:

10th percentile of lognormal distr. = geometric mean x (geometric std. dev)$^{1.282}$ (Equation 3)

The commenter provided estimates for each of the five coal types obtained from Equations 1, 2, and 3. The three estimates associated with bituminous coal are approximately equal. However, the estimates obtained from the three equations differ significantly when the coal type is subbituminous (using either a wet or dry scrubber) or lignite. In each case, the control efficiency estimate obtained from using the l0th percentile of the normal distribution is greater than the one derived by using EPA's flawed methodology.

EPA's memorandum indicates that the coal refuse category was represented by only two facilities. EPA lists the arithmetic mean of these two values as 99.9 percent and the arithmetic standard deviation as 0.02 percent. The latter value is incorrect, because the standard deviation of 99.9 percent and 99.9 percent is zero. (EPA provides no information concerning the source of the 0.02 percent value.)

The commenter believes that equations 1, 2, and 3 are not applicable to data that exhibit no variation. The sample sizes associated with the five coal types vary from 2 to 7. Larger sample sizes (n > 20) are needed to adequately identify a good-fitting distribution for each coal type and to determine the parameters of the distribution. In addition, small sample sizes are sensitive to outliers. The estimate obtained from Equation 2 (normal distribution) for all lignite values is 21.7 percent. If the commenter's assumed outlier is removed from the data set (as it should be because two out of three emission tests during the subject test measured negative removal efficiencies), Equation 2 yields 42.7 percent – a doubling of EPA's estimate. Similarly, the data set for subbituminous dry contains four values. The estimate obtained from Equation 2 (normal distribution) for these values is 38.1 percent. If the commenter's assumed outlier is removed from the data set (as it should be because in two out of thee emission tests at the subject test measured negative removal efficiencies), Equation 2 yields 13.9 percent compared to EPA's calculation of -10.2 percent.

As a last step, the commenter alleges that EPA arbitrarily applies its invalid control efficiency level to a coal containing the 90th percentile of measured Hg concentration in coal. Using this approach, the NSPS does not reflect BDT, but instead approximates what new sources would emit if they were burning some of the dirtiest coal in the industry. EPA explains that this calculation is "considered reasonable" because compliance will be on a rolling 12-month basis. To the contrary, the fact that compliance is measured on a rolling 12-month basis is a reason why relying on the filthiest coal is unreasonable; the burning of the dirtiest coal, if it occurs at all, is likely to occur only periodically, and would, therefore, be averaged out over the course of the year. Similarly, a source that burns dirty coal on one occasion will not be in immediate danger of noncompliance, because the emission limit need not be met on an instantaneous or short-term basis. Using a calculation that simply assumes new sources will always burn the dirtiest coal, therefore, is not a reflection of "conditions that are reasonably expected to occur." A better estimate of the Hg concentration of a typical coal is to calculate a weighted average of the Hg content in coal based on the production of coal by State and coal rank. The commenter presented a calculation of the weighted average of the Hg concentration of the three major coal ranks based on the percentage of coal produced in each State. The weighted average values developed by the commenter, representing a typical coal, are approximately half what EPA estimates.

Although maintaining that EPA acted arbitrarily and capriciously in pre-selecting certain control technologies to represent BDT and that subcategorization by coal type and control device is unlawful, the commenter calculated more stringent NSPS using the same data and methodological approach that EPA used for the sake of illustrating that more stringent standards can be derived from the same data set.

Using EPA's methodology, the commenter calculated an uncontrolled emission rate for each coal type by multiplying the weighted average coal Hg concentration by the 90th percentile heating value for each coal type. For control efficiency, the 10th percentile of the normal distribution, with the outliers removed, was used. Multiplying the uncontrolled emission rate by the control efficiency yields the NSPS emission rate, which is then converted to an output-based standard. Results were not shown for coal waste as a weighted average of the coal waste Hg content could not be calculated due to a lack of data on the amount of coal waste burned. Even using EPA's erroneous definition of BDT, the commenter believes that a reasonable statistical analysis will yield far more protective NSPS than EPA has proposed.

Response:

EPA reasonably applied the statistical analysis. Contrary to the commenter's assertion, EPA does not set NSPS by looking at data from only the best sources (i.e., those sources with the lowest emission levels) in a particular category. Pursuant to CAA §111, NSPS must be achievable under the range of relevant conditions which may affect the emissions to be regulated. See National Lime v. EPA, 627 F.2d 416 (1980). Thus, in setting NSPS, EPA cannot focus on only the best sources, as commenters suggest, because it must be able to demonstrate the achievability of the standard across a range of normal operating conditions.

Commenters have expressed considerable concern over EPA's "artificially" lowering of the NSPS and use of an "inappropriate" or "fatally flawed" statistical analysis. EPA has reviewed its analysis along with the discussions provided by the commenters and believes that, at base, commenters disagree with the assumptions that were made in conducting the analysis more than they disagree with the analysis itself.

*Commenters 6633 goes to great lengths to assail EPA's statistical analysis, even noting that the equation used "...does not appear in any standard statistical textbooks." EPA respectfully disagrees. Not only does the general form of the equation used by EPA (i.e., confidence limit = t * standard deviation) appear in at least one standard statistical textbook[287] but it also appears in at least one statistics reference guide[288] as follows:*

The general formula for computing a confidence interval is:

*(a,b) = {sample or population mean} ± (test statistic) * (standard error)*

Where a and b are the lower and upper limits of the confidence interval,...the test statistic is the critical value from the table of the appropriate probability distribution

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[287] See, e.g., EPA-HQ-OAR-2002-0056-6712, p. 441.

[288] See EPA-HQ-OAR-2002-0056-6716, p.84.

{i.e., t or z statistic}, and standard error is the standard error of the sampling distribution.

Further, the general equivalency for the equation appears in the 6th edition (1971) of the textbook cited by the commenters:[289] *"The standard deviation…is often called, alternatively, the standard error…"*

Although the commenter contends that EPA's equation is unreferenced and in error, the commenter uses the expanded version for its analysis, also without referencing. Further, the commenter's analysis also appears to contain numerical inconsistencies and arithmetic errors (e.g., in commenter's equation 3, a number greater than one raised to a power greater than one cannot yield a value less than one; however, the commenter's analysis yields a resulting percent reduction less than that with which it started).

*EPA has reexamined its statistical analysis. As noted above, EPA used the general equation: confidence limit = t * standard deviation. This general equation has been used by EPA in similar analyses (see, e.g., 68 FR 27650). As the sample population is small (and EPA agrees that the sample size is small but disagrees that it is, therefore, essentially unusable), EPA has used the "t-statistic" rather than the "z-statistic" wherein the sample, rather than the population, means and variances are used. The t-statistic has the further advantage of being useful for any population not highly skewed.*[290] *Assuming the commenter's analysis to be correct, it indicates that the assumption of normal vs. log-normal with regard to the sample/population distribution is immaterial here, at least for bituminous coal, as their results are similar in either case.*

EPA has utilized the statistical functions of Microsoft Excel® in performing its analyses. This spreadsheet calculates using all decimal places available, regardless of the number showing. This is why the two coal refuse units appear to have 99.9 percent emission reductions but a standard deviation of 0.02 percent (the percent reductions are actually 99.95 and 99.92).

Commenters also note that some of the data points appear to be outliers and that BDT in one case is reported as being zero percent reduction. EPA believes that, given the sample size, one cannot assume that the apparent "outliers" are, in fact, statistical outliers. Absent any other information, EPA believes it is just as plausible to assume that these data points represent installations where little or no Hg removal was evidenced during the emission tests. That is, installation of control equipment on one source yielded no effective Hg control but installation of apparently similar control equipment on other apparently similar sources resulted in effective Hg control. EPA believes that, in general, the commenters would have us conduct more sophisticated analyses than are warranted given the admittedly small sample size.

As noted elsewhere in this document, EPA has reevaluated the NSPS emission limit for coal refuse-fired units based on the additional data provided. No other changes to the analysis have been made. The results of this reanalysis are presented in Table 8 and in the revised NSPS memo in docket EPA-HQ-OAR-2002-0056.

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[289] See EPA-HQ-OAR-2002-0056-6713, p. 50.

[290] See e.g., EPA-HQ-OAR-2002-0056-6710, p. 265. See also EPA-HQ-OAR-2002-0056-6711.

Table 8. Revised NSPS Emission Limits.

Coal rank/unit type	*Hg (10^{-6} lb/MWh)*
Bituminous	*20*
Subbituminous – Wet	*66*
Subbituminous – Dry	*97*
Lignite	*175*
Coal refuse	*16*
IGCC	*20*

In performing this analysis, EPA has rounded the resulting percent reduction down to the next one-tenth of one percent as a reflection of the imprecision of the overall analysis (i.e., the data do not warrant more than three significant figures). EPA does not believe that the percent reduction values have been "artificially lowered" in obtaining these results. Rather, EPA believes that the values reflect performance that can be expected under conditions that may reasonably be expected to recur within the industry.

EPA addresses the use of the 90th percentile Hg value in the coal elsewhere in this document.

Comment:

Commenters 6495 and 6590 state that EPA's revised NSPS limits continue to favor lower rank coals without any basis for doing so. The commenters provided revised NSPS values compared to an imputed CAMR Phase I limit (calculated by dividing the Hg allowance allocation for each coal rank by its respective heat input) and to the average Hg content of each coal rank as determined from the 1999 ICR-2 data. Although individual units may have somewhat different heat rates, the approximate value of 10,000 Btu/kWh used is sufficiently accurate, for purpose of comparison, to highlight the discriminatory effect of the rule among the coal ranks.

The commenters stated that the "final" NSPS limits in the CAMR clearly demonstrate EPA's illogical and unreasonable action to favor subbituminous coal and lignite, to the detriment of bituminous coal, by establishing limits that require stringent control of bituminous coal units, although allowing the average subbituminous coal or lignite coal unit to comply with little or no Hg control. Even more remarkable, the NSPS limits for new subbituminous- and lignite-fired units, presumably able to avail themselves of the best control technology, are less stringent than the average emission rate (i.e., the imputed limits) that an existing unit would need to achieve to meet its allowance allocation under CAMR. By contrast, bituminous coal units would, on average, require 60 percent Hg control to meet the CAMR allocations, and 77 percent control to achieve the NSPS limits. Thus, the limits for bituminous coal require substantial control for existing units under CAMR, and even more stringent control for new units under the NSPS.

The commenters stated that these NSPS limits clearly would prejudice the choice of fuel for a new coal-fired unit. For example, an owner considering the fuel for a new unit could choose to design it for subbituminous coal, knowing that even the average subbituminous coal has a Hg content that is already 20 to 40 percent below the NSPS limit, and, thus, would immediately be in compliance with no additional control requirement, as opposed to a bituminous coal that would require an average of 77 percent control. Because coal-fired boilers are designed and built to perform optimally with a particular rank of coal, the NSPS limits proposed by EPA will serve to skew the new unit coal market toward subbituminous coal and lignite, at the expense of bituminous coal. Furthermore, the NSPS limits on subbituminous coal and lignite units serve no environmental purpose, because they are, in effect, no limits at all. The commenters believe that, in revising the rule, EPA's action serves only to further exacerbate the discrimination against bituminous coal, by increasing the emission limits for subbituminous coal and lignite units, while further reducing the limit for bituminous coal units, compared to those in the original CAMR rule.

Commenters 6479 and 6503 extracted coal property data from the 1999 ICR. An analysis of the Hg content of coal data contained in the ICR-2 demonstrates that facilities with wet FGD units which burn subbituminous coal would not need to reduce Hg emissions at the proposed revised NSPS limit of 66 x 10^{-6} lb/MWh. In contrast, facilities that burn bituminous coal would need to reduce Hg emissions by a level of 76 percent at the proposed revised NSPS limit of 20 x 10^{-6} lb/MWh. This type of subcategorization could encourage operators of affected facilities to switch the fuel from bituminous coal to subbituminous or lignite coal to obtain a higher Hg limit. As a result, the Hg emissions to the atmosphere may increase instead of decrease.

Response:

EPA has used data from the respective subcategories to establish emission limits for the subcategories and, therefore, does not believe that any subcategory has been advantaged or disadvantaged at the expense of another – the emission limits established are based on what controls in each subcategory have demonstrated an ability to meet. Further, EPA continues to believe that CAMR will not lead to widespread coal switching as alleged by some commenters.

Furthermore, when the CAMR Hg cap-and-trade system starts in 2010, it will provide strong incentives for the owners and operators of affected plants to reduce emissions beyond the level achieved by co-control of other pollutants so long as these reductions cost less than purchasing allowances.[291] *The cap-and-trade program allows plants to sell excess allowances, or bank them for future use. These features of the cap-and-trade program are expected to lead to a significant reduction in Hg emissions beyond what is required in 2010. We estimate that this incentive to reduce emissions beyond what is required will cause the fleet of power plants to collectively reduce their emissions by about 7 tons in 2010 (7 tons corresponds to 224,000 allowances that will be banked by the entire industry for use in subsequent years).*

Thus, although the first-phase Hg cap in CAMR is not effective until 2010, the banking

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[291] *For every additional ounce of Hg emissions a facility reduces, it will be required to retire one fewer allowance, which is estimated to be worth over $1,000 in 2010. See the final CAMR RIA (http://www.epa.gov/ttn/atw/utility/ria_final.pdf) Table 7-8 at page 7-7 for the cost per pound of $23,200. This is equivalent to a cost of $1,450 per ounce but "[a]ctual costs may be lower than those presented since modeling assumes no improvements in the cost of mercury control technology."*

provisions of CAMR encourage plants to begin investing now in developing and testing innovative Hg reduction technologies so that the plant will be able to implement these technologies and generate allowances when the trading provision is operative. Specifically, for new plants, the near-term prospect (2010) of the Hg cap-and-trade program reduces any incentives plant managers might have to adjust capital expenditures in a manner that allows increased Hg emissions. On the contrary, the incentive effect caused by the prospect of the Hg cap-and-trade program is in the direction of increased capital expenditures to reduce Hg emissions further.

An examination of the subbituminous coal Hg data contained in the ICR-2 results indicates the following results:

Property	*Hg, lb/TBtu*
Maximum	*71*
99th percentile	*18*
95th percentile	*12*
88th percentile	*9.1*
67nd percentile	*6.3*
Mean	*5.75*

The lb/TBtu equivalent of the revised NSPS for subbituminous - wet (shown above) is 6.2 lb/TBtu and for the revised NSPS for subbituminous - dry (shown above) is 9.1 lb/TBtu. Thus, EPA believes that the commenters are incorrect in stating that no subbituminous unit with wet controls will have to reduce emissions. EPA agrees that the respective levels of control vary among the coal ranks as a result of the ability of current controls to effect Hg reductions. However, EPA does not agree with the commenters that utilities will use Hg as the sole determinant in deciding which coal rank to use in a given EGU.

Comment:

Commenter 6472 believes that dealing with limited data and uncertainty is a normal part of the regulatory decision process. Rarely has EPA had as much data as it does for Hg control of EGUs, so one would expect a better standard to result. However, industry's statistical analyses, which were the basis for the statistical analyses used by EPA, incorrectly and unreasonably inflates the allowable emission rates for the Hg NSPS. Statisticians have critiqued the science of the statistical analysis used in this rule. One of the most obvious flaws was the manipulation of statistics on a few short term tests to attempt to estimate the worse case short term emissions and then set a standard based on a long term annual average. The absurd result was that some limits are above the average Hg content of the coal, despite the demonstration that high control efficiencies were achievable on units with better air pollution control systems. Also, with the success of ACI, the uncertainty of compliance is much less because ACI can reasonably be added to traditional criteria pollutant control systems for even greater Hg removal efficiency.

Response:

EPA did not use industry's statistical analysis for the CAMR NSPS emission limits as the *commenter states. Nor does EPA believe that the data have been manipulated as the commenter infers. EPA reasonably assessed the plants for which it had data (both ICR-3 and Hg continuous monitoring data) and properly set the emission limits based on that data, which in EPA's view is representative of the different types of plants that will be built. Further, EPA does not believe that it is "absurd" that the resulting emission limits are above the average Hg content of the coal, given (as discussed elsewhere) the limited ability of some controls to effect Hg removal, among other factors. As noted in the final CAMR and elsewhere in this document, EPA disagrees with the commenter in terms of its characterization of ACI.*

Comment:

Commenter 6598 stated the proposed revision based on the reanalysis is not based on accepted statistical procedures, does not represent the BDT, and does not reflect the level of technology that will actually be installed on all future new units. The commenter reviewed the reanalysis memo and provided information summarizing the results in terms of 10^{-6} lb/MWh.

The commenter was baffled by how the NSPS can possibly have been set so high given the relatively low emissions from the sample of units tested. EPA relied on percent reduction as the key statistic analyzed rather than emissions in lb/MWh and yet put the final limit in lb/MWh instead of percent reduction.

A random sample of 30 data points is typically accepted as representative of a population. Although there are statistical techniques for drawing inference from smaller numbers of data points, the number tested (six units) is too small especially considering the importance of the standard to public health and electric generating capacity investment decisions.

The commenter believes that there are other problems with EPA's approach. For example, greater coal Hg will not necessarily yield proportionately greater Hg emissions over the full range of coal Hg values as EPA presumed. There are probably ranges within which the relationship is a linear one; however the assumption imposed after conducting the experiment removes some of the objectivity. Actually, poor removal efficiency is sometimes observed in control equipment behavior when the parameter of interest is present in low concentration. Quite likely control efficiency will, in general, improve with increasing coal Hg content.

The commenter believes that the efficacy of SCR in the promotion of Hg reduction in conjunction with wet scrubbers is well known and documented. The commenter believes that SCR is part of BDT. Given that all new bituminous coal-fired units will have some kind of PM control (typically FF), flue gas desulfurization (FGD, typically SDA or wet scrubber), and NO_x control (typically SCR), the commenter believes it would be safe to conclude all will achieve 96 - 99 percent Hg reduction and achieve emissions less than 5 x 10^{-6} 1b Hg/MWh. The commenter believes that this emission value is still greater than measured at any of the individual units.

EPA expects significant reductions under CAMR from existing units with the assumption that the cobenefits of NO_x and SO_2 under CAIR will help in the reduction of Hg. The commenter believes that the reductions necessary in future years would actually require, on average, Hg to be controlled at old units to levels less than the proposed NSPS for new units.

EPA should require that new bituminous coal-fired units meet 6 x 10^{-6} lb Hg/MWh as originally proposed by EPA. The insufficient statistical techniques that subsequently increased that value relied on too few data to make the inferences that were reached.

As an alternative, EPA can restore the value to 6 x 10^{-6} lb/MWh for an interim period while a larger sample of well controlled units (with SCR, ESO or FF, and SDA or wet scrubbers) is tested. After this, the Hg emissions characteristics of the population of all such well-controlled units can be properly inferred. Thereafter, situations such as those where higher Hg coal is used, can be addressed and possibly some additional control required. An objective and independent statistician who will not impose any arbitrary assumptions or presumptions should be hired to design the experiment.

Response:

EPA has addressed the statistical analysis elsewhere in this document. EPA has examined the data for the units upon which the NSPS emission limits were based (e.g., ICR-2 coal data; coal data for the period of the ICR-3 emission testing). In a number of cases, coal with a "cleaner" than average Hg content was used during the emission test program (see the test coal vs. year coal memo in docket EPA-HQ-OAR-2002-0056). We, therefore, do not know what the emission rate (in either lb/TBtu or lb/MWh) would be had the "dirtier" coal been utilized during the emission test program. The commenter states that the percent reduction observed will improve with increasing coal Hg content. EPA has no data upon which to base that statement, particularly within the range of Hg contents observed. Therefore, EPA has assumed that the Hg control efficiency (i.e., percent reduction) is a constant. Using this assumption, and because plants using "clean" coal during the test could just as likely have been using "dirty" coal, we have applied the percent reduction values (which we have) to the coal Hg content, instead of the emission rate values (which we don't have), to obtain the NSPS emission limits.

SCR is included in the units upon which the NSPS emission limit for bituminous coal-fired units is based (SEI-Birchwood and Logan). Further, units with FFs performed generally better than units with wet FGD systems. EPA did not have data for units with SCR and wet FGD systems installed to include with the NSPS calculations. However, such data as the commenter cites has been used in EPA's projection for the Phase II Hg cap.

EPA fully expects to review and reassess the data and the control technology performance during the required 8-year review of the NSPS.

Comment:

Several commenters provided comment on the NSPS limits for coal refuse-fired units.

Commenter 6529 stated the Agency's determination to establish a separate category, for purposes of imposing new source Hg emission limitations, for coal refuse-fired sources is not supportable because the aggregate Hg emissions from such sources pose no risk to human health or the environment, and because insufficient data were available (on only two units) to the

Agency to support the separate categorical classification. In addition, as a technical matter, the Agency did not appropriately consider the variability inherent in the coal refuse fuel source. Specifically, the characteristics of coal refuse vary to a much greater extent than other coal types. Because of the extremely low emission levels associated with the Agency's NSPS for coal refuse sources, even minor variations in the Hg content of the fuel would have significant impacts on emissions. The stringent NSPS established by the Agency for coal refuse-fired sources cannot be consistently satisfied by such sources; for this and other reasons, the standard is contrary to appropriate public policy and environmental protection objectives. Further, the commenter contends that it is essential that the emission limitations established for coal refuse-fired sources adhere to the underlying principal referenced by EPA within its Notice of Reconsideration. Specifically, the NSPS standard "must be achievable by all new units to which it will apply over the full range of operating conditions which can reasonably be anticipated to occur." Unfortunately, the NSPS Hg emission limitation for coal refuse-fired sources derived by the Agency and described in the Reconsideration Notice does not adhere to this principal.

In establishing an NSPS emission limitation for coal refuse-fired sources, the Agency relied on only two stack test results when they are not reflective of all sources in the industry and fail to taking into account variability in plant operations and the nature of the coal refuse fuel source. More recent data, including subsequent emission data for one of the two plants evaluated by EPA, demonstrates that the NSPS established by the Agency for coal refuse-fired sources would not be achievable by all new units to which it will apply over the full range of operating conditions which can be reasonably be anticipated to occur.

The Agency must, at a minimum, correct the errors in its evaluation and statistical analysis in order to establish a defensible NSPS. EPA evaluated the ICR data to determine the Hg concentration that constitutes the 90th percentile for this type of fuel. To the extent that EPA isolates coal refuse as a fuel source, the commenter supports this approach as a reasonable means to ensure that the resultant NSPS is reflective of the majority (90 percent) of fuel characteristics likely to be encountered by affected sources. The commenter also concurs that the value derived by EPA as the 90th percentile for Hg in coal refuse, 0.88 ppm, is a realistic value reflective of the majority of coal refuse that is now available for combustion by the coal refuse plants.

EPA then attempted to convert the identified concentration of Hg in fuel to a mass of Hg per unit of heat input (lb Hg/MMBtu). EPA determined to use the same statistical concept – identification of the heat content of coal refuse that constitutes the 90th percentile for this class of fuel. In this case, the commenter believes that EPA committed a logical error in the direction of the deviation from the mean by apparently identifying the heat input constituting the 90th percentile relative to the upper end of the Btu scale, as opposed to the "low-Btu" 90th percentile. The apparently unintended consequence of this approach is to exclude, rather than include, 90 percent of the fuel. Because EPA determined the Hg content of the fuel on a lb Hg/MMBtu basis, incorporating a higher than expected heat content severely underestimates the mass of Hg that is likely to be combusted by these sources (on a mass per unit-heat input basis). EPA then applied anticipated control efficiency to this incorrectly calculated value of Hg loading per unit of heat input. Accordingly, EPA's calculation error in the quantity of Hg present during combustion necessarily translates directly into a significant underestimation of the quantity of Hg that should be present within the emissions from a source utilizing the demonstrated technology under all potential fuel characteristics.

EPA's statistical error is not only evident through valuation of the mathematical sequence employed by EPA, but also by review of available data concerning the heat content of coal refuse. In calculating its Hg emission limitation for new and reconstructed sources combusting coal refuse, EPA's methodology utilizes a heat content of 12,288 Btu/lb. None of the commenter's plants are burning any fuel mixture even approaching this heat content. Instead, an analysis of coal refuse characteristics compiled by commenter's members reveals that a more accurate determination of the 90th percentile level for heat content in coal refuse is 4,336 Btu/lb; that is, 90 percent of the coal refuse combusted by the coal refuse facilities would be expected to exhibit a heat content of 4,336 Btu/lb or greater. The commenter would support either this value or a similarly derived value from the ICR data base. The representative heat content value used by EPA for coal refuse, however, is nearly three times higher than the accurate value. This inaccuracy results in a Hg NSPS that is nearly three times more stringent for these sources.

Further, as far as can be determined by the data presented by EPA in describing the derivation of the NSPS limit for coal refuse, EPA did not accurately evaluate the limited data that it had secured from the two coal refuse-fired facilities. Instead, EPA either made a mathematical error or employed an improper rounding technique to arrive at a 99.9 percent control requirement. The actual calculation presented in the NSPS memorandum results in a calculated value of 99.84 percent as the 90th percentile control rate; this value could have justifiably been rounded down to 99.8 percent. Without consideration of any of the points raised above, use of the accurate value for the control standard achieved during the emission testing of the two sources would result in a level of required control of only half of the value actually used by EPA in calculating the ultimate Hg limit for these sources.

For all of these reasons, the commenter believes that EPA's mathematical and statistical analysis was flawed in deriving a Hg emission limitation for coal refuse-fired EGUs.

Although many of the commenter's plants have conducted Hg emissions testing in recent years, the data collected often did not include contemporaneous fuel sampling to determine the Hg content and the F factor. Nonetheless, in reviewing the data available to the commenter, the commenter identified a sufficient number of results to allow for a realistic calculation of the 90th percentile of control attainable from these units, using the BDT selected by the Agency. Due to the limitation of the available data and the variability of calculated control efficiencies, the commenter's analysis evaluated individual runs of Hg tests rather than the emissions averages for the tests. Compliance stack tests typically consist of three runs due to the expected variability; when variability is part of the assessment process, it is logical to include the individual run results, particularly when data sets are limited.

From the data available to the commenter, 16 test runs were identified for which Hg emission results and contemporaneous fuel data were available. Six of the runs are from the two tests EPA previously used in their analysis of BDT control efficiencies. Both of these tests measured fuel feed to the boilers and sampled the fuel for Hg content, both on an individual run basis. The commenter included these data as they were reported to EPA, with one exception. In one test, Hg content was measured in the limestone as well as the coal; no Hg was found in the limestone. However, if the Hg content of the limestone is assumed to be at the relatively high minimum detection limit, the Hg feed to the boiler is increased by almost 4 percent and the apparent collection efficiency is inappropriately biased upward. Consequently, the commenter's analysis only considered the actual fuel Hg.

Fuel feed data were not available for the other test runs; however, individual fuel samples with Hg and individual ultimate analysis were available for each run. Thus, the commenter was able to calculate a true F factor for the specific run at the percent excess air observed during the test. The commenter then used that F factor to calculate the heat input from the Btu value of the fuel sample. Based on the Hg input on a lb/MMBtu basis derived in this manner, and measured Hg output on a lb/MMBtu basis, the commenter calculated, and provided, the percent control efficiency for the 16 individual test runs.

The commenter believes that it is noteworthy that two of the plants demonstrated fairly consistent control efficiencies over all three runs. However, these results are for a single testing campaign, and, therefore, do not account for fuel variability. In fact, available data demonstrates variability from year to year at one plant.

One data set reflects results from distinct testing methodologies. This facility conducted two test runs using Method 29, followed by two runs with the Ontario Hydro method. The third test run evidenced the lowest control efficiency the commenter has documented in any of their tests, yet it was followed immediately by a test run showing greater than 99 percent control. A review of the lab results for the low test result shows that a duplicate analysis was run for this sample; the duplicate analysis came up with the same result. This data point appears valid based on all available information.

If the commenter uses the same methodology that the Agency employed in the Reconsideration Notice, the commenter believes that the 90th percentile control efficiency for coal refuse plants should be 93 percent.

In addition to these 16 test runs, the commenter identified and analyzed 15 other test runs for which contemporaneous fuel feed data are not available for individual runs, but for which at least one fuel sample is available at or near the time of the stack test. The commenter evaluated these results as a second tier of accuracy, with the realization that the variability demonstrated would not encompass the variability in the fuel during the test and provided the results of that analysis. The inclusion of this second set of data raised the 90th percentile BDT control to 95 percent.

Based on these analyses, the commenter believes that available data supports a Hg emission limit for coal refuse-fired sources based on a control efficiency of 93 percent. These available data are substantially more expansive than the data relied upon by the Agency in promulgating the Hg emission limit for coal refuse-fired sources in CAMR.

Using EPA established upper limit of Hg in coal refuse of 0.88 ppm, and the commenter's calculation of a 90th percentile of heat content in coal refuse of 4,336 Btu/lb, the commenter calculated an inlet rate of 2.0×10^{-4} lb Hg per MMBtu for coal refuse. A control efficiency of 93 percent would result in a calculated emission limit of 1.42 x 10^{-5} lb/MMBtu.

Using EPA's heat rate conversion of 10.667, this value equates to 151 x 10^{-6} lb/MWh, which the commenter recommends as the coal refuse NSPS. This value compares fairly well to the value calculated by the Agency for bituminous coal, because coal refuse has about four times more Hg at the 90th percentile than bituminous coal, and only about one-fourth of the heat content, again at the 90th percentile. Thus, on a fuel-corrected basis, the Hg emission rate calculated for coal refuse is more than twice as stringent as the limit imposed on bituminous coal-fired sources.

Commenter 6577 provided information that the commenter believes demonstrates that the reconsideration proposed limits for coal refuse units are exceedingly stringent. As opposed to EPA's data that indicated both of the units for which data was collected were able to comply with the proposed limit, five of the eight units tested in Pennsylvania were unable to comply with the proposed Hg limit. These proposed limits for units, that have an associated environmental benefit in reducing mine-acid drainage by cleaning-up otherwise unusable coal refuse, may cause these facilities to close rather than install additional Hg control.

Response:

"Coal refuse" has been a defined term in 40 CFR part 60, subpart Da, since it was proposed in 1978. Further, coal refuse-fired units have had, over time, separate emissions limits for various pollutants. Therefore, EPA is not uniquely establishing a separate subcategory for such units under CAMR as the commenter infers. And, as the NSPS are not based on a "risk" evaluation, the level of risk from such units is immaterial to their inclusion in the standards.

EPA has reviewed the additional emission data noted by the commenter (EPA-HQ-OAR-2002-0056-6698) in response to follow-up questions related to commenter's original comments and believes that certain of these data should be included in a reanalysis. Of the additional 31 emission tests identified by the commenter, however, EPA believes that 8 tests should be excluded as follows:

- *Wheelabrator; February 2004; Runs 3 – 4 (Ontario Hydro method): The test report gives the indication that there was, or may have been, a contamination problem with the Ontario Hydro runs ("…cannot find a source or reason for contamination…"). Given that there is no definitive answer that there was NO contamination, EPA has elected to eliminate the runs.*

- *Ebensburg; October 2003; Runs 1 – 3: The test report indicates that there was some concern that "…a portion of the boiler emissions were still bypassing the baghouse…" during the Hg tests. This "…may have been affirmed by the heavy loading of particulate captured on the filter of each multiple metals test train." The test firm and the company elected to leave the data in. However, EPA believes that without conclusive evidence that no bypass was occurring, the data are not representative and should be excluded.*

- *Panther Creek; May 2004; Unit 1, Run 1 and Unit 2, Run 1: These are only single test* *runs (as opposed to averages of three test runs) and, thus, EPA has excluded the data.*

- *Piney Creek; February 1999; Composite average: These data are only on a single sheet containing the test data. There is insufficient information to assess much, although the data appear ok. However, even the commenter indicated that "the Piney Creek data did not include individual lbs/MMBtu output for each run so the entire test was used as a single data point." EPA has, thus, excluded the data.*

The commenter notes that none of his facilities uses a coal refuse with a heat content as high as 12,288 Btu/lb. None of the commenter's facilities may be using such a fuel but other EGUs reported (in responses to the ICR) using coal refuse with Btu/lb values as high as 13,730 Btu/lb; thus, EPA has used the entire data set (waste anthracite, bituminous, and subbituminous) in its reanalysis. EPA continues to believe that it can and must appropriately rely on the coal rank as identified by the submitter, particularly as this information is supposed to be identical to that supplied to the DOE/EIA. Further, EGU's may utilize this high Btu-content coal refuse in the future. As noted elsewhere, EPA believes that the use of more than three significant figures is inappropriate and has rounded the percent reduction values down to the next one-tenth of one percent. The results of the reanalysis of the coal refuse NSPS emission limit are provided elsewhere in this document.

<u>Comment</u>:

Commenter 6612 stated EPA seems to have coined a new definition of "best demonstrated technology (BDT)" and used this as a screening criteria to establish the NSPS. NSPS are based on the "best system of emission reduction" (CAA §111). The BDT seems to be an arbitrarily chosen technology by EPA to identify units in the 1999 ICR that actually were required to do stack testing, and hence, could be used in a statistical analysis to develop NSPS limits. The units that actually performed stack testing are a very limited pool and in selecting only those units with BDT, this pool of units to analyze got even smaller.

EPA also did not strictly follow the BDT criteria for the statistical analysis. For instance, BDT was identified for subbituminous coal-fired units as dependent on water availability. The analysis for the subbituminous limits was broken into BDT units tested with FFs and wet FGDs and BDT units tested that had FFs and dry FGDs. The analysis of the wet units consisted of two units with FFs only and no apparent wet FGD was installed. Not to mention, statistics on two units is not a robust and meaningful statistical analysis.

For the subbituminous dry units, four units were analyzed. One of these units was an FBC with a FF that was counted as BDT even though the other three units did have FFs and dry FGDs. The FBC unit had the highest control efficiency of 78.8 percent while one BDT unit had a control efficiency of 8.2 percent. This results in a high standard deviation and should promote questions about the analysis of this data set.

Within the data sets analyzed for the NSPS limits, statistical outliers appear to exist. For the bituminous units, which consisted of data from 6 units, the lowest control efficiency of 83.8 percent appears to be an outlier based on a 95 percent significance level. For lignite units, which consisted of data from 7 units, the lowest control efficiency of 5.9 percent appears to be an outlier based on a 95 percent significance level. The commenter contends that outliers should be discarded from data sets and a statistical analysis performed on the remaining data.

In addition to limited data and the evidence of statistical outliers, statistically calculating control efficiency and applying it to fuel content in the manner used introduces flaws and potentially inflates numbers. Because emission testing was performed and emission limits are being set for the NSPS, the analysis should be performed on the emission testing results to calculate output-based Hg limits for each coal type. Calculating a control efficiency and then applying it to the maximum annually averaged fuel Hg content (90th percentile) input into the system creates emission limits that are not based on actual EGU system performance but a fictional system. This approach for determining an output standard is not appropriate.

Due to the limited amount of data analyzed and the age of the data being analyzed, the commenter recommends that additional emission testing data for EGUs be identified and used in order to calculate NSPS limits. In the past 6 years since the 1999 ICR data was collected, many more units have tested. Development of NSPS limits should not be restricted to such a limited data set if more data are available. The proposed NSPS limits in which the bituminous limit decreases slightly, and the subbituminous limits and lignite limits increase by a factor of 1.2 to 1.6 appears greatly flawed.

Response:

EPA has explained its position on BDT and outliers elsewhere in this document. EPA agrees that additional test data would be helpful, but does not believe that such data is necessary. Other commenters have indicated that additional test data are available. However, none of these test data (beyond that supplied for coal refuse) – in the form of emission test reports that may be analyzed – have been provided to the Agency, either during or independent of the public comment periods.

Comment:

Commenter 6510 stated that new units burning high-sulfur bituminous coal are unlikely to meet the proposed NSPS. The six selected ICR-3 units selected to represent the BDT for bituminous coal-fired electric utilities typically burn coal with less than one-pound sulfur per million Btu. Half of the bituminous ICR-2 coals contain more than one pound sulfur per million Btu. New units burning high-sulfur bituminous coal are unlikely to achieve the same level of Hg capture as the six ICR-3 units used to establish NSPS for bituminous-fired units. Accordingly, statistical analysis to establish NSPS for bituminous coal should include coal-fired utility boilers that demonstrate Hg capture for high-sulfur bituminous coal.

Response:

EPA agrees that the coal sulfur content~~*s*~~ *of the plants selected for purposes of evaluating BDT is generally less than 1.5 percent. However, tests on other units burning coal with sulfur contents ranging up to almost 3 percent showed up to 82 percent Hg removal. These units were equipped with wet FGD systems, but none were equipped with a FF. It is expected that with the* *addition of a FF, any high-sulfur bituminous coal-fired EGU will be able to comply with the NSPS.*

Based on discussions with FF equipment suppliers, EPA has concluded that FFs can be installed and operated on new, modified, and reconstructed high-sulfur coal-fired EGUs. Two recent permits for electric utility steam generating unit projects designed to burn relatively high-sulfur coals include the use of FFs for PM control. The Longview Power, LLC, facility in West Virginia is permitted to burn 2.5 percent sulfur coal,[292] *and the Elm Road Generating Station – North Site in Wisconsin is permitted to burn coal with potential (i.e., uncontrolled)* SO_2 *emissions of 4 lb/MMBtu (i.e., approximately 2.5 percent sulfur coal).*[293]

Comment:

Commenter 6559 noted that the universe for wet FGD subbituminous plants (2 units) and dry FGD subbituminous plants (4 units) is not particularly a robust sample.

Response:

The data set that EPA analyzed for subbituminous-fired units is representative and adequate. Although the commenter complains that the six units examined is not a "robust sample," it fails to provide EPA with any data. EPA reasonably assessed the six plants for which it had data and properly set the emission limits based on that data, which in EPA's view is representative of the different types of subbituminous plants (i.e., those that employ wet FGD and dry FGD for controls). Moreover, EPA provided ample opportunities for commenters to provide information, including in response to the NPR in January 2004, the SNPR, and the October 2005 reconsideration notice.

Comment:

Commenter 6503 requested that EPA consider a number of issues regarding subcategory emission limitations. The commenter believes that there is no explanation of why EPA feels it is appropriate to increase the emission limitations for both types of subbituminous units. Further, the commenter believes that the emission limitations are too high and are likely to present a problem with regard to future implementation of the Hg cap-and-trade regulation. With the cost of natural gas increasing, increased electrical demand, and a favorable regulatory environment for burning coal, there is a rush to install coal-fired plants. These plants are being designed with controls for PM, NO_x, and SO_2. Thanks to EPA's rulemaking efforts, including the high emission limitations published in the reconsideration, EPA is making it much more likely that a new coal-fired plant will not be designed with Hg-specific add-on controls. In order to meet reductions contemplated by the cap-and-trade rule, it is imperative that any new plants are designed with Hg reduction in mind. The emission limitations EPA has published in the reconsideration do not compel a new source to consider Hg-specific add-on controls. The emission limitations should be reduced by at least a factor of three to ensure that new sources are designed with Hg-specific add-on controls.

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[292] See EPA-HQ-OAR-2002-0056-6700.

[293] See EPA-HQ-OAR-2002-0056-6701.

Response:

EPA believes that the rationale behind the NSPS emission limits finalized, including the revised limits for subbituminous, is adequately explained in the final CAMR preamble, the supporting memoranda (including the revised NSPS memorandum), the October 2005 preamble, and this document. EPA established the NSPS consistent with the requirements of CAA §111, and those standards constrain the emissions for all new, modified, or reconstructed sources to a specified level. These units are also subject to the cap-and-trade system which we believe will provide a strong incentive for Hg emissions reductions.

Comment:

Commenter 6586 stated that EPA did not have adequate emissions data for all types of lignite fuels in establishing the NSPS limit for lignite-fired plants. In particular, the commenter is concerned that the standard established by EPA was based on North Dakota lignite whereas Texas and Gulf Coast lignite can contain higher levels of Hg and may be more difficult to control. The commenter requests that EPA consider reviewing the NSPS standard for lignite plants and establish an appropriate standard for new Texas and Gulf Coast lignite plants.

Response:

The NSPS are based on data from EGUs utilizing both Northern (Fort Union) and Southern (Gulf Coast) lignites. EPA, therefore, believes that the NSPS are appropriate.

Comment:

Commenters 6479 indicate that EPA dismisses the importance of the NSPS limits because it believes that the CAMR Hg cap will be a greater long-term factor in constraining Hg emissions. However, in doing so EPA undermines the value of the NSPS limits and their ability to constrain emissions as intended by Congress. The primary purpose of the NSPS is to achieve long-term emissions reductions by ensuring that the best demonstrated technologies are installed.

Response:

The commenters focus on the standards of performance for new sources (NSPS). EPA does not believe that the value of the NSPS has been undermined through CAMR. EPA established the NSPS consistent with the requirements of CAA §111, and those standards constrain the emissions for all new, modified, or reconstructed sources to a specified level. These units are also subject to the cap-and-trade system which we believe will provide a strong incentive for Hg emissions reductions.

2.1.4.2 Selection of BDT and Units Considered in the Analysis

Comment:

Commenter 6472 stated that traditional criteria pollutant control technology is effective. Using the best available control technology already in place on many facilities for the criteria pollutants, highly efficient control of Hg has been demonstrated. The combination of low-NO_x burners, SCR, scrubbers (wet or dry), and FF control have achieved well over 90 percent Hg removal. Setting Hg performance standards based on the capability of the currently available best criteria pollutant control technology would minimize the emissions of fine particles and non-Hg HAP, including acid gas HAP, other heavy metal HAP, and polycyclic organic matter HAP, as well as Hg.

Response:

EPA concurs that the approach of basing the Hg NSPS on the best available controls in-place for criteria pollutants is appropriate. However, EPA disagrees with the commenter with regard to the resulting level of Hg control that may be achieved under this approach as discussed elsewhere in this document.

Comment:

Several commenters suggest that EPA's selection of BDT should have included ACI.

Commenters 6282 and 6633 stated that EPA's revised NSPS are contrary to law because they are not based on the "best demonstrated technology" for Hg emissions from the EGU industry. The commenter stated that CAA §111(d) (1) requires "standards of performance," a phrase defined in CAA §111(a) (1). Congress's use of the term "best" reflects its intention that the emission standards would be those achieved by control technologies that are "excelling all others," and it is the emissions standard that must be "achievable," not the system of emissions reduction.

The commenters stated that EPA now asserts that it "evaluated the controls that effect the best emission reduction of [Hg]" and set the NSPS on that basis. The Agency further asserts that it reviewed the ICR-3 emissions test data "to identify the units that were using technologies which were most effective at capturing [Hg] from coal-fired power plants" - and then defines "BDT" solely on that basis. The Agency opines that "[t]he technologies that appeared most effective in reducing [Hg] emissions were those that were installed, or likely to be installed, to comply with the current NSPS standards for particulate matter and SO_2." EPA provides no further basis or justification for this choice of BDT.

The commenters believe that EPA's selection of BDT is fundamentally contrary to law for several reasons. First, it does not consider the "best" Hg control technologies in use in the EGU industry, particularly ACI, despite the fact that EPA is well-aware of the existence and performance of this technology on coal-fired EGUs. EPA's final rule, furthermore, had rejected ACI on unlawful grounds – asserting that ACI was not "commercially available"– an assertion which is not relevant to the statutory factors permitted for an NSPS determination, and also is not supported on the record. CAA §111 expressly identifies the criteria EPA may consider in setting an NSPS, and the Agency is, therefore, limited to considering those factors. CAA §111(a) (1) directs the Agency to consider "cost...any nonair quality health and environmental impacts and energy requirements." "Commercial availability" is not "cost" – cost is the amount that must be spent to achieve the emissions reductions. Furthermore, even if "commercial availability" includes the consideration of cost, the record demonstrates that the cost of ACI is reasonable and can achieve emission rates that are far more stringent than what EPA has proposed. In terms of availability, air pollution control vendors have publicly acknowledged that several engineering companies have recently signed contracts with several utility companies for Hg-specific control technologies. According to the commenters, the industry is poised and ready to respond with manpower and products to increasing demand for their services. Moreover, to the extent that EPA's failure to consider or its rejection of ACI is based on whether ACI is "achievable," that word refers to the technical limits of a system, not its commercial availability. Indeed, the commenters believe that EPA can designate a given system, such as ACI, as BDT even where it has minimal data on the system's application within a particular industry. Moreover, "it is the systems which must be adequately demonstrated and the standard which must be achievable." The record demonstrates that an emissions rate based on the application of ACI is "achievable."

The commenters stated that EPA's NSPS are contrary to law because they are based on assertions EPA knows are spurious about the future application of EGU control technologies for the control of SO_2 emissions. EPA asserts that its analysis of BDT included an investigation of technologies "likely to be installed, to comply with the current NSPS standards for particulate matter and SO_2." EPA's assertions of the "likelihood" of these installations run contrary to the actual modeling evidence the Agency has done, which shows that even in the CAIR region, there will be numerous EGUs without scrubbers for SO_2, even as late as 2015.

This flawed analysis, in the commenters' opinion, is yet another piece of the circular logic that pervades EPA's attempt to remove EGUs from the list of industries requiring a MACT standard and instead regulate them using the illegal cap-and-trade approach, based on an illegal and inadequate NSPS. In the delisting rule, the Agency asserts that it can rely on CAIR and CAMR co-benefits in order to make its determination that there will be no adverse impacts of EGU Hg emissions "after imposition of the requirements of the Act." Here, however, EPA completes the circle of illogic, by setting NSPS at levels that do not comply with "the requirements of the Act" because they do not reflect BDT. In other words, EPA's delisting rule asserts that CAMR is "requirement of the Act," and relies on the results to be achieved by CAMR, to support the revised regulatory determination and delisting of EGUs, but in fact, CAMR itself does not satisfy the "*requirements* of the Act" with respect to NSPS setting.

Commenters 6479 stated that EPA's assessment of BDT was arbitrary and capricious in that EPA states that it "evaluated the controls that effect the best emission reduction of the pollutant in question (in this case, Hg)" and thereby set NSPS levels based on its determination of BDT. Despite the central role that BDT allegedly plays, EPA provides insufficient information about the criteria and general decision-making process that it used to select BDT for each subcategory of EGUs. EPA indicates only that it reviewed ICR-3 test data "to identify the units that were most effective at capturing Hg from coal-fired power plants (i.e., BDT)" and that the technologies that appeared most effective in reducing Hg emissions were those that were installed or likely would be installed, to comply with the current NSPS standards for PM and SO_2. This combination of controls was most effective in reducing Hg emissions and, thus, is considered BDT. EPA gives no further justification or documentation of the criteria it used to choose BDT, rendering the Agency's choice of BDT highly arbitrary.

Furthermore, EPA's choice of NSPS standards for certain subcategories underscores the arbitrary nature of the Agency's BDT analysis. For example, EPA determined that in the "dry subbituminous" subcategory "the achievable Hg emission limit reflecting BDT for dry FGD subbituminous coal units is the same as the maximum annual average uncontrolled Hg emission rate for the dry subbituminous subcategory. EPA's assertion that such an emission limit can represent the "Best" demonstrated technology is, therefore, unreasonable. Similarly problematic is EPA's assessment of what constitutes a "demonstrated" technology. EPA determined that BDT in the "wet subbituminous" subcategory consisted of a combination of a FF and wet FGD. EPA choose this combination as BDT, even though "there are no subbituminous coal units listed in ICR-3 that utilize a FF/wet FGD combination". EPA's decision to select a technology that "likely would be installed," as opposed to a technology that is "Demonstrated" in a literal sense is particularly capricious in light of the Agency's rejection of any consideration of ACI technology as a system of Hg emission reduction. Based on information available today, BDT for Hg emissions from EGUs includes dry scrubbers with carbon injection (brominated for subbituminous coal) and FF control.

Commenter 6577 stated that highly effective Hg control technologies are available and cost effective. Two companies that supply B-ACI for utility power plants offer removal rate guarantees. The ACI industry reports that there is a sufficient supply of activated carbon to supply the anticipated demand for Hg control by the regulated industry. More than 800,000 tons of activated carbon is currently produced worldwide annually. The technology has proven to be more cost effective than initially thought by EPA. The cost of ACI has been reported to be ranging between $2,000 and $20,000 per pound of Hg removed, much less than the control cost of $50,000/lb that was considered in the proposed rule. The B-ACI technique has reduced the amount of activated carbon necessary to create the same effect. By reducing the amount of activated carbon needed, the B-ACI technology will have a significant impact on the results of IPM modeling included in the proposed rule. The impact from the use of B-ACI will serve to positively enhance the economic viability of Hg control under MACT. It also addresses any potential concerns regarding sufficient availability of activated carbon.

Response:

Commenter's assertions address the standards of performance established for new sources (i.e., the NSPS). EPA maintains that it properly selected and analyzed BDT in CAMR and its approach is consistent with the approach it has employed in establishing NSPS in other NSPS rulemakings (see, e.g., 70 FR 9714-6, February 28, 2005; 63 FR 49444, September 16, 1998; 62 FR 36952, July 9, 1997). As an initial matter, EPA agrees with the commenter that it is the system which must be adequately demonstrated and the standard that must be achievable. We disagree with the commenter on numerous other grounds, however.

First, contrary to the commenter's characterization, the case law does not interpret CAA §111 to mean that the emission standard "be...achieved by control technologies that are 'excelling all others.'" Rather, under CAA §111, EPA must set an achievable standard, which is one that is within the realm of the adequately demonstrated system's efficiency. See National

Asphalt Pavement Ass'n v. EPA, 539 F.2d 775 (D.C. Cir. 1976). To be achievable, a uniform standard must be capable of being met under most adverse conditions which can reasonably be expected to recur and which are not, or cannot be, taken into account in determining the "costs" of compliance. See National Lime v. EPA, 627 F.2d 416 (1980).

Consistent with the requirements of CAA §111, EPA reviewed the control technologies available for controlling Hg emissions, selected the technology (or technologies) that resulted in the best emission reduction performance, and then assessed those performance levels to determine the appropriate emission limit for each subcategory of sources (see revised NSPS memo in docket EPA-HQ-OAR-2002-0056).

Second, the commenter misinterprets our use of the term "commercial availability" in the final rule. EPA did not, as the commenters assert, inject a new factor into its BDT review, but rather evaluated the statutory factors of cost, nonair health and environmental impacts and energy requirements. When read in context, it is clear that the use of the term "commercially available" was a shorthand phrase for dealing with the questions of whether a particular type of control technology has been "adequately demonstrated" and whether a particular level of emission reductions based on the use of that technology is, therefore, "achievable." We have not received any information to give us reason to alter our position in this regard, nor do we think there is any such information available.

Third, we disagree with commenters' assertion that ACI for new units is "adequately demonstrated." Specifically, commenters allege that ACI is demonstrated because it is being included in several State permits for coal-fired EGUs. However, commenters neglect to point out that there currently are no full-scale, operating ACI installations on U.S. coal-fired EGUs (nor are any planned until at least 2007 or 2008) upon which to base their claim. Further, detailed examination of the permits on which they rely indicates that at least some of the cited permit limits are not enforceable Rather, the permit limits are written such that they are expressly subject to change by the State following emission testing to be conducted 18 months following start-up of the system.[294] *Another facility has announced plans to use its facility as a test site for Hg controls for 3 years. During that 3-year period, the facility must install ACI technology, but there is then an ensuing 18-month period before an emission limit is set based on the demonstrated performance of the technology.*[295] *Thus, these "permits" are essentially State-authorized Hg emission test programs, similar to the one being conducted by the DOE. Their existence alone does not demonstrate that ACI can be the basis for BDT. Ordinarily, EPA defers to the permitting process as indication that the stakeholders (e.g., States, industry, control device vendors, third parties) are convinced that the permit levels are achievable using the designated control technologies. In the case of Hg, however, EPA believes that it is apparent from these permits that the major stakeholders (e.g., States, industry, control device vendors) remain unconvinced that the technologies will work as advertised and have written into the permits "escape clauses" to cover contingencies. This situation belies the commenter's contention that the vendors are ready and able to provide "permit-ready" performance guarantees for this technology.*

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[294] See EPA-HQ-OAR-2002-0056-6707. See also EPA-HQ-OAR-2002-0056-6708.
[295] See EPA-HQ-OAR-2002-0056-6709.

Fourth, EPA does not believe that it is ironic that we would choose as BDT for subbituminous units a technology combination that is not currently being used while at the same time rejecting ACI. The components of the technology combination chosen (i.e., FFs and wet FGD) are being utilized individually on subbituminous units and there is, therefore, no technical reason to believe that they could not be used in combination. As noted above, this is in stark contrast to the situation of ACI.

Finally, commenters' characterization of CAIR and EPA's reliance on that rule in CAMR is erroneous. As the commenter notes, the NSPS are for "new" sources which must meet not only the Hg emission limits of 40 CFR part 60, subpart Da, but also those for PM, NO_x*, and* SO_2*. Existing units may or may not install controls (e.g., scrubbers) under CAIR; however, the commenter has not shown that there will be any new units that will not install such controls to meet the* SO_2 *NSPS limits. EPA does not believe that there will be any coal-fired EGUs that will not install FGD to comply with the* SO_2 *provisions of 40 CFR part 60, subpart Da. (The pre-2006 subpart Da* SO_2 *NSPS limits are bound by a minimum reduction requirement of 70 percent and a maximum reduction requirement of 90 percent. The revised* SO_2 *NSPS limits remove the percent reduction requirements but establish an equivalent emission limit. The economic analysis for the revised subpart Da NSPS assumes all new units will have some type of FGD system installed.*[296]*)*

Comment:

Commenter 6472 stated that ACI is commercially available and proven, today. Other technologies which were commercially available, but not in use on EGUs in 2003, have now been proven on EGU's with many tests. Of those, ACI, or brominated ACI in the case of low chlorine coal, has been shown highly effective at Hg control. Hence, use of traditional criteria pollutant control technology, although effective at controlling Hg, is not the only option available. This is particularly relevant for the issue of timing of the Hg limits.

Commenter 6472 stated that ACI has been used successfully on MWC units for over 10 years. In New Jersey alone, 13 units at 5 facilities now remove about 95 to 99.7 percent of the Hg, as determined by inlet testing vs. stack testing. These high efficiencies were achieved with dry scrubbers on all 13 units, indicating that less stringent limits are not required for EGU's with dry scrubbers. Installation of ACI was quick, less than one year for all 13 units, and at low capital cost. One facility installed carbon injection in a matter of months by renting temporary portable injection units.

The commenter added that with ACI on MWC, Hg control efficiency has improved over time. New Jersey's MWC Hg rule initially required 80 percent control and in November 2004, was revised to require 95 percent control for the efficiency part of our hybrid Hg control standard (concentration limit or efficiency limit). EPA has also recently proposed increasing the Hg removal efficiency requirement for new MWC units. The commenter provided recent test results for Hg testing of MWC in New Jersey. The commenter asks that EPA please consider these data, along with the MWC Hg control data previously provided.

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[296] See EPA-HQ-OAR-2005-0056-6699.

Commenter 6472 stated that EPA should consider the benefits of technology transfer in trying to control Hg emissions from EGUs. Greater than 99 percent Hg removal is achieved by dry scrubbers, carbon injection, and FFs. With over 10 years of operation, there have been no reported adverse effects of the carbon on other systems. (That is true for the ESP equipped facilities as well.) The 99 percent removal efficiency is 10 times more efficient than the 90 percent control efficiency New Jersey has adopted in the standard for coal combustion. Using a lower efficiency than achieved by MWC recognizes that uncontrolled Hg from coal combustion is at a lower concentration than MWC Hg in the flue gas, typically by a factor of about 10. The 0.5µg/m^3 emission level achieved with ACI on MWC is particularly relevant for coal. This MWC outlet concentration is equivalent to about 0.5 lb/TBtu (2.5 milligrams per megawatt-hour (mg/MWh), or 5.5 x 10^{-6} lb/MWh) for a typical coal fired power plant. This is about 4 to 30 times lower than EPA's proposed NSPS standards for new coal fired plants. Hence, well-controlled MWC with FFs achieve the New Jersey concentration standard for coal combustion and are well under the rates in the EPA proposed NSPS for coal combustion.

The commenter added that although the percentage ionic Hg content may be higher for MWC than some coal plants, even if MWC elemental Hg content were only 10 percent of the total, that is comparable to the total amount of Hg emitted by some coals. Achieving 0.5 µg/m^3 means that over 95 percent of the elemental Hg from MWC was controlled by ACI. Also, the fact that ACI on MWC, with much higher inlet Hg concentrations than coal, results in outlet Hg levels below the coal standard adopted by New Jersey, means it is reasonable to conclude that ACI control of coal combustion can achieve at least the same emission concentrations. Hence, the transfer of the proven ACI technology to coal combustion is indicated by the ACI experience for MWC. Also, the data gathered on numerous coal tests shows ACI control factors for coal to be the same, or similar to, New Jersey's experience with MWC. In both cases, FFs are substantially more effective than ESPs, more carbon achieves better control, and good distribution of the carbon is important.

Response:

We disagree with the commenters' characterization of ACI, and we outline our position on ACI in the final CAMR and supporting documents and elsewhere in this document.

The remainder of the commenters' assertions relate to the issue of technology transfer and ACI. As we have explained previously, there are important technical differences between EGUs and MWC units which need to be recognized and which, we believe, preclude any direct transfer of emission control capabilities, particularly as pertains to Hg, between the MWC and Utility industry sectors. See 69 FR 4673-4, January 30, 2004. Nothing that the commenter has submitted leads us to change our position concerning the issue of transfer of technology. Id.

Comment:

Commenter 6499 stated that pilot testing of ACI on Gulf Coast lignite demonstrated that for ACI, "lower-than-expected collection efficiency was observed throughout [the] test matrix – high carbon injection rates [were] required to obtain 60 percent-70 percent. Three to four times as much AC is needed to achieve similar levels of control as compared to other coals." Also, the initial data from another DOE/NETL pilot project on TXU's Monticello Unit 3 indicates that oxidation catalysts lose 10 percent to 25 percent of their oxidation effectiveness over a three month period.

Response:

EPA concurs that ACI on lignites may require more carbon and needs further investigation.

Comment:

Commenter 6621 stated that despite the fact that presently there are no commercially available technologies designed exclusively to control Hg emissions from all coal-based power plants, currently installed controls for PM, NO_x, and SO_2 emissions already capture about 40 percent of the Hg contained in the coals power generators use to produce electricity. The commenter believes that EPA failed to focus on the lack of technology that is suitable now or "off the shelf' for smaller coal-fired Utility Units, especially those with a limited "foot print" for retrofitting emissions control equipment. The focus on available technology has primarily been on >100 MW units. Municipal and other State and local community-owned electric utilities have a large number of <100 MW units that will be required to reduce Hg, but they must be realistic about the viability of those smaller units and how much retrofit investment can be economically justified. Yet, especially now in this time of increasing electricity prices nationwide, those smaller units (often "peakers" or "intermediates") are needed in operation or able to be available for dispatch to maintain local and regional electricity reliability.

Response:

EPA believes that the CAMR program adequately addresses the commenter's concern in that the Phase I cap is based on just the "off the shelf" technologies that the commenter desires. The Phase II cap is based on the development and installation of Hg-specific technologies that can be designed and adapted to the wide range of installation scenarios existent in the industry.

Comment:

Commenters 6282 state that EPA determined the BDT for Hg reduction through an arbitrary analysis of subsets of EGUs based on coal-type and emission control technology. However, EPA failed to consider the best-performing units in each category, instead preselecting a combination of controls the Agency felt was the best, and analyzing units in a given subcategory that possessed such a combination. For example, in setting the NSPS standards for bituminous units, EPA analyzed data from five units: Mecklenburg Cogeneration Facility; SEI-Birchwood Power Facility; Logan Generating Plant; Clover Power Station; and Intermountain. It did not include the W.H. Sammis Plant in its analysis despite the fact that Sammis burns bituminous coal and gets significantly greater Hg emissions reductions than the Intermountain facility. Stack tests of the Intermountain facility reveal that it actually burns a mixture of bituminous and subbituminous coal, making its inclusion in the analysis even more arbitrary. As a result, EPA arbitrarily excludes units with better-performing systems and includes less efficient units, simply because they meet EPA's pre-selected criteria. EPA offers no reasoned analysis for this approach, which inappropriately lowers the resulting NSPS standard and fails to meet the requirements for a standard of performance.

Response:

The W.H. Sammis facility uses compliance coal (i.e., no scrubber) and a FF. Thus, this facility was determined not to use BDT (i.e., particulate control plus add-on SO_2 *control) and, therefore, was not included in the analyses. EPA conducted an analysis under CAA §111, requiring the use of BDT, rather than under CAA §112, requiring the use of the best-controlled unit(s).*

Further, EPA believes that the commenters are confusing the methodologies for establishing standards under CAA §111 with those utilized under CAA §112. The United States Court of Appeals for the District of Columbia Circuit has previously indicated that an NSPS must be achievable by all new units to which it will apply over the full range of operating conditions which can reasonably be anticipated to occur. In making this determination, it is appropriate for EPA to consider the performance of a variety of units, not just the "best performing units."

Comment:

Commenters 6479 stated that EPA continues to include inappropriate facilities in its assessment of BDT for the bituminous subcategory. The section on bituminous coal-burning units still erroneously includes the Intermountain unit, which, although listed as burning bituminous coal in the ICR-3 data, is reported in the stack test report as burning a mixture of bituminous and subbituminous. The stack test report used for the ICR-3 database for this facility states that the unit is "fired with a blend of bituminous and sub-bituminous coal." Based on this stated difference in fuel type, this unit should not have been included with the other four in the bituminous subcategory. Further, another unit - the Dwayne Collier unit - has been added to the group of bituminous units. The data for this unit indicates that it has a stoker furnace rather than a regular pulverized coal type of burner. Using stoker data to set a standard for pulverized coal burners may be inappropriate from a Hg control perspective. The commenter believes that only four units - Mecklenburg, SEI-Birchwood, Logan, and Clover - apparently fit EPA's criteria as representing examples of BDT for bituminous coal-fired units. These units are reported as having 98.8, 97.8, 97.8, and 96.7 percent control respectively. The two additional units that the commenter believes are erroneously included are reported to have control efficiencies of 83.8 and 95.2 percent. Any reasonable statistical treatment of the data reveals that the addition of these two units greatly lessens the calculated average control efficiency of the group.

Response:

EPA has reviewed the test report for the speciated Hg testing conducted at the Intermountain facility. The commenter is correct that the test report indicates that Unit 2SGA is "fired with a blend of bituminous and sub-bituminous coal." However, EPA notes that this description is contained within a general description of the facility, not in any specific discussion *of conditions during the test program (indicating overall design capability but not specific operating details at any given time). EPA has also reviewed the coal data that Intermountain provided through the ICR-2 data collection. These data were to be the same data as provided to the DOE/EIA under their appropriate statutory authority. Never in the reporting period of 1999 did Intermountain report receiving subbituminous coal. Further, the coals identified in Table 2-3 of the Intermountain emission test report are all identified in their ICR-2 submittals as being bituminous. Therefore, absent any information that the DOE/EIA data are inaccurate, EPA continues to believe that the unit was burning bituminous coal during all of 1999, including the period of the test, and is appropriately placed in the subject subcategory.*

With regard to the Collier facility, the commenter has not provided any information that would indicate that stoker units similar to Collier will not be built in the future, and are, therefore, not representative of what a new unit could look like. Therefore, EPA believes that inclusion of the Collier facility in the subcategory is appropriate.

<u>Comment</u>:

Commenter 6559 continues to object to EPA's use of an FBC unit burning Indonesian coal. EPA should not be setting domestic standards using foreign coals.

<u>Response</u>:

The AES Hawaii unit to which the commenter refers is but one of four units used to establish the dry FGD NSPS limit for subbituminous coal-fired units. EPA does not feel it appropriate to exclude a coal rank or source that is currently being used in a U.S. EGU, particularly when that coal is also being used at two other facilities (according to the ICR-2 data) and, thus, is a viable option for future use at these or other facilities. Further, EPA has previously stated its belief that it is appropriate to look at the performance of sources located in other countries, as well as domestic sources, in determining BDT. The United States Court of Appeals for the District of Columbia Circuit has endorsed this approach. <u>See</u> <u>Lignite Energy Council v. U.S. EPA</u>, 198 F.3d 930 (D.C. Cir. 1999). EPA's use of an FBC unit burning Indonesian coal is analogous.

2.1.6 Definition of Covered Units as Including Municipal Waste Combustors (MWC)

<u>Comment</u>:

Commenter 6458 supports EPA's reconsideration of the rule, specifically its conclusion that CAMR does not regulate MWC units, a source category that is already well-regulated by Federal standards including CAA §129 and CAA §111. The commenter believes EPA is correct when they offer that the term "EGU" specifically excludes MWC units that are subject to applicable NSPS, an EPA-approved State plan, or an applicable Federal plan. The commenter added that there are compelling reasons why EPA should promulgate its exclusion of MWC units from CAMR. These reasons stem from the fact that MWC facilities are fundamentally different from EGUs and are regulated as a separate source category for purposes of air toxics and criteria pollutants. The primary purpose of MWC facilities is to burn and properly dispose of solid waste and not to generate electricity for sale. Because MWC boilers burn a heterogeneous, wet municipal solid waste, they are not designed, constructed or operated in the same manner as EGUs which burn a uniform and consistent fossil fuel.

Commenter 6649 supports EPA's proposal to revise the definition of EGUs to establish an exemption for MWCs. EPA already regulates Hg emissions from all MWCs through EPA-approved State plans or Federal plans as set forth in 40 CFR part 62, subparts FFF and JJJ. Failure to specifically exclude MWCs from regulation under CAMR would cause undue hardship to owners and operators trying to comply with two emission limits for the same pollutant.

Response:

EPA has clarified the definitions to exclude MWC units from CAMR.

2.1.7 Definition of Covered Units as Including Some Industrial Boilers

Comment:

Commenter 6620 stated that supports the revision to the EGU definition in 40 CFR 60.24(h) to include only stationary, coal-fired combustion turbines serving, at any time after November 15, 1990, a generator with a nameplate capacity of more than 25 MWe producing electricity for sale. This date would be consistent with the dates used in the Acid Rain Program and proposed changes to CAIR.

Response:

EPA appreciates the commenters support.

Comment:

Commenter 6460 agrees with EPA's statement in the preamble that the definition for EGUs and cogeneration units should be synchronized with the definition used by the Acid Rain Program (40 CFR part 72) and the Boiler MACT. As CAMR is currently written, some 6 percent of the smallest units regulated under the rule have never been subject to the Acid Rain Program. Therefore, the commenter requests that EPA add language to the definition of EGU in CAMR that will exempt cogeneration facilities that are not subject to the Acid Rain Program, but that are regulated under the Boiler MACT.

Response:

EPA is maintaining the applicability definition in the final CAMR for such boilers. We are, however, proposing to revise the applicability definition in the Boiler MACT (CAA §63.7491), in order to exclude units subject to CAMR (see 70 FR 62264, 62272). EPA believes that this is a reasonable approach that will avoid subjecting certain units to both CAMR and a

MACT for Hg, while maintaining an applicability definition under CAMR for coal-fired units that is consistent with CAIR. The commenter does not provide analysis that would support certain units being subject to a boiler MACT rather than CAMR. EPA believes that the CAMR cap-and-trade approach provides a cost-effective way to reduce Hg emissions from coal-fired power plants.

Comment:

Commenter 6476 agrees that certain industrial boilers should not be subject to both the Boiler MACT and CAMR. The commenter does not take a position as to how EPA should resolve this problem.

Response:

EPA agrees and has resolved this issue as described above.

Comment:

Commenter 6509 supports EPA's proposed change to clarify that industrial boilers are not subject to CAMR and to introduce a definition of affected EGU based on criteria of post November 15, 1990 service from a generator with a nameplate capacity of more than 25 MW producing electricity for sale.

Response:

As stated above, pursuant to the revisions to 40 C.F.R. §60.14(h), industrial boilers are covered by CAMR, but only if they serve, at any time after November 15, 1990, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

Comment:

Commenter 6580 noted that EPA determined those units with boilers equal to or less than 25 MWe and generators greater than 25 MWe should not be subject to both CAMR and the Boiler MACT. The commenter supports this decision. EPA, however, included these units in CAMR. The commenter believes that EPA lacks the statutory authority under the plain language of the CAA to include these units within CAMR. Further, EPA's decision to include units with boilers equal to or less than 25 MWe in CAMR is an arbitrary and capricious reversal of EPA's long-standing position on this issue. The commenter believes that EPA's failed to provide adequate and timely notice and outreach to municipal utilities with boilers less than or equal to 25 MWe regarding CAMR and, thus, violated the letter and spirit of the Unfunded Mandates Reform Act.

The commenter proposes that in order to make EPA's regulations consistent with CAA §112(n)(1)(A), EPA maintain the current definition of covered units under Boiler MACT and cross-reference CAMR to either the Boiler MACT or to CAA §§112(n)(1)(A) and (a)(8). The commenter recommends that EPA amend 40 CFR 60.4101(a) to add an additional exclusion in subsection (c). Specifically, the commenter recommends the following underlined language be added to 40 CFR 60.4101 and that the current coverage provisions of the Boiler MACT be left unchanged:

> The following units in a State shall be Hg Budget units, and any source that includes one or more such units shall be an Hg Budget source, subject to the requirements of this subpart:
> (a) Except as provided in paragraphs (b) and (c) of this section, a unit serving at any time, since the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.
> (b) For a unit that qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continues to qualify as a cogeneration unit, a cogeneration unit serving at any time a generator with nameplate capacity of more than 25 MWe and supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale. If a unit qualifies as a cogeneration unit during the12-month period starting on the date the unit first produces electricity but subsequently no longer qualifies as a cogeneration unit, the unit shall be subject to paragraph (a) of this section starting on the day on which the unit first no longer qualifies as a cogeneration unit.
> (c) Units regulated under 40 C.F.R. Part 63, Subpart DDDDD

Conforming changes would need to be made to the applicability provisions of the model trading rule (Subpart HHHH, 40 C.F.R. 60.4104). In the alternative, the commenter requests that EPA provide an applicability determination that the commenter is subject to only the Boiler MACT. The commenter also requests that EPA consider a voluntary opt-into CAMR for units with boilers less than or equal to 25 MWe and generators greater than 25 MWe.

Response:

EPA disagrees with the commenter's assertion that it does not have the authority to include boilers with a capacity less than 25 MWe but serving a generator greater than 25 MWe under CAMR as opposed to the boiler MACT. The CAA §112(a)(8) definition of an electricity steam generating unit defined the universe of sources to be evaluated in accordance with CAA §112(n)(1)(A). However, upon EPA's determination that it was not appropriate and necessary to regulate electric generating units under CAA §112, the Agency then had the authority to propose and finalize an appropriate applicability definition for the rule under CAA §111. EPA believes that the applicability definition included in the final CAMR, and the approach it proposed in the Notice of Reconsideration for preventing overlapping applicability with the Boiler MACT are both reasonable. Further, EPA has complied with the requirements of UMRA in the CAMR rulemaking. See the final CAMR preamble for detail on how Executive Orders were addressed.

Comment:

Commenter 6622 provided additional information on the #21 Boiler at the S.D. Warren Company – Westbrook Mill located in Westbrook, ME. Since startup in 1981, the unit has qualified as a “cogeneration unit” under CAMR. It has also served as a generator with nameplate capacity of more than 25 MWe. It is not clear from the Mill’s existing records (due to severe flooding in October 1996) whether the unit sold more than 1/3 of its potential electric output capacity to a utility power distribution system for sale prior to 1997. However, the Westbrook Mill’s records demonstrate that the boiler has not exceeded this regulatory threshold since October 1997. Nonetheless, based on EPA’s background documents and the Hg budget allocated to the State of Maine under CAMR, it appears that EPA has considered #21 Boiler to be an affected utility unit for purposes of CAMR.

The commenter stated the Notice of Reconsideration is unclear whether EPA intends that a unit such as the #21 Boiler should be subject to the Boiler MACT and exempt from CAMR; or conversely, whether such a boiler is to be subject to CAMR but exempt from the Boiler MACT. The commenter strongly urged that CAMR be clarified to incorporate the former approach. The commenter believes that the #21 Boiler, and similar industrial cogeneration boilers subject to the Boiler MACT, should not be subject to CAMR because they would be at a disadvantage with competitors who will operate with boilers or cogeneration boilers subject to Boiler MACT but not CAMR.

The #21 Boiler emits about 3 lb Hg/yr and is the only utility unit within the State of Maine identified by EPA as being affected by CAMR. The commenter further stated that if the #21 Boiler is to be subject to CAMR, Maine’s Hg allocation should be corrected – on a basis that is consistent with the approach used for the Acid Rain Units. Using annual (1999 – 2002) coal usage rates for the #21 Boiler (reported to Maine DEP under Chapter 137) and EPA’s allocation spreadsheet, it appears that the allocation to the State of Maine should be 110 ounces allocated for 2010 and 43 ounces allocation for 2018.

Response:

EPA has addressed the status of SD Warren #21 elsewhere in this document.

Comment:

Commenter 6621 supports situations where some utilities prefer to have their < 25 MW boilers covered by CAMR rather than the Boiler MACT. The commenter believes that < 25 MW units should be able to make this choice between the two Hg rulemakings if they desire.

Response:

EPA aggress that individual units should not be subject to both CAMR and the Boiler MACT and is refining the applicability definitions under both CAMR and the Boiler MACT as discussed earlier in this section. EPA could not allow individual sources to choose which of the two programs with which they would comply. This would greatly complicate administration, compliance determination, and enforcement under both programs.

Comment:

Commenter 6649 supports EPA's proposal to prepare revisions to its Boiler MACT to specifically exclude units subject to CAMR from regulation under the Boiler MACT. The commenter was one of the petitioners requesting clarity on this oversight to avoid potential dual regulation for two of its boilers in northern Wisconsin. Although this proposal will likely succeed in removing the ambiguity currently existing within CAMR on this issue, it does not appear to address a "fallout" issue relating to EPA's exclusion of these affected units when calculating the State Hg budgets in CAMR. In the January 30, 2004 NPR, EPA indicated its formula for determining the total amount of allowances for the Hg budget trading program involved using the baseline heat input of all affected units in a State, assigning each unit in the State allowances based on its proportionate share of the total heat input, and summing each unit's allowances in each State to determine that State's 2010 and 2018 Hg budgets. Therefore, in certain States (i.e., those with boilers originally assumed by EPA to be regulated by the Boiler MACT, and now being regulated under CAMR) electric utilities will be unduly penalized if the State Hg budgets are not re-calculated to include the heat input of these additional units. Therefore, although the commenter strongly supports EPA's proposal to revise the Boiler MACT to specifically exclude units subject to CAMR, it also requests Hg allocation budgets be re-calculated in affected States in order to address a potential shortfall as a result of this revision.

Response:

EPA appreciates the commenter's support of its approach for clarifying applicability between the two rules. EPA is not revising the CAMR State budgets to attempt to consider the heat input from any small units that may have been excluded from the ICR and subject to CAMR, beyond those for which commenters have submitted actual historic heat input data. EPA believes that addition of these units would have a very small impact on overall State budgets, particularly if they were to being added in a number of States. EPA did not purport that the heat input inventory used to calculate State budgets represented a comprehensive list of CAMR affected sources. Rather, EPA attempted to represent, to the best of its ability, historic heat input and coal use in each State. It should be noted that the hypothetical unit allocations that were used to calculate State budgets do not represent actual unit allocations.

2.2 Clarification of Statements Made in CAMR

In the final CAMR, we state that "As stated elsewhere in this action, EPA does not believe that utility hotspots will be an issue after implementation of CAIR and CAMR." See 70 FR 28631. This statement has engendered some confusion. Specifically, in a May 15, 2006 report, EPA's Office of Inspector General stated that it thought this statement if read in conjunction with the Section 112(n) Revision Rule could be construed to mean that EPA can only modify the standards of performance in CAMR if it finds a utility hotspot. As we reported back to the Office of Inspector General, the identification of a utility hotspot is **not** a prerequisite to revising the standards of performance in CAMR.

In CAMR, we established standards of performance pursuant to CAA §111. That section, among other things, requires that every 8 years EPA review the standards of performance established for new sources, and, if appropriate, revise such standards. See CAA §111(b). In conducting such a review, EPA analyzes, among other things, the availability of control technologies installed since the previous review, the costs of such technologies, and any other information relevant to the statutory factors set forth in CAA §111(a) (i.e., cost of achieving the reductions, nonair health and environmental effects and energy requirements). For example, if the Agency determines that a new technology provides additional reductions in a cost-effective manner, the Agency can modify the standard of performance accordingly. In addition, apart from the 8-year review, EPA strives to stay abreast of technological and other developments and reviews any new information that is provided to the Agency in this regard, whether through a petition to modify the standards of performance or otherwise. Thus, although information concerning utility hotspots would certainly be relevant to a possible future revision of the standards of performance in CAMR, such hotspots are, by no means, a prerequisite to amending such standards. Were EPA to propose revisions to the standards of performance in CAMR, it must consider the statutory factors in CAA §111(a) and justify the proposed revisions consistent with the requirements of CAA §111.

3.0 Comments Not Related to the Issues Subject to Reconsideration

Comment:

A number of comments received during the comment period were on topics for which reconsideration was either not requested or not granted. These topics included (1) the pros and cons of the overall CAMR cap-and-trade program (commenters 6455, 6457, 6459, 6461, 6462, 6463, 6465, 6467, 6469, 6470, 6472, 6474, 6480, 6482, 6483, 6486, 6489, 6491, 6494, 6508, 6509, 6511, 6512, 6514, 6515, 6516, 6518, 6519, 6520, 6521, 6523, 6524, 6526, 6527, 6528, 6531, 6532, 6534, 6535, 6536, 6337, 6538, 6539, 6540, 6541, 6542, 6543, 6544, 6545, 6546, 6547, 6548, 6549, 6550, 6551, 6552, 6553, 6554, 6555, 6556, 6557, 6558, 6559, 6560, 6561, 6564, 6565, 6566, 6567, 6568, 6569, 6570, 6571, 6572, 6573, 6576, 6586, 6588, 6592, 6593, 6594, 6595, 6596, 6599, 6600, 6601, 6602, 6603, 6604, 6605, 6606, 6607, 6608, 6611, 6612, 6614, 6617, 6618, 6621, 6625, 6627, 6628, 6629, 6630, 6631, 6632, 6635, 6637, 6638, 6643, 6644, 6645, 6646, 6647, 6649, 6655, 6664, 6670, and 6684); (2) the pros and cons of the STAPPA "model rule" or otherwise related to regulatory or permitting efforts in specific States (commenters 6455, 6474, 6506, 6586, 6588, 6599, 6610, 6643, and 6666); (3) assertions that further emission reductions must provide commensurate benefits (commenters 6459, 6461, 6482, 6611, and 6617); (4) the CAMR implementation schedule (commenters 6459, 6461, 6474, 6482, 6558, 6611, and 6621); (5) the availability of air pollution construction personnel under CAMR (commenters 6459, 6461, 6558, and 6611); (6) use of the American Society for Testing and Materials (ASTM) rank in CAMR determinations (commenters 6507 and 6510); (7) claims that EO 13211 will be triggered (commenter 6513); (8) adequacy of the opportunity to comment (commenters 6513 and 6558); (9) the need for fuel diversity (commenters 6474 and 6501); (10) support for nationwide participation in the cap-and-trade program (commenter 6584); and (11) monitoring issues (commenter 6586).

Response:

EPA did not ask for comment on or otherwise open for reconsideration these issues. Therefore, we are not considering these comments as part of the reconsideration process, and are not responding to them.

4.0 Summary of EPA Responses on Issues For Which Reconsideration Was Denied

In their petitions for reconsideration, the Petitioners sought reconsideration of many issues in both the Section 112(n) Revision Rule and CAMR. This Section addresses the issues for which EPA is denying reconsideration. As explained below, we are denying reconsideration of these issues because they fail to meet the procedural test for reconsideration under CAA §307(d)(7)(B), and/or are not of central relevance to the outcome of the rule, both of which are necessary conditions precedent to granting reconsideration.

4.1 Final Section 112(n) Revision Rule

4.1.1 EPA Failed to Address Certain Comments

Petition:

Petitioners 6280 state that EPA arbitrarily refused to address some comments that were submitted before the close of the public comment period. They argue that the Central States Air Resource Agencies Association (CenSARA) submitted timely comments noting that at least two EGUs have been permitted since EPA's December 2000 "appropriate and necessary" determination and have been required to undergo a CAA §112(g) case-by-case MACT evaluation. CenSARA sought guidance from EPA on whether the Agency's revision of the December 2000 finding would affect these units. Petitioners state that the Agency's only response in the Response to Comments document was to say: "EPA is not addressing today the issues raised by these comments. The Agency will continue to consider the commenter's suggestion for guidance on the applicability of CAA §112(g)." Petitioners claim that EPA's failure to address this issue of the status of EGUs that have already undergone a MACT determination creates uncertainty and results in an unequal treatment of facilities.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the outcome of the final rule. They argue only that they did not like EPA's prior response to their comment, but that is not a sufficient ground for reconsideration. Petitioners' objection focuses not on the substance of the Section 112(n) Revision Rule, but rather on how that rule is to be implemented. Implementation of a rule is routinely addressed, if necessary, through guidance, which is what EPA explained in its initial response. Moreover, contrary to Petitioners' assertion, the final Section 112(n) Revision Rule did not create uncertainty. In the final rule, EPA removed coal- and oil-fired Utility Units from the CAA §112(c) source category list and because of that action, the requirements of CAA §112(g) no longer apply to such units. Accordingly, CAA §112(g) is no longer an "applicable requirement" for coal- and oil-fired Utility Units within the meaning of 40 C.F.R. 70.2. It is EPA's position that any coal- or oil-fired Utility Unit that currently has a CAA §112(g) limit in its Title V permit can file a permit modification application with the relevant permitting authority and request that the limit be removed. The limit may be removed to the extent it was included in the permit on the basis of our December 2000 action alone, and not some independent authority.

4.1.2 EPA Failed to Docket Certain Items on Which it Relied

Petition:

Petitioners 6280 state that EPA promulgated the final rule without putting into the rulemaking docket all information upon which the Agency relied. First, Petitioners argue that EPA failed to docket a memorandum written by the law firm of Latham and Watkins entitled "A System-Wide Compliance Alternative for Mercury Emissions from Electric Utility Steam Generating Units – Legal and Policy Basis" (Latham memo) (September 4, 2003). Second, Petitioners point to two IPM runs ran before the proposed rule that were not placed in the docket. Finally, Petitioners argue that EPA failed to place in the docket two variations of its technology-based option and that those variations had "more stringent mercury limits" than the option included in the proposed rule. Petitioners further argue that EPA's position that the more stringent limits were not as cost-effective as the option included in the proposed rule is disingenuous, because EPA did not estimate the benefits of the omitted scenarios.

Response:

Petitioners' allegations are misplaced. As to the first document – the Latham memorandum – petitioners are factually incorrect. The memorandum was placed in the docket prior to issuance of the proposed rule. See A-92-55, entry II-E-127; "Record of September 11, 2003, meeting with Edison International." As to the two IPM runs and the two variations on the technology-based regulatory alternative that was included in the proposed rule, petitioners have not demonstrated that this information is of central relevance to the outcome of the final rule.

First, the two IPM runs referenced by petitioners were not included in the docket because neither the final Section 112(n) Revision Rule, nor CAMR, relied on those runs. CAA §307(d) requires EPA to docket only those materials that form the basis of the proposed and final rules. Because the two IPM runs did not form the basis of either the proposed or final rules at issue here, EPA properly did not docket the runs.

Moreover, EPA notes that the two IPM runs referenced by petitioners are the subject of a Freedom of Information Act (FOIA) lawsuit in the U.S. District Court for the District of Massachusetts. See Reilly v. US EPA (Civil No. 05-10450-RBC). On April 13, 2006, the U.S. Magistrate issued an opinion holding that the deliberative process exemption under FOIA did not apply to the two IPM runs. EPA is reviewing the decision and evaluating whether to appeal. Regardless of the outcome of the FOIA case, the fact remains that the runs are not of central relevance to the outcome of either the final Section 112(n) Revision Rule or CAMR and, therefore, EPA is denying reconsideration of this particular issue.

Second, petitioners' reference to two variations of its technology-based option and the proposed rule is vague. EPA presumes that petitioners' argument relates to the CAA §112(d) proposed regulatory alternative that was included in the proposed rule, but never finalized. The CAA §112(d) proposed regulatory alternative was one of three different regulatory alternatives that EPA proposed, but it was not the one that EPA pursued in the final rules. Neither the final

Section 112(n) Revision Rule, nor CAMR, relied on the information identified by petitioners. Therefore, petitioners have failed to demonstrate that their objection is of central relevance.

4.1.3 EPA's Analysis of Conflicting CAA §111(d) Amendments

Petition:

Petitioners 6270 argue that EPA provided a new rationale in the final Section 112(n) Revision Rule in support of its argument that it is authorized to regulate Hg emissions from Utility Units under CAA §111(d), and, thus, can rely on CAMR in its CAA §112(n) analysis. Petitioners also took the opportunity to reargue their position that EPA cannot regulate Hg emissions from Utility Units under CAA §111. These same petitioners raised these same issues in the context of definition of "regulated pollutant" discussed in Section 2.1.2 above.

Response:

To the extent petitioners are arguing that EPA raised new legal arguments for the first time in the final Section 112(n) Revision Rule regarding this issue, we disagree. The petitioners had adequate notice and opportunity to comment on EPA's interpretation of the conflicting amendments to CAA §111(d). See 69 FR 4652, 4685-87. Indeed, the allegedly "new" reasoning identified by petitioners was in response to comments that EPA received on this issue. See 70 FR 16031-32. Petitioners provide no new information or argument that causes us to believe that our original response was incorrect. Accordingly, the petition to reconsider this point as it related to the final Section 112(n) Revision Rule is denied. Nevertheless, we will take this opportunity to respond further to objections raised by the petitioners.

4.2 CAMR

4.2.1 Insufficient Notice for Cost-benefit Analysis in Final Rule

Petition:

Petitioners 6282 state that EPA did not re-assess the benefits of a MACT approach under CAA §112 in the final CAMR and that the final regulation's cost-benefit analysis is not a logical outgrowth of the proposed rule. They also claim that EPA failed to adequately examine its assumptions about the cost-effectiveness of CAMR. According to the Petitioners, EPA illogically insists that a comparison between the cost-effectiveness of a MACT approach and a cap-and-trade approach is not "necessary." If EPA can conclude that a given approach is the "most cost-effective" without comparing it to the primary alternative approach, any approach can be deemed "the most cost-effective" approach. Petitioners also argue that EPA erred in setting the NSPS because, in their view, CAA §111 requires EPA to set NSPS based on an analysis of the best performing units. See Petition at 21 ("The plain meaning of this standard requires an NSPS standard to reflect the performance of only the most efficient units.").

Response:

Because the Agency issued a final regulation under CAA §111 rather than CAA §112, *petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. In the proposed rule, EPA identified three regulatory alternatives that it was considering. One of those alternatives involved regulation under CAA §112(d) and another involved revising the December 2000 CAA §112(n)(1)(A) finding and issuing standards of performance under CAA §111. In the docket for the proposed rule, the Agency properly included appropriate supporting record materials for each alternative regulatory approach. EPA did not finalize the CAA §112(d) proposed regulatory approach, however, but instead finalized the regulatory alternative that involved revising the December 2000 finding and issuing standards under CAA §111. In preparing materials in support of the final CAA §111 rule (CAMR), EPA properly limited its cost-benefit assessment to an analysis of alternative emission cap levels, based on its determination that for existing units, cap and trade represents the best system of emission reduction. The Petitioners' sole dispute here hinges not on CAMR or the adequacy of the cost-benefit analysis supporting that rule, but on whether EPA properly revised the December 2000 finding. To the extent Petitioners object to EPA's revision of the December 2000 finding or its discussion of health effects and costs in the context of the final Section 112(n) Revision Rule, those comments are addressed in Section 1 of this document.*

Petitioners also misconstrue the requirements of CAA §111 and improperly attempt to import the requirements of CAA §112(d) into that section. Pursuant to CAA §111, NSPS must be achievable under the range of relevant conditions which may affect the emissions to be regulated. See National Lime v. EPA, 627 F.2d 416 (1980). Thus, in setting NSPS, EPA cannot focus on only the most efficient or best-performing unit, as Petitioners suggest, because it must be able to demonstrate the achievability of the standard across a range of normal operating conditions.

4.2.2 EPA Provided Insufficient Notice for the Provisions Not to Regulate Ni

Petition:

Petitioners 6282 state that EPA's failure to regulate Ni emissions from oil-fired units in the final rule is arbitrary and capricious and not a logical outgrowth of the proposed rule. According to Petitioners, in the Final Rule, EPA, without explanation, reversed its position and determined not to regulate Ni emissions from oil-fired units at all.

Petitioners continue that EPA unlawfully delisted oil-fired units as a source category under CAA §112 without following the statutory mandatory procedure. They note that the Agency found in the proposed rule that regulation under CAA §112, though appropriate, was not necessary because such units could be regulated under CAA §111. EPA then, in CAMR, decided against regulating Ni emissions from oil-fired units entirely, because of "new information indicating that there were fewer oil-fired units in operation and that Ni emissions had diminished since the Utility Study." They further assert that EPA's determination was based simply on the averment that Ni emissions had decreased from the 11 plants that posed the highest risk, not a finding that oil-fired EGUs do not "cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare" as required by the CAA. Finally, Petitioners argue that EPA should have promulgated an appropriate

MACT standard under CAA §112 pursuant to its appropriate and necessary finding in December 2000, and that EPA's abrupt decision to leave completely unregulated Ni emissions from oil-fired units is arbitrary and capricious.

Response:

We are denying reconsideration of this issue because it is not of central relevance to the final CAMR. Contrary to Petitioners' assertion, EPA clearly stated in the final CAMR that it has not yet taken final action on whether to regulate Ni under CAA §111 (see 70 FR 28611). The Petitioners' arguments relate to EPA's decision in the final Section 112(n) Revision Rule that it is neither appropriate nor necessary to regulate oil-fired units on the basis of Ni emissions. EPA re-opened that particular issue in the context of the Section 112(n) Revision Rule reconsideration and any comments on that particular issue are addressed in Section 1 of this document.

4.2.3 EPA Failed to Solicit Comment on Information of Central Relevance

Petition:

Petitioners 6282 noted that it was in the Final Rule that EPA first let the public know that the Agency had used the CMAQ model to assess Hg deposition. For the Final Rule, EPA used a non-peer reviewed, prototype model that has not even been publicly released. Furthermore, considering the following major substantive issues concerning the CMAQ modeling EPA used, the conclusions that EPA drew based on the modeling are arbitrary and capricious.

Given the identified flaws in the emissions inventory EPA used, EPA's failure to perform adequate model performance evaluations, and EPA's use of a prototype model that had not been peer-reviewed, the conclusions EPA drew from this modeling concerning public health are arbitrary and capricious. The model's limitations are exacerbated to the extent that EPA grossly underestimated Hg emissions and the percentage of that Hg that is deposited locally. EPA's reliance upon modeling that likely overlooked hotspots is misplaced.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioner's concerns appear to relate to the portion of the proposal (69 FR 4703; January 30, 2004) in which the CMAQ modeling and hotspots are discussed in relation to EPA's future review of CAMR. As explained further in Section 2.2, EPA is obligated to review NSPS every eight years; this review is not dependent on the issue of hotspots or modeling. Thus, this objection is not of central relevance. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found in Section 1.1.3.1 of this document.

Petition:

Petitioners 6282 stated that EPA failed to take into account information centrally relevant to EPA's cost-benefit analysis, including the NESCAUM/Harvard Study, and its analysis of the environmental impacts of Hg, including an article in the March 2005 edition of *Ecotoxicology*, an April 21, 2005, presentation to a Mercury Working Group demonstrating the importance of weather in Hg deposition, and an article in the May 2005 edition of *Environmental Health Perspectives* (which was posted on-line on February 28, 2005, after the close of the public comment period but before the Rule was published.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found in Section 1.1.5 of this document.

4.2.4 RIA Contains Many Sections that were Not Adequately Noticed

Petition:

Petitioners 6282 noted that, on March 1, 2005, EPA placed into the docket its RIA of CAMR. The public had no opportunity to review or comment on this centrally relevant information. The impacts analysis is fundamentally flawed and its conclusions are unsupported by the record. As a result, EPA has failed to adequately account for the health and environmental impacts of the Final Rule as required by CAA §111.

Petitioners 6282 also stated that EPA's analysis is inadequate to assess the potential health impacts on several affected populations, including pregnant women and women of child-bearing age. The presence of high levels of Hg in the blood of both women of childbearing age and pregnant women is well documented. EPA's RfD is an established public-health guideline and women whose Hg blood levels exceed the RfD are an affected population that EPA's analysis does not adequately address.

For babies who are already known to be exposed in utero to excessive MeHg from a combination of emission sources, each additional increment of utility-attributable Hg, however small, carries a predictable risk of additional IQ loss and other effects. Each such additional increment in the maternal blood stream adds to the Hg dose delivered to the fetal brain whether maternal exposure is from the single dietary pathway recognized by EPA, i.e., recreationally-caught freshwater fish, or from any of the other pathways unreasonably ignored by EPA, such as estuarine, marine, and commercial fish. Notably, the "overlap" population of pregnant women who have both Hg levels that exceed the RfD and consume recreationally-caught freshwater fish is an especially sensitive subpopulation that EPA ignores. EPA's claimed reductions in MeHg in fish tissue do not entirely remove the utilities' portion of this neurotoxin from recreationally-caught freshwater fish. Therefore, the fish diet of this maternal subpopulation will continue to add utility-attributable Hg to babies in utero who are already exposed beyond the RfD.

This problem is further compounded by the fact that EPA underestimated the amount of recreationally-caught freshwater fish that pregnant women consume. Comparison to other sources suggests that EPA's estimates are too low and that EPA is underestimating fetal Hg exposure through the only pathway – recreationally-caught freshwater fish – that it considers valid. EPA's estimates are grossly low and the Agency is substantially underestimating both recreationally-caught freshwater fish consumption and the Hg intake of the approximately 500,000 pregnant women per year who eat these fish.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found elsewhere in this document. In developing CAMR, EPA did consider the statutory criteria of cost, non-air quality health and environmental impacts, and energy requirements.

Petition:

Petitioners 6282 stated that EPA's analysis and treatment of uncertainties does not provide for an ample margin of safety for public health. EPA's treatment of the data uncertainties associated with the public health analysis indicates that EPA did not provide an ample margin of safety in the Final Rule or adequately take into account the potential impacts to health in the promulgation of its standards of performance.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found elsewhere in this document.

Petition:

Petitioners 6282 stated that the single pathway of Hg exposure that EPA considered is inadequate to fully assess the potential impacts to human health that could reasonably be expected to result from EGU emissions. EPA provides only two detailed statements to justify its exclusion of marine and commercial fish from its analysis. EPA's exclusion of marine and commercial fish from its analysis is arbitrary and capricious.

Having failed either to consider the impacts of Hg emissions from domestic EGUs on commercial, estuarine, and marine fish or to estimate the public health impacts on consumers of these fish, EPA acted arbitrarily and capriciously in determining that Hg emissions from these utilities do not present significant public health risks. Petitioners also stated that EPA's health analysis was arbitrary and capricious in that it was based on a single, narrow pathway of exposure to Hg.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found elsewhere in this document.

Petition:

Petitioners 6282 stated that EPA's MeHg water quality criterion is not sufficiently protective of consumers of seafood. EPA arbitrarily and capriciously relied on a MeHg water quality criterion (MeHg criterion or criterion) that is not adequately designed to protect consumers of fish.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. Petitioners have made the same comment on the final Section 112(n) Revision Rule, under which the comment is of central relevance. Discussion of this issue may be found elsewhere in this document.

4.2.5 Phase I Cap

Petition:

Petitioners 6276 state that there was no notice of the phase I Hg budget as it appeared for the first time in the final rule.

Response:

We are denying reconsideration of this issue because Petitioners had adequate notice of the phase I cap in the proposed rule and, therefore, Petitioners fail to meet the first criterion set forth in CAA §307(d)(7)(B). Although EPA did not identify the level of the phase I cap in the proposed rule, we stated at proposal that the level of the cap would be at the co-benefit level achieved under CAIR. Thus, petitioners had actual notice, as the CAIR proposal was issued prior to the January 30, 2004 proposed rule. All Petitioners had to do was to refer to the CAIR proposed rule. The mere fact that the level of the phase I cap changed by a few tons between proposal and final, in response to comments, does not mean EPA did not provide adequate notice. It is analogous to EPA adjusting the level of a standard in response to comments received on a proposed rule. Thus, adequate notice was provided and EPA is denying on this issue.

4.2.6 Cap-and-trade Cannot Constitute BDT

Petition:

Petitioners 6276 (and subsequently in their comments 6633) contend that the final CAMR does not, and cannot, justify why the Statewide and unit-specific emissions increases allowed (noted in their petition and comments) under the allowance system represent BDT. The unlawful, arbitrary and capricious nature of CAMR as revised is illustrated in several examples (presented in the petition) of the absurd results that its implementation will yield. The petitioners contend that EPA's proposed revisions will not correct those problems, but in fact will exacerbate them.

Petitioners 6282 state that the fact that EPA's State budget allocations were based on emission increases for large numbers of units confirms that the rule does not reflect the best system of emission reduction that has been adequately demonstrated. Indeed, not only are specific units expected to increase their Hg emissions under the Final Rule's analysis, but the Phase I State budget allocations reveal that entire States will be allowed to increase their emissions of Hg under the Rule until at least 2018. EPA offers no justification for how such a budget allocation could represent a standard of performance reflecting the best system of emissions reduction adequately demonstrated.

Commenters 6479 stated that, under CAA §111, NSPS standards are required to reflect the "best system of emission reduction" adequately demonstrated.[297] EPA has asserted that the cap-and-trade program promulgated through CAMR reflects such a system. However, when the annual CAMR budgets are compared to EPA's 2003 Toxics Release Inventory (TRI) point source Hg air emissions data for electric utilities the First Phase (2010-2017), State-specific CAMR budgets are greater than the State-specific 2003 Hg emissions from electric utilities for 16 States (Arkansas, California, Colorado, Connecticut, Maine, Massachusetts, Michigan, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Texas, Utah, Washington and Wyoming). It is unreasonable for EPA to assert that the best system of emission reduction for Hg coming from EGUs would allow increases of those emissions for the next 12 years in 16 States, especially in light of EPA's acknowledgment that existing, commercially available technologies such as scrubbers can greatly reduce those emissions. The commenter stated that the problem with EPA's procedure continues into Phase II of CAMR (2018 and thereafter), where State-specific CAMR budgets are greater than the State-specific 2003 Hg emissions from electric utilities for four States (California, Colorado, Maine, and Washington). Because the State-specific CAMR budgets for these States are greater than the actual annual Hg emissions in these States, a pool of excess Hg allowances can be generated from 2010 through 2017 with a potential of over 4,600 lb/yr and a potential total of 18 tons of excess Hg allowances accumulated over this 8-year period.

Response:

EPA interprets Petitioners' comments as requesting that the Agency reconsider the appropriateness of the Phase I Hg emissions cap. Because EPA believes that it provided adequate notice of the basis for the Phase I cap (i.e., that it is based on co-benefits associated with the implementation of CAIR), and because it believes that the cap accurately reflects that basis, it is denying reconsideration of the appropriateness of the Phase I Hg emissions cap. This is consistent with the position taken in the October 28, 2005 notice, where we stated "we are at this time opening for public comment the methodology for determining the Phase I State Hg budgets and the unit-specific allocations on which those budgets are based." See *70 FR 62213,*

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[297] See 42 U.S.C. §7411(a).

62215.

EPA maintains that the national Hg cap-and-trade program provides the best system of emissions reductions. Under this program, national Hg emissions are capped at 38 tons beginning in 2010, and 15 tons beginning in 2018. The cap-and-trade program provides a cost-effective mechanism for achieving these reductions, and the caps guarantee that emissions reductions will be achieved from the current level of approximately 48 tons. Because emissions allowances are a scarce commodity under a cap-and-trade program, due to the fact that current emissions exceed the national cap, these allowances have economic value, and it will likely make economic sense for sources in States with a surplus of allowances to sell these allowances to sources in States with a deficit that need them for compliance. Regardless of the decisions made by participants in the allowance market, CAMR, by placing a hard cap on Hg emissions and accounting for each individual ounce of Hg emitted, guarantees that significant reductions in nationwide Hg emissions will be achieved.

Further, petitioners' comments are predicated on the false premise that every existing source in a category or subcategory of sources will be required to install and operate the emission controls used by the best performing source in the category or subcategory in order to comply with a CAA §111(d) standard of performance. This is simply not the case. In establishing a standard of performance, EPA must ensure that the standard is achievable (i.e., that it is within the realm of the adequately demonstrated system's efficiency and that it is capable of being met under most adverse conditions which can reasonably be expected to recur). See National Asphalt Pavement Ass'n v. EPA, 539 F.2d 775 (D.C. Cir. 1976) and National Lime v. EPA, 627 F.2d 416 (D.C. Cir. 1980). Thus, the fact that some sources may well be able to do more than is required by the standard is inherent in any standard of performance. This is particularly true for a standard of performance applicable to existing sources where Congress has specifically authorized the consideration of factors not relevant to the establishment of a standard of performance for new sources. For example, CAA §111(d)(1)(A) specifically authorizes a State to consider, among other factors, the remaining useful life of an existing source in applying a standard of performance to that source. Under such a regime, any adopted standard will almost certainly be set at a level which is less stringent than the emission reductions currently being achieved by particular sources subject to the standard. Those sources could, therefore, theoretically increase their current emissions and still comply with the applicable standard. EPA believes, however, that it is unlikely that sources will in fact increase their emissions in such circumstances and believes that this is true under CAMR as well. Thus, the facts that some sources have been allocated allowances above what is required by their current estimated level of emissions in developing State budgets and that some State budgets exceed current estimated emissions within the State under CAMR is not significantly different from the situation for any CAA §111(d) standard of performance.

4.2.7 Language of CAMR Does not Require that Hg Emissions Reductions Come from EGUs

Petition:

Petitioners 6276 state that CAMR does not clearly include a requirement that all of the

Hg emissions removed from the air as a result of CAMR come from EGUs. The petitioners also state that 40 CFR 60.24(h) contains provisions governing emissions standards and compliance schedules in State plans required to be submitted to the Administrator. Although 40 CFR 60.24(h)(3) mentions annual EGU Hg budgets, and contains a table setting out the allowable amount of Hg pollution for each State in each of the two compliance phases, Petitioners contend that there is no clear, specific and enforceable legal obligation that States achieve those Hg budgets solely as a result of emissions reductions from EGUs. They assert that the title to the table in 40 CFR 60.24(h)(3) is not sufficient to accomplish that result, and that in all the provisions of 40 CFR 60.24(h), there is no direct legal requirement for existing EGUs to achieve any Hg reductions. By contrast, they argue, all EGUs must comply with the monitoring, recordkeeping, and reporting requirements of Part 75 with regard to Hg mass emissions and new EGUs are mentioned in the context of notification requirements to the Administrator concerning Hg allocations. According to Petitioners, the final CAMR fails to impose obligations upon existing EGUs in each State to contribute any Hg reductions to each State's annual Hg budget.

The Petitioners believes that EPA's failure to correct the rule to require Hg emissions reductions from EGUs undermines altogether the basis for CAMR – and the Agency's separate claim that it need not develop a CAA §112(d) standard for power plants. They assert that it is not only circular logic, but it is also unlawful, arbitrary and capricious for EPA to revise its regulatory determination and delisting the EGU industry because CAMR will be "adequate" to protect public health and, therefore, EGU regulation under CAA §112 is not "necessary" when the CAA §111 regulation will not guarantee that the reductions in question will actually occur from the EGU industry.

<u>Response</u>:

We are denying reconsideration of this issue because Petitioners had adequate notice of the proposed regulatory text for CAMR and, therefore, Petitioners have failed to meet the first criterion set forth in CAA §307(d)(7)(B). <u>See</u> *70 FR 4653 (January 30, 2004; NPR) and 70 FR 12398 (March 16, 2004; SNPR setting forth proposed regulatory language for the model trading program). Furthermore, Petitioners' characterization of the final regulations is incorrect. The final regulatory text creates an enforceable obligation that each State meet its Hg budget, starting in 2010 and thereafter, by reducing Hg emissions from the EGUs existing in that State during the year to which the respective budget amount applies. Specifically, CAA §60.24(h)(3) requires that a State's State Plan "shall contain emission standards and compliance schedules and demonstrate that they will result in compliance with the State's annual electrical generating unit (EGU) mercury (Hg) budget for the appropriate periods." That section also lists the "Annual EGU Hg budget" amounts for 2010 and thereafter for each State. Moreover, CAA §60.24(h)(8) defines the term "EGU," explaining that it includes only certain coal-fired boilers and combustion turbines. On their face, the "Annual EGU Hg budgets" apply only to Hg emissions by such coal-fired boilers and combustion turbines.*

Because Hg emissions from sources other than EGUs are not covered by the Hg budgets for EGUs, emission reductions by sources other than EGUs will be irrelevant in determining whether a State will be in compliance with these budgets. Thus, contrary to Petitioners' characterization, the regulatory text in the final CAMR clearly requires State compliance only *through Hg emission reductions by EGUs and no additional language is needed to impose this requirement. Accordingly, Petitioners have not raised an issue of central relevance to the final rule.*

4.2.8 Inclusion of the CAIR Docket

Petition:

Petitioners 6282 state that inclusion of the entire CAIR docket into the CAMR docket just days before CAMR was finalized precluded meaningful public comment on material that provided the factual basis for CAMR.

Response:

Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking. The CAIR docket was included primarily to support the health effects assessment in the Section 112(n)(1)(A) Revision Rule, which is not relevant to CAMR.

4.2.9 Mean Control Efficiency

Petition:

Petitioners 6282 and commenter 6577 stated that, in setting the control efficiency reflecting the best system of emission reduction, EPA inappropriately used the mean control efficiency of all the units in a category which possess the Agency's pre-selected combination of controls as opposed to the best performing units. Thus, according to petitioners, EPA's analysis is not centered on the degree of emission limitation achievable through application of a best system of reduction, but rather the degree of emission limitation achieved by all the units employing a certain combination of control technologies. Petitioners further assert that this analysis lowers the control efficiency described by EPA as reflecting the best system of reduction below the efficiency achieved by the best performing units in each category and, therefore, does not comply with the requirements of CAA §111.

Response:

The Petitioners confuse the methodologies for establishing standards under CAA §111 with those utilized under CAA §112. Petitioners have failed to demonstrate that their objection is of central relevance to the CAMR rulemaking, and, thus, EPA is denying on this issue.

4.2.10 EPA's Analysis of Conflicting CAA §111(d) Amendments

Petition:

Petitioner 6276 argues that EPA cannot regulate Hg emissions from Utility Units under CAA §111.

Response:

EPA is denying reconsideration on this issue because Petitioner had ample opportunity to raise any comments on this issue in response to the proposed rule.

EPA set forth its interpretation of the 1990 House of Representatives and Senate amendments to CAA §111(d) in the NPR and solicited comment on its interpretation. EPA then finalized its interpretation of the conflicting amendments to CAA §111(d) on March 15, 2005. EPA's interpretation is set forth, in full, in the final action revising EPA's December 2000 appropriate and necessary finding and removing Utility Units from the CAA §112(c) list (see 70 FR 15994; the Section 112(n) Revision Rule). EPA incorporated its interpretation of CAA §111(d) into CAMR by reference to the final Section 112(n) Revision Rule. EPA continues to believe that its interpretation is both reasonable and lawful and that its subsequent actions in establishing NSPS for Hg under the authority of CAA §111(b) and a cap-and-trade program for Hg under the authority of CAA §111(d) are also lawful.

4.2.11 Commercial Availability

Petition:

Petitioners 6282 believe that EPA's selection of BDT is fundamentally contrary to law for several reasons. First, it does not consider the "best" Hg control technologies in use in the EGU industry, particularly ACI, despite the fact that EPA is well-aware of the existence and performance of this technology on coal-fired EGUs. EPA's final rule, furthermore, had rejected ACI on unlawful grounds – asserting that ACI was not "commercially available"– an assertion which is not relevant to the statutory factors permitted for an NSPS determination, and also is not supported on the record. CAA §111 expressly identifies the criteria EPA may consider in setting an NSPS, and the Agency is, therefore, limited to considering those factors. CAA §111(a) (1) directs the Agency to consider "cost...any nonair quality health and environmental impacts and energy requirements." "Commercial availability" is not "cost" – cost is the amount that must be spent to achieve the emissions reductions.

Response:

Petitioners contend that EPA improperly considered whether Hg-specific controls were "commercially available" in establishing the NSPS for new, modified, and reconstructed EGU. The EPA acknowledges that its use of the term "commercially available" in this context has created some confusion, but maintains that it established the NSPS at an appropriate level and, therefore, denies reconsideration of the issue. When considered in context, it is apparent that the term "commercially available" was intended to encompass the concepts of "adequately demonstrated" technology and an "achievable" emission rate. A technology which is not generally available to all of those who would need to use it is to some extent not "adequately demonstrated" even if that technology has been demonstrated to achieve substantial reductions in emissions. The EPA believes that this is the case with Hg-specific control technology under some conditions. That is, although the ability of such technology to substantially reduce emissions of Hg has been demonstrated in limited applications, its current availability is such *that EPA has determined that it has not been adequately demonstrated for use in all circumstances. Similarly, an emission standard which is based on a technology that is not available to sources which must comply with that emission standard, is not an achievable standard. Thus, EPA's reliance on ACI in establishing the NSPS for new sources as advocated by Petitioners would result in a standard which is <u>not</u> achievable by some sources required to meet the standard.*