North America
Environmental Law
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Coal-fired Power Plants

Factual Record regarding Submission SEM-04-005

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Acronyms, Abbreviations, and Definitions

Acronyms and abbreviations

BMP	Best management practice
CAA	Clean Air Act (42 U.S.C. § 7401 et seq. (1970))
CAIR	Clean Air Interstate Rule
CAMR	Clean Air Mercury Rule
CATF	Clean Air Task Force
CEC	Commission for Environmental Cooperation
CPP	Continuing planning process
CWA	Clean Water Act (33 U.S.C. § 1251 et seq. (1972))
EPCRA	Emergency Planning and Community Right to Know Act [42 U.S.C. § 11001 et seq. (1986)]
FCA	Fish consumption advisory
FOIA	Freedom of Information Act [5 U.S.C. §552 (1966)]
FWPCA	Federal Water Pollution Control Act (see CWA)
GLAD	Great Lakes Air Deposition Program
JPAC	Joint Public Advisory Committee
MWh	Megawatt-hours
MOA	Memorandum of agreement
NAAEC	North American Agreement on Environmental Cooperation
NPDES	*National Pollutant Discharge Elimination System*
POTW	Publicly owned treatment works
PPA	Pollution Prevention Act of 1990 (42 U.S.C. §13101 et seq.)
TBEL	Technology-based effluent limitation
TCEQ	Texas Commission on Environmental Quality
TMDL	Total maximum daily load
TRI	Toxic Release Inventory (created by EPCRA, expanded by PPA)
US EPA (or EPA)	United States Environmental Protection Agency
UNEP	United Nations Environment Programme
UWAG	Utility Water Act Group
WQBEL	Water quality–based effluent limitation
WQLS	Water quality limited segment
WQS	Water quality standard

Definitions

Parties	The Governments of Canada, Mexico, and the United States
Party	The Government of the United States
Reasonable potential test	Test used by NPDES permitting authorities to determine whether a permit for the discharge of a pollutant must include water quality–based effluent limitations
Request	Secretariat's request for relevant information
Response	Government of the United States, "Response to Submission SEM-04-005" (25 April 2005)
Secretariat	The Secretariat of the CEC
Seston	Minute material moving in water and including both living organisms (as plankton and nekton) and nonliving matter (as plant debris or suspended soil particles)
States identified by Council Resolution 08-03	Alabama Illinois Indiana Kentucky Michigan North Carolina Ohio Pennsylvania Texas West Virginia
Submission	SEM-04-005 *(Coal-fired Power Plants)* Article 14(1) Submission (20 Sept. 2004)
Submitters	Friends of the Earth Canada Friends of the Earth–US Pollution Probe Earthroots Centre for Environmentally Sustainable Development Great Lakes / United Saint-Laurent Grand Lacs Sierra Club (US and Canada) Waterkeeper Alliance

1. Executive Summary

1. Articles 14 and 15 of the North American Agreement on Environmental Cooperation (NAAEC)[1] establish a process allowing residents of Canada, Mexico and the United States (US) to file submissions alleging that a Party (Canada, Mexico or the United States) to the NAAEC is failing to effectively enforce its environmental law. Under the NAAEC, this process may lead to the publication of a factual record. The Secretariat of the Commission for Environmental Cooperation (CEC) (Secretariat) administers the NAAEC public submissions process.

2. On 20 September 2004, Friends of the Earth Canada, Friends of the Earth–US, Pollution Probe, Earthroots, Centre for Environmentally Sustainable Development, Great Lakes/United Saint-Laurent, Grands Lacs, Sierra Club (US and Canada), and Waterkeeper Alliance (together, the "Submitters"), represented by Waterkeeper Alliance and Sierra Legal Defence, filed a submission (Submission) asserting that the United States, through the US Environmental Protection Agency (US EPA, or EPA), is failing to effectively enforce the Clean Water Act (CWA) against coal-fired power plants for mercury emissions and discharges which are allegedly degrading the nation's waterways.[2] This Submission was amended on 18 January 2005 to meet the criteria of Article 14(1)(c) of NAAEC following a Secretariat determination that without additional information the initial Submission was incomplete.

3. Specifically, the Submitters assert that US EPA has failed to effectively enforce water quality standard (WQS) and total maximum daily load (TMDL) provisions of Section (§) 303 of the CWA, and permitting provisions required by the National Pollutant Discharge Elimination System (NPDES) pursuant to §402 of the CWA. The Submitters assert that such failure is occurring in three ways. First, they assert that US EPA or a duly authorized state permitting agency issues NPDES permits that allow ongoing point source discharges of mercury into waterways without consideration of the cumulative impact of both point and nonpoint source discharges of mercury to water. Second, the US EPA allegedly fails to safeguard waterbodies by approving inadequate state antidegradation policies and implementation procedures. Third, the US EPA allegedly fails to use its authority to require states to adopt TMDLs for mercury where WQSs are not being met, and to issue its own TMDLs where state action proves inadequate. Submitters also include two CAA Title V permits for coal-fired power plants operating at the time the Submission was made. The Submitters offer these permits as examples of standard Title V permits failing to utilize control mechanisms designed to address harmful air emissions from utility units to control mercury.

4. Section 303 of the CWA requires states to identify all waters within their borders that do not meet state-promulgated WQSs and to rank those listed waters in terms of priority, taking into account the respective levels of pollution and water uses. Furthermore, Section 303 of the CWA requires the state or, in the event the state fails to do so, the US EPA, to establish a TMDL for every pollutant causing impairment. Section 402 of the CWA establishes the NPDES permitting regime and is the primary means of implementing both technology-based effluent limitations and WQSs. NPDES regulations require water quality–based effluent limitations to be established for all pollutants that "are or may be discharged at a level that will cause, have a reasonable potential to cause, or contribute to an excursion above any applicable state water quality standard, including state narrative criteria for water quality."[3]

5. On 25 April 2005, the United States filed a response (Response), in which it acknowledges mercury as a highly persistent and toxic pollutant that accumulates in the food chain, and states that humans are exposed to methylmercury primarily by eating contaminated fish.[4] The US asserts in its Response that it has taken significant steps to reduce health risks,[5] that the Submitters "seek development of a factual record to demonstrate that the US is failing to implement the CWA on a basis that the US has failed to take actions that are neither required nor authorized by [the CWA],"[6] and that the "Submitters' [CAA] Title V argument is premised on a fundamental misunderstanding of the requirements of the CAA."[7]

6. In the Response, the US maintains that: the Submitters failed to consider "the CWA's preference for state action in the first instance with respect to the prioritization and scheduling of TMDL development;"[8] the Submitters have "erred in their interpretation of TMDL requirements" because the CWA "provides no authority to regulate nonpoint sources of pollutants;"[9] Congress has not authorized the US EPA to regulate or compel states to regulate or otherwise control nonpoint sources of pollution, be it through TMDLs or antidegradation requirements; and, the presence of a fish consumption advisory does not necessarily mean that a waterbody is not attaining its WQS, nor does the CWA bar point source discharges into waters not meeting their WQS.[10] On 9 September 2005, the US filed supplemental information informing the Secretariat of the status of pending judicial and administrative proceedings relevant to the Submission.[11]

7. On 23 June 2008, the CEC Council, upon review of the Secretariat's recommendation that a factual record was warranted with respect to some of the Submitters' assertions, instructed the Secretariat, pursuant to Council Resolution 08-03, to develop a factual record regarding the alleged failure by the United States to effectively enforce §§303 and 402 of the CWA, with respect to emissions or discharges of mercury from coal-fired power plants to air and water.[12] The Council Resolution does not include consideration of any CAA claims due to ongoing pending litigation. The scope of the factual record is discussed further in Chapter 4 of this factual record. In developing the factual record, the Secretariat both posted a request for relevant information (Request) on the CEC website and also sent that Request to the United States, the Submitters, the governments of Canada and Mexico, the Joint Public Advisory Committee (JPAC) of the CEC, the power plants identified in Council Resolution 08-03, and nongovernmental organizations identified as potentially having relevant information. All concerned parties were invited to respond by 31 December 2008. The Secretariat received responses to the Request from twenty-six coal-fired power plants or representatives thereof, the Clean Air Task Force, the Texas Commission on Environmental Quality, the Utility Water Act Group, and the University of Pittsburgh School of Law's Environmental Law Clinic (on behalf of Waterkeeper Alliance). The US proffered no further information pursuant to the Request, noting that its Response was comprehensive.

8. In seeking all information required to fulfill the mandate in Council Resolution 08-03, the Secretariat considered publicly available information and also requested and received information pursuant to the federal Freedom of Information Act[13] (FOIA) or equivalent state law, regarding NPDES permits of the coal-fired power plants identified in Council Resolution 08-03, and TMDLs from the following states: Alabama, Illinois, Indiana, Kentucky, North Carolina, Ohio, and Texas. Such requests made to the states of Michigan, Pennsylvania and West Virginia went unanswered; information included in this factual record regarding these states was submitted by an entity other than the particular state, or obtained through CEC Secretariat independent research. Further discussion pertaining to the information-gathering process is contained here in Chapter 5. Consistent with Council Resolution 08-03, this factual record presents the relevant factual information obtained regarding the following CWA assertions set forth in the Submission.

2. Summary of the Submission

9. On 20 September 2004, Friends of the Earth Canada, Friends of the Earth–US, Pollution Probe, Earthroots, Centre for Environmentally Sustainable Development, Great Lakes/United Saint-Laurent, Grands Lacs, Sierra Club (US and Canada), and Waterkeeper Alliance (together, the "Submitters"), represented by Waterkeeper Alliance and Sierra Legal Defence Fund, filed a submission asserting that the United States, through the US EPA, is failing to effectively enforce the federal CWA[14] in respect to coal-fired power plants, for mercury emissions that are allegedly degrading the nation's waterways.[15] The Submitters provide additional factual information including two CAA Title V permits for coal-fired power plants, which they allege is representative of systematic failure by the US EPA to regulate emissions from coal-fired power plants, and also provide discussion of an ongoing mercury rule making process under the CAA.[16]

10. The Submitters assert that throughout the United States, the number of Fish Consumption Advisories (FCA)[17] for mercury has risen from 899 to 2347 since 1993, and that, according to the US EPA, 35 percent of the total lake acres and 24 percent of the river miles in the United States are now under FCAs.[18] They contend that the US EPA "is allowing both nonpoint and point source discharges of mercury from coal-fired power plants, which are contributing to a steady degradation of the nation's waterways, as evidenced by the increasing mercury-specific fish advisories and the effective withdrawal of existing uses (fishable) of many of these water bodies."[19] According to the Submitters, these discharges include both direct discharges to water, and air emissions of mercury, which fall back to the earth in the form of precipitation and dry particles.

11. The Submitters assert that mercury discharges from coal-fired power plants to water and emissions to air contravene provisions of the CWA enacted to prevent degradation of national waters.[20] Specifically, the Submitters assert that such discharges contravene the NPDES program under CWA §402 and the WQSs under §303.[21] According to the Submission, the CWA, through the NPDES provisions, "requires the [US EPA] Administrator to establish and enforce technology and water quality–based limitations for point source discharges into the country's navigable waters."[22] The Submission also describes the system for delegating permitting of point sources to states under US EPA's oversight authority.[23] The Submitters then assert that:

> [t]he dramatic increase in FCAs suggests the EPA is permitting direct discharges through its CWA NPDES program or through state delegated [State Pollutant Discharge Elimination System] permitting without consideration for the cumulative impact of point and nonpoint discharges of mercury on degraded waters.[24]

12. The Submitters conclude that when US EPA issues or signs off on state-delegated permits, it is allowing mercury discharges into waterbodies already being degraded by atmospheric deposition of mercury.[25]

13. The Submitters then present information on state WQSs under §303 of the CWA, which requires states to establish a WQS for all waterbodies within their borders.[26] The Submitters assert that the CWA requires three components for setting a state WQS: designating uses for the waterbodies, setting water quality criteria for the waterbodies, and establishing an antidegradation policy for the waterbodies.[27] The Submitters assert that states are required to designate uses, including both existing and desired uses, for all waterbodies within their borders and that they are required to protect and maintain the level of water quality necessary to protect "existing uses."[28] The Submitters maintain that if a waterway was being used as a source for fish consumption on or after 28 November 1975, the CWA requires controls on both point and nonpoint source pollutants that allow the existing use to continue.[29] The Submission describes the requirement to develop numeric or narrative water quality criteria to achieve and protect existing and designated uses of waterways, and also outlines the antidegradation provision, which the Submitters describe as "[t]he most critical component of the state WQS scheme."[30] According to the Submitters, "[t]he purpose of the antidegradation policy is to ensure that existing water uses and the level of water quality to protect those uses are maintained and protected."[31]

The Submitters describe the federal antidegradation policy, which uses a three-tiered system for classifying waterbodies based on established existing uses and water quality.[32] They assert that the CWA's antidegradation provisions "require that both point and nonpoint sources of pollution be maintained to protect designated and existing uses of all US waterways."[33] The Submitters note that EPA retains oversight authority for all aspects of a state WQS, including authority to approve the state WQS or to promulgate its own standards if a state does not make changes that EPA requires.[34]

14. The Submission also outlines the CWA's Total Maximum Daily Load (TMDL) scheme, which the Submitters describe as essential for implementing the antidegradation provisions.[35] The Submitters assert that, "where waterways have become contaminated beyond levels set in the WQS, the state must establish TMDLs to bring a waterbody back into compliance . . . by establishing the maximum amount of pollution that can be added to [the] water body."[36] According to the Submitters, "[t]he CWA requires that TMDLs incorporate (1) a waste load allocation for point sources (those with NPDES permits), (2) a load allocation for natural background pollution, and (3) a load allocation for nonpoint sources."[37] The Submitters note that "TMDLs apply to water bodies that exceed their WQS even where there is no point source of pollution, that is, where the only sources of pollution are nonpoint, for example from atmospheric deposition."[38] The Submitters point out that the US EPA retains considerable oversight of a state's TMDL program, including authority to approve state TMDLs (or state "continuing planning processes" containing TMDLs) or to reject them and promulgate acceptable ones.[39]

15. Focusing on the years 1993 to 2003, the Submitters assert that EPA failed on an ongoing basis to effectively enforce the NPDES provisions under §402 of the CWA, and the WQS and TMDL provisions under §303 of the CWA. This alleged failure occurred in three different ways, according to the Submitters. First, US EPA allegedly issues NPDES permits—or delegates to states the authority to issue state permits meeting federal requirements—that allow ongoing point source discharges of mercury into waterways without consideration of the cumulative impact of point and nonpoint discharges of mercury on degraded waters.[40] Second, US EPA allegedly approves inadequate state antidegradation policies and implementation procedures, thus failing to safeguard waterbodies. Third, US EPA allegedly fails to use its authority to require states to adopt TMDLs for mercury where WQSs are not being met, and to issue its own TMDLs where state action is inadequate.

2.1 Appendix 12 of the Submission

16. On 18 January 2005, the Submitters provided additional information in the form of Appendix 12 to the original Submission.[41] This additional information was provided in response to the Secretariat's determination that the original Submission provided sufficient information with respect to some, but not all, of its assertions.[42] Specifically, the Secretariat concluded that the information provided in the original Submission and its attachments was sufficient to allow consideration of the Submitters' claims regarding the issuance of NPDES or state permits, but only with respect to all NPDES- or state-permitted electric utilities in Pennsylvania, Kentucky, Illinois, Ohio (identifiable through US EPA's TRI data referenced in the Submission),[43] and the three identified utilities in Michigan. However, the Secretariat found that the original Submission did not include sufficient information to allow consideration of the assertions regarding approval of state antidegradation policies and procedures and enforcement of TMDL requirements.[44]

17. Appendix 12 contains an initial section responding to the Secretariat's determination of 16 December 2004, plus twelve subsections containing supplemental information.

18. The Submitters state that

> [t]he very nature of the allegations—that the US government is failing to enforce its environmental laws with respect to mercury emissions from coal-fired plants across all of the country's almost 1,100 utility units and impacting virtually every waterway in North America—makes it highly impracticable to cite and provide documentary evidence of every alleged violation of the CWA with respect to every facility.[45]

19. Nonetheless, the Submitters purport to provide "detailed information relating to the coal-fired plants in ten specific states, which [they] submit as exemplary of the widespread and systemic problem that is being asserted."[46] They assert that these states—Alabama, Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Pennsylvania, Texas and West Virginia—"represent almost 60 percent of the mercury emissions from coal-fired power plants."[47] The Submitters provide data allegedly indicating that coal-fired power plants in these states emitted 73,624 pounds of mercury and mercury compounds to air in 2001 and 72,145 pounds to air in 2002.[48] They also provide data on the amount of mercury and mercury compounds those plants discharged to water in 2001 and 2002.[49]

20. For each of the ten states, Appendix 12 provides: analysis of private remedies available to address the matters raised in the Submission; statistical data of direct discharges to water from coal-fired power plants; charts that correlate designated uses of state waterways with mercury FCAs; a list of the largest mercury-emitting power plants in the state; a complete list of mercury-based FCAs for the state; an updated list of statewide FCAs; a copy of the state's water quality standards, including its antidegradation policy and, where available, a list of designated uses of each waterway in the state and tier protection designations; a detailed review of state TMDL actions, including CWA §303(d) on mercury-impaired waterways and preparation of TMDLs for mercury-impaired waters; and press reports critiquing US EPA's actions in dealing with mercury emissions under the Clean Air Act (CAA).[50]

21. In addition, the Submitters append two CAA Title V permits for coal-fired power plants, which they claim are representative of the systemic failure to regulate emissions from coal-fired power plants in that the permits neither place restrictions on mercury emissions nor mention water quality standards or antidegradation. The Submitters claim that the failure of the permits to control mercury emissions is consistent with statements on US EPA's website that "[US] EPA is committed to regulating and reducing power plant mercury plant emissions *for the first time ever*" and that "[o]n December 15, 2003, [US] EPA signed its first-ever proposal to substantially curb mercury emissions from coal-fired power plants."[51] According to the Submitters, the conduct of US EPA toward the coal-fired power industry, as demonstrated by its handling of an ongoing mercury rule-making process under the CAA, while allegedly not a "primary piece of evidence of non-enforcement" of the CWA, can "properly be considered to give factual context" to their allegation that US EPA is failing to effectively enforce the CWA.[52]

22. The Submitters also provide information regarding FCAs for the ten states in question. They submit that, as of July 2004, four of the ten states (Ohio, Pennsylvania, Illinois and Kentucky) had statewide mercury FCAs for both lakes and rivers, two (Indiana and Michigan) had statewide mercury FCAs for either lakes or rivers, and four (Texas, Alabama, North Carolina and West Virginia) had no statewide mercury FCAs but nonetheless had at least one, and as many as 17, mercury FCAs in the state.[53] The Submitters state that West Virginia has declared statewide mercury advisories on its waters since the filing of their original Submission.[54] They also note that Texas, Alabama, and North Carolina have statewide mercury FCAs for coastal areas.[55]

23. With regard to their NPDES-related assertions, the Submitters provide additional information that identifies all of the power plants that allegedly discharge mercury to water in the ten states on which Appendix 12 focuses.[56] They note that in states without statewide mercury FCAs, they were not able in each case to determine the name of the receiving waterbody to which NPDES-permitted facilities discharge mercury.[57]

24. The Submitters supplement their allegations regarding the CWA's antidegradation requirements by providing examples of instances where WQSs have been exceeded across all tiers of water within each of the ten states.[58] According to the Submitters, "every time a 'fishable' waterway becomes subject to a mercury FCA and is no longer fishable it is, by definition, in exceedance of water quality standards for the pollutant for which the FCA was issued."[59] In addition, they assert, "these ten states exceed their WQS' narrative criteria regarding the addition of toxic mercury from power plants into local waterways, resulting in a significant human health threat and a continuing diminution in water quality."[60] The Submitters contend that US EPA routinely approves state WQSs, including antidegradation provisions and implementation procedures that illegally fail to control nonpoint source mercury pollution from power plants.[61] With respect to Tier II waterways, the Submitters state that, having found no information to the contrary, they conclude that US EPA has taken no action to implement best management practices (BMPs) for mercury from utility units in order to protect Tier II waterbodies.[62]

25. The Submitters supplement their TMDL-related assertions by cross-referencing the listing of impaired waters with the waterbodies subject to a mercury FCA, for each of the ten states in question, and reviewing the US EPA approval regarding what, if any, TMDLs are planned or have been prepared for mercury-impaired waterbodies.[63] They assert that state lists of impaired waterbodies prepared under CWA §303(d), while often incomplete, to a large extent list waterbodies with mercury FCAs, but note "there is little if any follow through by states or US EPA in terms of moving even to the stage of listing such waters for TMDL preparation."[64] The Submitters state they "could not find an example—among the hundreds of mercury-impaired waters—of a control program for non-point mercury sources and therefore no evidence of any action against coal-fired power plants."[65]

26. The Submitters include a detailed description of the progress toward TMDLs addressing mercury-impaired waters in the ten states. They contend that of these states, only North Carolina has a TMDL for a mercury-impaired waterbody that acknowledges contributions from coal-fired power plant air emissions, but further note that this TMDL does not include a specific waste-load allocation for power plants.[66] According to the Submitters:

> [w]hile…the reason for these failures [to adopt TMDLs addressing mercury emissions from power plants] are diverse—in the case of Pennsylvania no explanation is given and in the case of Michigan the [US] EPA has offered to assist in preparing plans in 2011—the systemic nature of the failure of effective enforcement is shown by the almost total absence of action [on TMDLs] and, more importantly, the concomitant failure by the [US] EPA to take action.[67]

27. The Submitters then observe that in Georgia, pursuant to a settlement agreement, a state TMDL did address mercury deposition. The Georgia TMDL allegedly indicates that 99 percent of mercury deposition was from airborne sources, but, according to the Submitters, it does not outline any nonpoint source control program for coal-fired power plants.[68] The Submitters contend that the Georgia TMDL is illustrative of the predicament faced in issuing state-prepared TMDLs when attempting to address out-of-state nonpoint source polluters such as power plants, opining that this predicament "presents a plausible explanation for the [US] EPA's failure to effectively enforce the provisions of the CWA against states."[69] According to the Submitters, the absence of a national program highlights the failure of [US] EPA to act in regard to nonpoint sources of mercury from coal-fired power plants.[70]

28. With regard to available private remedies, the Submitters assert that one option would be to bring several hundred lawsuits against CAA Title V permitting authorities to challenge permits that fail to address antidegradation of waterways.[71] Another option would be to sue individual state governments, alleging failure to implement adequate water quality standards and antidegradation provisions.[72] The Submitters argue, however, that bringing multiple lawsuits would require considerable expenses of time and money.[73] The Submitters provide information regarding lawsuits private citizens have brought, with mixed results, in order to

attempt to force states and [US] EPA to "effectively control nonpoint sources of pollution and atmospheric deposition of toxics and to better implement current requirements under WQS and TMDL processes."[74] The Submitters contend that the TMDL litigation they reference "tends to strengthen [the] assertion that the [US] EPA fails to effectively enforce the relevant CWA provisions."[75] They conclude that "any attempts to address mercury emissions through TMDL litigation would itself be a great burden without necessarily dealing with the full extent of the problem."[76] The Submitters then state that pursuing litigation regarding individual NPDES permits would also be extremely cumbersome. In sum, noting that the failure to effectively enforce environmental law, as asserted in the Submission, is allegedly demonstrated by the totality of the evidence regarding asserted failures, based on the NPDES, antidegradation, WQS, or TMDL processes, the Submitters maintain that it would be "highly burdensome to attempt to remedy the issue through available private means."[77]

3. Summary of the United States' Response

29. The United States' Response has been summarized previously in the Secretariat's 2005 notification to Council (Notification) that a factual record was warranted.[78] Rather than duplicate the efforts that went into the latter summary, the following is a more concise summary of the Response.

30. In its Response, the US characterizes the Submission as an allegation that the US "is failing to effectively enforce Title V of the US Clean Air Act (CAA)…and §§303 and 402 of the US Clean Water Act (CWA)…in connection with mercury emissions to air and direct discharges to water from coal-fired power plants."[79] The US notes that mercury is a highly persistent and toxic pollutant that accumulates in the food chain and that humans are exposed to methylmercury primarily by eating contaminated fish.[80] The US maintains that it has taken significant steps to reduce such health risks and that it is fulfilling its enforcement duties in accordance with US domestic law.[81] The US also maintains that the increase in FCAs documented by the Submitters is due in large part to steps US EPA is taking to address mercury contamination in water and that, considered on its own, an increase in FCAs neither indicates that the level of mercury contamination is increasing nor demonstrates any failure to effectively enforce environmental laws.[82]

31. With regard to the CAA and the Submitters' allegation that the Title V permits fail to place restrictions on mercury emissions from coal-fired power plants, thus contravening the CWA, the US asserts that "nothing in the CAA or its implementing regulations requires CAA Title V permits to incorporate requirements under the CWA, such as water quality standards or antidegradation requirements."[83] Instead, the US contends that EPA has "reasonably exercised its discretion in implementing the CAA" and that even though coal-fired power plants were the largest unregulated anthropogenic source of mercury under the CAA, its efforts to control mercury emissions from all anthropogenic sources have been "substantial."[84] In support of the latter statement, the US posits that "[o]verall US mercury air emissions were reduced by 45 percent between 1990 and 1999"[85] and that the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR), when fully implemented, "will reduce domestic power plant mercury emission by nearly 70 percent from 1999 levels."[86] According to the US, implementing the foregoing rules will also address the Submitters' core concerns.[87]

32. Regarding the CWA, the US maintains that the "Submitters seek development of a factual record to demonstrate that the US is failing to implement the CWA on the basis that the US has failed to take actions that are neither required nor authorized by that act."[88] The response then proceeds to address each of the Submitters' three specific CWA-related assertions.

33. The US addresses the assertion that US EPA is exercising its responsibilities under the TMDL program ineffectively by failing to require coal-fired power plants to reduce airborne mercury emissions. In its response, the US describes the TMDL[89] program and its function under CWA §303(d). According to the US, CWA

§"303(d) requires each state to identify and prioritize waters where technology-based controls are inadequate to attain water quality standards…. The state's identification of such waters…constitutes the 303(d) list."[90] The US asserts that US EPA regulations require states to establish and submit their 303(d) lists to US EPA every two years, and notes that if EPA disapproves a state's list, US EPA must itself establish a 303(d) list for the state.[91] The Party notes that pursuant to CWA 303(d)(1)(C), states must establish a TMDL for each waterbody identified on their respective 303(d) lists.[92] The US maintains that the US EPA is required to establish a TMDL on behalf of a state only where (1) it disapproves a state TMDL that was actually submitted to US EPA, or (2) failure of a state to submit a TMDL amounts to a "constructive submission" that compels US EPA to take action.[93] Further, where a state has not submitted a TMDL for a particular pollutant, the Response states that US EPA has discretionary authority to establish a TMDL for that pollutant even where the failure of the state to submit a TMDL is not a "constructive submission" that compels [US] EPA to act.[94] The US explains that the US EPA has complied with consent decrees to establish TMDLs in four of the ten states at issue in the Submission, but has not exercised its discretionary authority to establish TMDLs for mercury in any of the six highlighted states in which US EPA has no consent decree obligation.[95] The US posits that a decision against exercise of discretionary authority "provides no evidence that [US EPA] has failed to perform non-discretionary duties or has in some way failed to fully implement and enforce the CWA."[96] Moreover, the US notes that there are private remedies available for citizens to petition a state regarding a perceived need for establishment of a TMDL.[97]

34. The Response interprets the limits of the TMDL legal regime, and states: "TMDLs established under §303(d)(1) of the Act function primarily as planning tools and are not self executing…A TMDL does not, by itself, prohibit any conduct or require any actions. Instead, each TMDL represents a goal that may be implemented by adjusting pollutant discharge requirements in individual NPDES permits or by a state establishing non-point source controls."[98] The Party maintains that the Submitters' assertions regarding TMDLs are fundamentally misplaced in that the TDML program does not provide US EPA with either a regulatory mechanism to control nonpoint source pollution or the authority to regulate such pollution.[99] Rather, the Party states, pollutant reductions are required under the CWA for coal-fired power plants that contribute nonpoint source pollutants to waterways "only to the extent that a state opts to make such reductions a regulatory requirement pursuant to state authority."[100] The Response then details US EPA's current implementation of the TDML program, which the US maintains is being conducted in accordance with US EPA's statutory mandate.[101]

35. The Response provides an overview of the antidegradation scheme, explaining that it is one of three elements constituting a WQS.[102] The US describes that under the CWA, the primary responsibility for establishing a WQS—and concomitant antidegradation policies—is vested in the states, with the caveat that the antidegradation policies adopted by states must be consistent with, and at least as stringent as, US EPA's federal antidegradation policy.[103] The Response explains that along with adopting antidegradation policies states must identify the methods for implementing those policies.[104] The Party explains that, while the CWA requires point source discharge permits (e.g., NPDES permits) to include the effluent limitations necessary to meet a WQS, "it is the resulting permit effluent limitations, not the standards themselves, that are enforceable under the CWA."[105] Moreover, the US notes that the US EPA does not have the power to compel states to regulate or otherwise control nonpoint sources of pollution through antidegradation requirements, stating:

> [T]he extent to which a state's antidegradation policy applies to nonpoint sources depends upon the extent to which state law regulates nonpoint sources and the extent to which the state voluntarily applies its antidegradation policy to unregulated nonpoint sources. [US] EPA's regulation does not require that states establish nonpoint source controls as part of their antidegradation policies. Therefore, there is no basis for [the] Submitters' claim that [US] EPA has approved inadequate state antidegradation policies and implementation procedures… because the policies and procedures do not control nonpoint source pollution, including emissions from coal-fired power plants.[106]

36. The Response next turns to the Submitters' third assertion: that the US EPA is issuing NPDES permits allowing discharges of mercury into impaired waters or allowing states to issue such permits. The US describes an NPDES permit as the "principal means" for implementing the WQS because the NPDES permit "transforms the general requirements and standards embodied in the WQS into specific limits applicable to an individual discharger."[107] It explains that NPDES permits have two components: (1) technology-based controls that reflect pollution reduction that is achievable through particular equipment; and (2) where necessary, more stringent limitations representing the level of control necessary to ensure that the receiving waters achieve applicable WQS.[108] The US explains that "[n]o person may discharge pollutants, including mercury, from a point source into the waters of the US unless the person has an NPDES or other CWA permit."[109] However, the US maintains that the Submitters misunderstand NPDES regulations, in that those regulations do not establish an "absolute prohibition" on new permits for point sources discharging to impaired waters; rather, permits may be granted to new dischargers "if the discharge would not cause or contribute to the exceedance of the water quality standards" and to existing dischargers so long as the "level of water quality to be achieved is derived from, and complies with all applicable water quality standards."[110] The response provides a number of examples of how an NPDES permit can be developed such that a particular discharge complies with the foregoing requirements.[111] In sum, the US contends that because "it is possible to permit [point source]...discharges under the NDPES program consistent with the [CWA],"[112] the Submitters' assertion that any point source discharge into impaired waters is *per se* evidence of a failure to effectively enforce the CWA "lacks merit."[113]

37. The Response also describes US EPA's efforts to improve monitoring and permitting of mercury discharges to water. The US indicates that TRI data provided in the Submitters' supplemental information should be considered by NPDES permit writers and reviewers.[114] The Response also indicates that an analytical procedure adopted in 1999 for greatly improving detection of dissolved mercury in water and fish samples was not used consistently, including in the ten states of particular concern to the Submitters, until a revised version of the procedure was adopted in 2002, noting "this will likely lead to the establishment of WQBELs for mercury in a greater number of permits."[115] The US asserts that, in light of the new analytical method and other planned actions, the present situation with regard to mercury emissions from coal-fired power plants is legally complex, but is "dynamic and improving."[116] The US also indicates that it is committed to reviewing closely the renewal of the approximately 40 permits identified by the Submitters for coal-fired power plants that have reported significant discharges of mercury to water.[117]

38. The response further describes US actions in international fora to address mercury uses, releases and exposure.[118] Such actions include bilateral cooperation with Canada, a North American Regional Action Plan for mercury developed through the CEC's cooperative work program, and global activities addressing mercury through the United Nations Environment Program (UNEP), among others.[119]

39. Finally, the US raises several procedural concerns. First, the US contends that the Submitters' assertions are the subject of pending judicial and administrative proceedings relating to both the CAA and the CWA.[120] In light of the latter proceedings, the Response maintains that pursuant to NAAEC Article 14(3)(a), the Secretariat should proceed no further with the Submission.[121] The US also asserts that there are ample private remedies available under domestic law to address the issues raised by the Submitters, but that the Submitters have failed to pursue those remedies.[122] In support of these assertions, the US filed a supplemental response with the Secretariat on 29 September 2005.[123] The supplemental response asserts that petitions for judicial review of the CAIR and CAMR, two power plant rules recently promulgated under the CAA, have been filed in US courts, and that these proceedings also preclude the Secretariat from further consideration of the Submission.[124] Last, the US contends that "the Submitters' purported notice should not be considered adequate notice of the complicated set of allegations and voluminous supporting materials ultimately reflected in the Submission."[125]

4. Scope of the Factual Record

40. On 5 December 2005, the Secretariat concluded that the United States' response left open central questions raised in the Submission, for which a more detailed presentation of factual information would assist in considering assertions that the US is failing to effectively enforce the CWA with respect to emissions or discharges of mercury to air and water from coal-fired power plants. The Secretariat notified the Council that development of a factual record was warranted, in accordance with NAAEC Article 15(1), and should present information regarding the Submitters' assertions that US EPA is failing to effectively enforce §§303 and 402 of the CWA in the ten highlighted states by issuing or renewing NPDES permits (or allowing states to issue or renew such permits) that allow point source discharges of mercury that do not comply with, or that cause or contribute to non-attainment of, the water quality criteria for mercury in the receiving waterbodies.[126] The Secretariat also recommended that a factual record be developed to examine US EPA's actions with respect to the development of mercury TMDLs for mercury-impaired waterways in the ten states of concern, except where pending litigation or consent decrees are addressing mercury TMDLs.[127] The Secretariat declined to proceed further with the CAA aspect of the Submission due to ongoing proceedings, as defined by NAAEC Article 45(3).[128]

41. On 23 June 2008, in Council Resolution 08-03, set out in its entirety in Appendix 1 to this factual record, the Council decided unanimously to instruct the Secretariat to develop a factual record with respect to SEM-04-005 (*Coal-Fired Power Plants*), in accordance with Article 15 of NAAEC, and with the Guidelines for Submissions on Enforcement Matters under Articles 14 and 15 of NAAEC (Guidelines), with regard to the following questions identified by the Secretariat in its Notification:

    (1) Concerning National Pollutant Discharge Elimination System (NPDES) permits, or NPDES-equivalent permits, under the US Clean Water Act (CWA), for the forty coal-fired power plants reporting direct surface water discharges of mercury on the 2002 US Toxics Release Inventory in the ten US states identified by the submitters, did the relevant permitting authority determine that point source discharges for each coal-fired power plant would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury (see 40 US Code of Federal Regulations section 122.44(d)(1)(i))?
    (2) If so, what information was used by the relevant permitting authority to make that determination?
    (3) What information is generally used to make NPDES or US state-issued permitting decisions for point source discharges of mercury from coal-fired power plants?
    (4) With regard to the ten US states identified by the Submitters, which mercury-impaired waterways are included on CWA section 303(d) lists?
    (5) With regard to the ten US states identified by the Submitters, what have the states or the US Environmental Protection Agency (EPA) done to account for mercury from air depositions in Total Maximum Daily Load (TMDL) calculations established by EPA or by a state, and what are some of the examples of TMDL calculations for mercury from air deposition in other US states?
    (6) What has been EPA's response to a failure, if any, by any of the US states to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways?

42. In their submission of Supplemental Information, the Submitters requested that the period of their petition extend from the date of entry into force of NAAEC through 31 December 2004.[129] In accordance with Council Resolution 08-03, and given the temporal range of the assertions and Party response, as well as the facts before the Secretariat, this factual record includes factual information relevant to asserted failures by the US EPA to enforce environmental law from 1 January 1994 to 31 December 2004.

5. Process to Gather Information and Prepare Factual Record

43. Under Article 15(4) of NAAEC, in developing a factual record, "the Secretariat shall consider any information furnished by a Party and may consider any relevant technical, scientific or other information: (a) that is publicly available; (b) submitted by interested nongovernmental organizations or persons; (c) submitted by the Joint Public Advisory Committee; or (d) developed by the Secretariat or by independent experts."

44. On 5 August 2008, the Secretariat presented its workplan to develop a factual record (set out in its entirety in Appendix 2 herein) pursuant to Council Resolution 08-03. The workplan stated the Secretariat's intent to gather and develop information relevant to the categories of information identified in Council Resolution 08-03.

45. On 15 September 2008, the Secretariat posted a request for information relevant to the factual record on the CEC website and sent a Request for Information to the United States. The Secretariat also sent that Request to the Submitters, the Governments of Canada and Mexico, the Joint Public Advisory Committee (JPAC), the power plants referred to in Council Resolution 08-03, and nongovernmental organizations identified as potentially having relevant information, inviting them to respond by 31 December 2008. The requests for information are set out in their entirety in Appendices 3–5.

46. The Secretariat informed all the power plants that their voluntary cooperation with the factual record process would greatly enhance the Secretariat's ability to present a comprehensive and balanced set of facts. Twenty-six power plants provided information to the Secretariat in response to its Request for Information.

47. In response to the Secretariat's Request for Information, the US did not provide supplemental information, stating that the Response had been comprehensive. The Submitters did provide supplemental information in response to the Secretariat's Request for Information, on 2 March 2009.

48. In order to provide all the information required in accordance with Council Resolution 08-03, the Secretariat requested and received information regarding NPDES permits and TMDLs from the following states, pursuant to requests made under the federal Freedom of Information Act:[130] Alabama, Illinois, Indiana, Kentucky, North Carolina, Ohio, and Texas. Requests made to the state of Michigan under FOIA and Michigan rules have not been answered by the state.[131] Requests made to the state of Pennsylvania under FOIA have also gone unanswered, and information gathered in connection thereto was obtained through the Secretariat's independent research. No information was made available by the state of West Virginia under the FOIA request.

49. The Secretariat also received information from the organizations listed in Appendix 6, in response to the Secretariat's Request for Information.[132]

50. The Secretariat engaged independent legal and technical experts to assist at various stages in the preparation of the factual record. The Secretariat's technical/scientific consultants were David Evers, Ph.D., and Madeline Turnquist, M.S., of the Biodiversity Research Institute (BRI).[133] The Secretariat also consulted Professor Robin Kundis Craig, Ph.D., J.D., M.A., B.A. and Attorney's Title Professor at Florida State University, regarding the environmental laws at issue.[134] All of the Secretariat's expert consultants signed declarations attesting to their respective impartiality and independence with regard to the Submitters and Parties. The Secretariat was moreover assisted by Geoffrey Garver, Esq., a former JPAC member, private consultant, and former Director of the CEC Submissions on Enforcement Matters Unit, at an early stage of the factual record development, and by legal interns to the CEC Submissions of Enforcement Matters Unit.[135]

51. NAAEC Article 15(5) provides that "[t]he Secretariat shall submit a draft factual record to the Council. Any Party may provide comments on the accuracy of the draft within 45 days thereafter." Pursuant to Article 15(6), "[t]he Secretariat shall incorporate, as appropriate, any such comment in the final factual record and submit it to Council." The Secretariat submitted the draft factual record to Council on 25 October 2013 and received comments from Canada on 15 January 2014.

6. Background on Relevant Laws, Regulations, Policies, and Practices

52. In accordance with NAAEC Article 15(4)(a), (b), and (d), the Secretariat provides information in this section about the relevant laws, regulations, policies, and practices which are at the heart of the Submission, the Response, and Council Resolution 08-03. The CWA[136] and its integrated components represent the primary focus of this section.

6.1 Overview of the Clean Water Act

53. The CWA's stated objective is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[137] While the CWA is currently the primary means for regulating water quality standards for the surface waters of the United States, the history of water pollution law dates back to 1899, with the Rivers and Harbors Act (commonly known as the Refuse Act).[138] Citing a need for more comprehensive water quality regulation, the federal government enacted the Federal Water Pollution Control Act (FWPCA) in 1948.[139] Early versions of the FWPCA gave most of the regulatory authority over water quality to the states and limited the federal government's role to interstate enforcement and to financial support for states to set water quality standards and build sewage treatment plants, often referred to as "publicly owned treatment works" (POTW).[140] In response to increasing public concern about water quality, Congress significantly restructured and extended the FWPCA in 1972,[141] which came to be known as the "Clean Water Act" after significant amendments in 1977.[142]

54. The 1972 amendments created a legal framework for regulating discharges of pollutants into US waters and established authority for the US EPA to implement effluent limits on an industry-wide (technology-based) basis, such as by setting wastewater discharge standards for industry.[143] The CWA retained existing requirements for states "to set water quality standards for all contaminants in surface waters" and subjected any person who discharged any pollutant from a "point source" into navigable waters without a properly obtained permit[144] to administrative, civil, and criminal penalties.[145]

55. There are two main permit programs under the CWA: the §402 National Pollution Discharge Elimination System (NPDES) permit program[146] and the §404 "dredge and fill" permit program.[147] The US EPA independently administers the NPDES permit program, while the US EPA and the US Army Corps of Engineers jointly administer the §404 permit program.[148] However, individual states may apply for permitting authority, and most states now implement the NPDES program, subject to oversight by the US EPA.[149] The CWA recognizes state authority to maintain water quality:

> It is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of states to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources, and to consult with the Administrator in the exercise of his authority under this chapter.[150]

56. This relationship between individual states and the federal government exemplifies the "cooperative federalism" structure of the CWA.[151] In 1992, the US Supreme Court elaborated on state authority by noting, "Congress, in crafting the [CWA], protected certain sovereign interests of the states, for example, §510 allows states to adopt more demanding pollution-control standards than those established under the [CWA]."[152]

57. Nevertheless, the US EPA retains the authority to administer NPDES permitting even when states have been given permitting authority.[153] At the level of individual NPDES permits, states must continue to notify the US EPA Administrator of each new proposed permit and cannot issue the permit if the US EPA objects to the permit within ninety days of receiving such notification.[154] If the state does not adequately respond to any US EPA objections, the US EPA can, after a hearing, take over the issuance of that individual permit.[155] More generally, if the US EPA Administrator determines that a particular state is not administering the NPDES permit program in accordance with CWA requirements, it may withdraw delegation of the entire permitting program to that state.[156]

58. The NPDES permit program is the principal means for implementing both "technology-based requirements" and water quality standards.[157] Because a central goal of the CWA is to achieve and maintain desirable levels of water quality, the CWA mandates the development of state water quality standards.[158]

6.1.1 Nonpoint Source Pollution

59. The 1987 CWA amendments authorized states to develop and implement nonpoint source pollution controls under §319.[159] Although the CWA's provisions do not contain an explicit definition of "nonpoint sources," they are typically defined by exclusion (i.e. "anything not considered a point source").[160] Like point sources, state-developed management programs regulate nonpoint sources.[161] Unlike point sources, however, there are few federal law "backstops" for managing nonpoint sources, which is one reason that it appears TMDLs have become an important impetus for nonpoint source management.

6.2 Clean Water Act §303

6.2.1 Water Quality Standards

60. States develop their water quality standards (WQSs) by establishing: (1) designated uses; (2) water quality criteria; and (3) antidegradation policies.[162] Designated uses are uses that the state wants the waters to achieve and protect, and may include existing uses.[163] Water quality criteria are the numeric and narrative standards for various pollutants, such as pH, toxics, temperature, and nutrients necessary to protect such designated uses.[164] The US EPA's recommended water quality criteria (CWA §304) often serve as guidance for the states in setting WQSs, particularly the numeric water quality criteria component.[165] These recommended criteria must reflect:

> [T]he latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on biological community diversity, productivity, and stability, including information on the factors affecting rates of eutrophication and rates of organic and inorganic sedimentation for varying types of receiving waters.[166]

61. Once US EPA approves the state's established WQSs, CWA §303(d) requires it to identify all water segments within its borders that do not meet its WQSs that still require a total maximum daily load (TMDL) and rank those waters in terms of priority, taking into account the severity of pollution and water uses.[167] Specifically, water must be listed where technology-based or other controls are not adequate to achieve water quality standards.[168] In addition, the state must establish the TMDL for listed water segments in accordance with the priority ranking.[169] A TMDL reflects the total amount of the pollutant that can be added to the waterbody each day while still allowing that body to meet its WQSs. TMDLs are thus planning tools that identify the levels of pollutants that need to be reduced from all sources (including sources not regulated under the CWA) if water quality standards are to be attained.[170]

62. The states can then determine steps necessary to achieve or maintain desired levels of water quality, whether through control or prohibition of pollutant-bearing discharges into the receiving waters,[171] or through nonpoint source management by utilizing best management practices (BMP) programs.

63. CWA §303(c) requires the states to adopt an antidegradation policy and identify implementation methods, thus limiting the state's ability to allow waters to degrade.[172] States must implement their antidegradation policies to maintain and protect existing uses.[173]

6.2.2 Impaired Waters List under CWA §303(d)

64. The Clean Water Act offers two basic approaches for protecting and restoring the nation's waters: the technology-based approach and the water quality–based approach.[174] The technology-based approach uses guidelines promulgated by the US EPA to derive individual, technology-based NPDES permit limits.[175] The water quality–based approach is designed to achieve the desired uses of a particular waterbody.[176] The CWA §303(d) program most directly links the water quality goals to NPDES permitting;[177] at the state level, the §303(d) listing process in conjunction with TMDLs prompts states to more effectively address nonpoint source pollution.[178]

65. Clean Water Act §303(d) requires each state to identify and prioritize waters where technology-based controls are inadequate to attain WQSs:

> Each state shall identify those waters within its boundaries for which the effluent limitations required by §1311(b)(1)(A) and §1311(b)(1)(B) of this title are not stringent enough to implement any water quality standard applicable to such waters. The state shall establish a priority ranking of such waters, taking into account the severity of the pollution and the uses to be made of such waters.[179]

66. The state's identification of such waters, which are known as "water quality limited segments" (WQLSs) still requiring TMDLs, constitutes the "303(d) List."[180] Pursuant to the US EPA's regulations, states must establish and submit their 303(d) Lists to the EPA for review every two years.[181] The EPA must then either approve or disapprove the list within thirty days after the date of submission. If the EPA disapproves the list, it must identify waters not meeting applicable water quality standards.[182]

67. In identifying impaired waters and developing a 303(d) List, each state must evaluate "all existing and readily available information."[183] Once the appropriate waterbodies have been identified and listed, the CWA requires that states establish prioritized schedules for waters on those lists and develop TMDLs for the identified waters.[184] After a TMDL has been set, the state divides the pollutant allowance among the point and non-point sources[185] and provides the EPA with a plan for developing TMDLs. EPA guidance recommends that states develop TMDLs within eight to thirteen years from the original listing.[186]

6.2.3 Total Maximum Daily Loads

68. As noted above, for all waters identified by individual states under CWA §303(d)(1)(A) as exceeding water quality standards, the CWA requires each state to establish TMDLs:

> Each state shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under §1314(a)(2) of this title as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.[187]

The US EPA must establish TMDLs for any state that fails to do so.[188]

69. The term "total maximum daily load" is not expressly defined in the CWA, but it has been defined by the US EPA in its 1985 implementing regulations as the sum of the "wasteload allocations" assigned to point sources, the "load allocations" assigned to nonpoint sources or "natural background," and a margin of safety.[189] In other words, a TMDL is a calculation of the maximum amount of a specific pollutant that can be added to a waterbody on a daily basis without violating water quality standards, and an allocation of that load among the various sources of the pollutant.[190] Because the overall goal of the TMDL program is to create an implementation plan to restore impaired waterbodies and meet WQSs,[191] states must establish TMDLs for both waters where pollutants are actually preventing attainment of water quality standards and waters where pollutants are expected to prevent attainment of water quality standards.[192] Once a state has calculated a particular TMDL, the state provides point source pollutants with a "wasteload allocation" (WLA) and nonpoint sources with a "load allocation" (LA).[193]

70. The development of a TMDL consists of several activities, including the identification of the pollutant and waterbody to be addressed, estimation of the pollutant loading capacity and sources, analysis of the loading reductions needed to meet water quality standards, and allocation of the allowable pollutant loadings among the sources.[194] Once a state has established a TMDL, it is required to submit the TMDL to the US EPA for approval, and the US EPA is required to review and approve or disapprove that TMDL within thirty days.[195] If the US EPA disapproves a state's TMDL submission, then the US EPA is obligated to issue its own TMDL for that waterbody-pollutant combination within thirty days.[196] Nevertheless, US EPA-approved TMDLs by themselves do not establish new regulatory controls, but instead function primarily as planning tools.[197] Each TMDL represents a goal that is be implemented via pollutant discharge requirements in individual NPDES permits or by a state establishing nonpoint source controls.[198] As the US Court of Appeals for the Ninth Circuit wrote in *Pronsolino*, it is in "[t]he final pertinent section of [CWA] §303, §303(e), requiring each state to have a 'continuing planning process,' [that] gives some operational force to the prior information-gathering provisions."[199]

6.2.4 Continuing Planning Process

71. Section 303(e) of the CWA requires each state to develop a "continuing planning process" (CPP) that will result in the navigable waters within that state achieving their WQSs.[200] The US EPA must approve or disapprove these CPPs no later than thirty days after submission.[201] CPPs must include, *inter alia*: effluent limitations and schedules of compliance; TMDLs in accordance with CWA §303(d); procedures for revision; adequate authority for intergovernmental cooperation; and adequate plans for implementation, including schedules of compliance for revised or new WQSs under CWA §303(c).[202] Thus, the CWA leaves to the states the responsibility to develop plans to achieve WQSs within the state if the NPDES point source controls do not suffice.[203] Moreover, CWA §319 financially encourages states to implement nonpoint source pollution control plans by providing federal funding to aid implementation of the management plans.[204]

6.3 Clean Water Act §402

6.3.1 The National Pollutant Discharge Elimination System Permit Program

72. The National Pollutant Discharge Elimination System (NPDES) permit program[205] "controls water pollution by regulating point sources that discharge pollutants" into the surface waters of the United States.[206] The US Supreme Court, in *Arkansas v. Oklahoma*, summarized the NPDES permitting program as follows:

> The [Clean Water] Act provides for two sets of water quality measures. 'Effluent limitations' are promulgated by the [US] EPA and restrict the quantities, rates, and concentrations of specified substances which are discharged from point sources. 'Water quality standards' are, in general, promulgated by the states and establish the desired condition of a waterway. These

> standards supplement effluent limitations so that numerous point sources, despite individual compliance with effluent limitations, may be further regulated to prevent water quality from falling below acceptable levels. [207]
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> ******
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> The primary means for enforcing these limitations and standards is the NPDES...§301(a) of the [CWA]… [that] generally prohibits the discharge of any effluent into a navigable body of water unless the point source has obtained an NPDES permit. §402 establishes the NPDES permitting regime, and describes two types of permitting systems: state permit programs that must satisfy federal requirements and be approved by the [US] EPA, and a federal program administered by the [US] EPA.[208]

73. Defining the scope of the NPDES program necessitates an understanding of how each of the key terms (pollutant," "point source," and "waters of the United States") has been defined and interpreted.[209]

74. The term "pollutant" has been defined expansively to include any type of industrial, municipal, and/or agricultural waste discharged into water,[210] including:

> dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.[211]

75. Pollutants can enter the water from a variety of pathways (i.e., point and nonpoint sources); however, the NPDES permit program is specific to point-source pollution.[212] As defined earlier, point sources are discrete conveyances such as pipes or man-made ditches.[213] The term "waters of the United States" has been interpreted to include navigable waters, waters flowing to navigable waters, interstate waters, the territorial seas, and intrastate waters used for various interstate commerce purposes.[214]

76. In 2006, the US Supreme Court addressed the federal jurisdictional reach of the CWA, looking specifically at whether a wetland or tributary constitutes a "water of the United States."[215] The plurality opinion[216] by Justice Scalia indicated that the agencies would maintain jurisdiction over traditional navigable waters, relatively permanent non-navigable tributaries, and adjacent wetlands.[217] Furthermore, according to Justice Kennedy's concurring opinion, agencies should use a fact-specific analysis to determine whether a "significant nexus" exists with a traditional navigable water, in order to assert jurisdiction over non-navigable tributaries that are not relatively permanent and adjacent wetlands.[218] Because the Court could not reach a majority opinion and no single rationale of the Court received assent of five justices, the US EPA and the Army Corps combined these latter two opinions in their Guidance for establishing CWA jurisdiction.[219]

77. As described earlier, the NPDES permit program is the primary means for implementing both technology-based requirements and water quality standards.[220] "Technology-based effluent limitations" (TBELs) are generally numeric limitations on the amount or concentration of a specific pollutant that can be discharged from a point source, based on the technology available to a particular type of industry to control that particular kind of discharge. [221] Permit writers establish TBELs based on US EPA-promulgated "effluent limitations guidelines" (ELGs) for specific industrial categories,[222] or, where there is no applicable ELG, on a case-by-case Best Professional Judgment basis.[223]

78. However, when the standard industry-wide, technology-based effluent limitations are not sufficient to protect water quality, the permitting authority must develop water quality–based effluent limitations (WQBELs) for NPDES permits instead.[224] The US EPA water quality–based effluent limitations require as follows:

> A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge. An NPDES permit may also include discharge limits based on federal or state water quality criteria or standards that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from state to state and site to site, depending on the use classification of the receiving body of water. Most states follow [US] EPA guidelines that propose aquatic life and human health criteria for many of the 126 priority pollutants.[225]

79. NPDES regulations provide that water quality–based effluent limitations must be established for all pollutants that "are or may be discharged at a level that will cause, have a reasonable potential to cause, or contribute to an excursion above any applicable state water quality standard, including state narrative criteria for water quality."[226] This requirement is often referred to as the "reasonable potential test" and used by NPDES permitting authorities to determine whether an NPDES permit for a point-source pollutant must include water quality–based effluent limitations.[227]

80. The two basic types of NPDES permits are individual permits and general permits.[228] An individual permit is "specifically tailored to an individual facility," based upon the particular facility application and is issued for a specified period of time (not to exceed five years).[229] A general permit "covers multiple facilities within a specified category" and geographic area,[230] which can be local, regional, or nationwide. The general permit may be written to address various categories of point sources that have common elements.[231] For example, a single general permit may cover multiple facilities in the same geographical region that discharge the same effluents and/or the same types of wastes.[232] Like individual permits, the CWA limits the length of a general permit to five years. A permit can be renewed or reissued at any time after the permit holder applies. In addition, NPDES permits can be administratively extended if the facility reapplies more than 180 days before the permit expires, and [US] EPA or the state regulatory agency, which ever issued the original permit, agrees to extend the permit.[233] General permits can ensure consistency among similar facilities and allocate permit resources in a more efficient manner.[234] Both individual and general permits incorporate technology-based and water quality–based effluent limitations to maintain environmental standards that ensure the safety of US surface water.[235] The NPDES and how it relates to the scope of this factual record will be described in greater detail below, in section 8.

6.4 The Toxics Release Inventory

81. The Toxics Release Inventory (TRI) is a publicly accessible database maintained by the US EPA that tracks toxic chemical releases by compiling annual data reports submitted by the facilities releasing toxic chemicals.[236] The TRI was initially created as a component of the Emergency Planning and Community Right-to-know Act of 1986 (EPCRA)[237] and expanded by the Pollution Prevention Act of 1990 (PPA).[238]

82. The EPCRA, also known as Title III of Superfund Amendments and Reauthorization Act of 1986 (SARA),[239] includes four complementary components intended to inform local communities about toxic chemicals management.[240] One of these components is EPCRA §313, which requires certain manufacturers to report annually the quantity of toxic chemicals their facilities release into the environment.[241] Once the TRI data have been reported in compliance with EPCRA §313, the US EPA is responsible for compiling the inventory in a national database and making it publicly accessible.[242]

83. The PPA[243] requires, *inter alia*, the US EPA to develop and implement a strategy to promote source reduction by way of identifying measurable goals and evaluating existing barriers to source reduction.[244] Further, the PPA amended TRI requirements by mandating that facilities subject to EPCRA §313 reporting requirements also provide information on pollution prevention and recycling for each facility and for each toxic chemical.[245]

84. Together, the EPCRA and PPA require certain facilities to submit annual reports to the EPA that specify the quantity of toxic chemicals released and provide information on each facility's pollution prevention strategies. The US EPA then compiles the TRI database and makes this information available to the public via the Internet.[246] Currently, the US EPA's TRI database contains detailed information on nearly 650 chemicals and chemical categories, which approximately 22,000 industrial and other facilities manage through disposal or other releases, recycling, energy recovery, or treatment.[247]

85. The TRI is relevant to this factual record because the Submitters relied on the database in part to assert that "the ten states targeted in [their] research represent almost 60% of the mercury emissions from coal-fired power plants in the US."[248] The Submitters also used TRI data to allegedly quantify individual state and total US mercury emissions from coal-fired power plants to air and water in 2001 and 2002.[249]

86. In its Response, the US described the information received from the Submitters and noted:

> There is not an exact correlation between TRI data and NPDES permitting data, primarily because facilities make 'reasonable estimates' of quantities of pollutants released into the environment for TRI purposes. Nevertheless, EPA believes state permit writers should consider the TRI data identified by the Submission and EPA permit reviewers as these facilities' permits come up for renewal.[250]

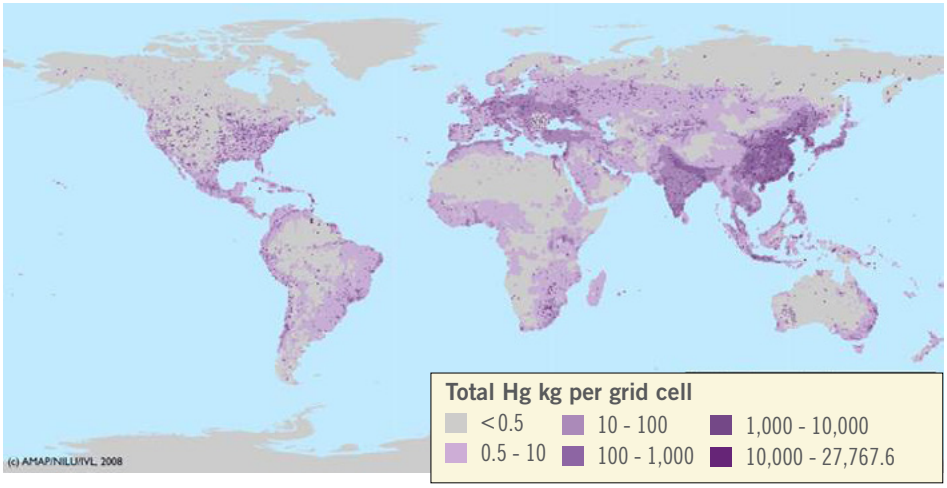
87. In preparation of this factual record, the Secretariat extended an invitation to various coal-fired power plants and state permitting authorities to submit relevant information. The Secretariat received responses from the Clean Air Task Force (CATF), First Energy, Owensboro Municipal Utilities, Reliant Energy, the Tennessee Valley Authority, the Texas Commission on Environmental Quality (TCEQ), and the Utility Water Act Group (UWAG). The various utility groups advised the Secretariat that TRI data are based on conservative estimates by companies,[251] that the "reasonable potential test" (which, according to the utility groups, is also conservative), not EPCRA's TRI reporting data, is what drives water quality–based effluent limitations under the CWA;[252] that TMDLs do not allow the US EPA to control nonpoint source pollutants[253] (although, following *Pronsolino*, TMDLs may be required on an impaired river even if all pollutant sources are from nonpoint sources[254]); that even if all power plants subject to the factual record ceased to exist, it is likely that not one of the impaired waterbodies would be removed from the impaired list nor would a single fish consumption advisory be removed;[255] and that because some of the power plants have applied for NPDES permit renewals and these renewals constitute pending administrative proceedings, the CEC is barred from proceeding further.[256] The Secretariat notes that the latter NPDES permit renewals referred to are not, however, pending proceedings barring the Secretariat from proceeding further, as they were not notified to the Secretariat by the Party in accordance with NAAEC Article 14(3).

7. Background on Relevant Science of Mercury

88. Just as the Secretariat provided information on the laws at issue in order for the reader to better understand the assertions in the Submission, and the Party's response, in following the Secretariat presents an overview of scientific and technical information relevant to the assertions and Party response, and which was gathered from documents submitted by the Submitters and Party, and in response to the Secretariat's information requests.

7.1 Global Emissions Of Mercury

Figure 1. Global Emissions of Mercury from Anthropogenic Sources[257]

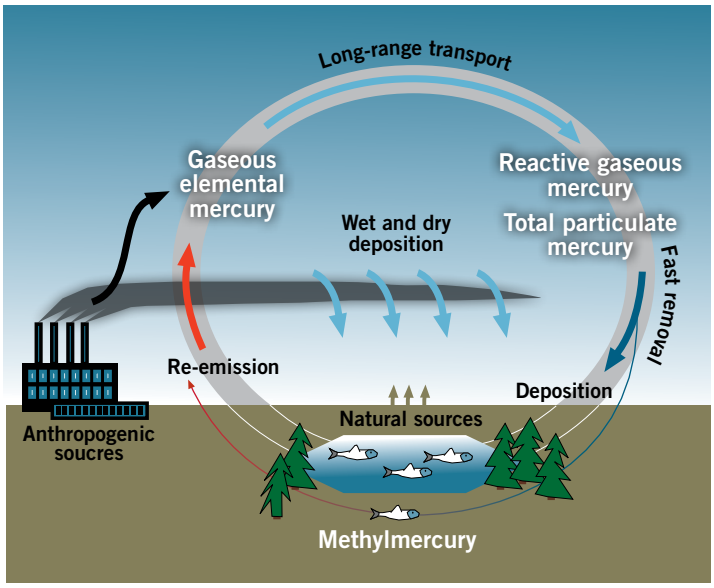


7.1.1 Form

89. Mercury, a naturally occurring element found within the Earth's crust, is naturally mobilized from the Earth's crust through volcanic activity, geothermal releases, and the natural breakdown of rock.[258] Mercury measurements in sediment cores around the world now average three to six times greater[259] than naturally occurring levels prior to the mid-19th century.[260]

90. There is no way to control when and where naturally occurring sources of mercury emissions may be found, e.g., mercury emitted through volcanic eruptions.[261] Meteorological events may also influence the occurrence of natural sources of mercury.[262] Re-emission of mercury from the soil and vegetation through wildfires and other anthropogenic activity is another major contributor to the global cycle of mercury,[263] increasing the presence of mercury in the biosphere (see Figure 1).[264]

Figure 2. Mercury Cycle[265]



91. Whether released by natural or anthropogenic means, mercury is found in the atmosphere predominately as elemental mercury.[266] Elemental mercury may travel considerable distances from its source, and thereby, become a global pollutant,[267] spending years in the atmosphere before being deposited on the landscape (Figure 2).[268] Alternatively, reactive gaseous and particulate forms of mercury are deposited more rapidly on the landscape, affecting local and regional areas.[269] Reactive gaseous mercury is highly soluble and is generally deposited within 250 kilometers from its source.[270] Particulate mercury is generally deposited within 400 kilometers from its source.[271] Mercury is primarily removed from the atmosphere through either wet or dry deposition, although some fraction of atmospheric mercury is absorbed by vegetation.

92. The sources of global anthropogenic releases of mercury are multifarious, and include electric arc furnaces, medical waste incinerators, hazardous waste incineration, chlorine production, and artisanal gold mining, but the main atmospheric releases of mercury are fossil-fuel burning and waste incineration (see Figure 7, p. 29).[272] Coal-fired power plants are the single largest source of mercury emissions in the United States (Figure 3).[273]

Figure 3. Mercury Species, by Source[274]

Source Category	Elemental Mercury Average %	Reactive Gaseous Mercury Average %	Particulate Mercury Average %
Coal-fired electric utilities – US average	50	40	10
Coal-fired electric utilities – the Northeast	30	68	2
Utility oil boilers	50	30	20
Municipal waste combustors	22	58	20
Pulp and paper production	50	30	20
Chlorine production	95	5	0
Hazardous waste incinerators	58	20	22
Municipal landfills	80	10	10

Sources: NEI 1999; Pacyna et al. 2003; NESCAUM 2005.

93. Globally, at least 45% of mercury released is due to coal combustion.[275] Overall, two-thirds of atmospheric mercury appears to be related to human activities.[276] Generally, the background level of mercury is increasing one percent each year and there was a 17% increase in anthropogenic emissions of mercury from 1990 to 2005.[277]

94. Not only is the amount of mercury increasing globally, but there is also a shift in its source and distribution. Although mercury emissions from North America have declined, there has been a great increase in the mercury emissions from Asia and China, due mainly to the sharp increase in burning coal for energy production,[278] and mercury emissions from Asia account for more than 50% of global anthropogenic releases.[279] This upward trend is likely to continue and may have impact on local, regional, and global ecosystems.[280]

7.1.2 Exposure Information

95. Mercury emitted into the atmosphere is ultimately deposited onto the landscape, where it can concentrate in the food web, ultimately reaching humans mainly through the consumption of contaminated fish.[281] Exposure to mercury vapors may occur in an occupation entailing work directly with mercury.[282] While mercury moves through the landscape, certain forms are readily absorbed and bioaccumulate.[283]

7.1.2.1 Bioaccumulation

96. In the environment, and particularly wetland and aquatic ecosystems, sulfur-reducing bacteria transform inorganic forms of mercury into methylmercury.[284] Methylmercury bioaccumulates and biomagnifies as it moves along the food chain, from the water column to algae, zooplankton, small fish, piscivorous fish, other fish-eating wildlife such as loons and eagles, and humans.[285] During bioaccumulation through the food chain from the water column to top trophic predator fish, methylmercury concentrations can increase ten million times.[286] The largest increase in methylmercury occurs at the base of the food web, from the water to the seston (minute living and nonliving matter in the water).[287] Because the trophic transfer of methylmercury is not markedly different between sites, the supply of aqueous methylmercury is the major controller of biotic methylmercury accumulation in higher trophic position organisms.[288] Particular trophic factors such as growth rate and feeding behavior specifically influence the difference in the bioaccumulation of mercury between sites.[289]

97. Besides the direct supply of methylmercury to lake or stream ecosystems, certain environmental factors influence the atmospheric transport and deposition of mercury, and the net production and trophic transfer of methylmercury.[290] Delivery efficiency of mercury from a watershed to the aquatic system is influenced by the amount of mercury deposition, the percentage of forest and wetland cover, the ratio of watershed to lake area, and the amount of dissolved organic carbon.[291] Sites with a greater connectivity to wetlands, presence of anoxic conditions, and highly dissolved organic carbon facilitate the transformation of mercury into methylmercury.[292] Once transformed into methylmercury, sites with low total phosphorus, low pH, and low acid-neutralizing capacity promote the trophic transfer of methylmercury.[293]

98. The specifics mentioned above, as well as the waterbody type (i.e., lake, river, reservoir), the trophic status of the site (i.e., low or high productivity, usually measured by total phosphorus), and the particular trophic position of the fish within the site (i.e., planktivorous or piscivorous) all affect the bioaccumulation at particular sites.[294] Thus, to understand mercury pollution in the environment, a complex combination of scientific fields must be applied.

99. Parallel patterns for the trophic transfer of methylmercury are now being documented for terrestrial invertivores.[295] Because taxa such as songbirds and bats occupy trophic levels equivalent to or greater than larger piscivores, there is concern about the effects of methylmercury on terrestrial organisms as well.[296]

7.1.2.2 Health Risks

100. Although there are many complexities to understanding the effects of mercury on biota in the environment, it is clear that mercury can pose direct health risks to people. Methylmercury has been classified as a potent neurotoxin affecting the brain and nervous system in addition to other biological functions in the human body.[297] Methylmercury has the ability to cross the blood-brain barrier, thus making it particularly potent.[298] The primary information on the effects of mercury relate to its impact on neurological systems.

101. Mercury is most noted to cause neurologic harm, especially affecting those exposed to high levels while in the womb.[299] Such impacts include a lowered IQ, impairments in visual and spatial functions, and deteriorations in the ability to recall and process information.[300] Exposure to mercury in the womb or as a young child can lead to overall slower development and a decrease in fine motor skills.[301] In extreme cases, fetuses exposed to high levels of mercury in the womb can be born with microcephaly, cerebral palsy, mental retardation, dysarthria, or hyperkinesias, or experience seizures.[302] Accumulation of methylmercury in the brain from *in utero* exposure can in turn affect the heart, particularly via the neurological system that regulates heart rate, and impair a person's ability to maintain a normal heart rate; these effects can last the duration of one's life.[303]

Figure 4. Blood Mercury Concentration in Women 16–49 Years of Age, by Region, United States

102. Beyond mercury's impact on the neurological system, studies have shown the impact of methylmercury on the endocrine system. Within the endocrine system, methylmercury can accumulate in the hypothalamus, leading to the disruption of hypothalamic-pituitary axes.[304] The accumulation of methylmercury within the kidneys can lead to nephropathy.[305]

103. Mercury toxicity affects children as well as adults.[306] Increased mercury exposure has been associated with an increase in cardiovascular disease, including coronary heart disease and acute myocardial infarction.[307] Continued exposure to and accumulation of mercury can lead to neurological impairments, such as hypoesthesia, ataxia, tremors, and fatigue.[308]

7.1.2.3 Fish Consumption Studies

104. As the primary pathway of mercury exposure to humans is through fish and seafood consumption, scientific studies have focused on human mercury levels in relation to fish consumption.[309] Many factors, such as age, geographic location, income, education, and dietary preferences, account for the differences in human mercury levels.[310] Eating fish occupying higher trophic positions, such as swordfish, correlates with higher blood mercury concentrations.[311] Populations that consume large quantities of fish have a greater portion of the population with blood mercury levels exceeding reference concentrations. In Japan, more than 70% of women sampled had hair mercury concentrations exceeding 1.0 part per million (ppm).[312] In Italy, a study of 237 adults from the general population showed a strong correlation between hair mercury concentrations and fish consumption.[313] Many native groups, such as Pacific Islanders, Native Americans, and native Alaskans, have higher mercury concentrations, due mainly to exposure through fish consumption.[314] In addition to cultural and ethnic influences on diet, island populations tend to have higher mercury concentrations than inland populations. In studies conducted on Bermuda, Fiji, Seychelles, and Tahiti, elevated blood mercury levels were found to be common.[315] A trend present among these studies is a correlation between the amounts of fish consumed, especially higher-trophic-position species, and the concentrations of mercury in blood or hair samples.

105. Within the United States there are significant regional differences in mercury exposure (see Figure 4).[316] Methylmercury exposure in coastal areas is generally greater than in other regions.[317] Ethnicity and income are also factors related to mercury exposure through fish consumption.[318] Women with higher incomes, as well as Asian women in the United States, ate more fish and had higher blood mercury concentrations.[319] Ultimately, as noted above, women exposed to high mercury levels through fish consumption can pass the mercury on to their fetuses.[320] The Center for Disease Control and Prevention finds mercury in umbilical cord blood at quantities greater than 5.8 micrograms per liter (μg/L) in 300,000 to 600,000 children each year.[321] Considering the foregoing, globally, fish consumption is a major pathway for mercury exposure and is correlated with biological mercury levels.

7.1.3 Issues with Control of Mercury Emissions Generally

106. Mercury is a pervasive pollutant released into the atmosphere predominantly from fossil fuel combustion.[322] Three predominant forms of mercury—elemental, reactive gaseous, and fine particulate mercury—may be released in coal-fired power plant plumes.[323]

107. Once released into the atmosphere, mercury is deposited either through dry or wet deposition.[324] The form of mercury in the atmosphere determines the composition of mercury in the form of deposition.[325] Particulate mercury is predominantly deposited on the landscape through dry deposition.[326] Many factors can contribute to the variation in atmospheric mercury deposition. Deposition is site-specific, and varies with time, season, and meteorological conditions.[327] The interaction between other particles and gases in the plume and atmosphere, such as sulfur oxide, carbon monoxide, and nitrogen compound gases, also affect mercury deposition and transport.[328]

108. Weather can also significantly influence mercury deposition, particularly through precipitation.[329] A multitude of meteorological events can change the concentration and location of mercury deposition, the primary source of mercury pollution.[330] Urban areas and areas downwind of urban areas tend to receive larger quantities of mercury deposition.[331] Rainfall events are extremely efficient at removing atmospheric reactive gaseous mercury, as well as tracer elements.[332] The variation observed in mercury deposition occurs temporally and spatially with respect to daily weather changes and seasonal shifts in larger weather patterns, suggesting a significant impact from localized sources.[333] Shifts in weather and wind direction play a major role in the amount of local mercury transported and its potential depositional path.[334]

109. It is important to note an inverse relationship between mercury concentration and total amount of rainfall received. As precipitation increases, the mercury concentrations in that rainfall event decrease.[335] Additionally, the frequency and magnitude of weather events affect the variability of mercury deposition.[336] The variation of mercury deposition is affected by local conditions and local sources of mercury releases, depending upon whether the sampling site is urban or rural.[337] Specifically, variations of mercury concentrations and regularities in depositional patterns of urban sites are influenced more by local emissions, whereas rural sites farther from major point sources are more varied in the mercury deposition that is based on the rainfall amount.[338]

110. Along with studying the large variation in mercury deposition and the role weather plays in it, scientists track sources and patterns of mercury deposition.[339] Tracer elements, such as vanadium, nickel, antimony, lanthanum, cerium, and lead, are also released into the atmosphere from fossil-fuel combustion and can be used to track the source and composition of mercury pollution.[340] Researchers are able to determine the specific type of source and create connections from sources to depositional sites, such as pathways, changes in wind patterns, and seasonal weather inputs, by measuring these tracer elements.[341]

7.1.3.1 Global Sources

Figure 5. Global Anthropogenic Mercury Emissions to Air, by Region, 2005[342]

Continent/region	2005 Emissions (tonnes)	% of 2005 Emissions	Low-end Estimate (tonnes)	High-end Estimate (tonnes)
Africa	95	5.0	55	140
Asia	1,281	66.5	835	1,760
Europe	150	7.8	90	310
North America	153	7.9	90	305
Oceania	39	2.0	25	50
Russia	74	3.9	45	130
South America	133	6.9	80	195
Total	**1,930**	**100.0**	**1,220**	**2,900**

111. Reactive gaseous mercury can transform to elemental mercury in the atmosphere, where it then circulates.[343] Elemental mercury from foreign sources is likely to travel long distances and can affect US ecosystems.[344] Based on modeling efforts in the northeastern United States, about 11–20% of the mercury deposited there could have Asian origin, and about 10% could originate from Europe.[345] Mercury may moreover be able to travel farther than previously estimated, if re-emissions are accounted for as well.[346] Geographic transport models examine the atmospheric transport and deposition of mercury.[347] Such models can help illustrate the relationship between sources of mercury and the deposition locally and globally. The risk of particular episodic events can be examined when a multitude of variables are incorporated into the models.[348] For example, severe cyclonic activity in the Pacific can transport mercury from East Asia to North America.[349] This transport can be substantial, considering that East Asia releases about half of the global anthropogenic mercury (see Figure 5).[350]

7.1.3.2 Measurement

112. Measurements of emissions from coal-fired power plants at detection sites indicate elemental mercury is the dominant form, averaging over 80% of the total mercury measured.[351] Particulate mercury represents a minor fraction, usually 2% or less, of the total mercury measured in coal-fired power plant plumes.[352] In measurements from emissions to sites, reactive gaseous mercury comprised less of the total mercury measured at

the site than expected from emission estimates.[353] Reactive gaseous mercury, composed of oxidized forms of mercury, can however be reduced to elemental mercury within the plume and atmosphere.[354] The latter fact may account for the differences in estimated and measured reactive gaseous mercury from emissions to sites. Other plausible explanations for these differences are measurement errors, errors in emission estimations, and/or depositional losses.[355] In particular, studies in the southeastern US show that plume transportation events occurred fairly quickly (in less than five hours) from coal-fired power plants to measurement sites.[356] This research indicates that reactive gaseous mercury is lost or converted rapidly once leaving the emission source. Additionally, elemental mercury can be oxidized to reactive gaseous mercury, which is rapidly removed from the atmosphere through wet and dry deposition.[357]

113. Elemental mercury was the dominant form of mercury determined at measurement sites.[358] The ratio of speciation and composition of elemental mercury can change based on a variety of factors, including the type of coal burned (e.g., bituminous, sub-bituminous, lignite) and burning units used (i.e., cold-side electrostatic precipitators, super-critical pulverized coal, integrated gasification combined cycles).[359] The form of mercury measured in the plume from coal-fired power plants may also change when it reaches the measurement site.[360] However, the total mercury measured is constant from emission source to measurement site, indicating the total mass of mercury emissions is conserved during atmospheric transport.[361]

7.2 National Emissions of Mercury—Coal-fired Power Plants

114. Approximately 100 tons of mercury are emitted on a yearly basis from anthropogenic sources in the United States (Figure 6).[362] Elemental, reactive gaseous, and particulate mercury are released in the plumes of coal-fired power plants.[363] Mercury in the atmosphere is deposited onto the landscape through wet and dry deposition.[364] Although wet deposition has been substantially studied and monitored[365], dry deposition may comprise a larger portion of total deposition than previously thought, ranging from 25% to 69% of total deposition.[366]

Figure 6. US Mercury Emissions, by Source

Source Category	US, 1990 *(t/yr)*[1]	US, 1996 *(t/yr)*	US, 1999 *(t/yr)*	US, 2002 *(t/yr)*	Northeast, 2002 *(t/yr)*
Coal-fired power plants	58.8	51	47.9	50.3	0.82
Medical waste incinerators	51	40.5	2.8	0.3	0.017
Municipal waste combustors	57.2	31.8	5.1	4.2	1.2
Industrial/commercial/ institutional boilers and process heaters	14.4	12	12	11	0.36
Chlorine production	10	7.8	6.5	5.4	0
Electric-arc furnaces	7.5	No data	No data	10.7	No data
Hazardous waste incineration	6.6	4.5	6.5	4.6	0.001
Total, all categories	**245**	**185**	**120.3**	**113.8**	**5.2**

Sources: NEI 1999; NEI 2002.
1. In short tons (2,000 lbs)

7.2.1 Total Maximum Daily Load, related to the Toxics Release Inventory

115. The US EPA's Toxics Release Inventory (TRI) is a database on the disposal and release of toxic chemicals from US facilities and how these facilities manage, recycle, and treat these chemicals.[368] The TRI compiles data submitted each year by facilities releasing toxic chemicals and waste and provides communities with this information.[369] Information from the TRI is also used to calculate TMDLs.[370] While mercury is a toxic substance included in TRI reporting requirements, the TRI commonly overstates the amount of mercury discharged directly to water, as a result of measurements below detection limits, mercury in the intake water, and samples below the quantification limit, so as to prevent underestimating releases of mercury due to inaccurate measuring technology.[371]

116. As noted above, the US EPA implemented the CWA to protect the nation's water.[372] Various provisions were enacted to ensure controls of point- and nonpoint-source pollution.[373] As stated in more detail in section 6.2.3 of this factual record, total maximum daily loads (TMDLs) must be calculated for waterbodies deemed to be significantly impaired from a particular pollutant.[374] In this connection, it is useful to recall that a TMDL "is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards"[375] and allocates the maximum amount of discharge allowable among both point-sources and nonpoint-sources.[376] The greater portion of mercury pollution across the US is emitted into the air as elemental mercury and is received by water through atmospheric deposition and nonpoint-source discharge.[377] Because atmospheric mercury as it affects water is considered a nonpoint-source discharge,[378] regulation thereof is left to either the states' TMDL programs, or a voluntary program known as "subcategory 5m," drafted by the US EPA in 2006.[379]

7.2.2 Trends of Emissions

117. In the United States, total mercury emissions decreased by 58% from the 1990s to 2005.[380] Mercury emissions from coal-fired power plants have decreased roughly 20% during that same period.[381] In 2002, 42% of the mercury emissions were from coal-burning utility plants, which emitted around 50 tons of mercury per year.[382]

118. Although mercury emissions have decreased nationally, varying localized trends in emissions can be observed regionally across the country. In the Midwest, overall mercury deposition has decreased from its peak in the 1960s and 1970s.[383] However, more recent studies in the Great Lakes Region (2002–2008) indicate that no substantial decreases in wet mercury deposition have occurred.[384] When total mercury deposition is examined, there has been a roughly 20% decrease, as measured in lake sediments across the Great Lakes Region.[385] In the Northeast, according to lake sediment core measurements, deposition of mercury to lake surfaces has declined; yet watershed exports of deposited mercury remain high.[386]

7.2.3 Health Risks

119. Mercury is a neurotoxin affecting the brain, central nervous system, and motor functions.[387]

7.2.3.1 Methylmercury

120. As noted in section 7.1.2.3 above, methylmercury affects people through the consumption of fish and has a spectrum of effects, depending on the degree of exposure.[388] Following consumption, methylmercury is absorbed into the tissues and organs, affecting many areas of the human body.[389] Some common symptoms of methylmercury toxicity in adults include affects to the nervous system, such as determination of gait, balance, speech, gastrointestinal discomfort, and decreases in vision; and determination or loss of function in extremities.[390]

121. Pre-natal babies exposed to methylmercury can have direct neurological impacts, or effects delayed to later in life.[391] Exposure to methylmercury in the womb can result in mental retardation affecting motor functions.[392] Most notable effects occur on the brain, leading to delays in walking and speech development.[393] In addition to direct nervous system impacts, pre-natal exposure can also lead to heart problems in adulthood, such as increased blood pressure and decreased heart rate variability.[394]

7.2.3.2 Elemental and Inorganic Mercury

122. Elemental and inorganic mercury can also be found in fish tissue.[395] However, because such mercury is not absorbed by human tissue as proficiently as methylmercury, the relative chances of human exposure to toxic levels of elemental mercury are significantly less.[396]

7.2.3.3. Other Mercury Compounds

123. While methylmercury and inorganic mercury are the most common forms of mercury exposure, people are also exposed to other health-affecting mercury compounds.[397] The exposure to mercury vapors, which mainly occurs through inhalation and exposure in those working directly with mercury in industrial processes, can cause effects ranging from acute to chronic.[398] Those exposed to mercury vapors over time can develop chronic and severe symptoms such as tremors, severe pulmonary effects, gingivitis, and interstitial pneumonia.[399] More acute symptoms of mercury vapor exposure include cough, pulmonary inflammation, nausea, short-term memory loss, psychological changes, and mental disturbances.[400]

124. Mercury exposure has also resulted from the use of mercury in various medicinal and consumer products.[401] An inorganic form of mercury known as mercurous mercury has been documented to create health problems that are more related to sensitivity and allergic reaction than to direct toxicity.[402] Calomel, a teething powder for infants, caused swollen red extremities, sensitivity to touch, insomnia, and photophobia.[403] Mercurous mercury has also been used in skin-whitening creams.[404] Unlike mercurous mercury, mercuric mercury is quite poisonous and small doses can be fatal.[405] Effects of mercuric mercury include destruction of kidney functions, somatitis, gastroenteritis, acrodynia, and autoimmune diseases.[406] The autoimmune system response to mercuric mercury has included lymphoproliferative disorders, hypergammaglobulinemia, and damage to multiple organ systems.[407]

7.2.4 Impacts on Fish and Wildlife

125. Fish accumulate methylmercury from their aquatic environment generally, but mainly through their diet.[408] Significant exposure to methylmercury can cause oxidative stress to cells, alter genes transcription, and change the biochemistry and tissue histology.[409] Mercury exposure can also reduce body condition and overall health.[410] Depending on the life stage and exposure level, fish can experience a range of effects that includes embryo mortality; changes in hormones, growth and development; change in spawning behavior and success; and alterations in school patterns.[411]

126. Some studies indicate mercury concentrations above 0.88 ppm posed adverse effects.[412] Other studies found that sexually mature female walleye (*Sander vitreus*) and largemouth bass (*Micropterus salmoides*) may experience adverse effects from methylmercury at concentrations as low as 0.20 ppm and adverse effects are expected at 0.30 ppm.[413] At these levels, walleye and largemouth bass experience altered reproductive success or changes in survival rate.[414]

127. Common loons (*Gavia immer*) in North America have also been well documented to contain elevated levels of mercury.[415] Elevated mercury levels in loons can cause altered feeding and nesting behavior.[416] Paired loons with elevated mercury levels may not properly incubate their eggs, and loon chicks with high mercury concentrations may not successfully fledge.[417] In turn, the reduced fledgling rates due to increased mercury concentrations[418] may lead to altered population levels such that population sustainability is impossible.[419] Loon chicks can also experience depletions in bursal lymphoids, leading to a compromised immune system[420].

128. Over the past decade, the focus of mercury accumulation has shifted from strictly aquatic ecosystems to include terrestrial systems.[421] Affected terrestrial ecosystems and associated inhabitants can suffer adverse impacts at some distance (>100 km) from point sources.[422] While common loons are a noted key indicator of mercury contamination in aquatic systems, songbirds are becoming preferred target indicators for terrestrial habitats.[423] Accumulated mercury in songbirds can cause reduced survival, decreased immune systems, changes to the endocrine system, and diminished reproduction.[424]

129. Birds, in general, can experience mercury effects on their reproduction, behavior, neurology, and physiology. Elevated mercury exposure in birds may lead to reduced egg production, less responsive offspring, reduced egg hatchability, lower survival rates of young birds, and compromised embryonic development.[425] Changes in bird behavior due to elevated mercury exposure can include less time spent seeking food and eating, changes in mobility patterns, and increases in altered responses to predatory encounters.[426] Mercury can also cause brain damage, lesions, tremors, reduced coordination, degradation of the spinal cord and changes in the central nervous systems of birds.[427] Changes in hormone levels and increases in feather asymmetry may also be found in birds that experience elevated exposure to mercury.[428]

130. In addition to the above key taxa and species extensively studied, bald eagles (*Haliaeetus leucocephalus*), American mink (*Neovison vison*), northern river otter (*Lontra canadensis*), and amphibians have been examined for various effects of methylmercury exposure. Bald eagles exposed to mercury have shown subclinical neurological damage, causing change to brain enzymes, receptors, or other cellular tissue, resulting in neurobehavioral changes.[429]

131. In piscivorous mammals, such as mink and otter, impairments of sensory and motor functions due to neural necrosis, as well as changes to neurochemical brain receptors may be experienced.[430] Amphibians, such as the eastern narrow-mouth toad (*Gastrophryne carolinensis*), also face exposure effects from mercury, either directly in the environment, through their diet, or transferred maternally to the eggs.[431] Results of maternally transferred mercury to eggs include reduced hatching success, an increased frequency in abnormal development, and overall lower viability.[432]

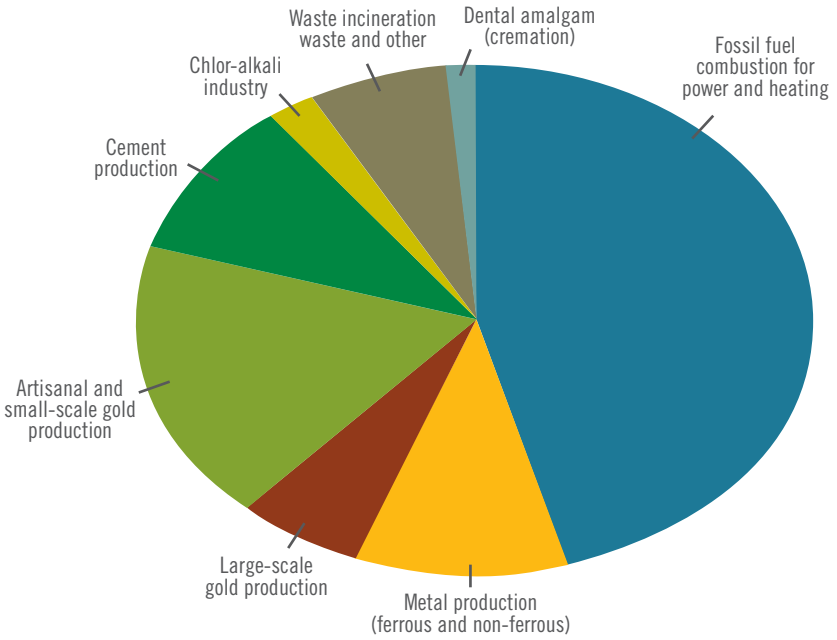
7.2.5 Control of Mercury Emissions

7.2.5.1 Fish Advisories Linked to Mercury Emissions from Coal-fired Power Plants

132. State agencies sample fish across their area to determine elevated mercury concentrations, and send out consumption advisories to ensure public safety. All fifty US states have some form of fish consumption advisory related to mercury contamination.[433] In 2008, there were 3,361 specific fish consumption advisories related to mercury, as well as over 16,000,000 lake acres and 1,250,000 river miles under fish consumption advisories due to mercury contamination.[434]

133. Relative distance from coal-fired power plants tends to dictate mercury concentrations in fish.[435] Studies have evaluated fish located directly in the shadow of coal-fired power plants and found that there may not be an increase in fish mercury concentrations at these sites, due to limited particulate fallout directly adjacent to the plant.[436] However, sites not adjacent to but within regional proximity to coal-fired power plants do show a potential for increased mercury deposition and greater fish mercury concentrations.[437]

Figure 7. Proportion of Global Anthropogenic Emissions of Mercury to Air, by Sector[438]



134. In addition to distance from coal-fired power plants, environmental and biotic characteristics also dictate the mercury concentrations in fish.[439] Factors such as high percentage of forest cover, weak buffering capacity, and nutrient-poor lakes usually indicate elevated fish mercury concentrations, compared to the concentrations in the nutrient-enriched lakes found in agricultural areas.[440] The nutrient-poor lakes are usually dominated by large piscivorous fish and tend to be found in northern hardwood ecosystems.[441] Ultimately, these large piscivorous fish found in highly sensitive lakes have drastically elevated mercury concentrations.[442] Furthermore, because these areas also tend to be where it is culturally important to fish for recreation and consumption,[443] humans residing in these regions are at greater risk for mercury exposure.[444]

135. The mercury cycling in aquatic systems responds rapidly to changes in inputs of mercury.[445] Aquatic systems respond with either an increase in the bioavailable mercury, as a result of new deposition, or with a decrease in the total mercury cycling when depositional inputs are reduced.[446] Fish may also respond to changes in direct atmospheric deposition to the lake.[447] With great reductions in atmospheric mercury (~90%), significant declines in fish mercury have been noted.[448] Again, the magnitude and timing of the changes is dictated by the environmental conditions of the lakes.[449] Examining fish mercury concentrations and wet atmospheric mercury deposition across broad landscapes reveals a clear link between the amount of wet mercury deposition and fish mercury concentrations.[450]

8. Facts Regarding the Questions Identified in Council Resolution 08-03

8.1 Information Used in NPDES or State-issued Permitting Decisions for Mercury Discharges from Coal-fired Power Plants

136. Congress created the National Pollution Discharge Elimination System (NPDES) in §402 of the CWA.[451] The NPDES controls water pollution by restricting point source discharges of pollutants into waters of the United States according to standards set in permits issued to applicants.[452] A primary example of a permit standard is a limitation or cap on the amount of a particular pollutant that the applicant may discharge.[453]

137. Implementation of NPDES laws and rules, including permitting, is a matter of federal jurisdiction;[454] authority over NPDES laws and rules can be transferred or delegated to the individual states upon the completion of a Memorandum of Agreement (MOA)[455] between the federal government and the particular state.[456] In the instance of delegation to a state, however, the US EPA retains oversight of state NPDES implementation and programs, including the permitting process.[457] The appropriate US EPA regional office must generally have the opportunity to object to a permit that has been approved by a state permitting authority before it becomes valid.[458] If the US EPA Administrator does object to the terms of a particular permit, it can insist on changes or take over the process of issuing that permit.[459] Such objections, however, must be based upon one or more of the following grounds:

(1) the permit fails to apply or comply with any applicable requirement of 40 C.F.R. part 123;
(2) the permitting state has not accepted the written recommendations of an affected state and the US EPA Regional Administrator finds the reasons for rejecting the recommendations to be inadequate;
(3) the procedures followed in creating the permit materially failed to comply with the procedures required by the CWA;
(4) a finding made by the state permitting director misinterprets or misapplies the CWA as to the facts;
(5) provisions of the proposed permit are inadequate to assure compliance with permit conditions;
(6) the proposed permit fails to carry out the provisions of the CWA (including determinations made per §125.3(c)(2) to best management practices under CWA §304(e), which must be incorporated into permits);
(7) issuance of the proposed permit would in any other respect be outside the requirements of the CWA;
(8) the effluent limits of a permit fail to satisfy the requirements of 40 C.F.R. §122.44(d); or
(9) for a permit issued by a Great Lakes state or Tribe, the permit does not satisfy the conditions promulgated by the state, Tribe, or US EPA pursuant to 40 C.F.R part 132.[460]

138. All of the states in which the coal-fired power plants at issue are located—Alabama, Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Pennsylvania, Texas and West Virginia—have executed MOAs with the US EPA for the purposes of administering the NPDES.[461] These MOAs were in effect throughout the period of inquiry relevant to this factual record.[462]

139. At the regulatory level, state laws and rules for the issuance of NPDES permits must have requirements at least as stringent as their federal counterparts.[463] The information requirements for federal NPDES and state NPDES permits regarding mercury emissions from coal-fired power plants are set out below.

140. The following subsections (8.1.1–8.1.2) contain a discussion of permit requirements in federal NPDES permits and those in state equivalent programs. Specifically, these subsections address questions two (2) and three (3) of Council Resolution 08-03 with respect to information used by the relevant permitting authority

to determine whether point-source discharges for coal-fired power plants, both generally and in particular to those facilities identified by Council Resolution 08-03, do not have the reasonable potential to cause or contribute to an exceedence of an applicable water quality standard for mercury.

8.1.1 Federal NPDES Permit Requirements

141. As noted above in section 6.3.1, the CWA's NPDES requirements are codified in title 40 of the Code of Federal Regulations.[464] The US EPA's NPDES permitting rules expand upon the CWA's definition to define the "discharge of a pollutant" as:

> Any discharge of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source"… This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person which do not lead to treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works. This term does not include an addition of pollutants by any "indirect discharger."[465]

142. An "effluent limitation" is defined as "any restriction imposed by the Director on quantities, discharge rates, and concentrations of 'pollutants' which are 'discharged' from 'point sources' into 'waters of the United States,' the waters of the 'contiguous zone,' or the ocean."[466] A "facility or activity" is defined as "any NPDES 'point source' or any other facility or activity… that is subject to regulation under the NPDES program."[467] A "hazardous substance" is "any substance designated under 40 CFR part 116 pursuant to §311 of the CWA."[468] A "point source" is:

> any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.[469]

143. For the purposes of the NPDES permitting program, a "pollutant" is defined as "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials… heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."[470] Finally, for the purposes of NPDES evaluation and permitting, a "toxic pollutant" is one listed and published by the US EPA Administrator pursuant to §307(a)(1) of the CWA.[471] In 1996, the EPA affirmatively identified mercury as a "toxic pollutant."[472] Currently, "mercury and [its] compounds" are considered toxic pollutants under the EPA's construction of the CWA's requirements.[473]

144. Federal law prohibits state-issued NPDES permits in instances where the appropriate state and federal approvals have not been granted or appropriately waived; where permit conditions cannot ensure that all of the affected states' water quality standards will be met; or for other disallowed discharges, including any radiological, chemical, or biological warfare agent or high-level radioactive waste, and also various maritime discharges of pollutants.[474]

145. Generally, NPDES permits are mandatory for persons acting or proposing to act in a way that will result in the discharge of pollutants.[475] Those seeking an NPDES permit must file the requisite permit application at either the state or federal level.[476] The CFR provisions specify the basic level of information required of NPDES permit applications.[477] Similarly, there are specific federal requirements for the renewal of an NPDES permit, for which the applicant must demonstrate the outfall location,[478] drawings of the facilities, the "average flows and treatment" occurring at the facility, "intermittent flows," the "maximum production"

of effluents that are subject to US EPA guidelines, relevant improvements made to the facility since the time of the last permit, "effluent characteristics"—including information on "biochemical oxygen demand, chemical oxygen demand, total organic carbon, total suspended solids, ammonia, temperature, pH"[479], "used or manufactured toxics," "biological toxicity tests," "contract analyses," and any other relevant information.[480]

146. In addition to these basic requirements, there are several other conditions that NPDES permittees at both the state and federal level must fulfill.[481] These conditions include the "duty to provide information," the right of inspectors to enter and inspect the facility under permit, appropriate record-keeping, reporting requirements, and limitations on transferability of the permit.[482] Further, the permitting authority Director is given regulatory latitude to establish conditions to provide for and assure compliance with all applicable requirements in the CWA and regulations, or the applicable state requirements.[483] Other sources of control over the facility's discharge include technology-based effluent limitations (TBELs) and standards, which are established based on the levels of effluent control achievable through industry-based best technologies.[484] In setting discharge requirements, state permitting authorities will generally start with these TBELs.[485] The US EPA establishes these effluent limitations through rulemaking on an industry-by-industry basis, in nationally applicable effluent limitations guidelines (ELGs).[486] Where there is no applicable ELG, permit writers establish TBELs on a case-by-case Best Professional Judgment (BPJ) basis, considering the same technology-based factors that US EPA considers in developing categorical ELGs.[487] The US EPA established TBEL guidelines for the steam electric power generation industry, which includes coal-fired power plants, in 1982.[488] These effluent limitation guidelines cover 126 priority pollutants, including mercury. The US EPA established a TBEL for mercury requiring the pollutant shall be present in "no detectable amount."[489] The permitting authority must include effluent limitations for that contaminant only if it is determined that there is a "reasonable potential" for the mercury discharge at a particular plant to violate applicable state water quality standards.[490] Additionally, states must use more stringent permit requirements than those required at the federal level if such a limit is necessary to achieve other requirements of the CWA, particularly where it is determined by the Director that the current "pollutants or pollutant parameters… are or may be discharged at a level which will cause, have the reasonable potential to cause,[491] or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality."[492] If such a determination is made, the permit must contain specific effluent controls for the pollutant at issue. [493] Conversely, the Director of the permitting agency may authorize a facility to forego sampling requirements for specific pollutants if, through "sampling and other technical factors," it can be demonstrated that those pollutants are not present or are only present at background levels of intake water, with no increase in concentration.[494]

147. Generally, where a pollutant has reasonable potential to exceed a state narrative water quality criteria but the state has not established a chemical-specific criteria for that pollutant, the permit must contain water quality based effluent limits based on a numeric water quality criterion calculated by the permit writer to meet water quality standards, criteria developed on a case-by-case basis, using US EPA's national water quality criteria or through the use of a pollutant indicator.[495] These requirements are applicable to permits involving toxic pollutants—including mercury—as defined by the US EPA through the CWA.[496] There is regulatory guidance for federal and state entities to aid in the creation of effluent guidelines and limitations for facility permits.[497]

148. For the US EPA's stated purposes of providing the permit applicant and the public a "transparent, reproducible, and defensible description of how the permit writer properly derived WQBELs for the NPDES permit[,]"[498] permit writers are required by regulation to include in the permit's Fact Sheet the process used to develop the WQBELs.[499] The purposes of the Fact Sheets are to "clearly identify the data and information used to determine the applicable water quality standards and how that information, or any applicable TMDL, was used to derive WQBELs and explain how the state's antidegradation policy was applied as part of the process."[500] Similarly, if the permitting authority determines that the effluent discharge does not have a reasonable potential to cause or contribute to a violation of relevant water quality standards, then information used to make such a determination must also be clearly articulated in the Fact Sheet.[501]

149. After the discharger files the permit application and the permitting authority completes the draft permit, the Director shall give public notice that the action has occurred.[502] For NPDES general permits or "major" individual permits (the latter being the classification applicable to coal-fired power plants) the notice must be made available in a daily or weekly newspaper within the area affected by the facility or activity.[503] During the public comment period, any interested party may submit written comments on the draft permit and may request a public hearing.[504] The Director shall hold a public hearing whenever he or she finds a significant degree of public interest, or at his or her discretion.[505]

150. In the following section are summaries of how each state that has power plants identified in Council Resolution 08-03 is implementing the relevant provisions of the CWA.

8.1.2 State Pollution Discharge Elimination Systems

8.1.2.1 Alabama

151. The Alabama Code grants the Director of the Alabama Department of Environmental Management (ADEM) the authority to promulgate rules regarding, among other things, effluent limitations within the state, and associated permitting requirements.[506] Thus, the state of Alabama, under the authority of the US EPA, has undertaken its own NPDES permitting system, incorporating the terms of the federal NPDES program.[507] Under the Alabama NPDES, definitions of most key terms, such as "effluent limitations" and "pollutants," are the same as their federal counterparts.[508] However, the definition of a "toxic pollutant" is more inclusive than the federal NPDES requirements and, in addition to the specific pollutants identified by the US EPA under the CWA's requirements, extends to:[509]

> pollutants and combination of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organisms, either directly from the environment or indirectly through food chains, will, on the basis of information available to the Department or Director cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations, in such organisms or their offspring.[510]

152. Specific toxic pollutants for Alabama's NPDES program include total recoverable mercury, with an US EPA-established acute freshwater discharge concentration limit of 2.4 µg/l (micrograms/liter) and a chronic freshwater discharge concentration limit of 0.012 µg/l.[511] The Alabama Code mirrors the federal mandate that all discharges of pollutants into state waters are illegal without a valid NPDES (or §404) permit.[512]

153. Under the relevant provisions of the Alabama Code and rules, NPDES permits have a life of five years and can be renewed or modified, provided that the appropriate applications are made.[513] The requisite contents for NPDES permit applications and permits are prescribed by statute and reflect the federal requirements.[514] Once issued, permit holders have the same duties and responsibilities as under the federal NPDES permitting rules, and the Alabama Code does not require additional reporting for any particular toxic or other pollutant.[515] Rather, it requires reporting of effluent data for the pollutants addressed in the permit itself and when the facility at issue has released pollutants in amounts deemed toxic to humans or wildlife.[516] The Alabama NPDES rules allow the Director the same discretion as the federal regulations to impose additional requirements on permit applicants as needed and also require the incorporation of TBELs into the overall permitting decision and limitation designation.[517] Discharge limitations are also required in Alabama NPDES permits using the "will cause or have the reasonable potential to cause" standard set out in the federal NPDES rules.[518]

154. Alabama law also requires the establishment of effluent limitations for toxic pollutants, if the US EPA does not already identify such limits.[519] The Alabama Administrative Code articulates the formula to be used in creating discharge concentration limits for various toxic pollutants, including mercury, based on human health criteria.[520]

155. Under Alabama law, applicants for NPDES permits to discharge wastewater from facilities deemed "major" under the federal CWA are required to submit a Fact Sheet along with their applications so the public may understand the nature of the intended facility's operations.[521] ADEM did not make available any Fact Sheets for the relevant facilities during the relevant time period. Both coal-fired power plants included in Council Resolution 08-03 that operate in Alabama, Widows Generating Station and Charles R. Lowman Generating Station, were listed in US EPA's 2002 Toxics Release Inventory as discharging measurable amounts of mercury directly to each plant's effluent receiving waters.[522]

8.1.2.2 Illinois

156. Discharge of a pollutant into the waters of Illinois without a permit issued in accordance with Illinois law and the CWA is unlawful.[523] Those seeking to discharge any form of pollutant into Illinois waters must apply for an NPDES permit by using an application form that incorporates state and federal information requirements.[524] The Illinois Environmental Protection Agency may require additional testing and reporting of information regarding the release of toxic effluents by a facility that needs an NPDES permit.[525] As at the federal NPDES permitting level, the state of Illinois may not issue NPDES permits that would conflict with other federal laws, allow the discharge of weapons of war or radiological materials, interfere with federal waterways or navigation, or fail to meet the requirements of federal NPDES regulations.[526] Illinois law also requires public notice regarding the intent to issue an NPDES permit[527] and the distribution of Fact Sheets to inform the public of an NPDES permit application's details.[528]

157. Illinois sets out a list of terms and conditions that must be incorporated into an NPDES permit: the imposition of effluent limitations under relevant sections of the CWA; "standards of performance for new sources" of pollutant discharges under the terms of the CWA; "effluent standards, effluent prohibitions, and pretreatment standards" pursuant to the CWA; "more stringent" Illinois requirements regarding the regulation of water quality within the state, particularly in relationship to Lake Michigan; and the relationship between NPDES limits and any TMDLs or waste load allocations implemented for the waters in which pollutant discharge will occur.[529] As with the federal NPDES regulations and other state requirements, an Illinois NPDES permit must include effluent limitations when the state permitting agency determines that a pollutant discharge "will cause" or has "reasonable potential to cause… an excursion above the narrative or numeric criteria within a state water quality standard."[530] There is no specific reference to mercury in this rule.[531] All holders of NPDES permits are subject to testing/monitoring and reporting requirements for the particular effluents identified and limited in their permits.[532]

158. The Illinois environmental regulations do, however, establish a statutory threshold limit for mercury discharges—a concentration level of 0.0005 mg/l.[533] There are limited situations in which discharges exceeding this limit would be permitted.[534] This threshold limit applies to the direct discharge of mercury into waterways and does not consider atmospheric deposition of mercury from sources such as coal-fired power plants.[535] Furthermore, the Illinois environmental regulations do consider "background concentrations" of contaminants for the purposes of determining numerical effluent limitations, but do not consider facilities within the state to be sources of the "background concentrations," such as through atmospheric deposition of mercury, in the permitting process.[536]

8.1.2.3 Indiana

159. The Indiana Administrative Code reflects that NPDES permitting authority in Indiana lies with the Indiana Department of Environmental Management (IDEM), and permitting is conducted under the discretion of the Commissioner of IDEM.[537] The discharge of any pollutant from a point source into Indiana state waters must be done pursuant to a valid NPDES permit.[538] Indiana's definition of "waters" is more inclusive than the federal "navigable waters" because it includes underground waters.[539] For the purposes of Indiana NPDES regulations, a "point source" is defined as:

> any discernible, confined, and discrete conveyance, including, but not limited to, any of the following from which pollutants are or may be discharged: 1) Pipe. 2) Ditch. 3) Channel. 4) Tunnel. 5) Conduit. 6) Well. 7) Discrete fissure. 8) Container. 9) Rolling stock. 10) Concentrated animal feeding operation. 11) Landfill leachate collection system. 12) Vessel. 13) Other floating craft… The term does not include return flows from irrigated agriculture or agricultural storm run-off.[540]

160. As with other states and the federal system, Indiana has a specific application process for an NPDES permit, and there are special exceptions to the permitting process requirements.[541] However, operators of coal-fired power plants do not fall into one of the enumerated exceptions.[542] Certain types of discharges are precluded *per se* from receiving NPDES permit approval, such as a proposed discharge of radioactive waste or any point source discharge "substantially inconsistent" with a plan approved pursuant to §208(b) of the CWA.[543]

161. Although mercury is not a designated "pollutant" under Indiana law, it does fall within the state's definition of a "toxic pollutant."[544] As such, any effluent limitation concerning mercury included in a permit must be as least as stringent as the US EPA-promulgated standard.[545] In certain limited circumstances, IDEM may grant a variance from the standard mercury discharge limitation requirement when it can be demonstrated that the facility is consistently unable to meet the established mercury threshold for the facility on a daily basis.[546] This variance is called a "streamlined mercury variance" (SMV). It differs from other individual variances provided for by the state's administrative code, because while the individual variances "focus on pollutant removal and treatment technologies, the SMV is a streamlined process focusing on pollution prevention and source control to achieve mercury-effluent reductions due to a lack of economically viable end-of-pipe treatment options."[547] According to IDEM, SMV variances are available to "any facility with an effective NPDES permit that contains or will contain a WQBEL for mercury that cannot be consistently achieved," with exceptions precluding applicability to certain discharges to the Great Lakes.[548]

162. Indiana NPDES permits may be modified, revoked, reissued, and terminated through an application process, subject to further administrative procedures.[549] During these processes, one factor that must be considered is the threat the proposed change in permit coverage may pose to human life, wildlife, and wildlife habitats.[550]

163. Reporting and facility maintenance duties are imputed to each NPDES permit holder.[551] The permit holders must oversee the implementation of and ensure compliance with effluent limitations.[552] Public notice is required during the NPDES permit application process.[553] Like most states, the use of TBELs in Indiana is highly regulated as part of the NPDES permitting process.[554] These state regulations adopt federal standards enumerated in CWA §301(b) and §306 as "the minimum level of control that must be imposed in an NPDES permit under CWA §402 for an existing source and a new source, respectively."[555]

8.1.2.4 Kentucky

164. The Kentucky Pollution Discharge Elimination System (KPDES) program is the state equivalent of the NPDES program. To discharge a pollutant into the waters of Kentucky, a facility must obtain a KPDES permit.[556] The Kentucky Division of Water (KYDOW) is the state agency authorized to issue KPDES permits.[557] Under the KPDES program, facilities generally must comply with TBELs for toxic pollutants, including mercury, as defined under the CWA,[558] unless the facility operator can demonstrate that an economic hardship would result.[559] The KPDES statutes and rules largely codify the NPDES standards and requirements for permit applications.[560] Authorizing legislation for the KPDES program explicitly states that the effluent limitations included in KPDES permits cannot be more stringent than those used in the federal NPDES program.[561] Generally, the effluent criteria used in KPDES permit evaluation and monitoring are also the same as those used by the federal NPDES.[562] Mercury is designated as a toxic pollutant, for purposes of the KPDES program.[563]

165. On 1 April 2010, two weeks after the US EPA received a petition from the Appalachian Center for the Economy & the Environment (Appalachian Center) for the withdrawal of the Kentucky Pollutant Discharge Elimination Program delegation from the Commonwealth of Kentucky, due to Kentucky's alleged "complete failure to prevent widespread contamination of state waters by pollution from coal mining operations," the EPA issued a pair of memoranda. The first memorandum's subject line reads: "Detailed Guidance: Improving [US] EPA Review of Appalachian Surface Coal Mining Operations under the Clean Water Act, National Environmental Policy Act, and the Environmental Justice Executive Order."[564] This document, while not directly addressing the Petition, discusses the substance of the Petition's allegations and articulates the legal basis for many of these allegations.[565] This memorandum's evaluation of administrative records from EPA Regions 3, 4, and 5 provides information relevant to the questions enumerated by Council Resolution 08-03 concerning state agency application of the "reasonable potential test."[566] This evaluation discussed that "parameters known to be present in the effluent, based on data submitted with the permit applications, were often not assessed for the reasonable potential to cause or contribute to an excursion above water quality standards."[567] The memorandum further states that "although each permit requires a case-specific analysis, in general, an NPDES permit that fails to show evidence of a parameter-specific reasonable potential analysis will be inconsistent with the requirements of the CWA."[568]

166. The second of the EPA's two memoranda dated 1 April 2010 provides a summary of the first memorandum and "clarifies how [US] EPA is carrying out [its] responsibilities with federal and state partners, to assure that the environmental impacts of Appalachian surface coal mining operations comply with the [CWA, NEPA, and E.O. 12898]."[569] Following a Permit Quality Review of permits issued in Kentucky and other states, the [US] EPA concluded that "many of the state-issued NPDES permits failed to comply with the requirements of the CWA in several respects"[570] and that the reviewed permits "often lacked any water quality based effluent limits to implement applicable numeric or narrative water quality standards."[571]

8.1.2.5 Michigan

167. The definition of a "pollutant" in Michigan is the same as that used in the Indiana NPDES regulations.[572] The Michigan NPDES laws extend the scope of the federal NPDES permit requirement to all discharges of pollutants into the surface or groundwaters of the state, as well as to point source discharges of pollutants onto the ground within the state.[573] The Michigan NPDES permitting application process and procedure is closely linked to the federal NPDES requirements, incorporating many steps of the process by reference,[574] including the public notice and hearing process.[575] To encourage public understanding and participation, the permit applicant must produce and make available to the public a Fact Sheet, including information on the types of discharges to be made and their amounts.[576] Effluent discharge standards are the same as those set by the US EPA pursuant to the CWA.[577] There are recordkeeping and recording requirements, as well, in accordance with the information required by the NPDES permit issued.[578]

168. Beginning in 1999, Michigan developed additional monitoring systems for pollutants identified as potentially dangerous to human and aquatic life, including mercury.[579] In addition to developing supplemental monitoring systems for mercury, the state's NPDES permitting agency, the Michigan Department of Environmental Quality (MDEQ), developed several rules and strategies between 1998 and 2011, accompanied by detailed guidance, for mercury-permitting in the state.[580] The MDEQ website provides a comprehensive and easily accessible collection and summation of resources related to the permitting of a mercury-contaminated discharge in the state of Michigan.[581]

8.1.2.6 North Carolina

169. North Carolina's water quality laws prohibit the discharge of any pollutants into state waters without the appropriate permit.[582] The environmental regulatory authority in North Carolina is required to "act on all permits so as to prevent, so far as reasonably possible, considering relevant standards under state and federal laws, any significant increase in pollution of the waters of the state from any new or enlarged sources."[583]

170. Collectively, North Carolina's regulations set guidelines for when and how toxic pollutants qualify as threats to human or aquatic life/health.[584] These standards also apply to the determination of water quality and anti-degradation measures. The rules for water quality standards in North Carolina reference generally acceptable amounts of mercury for various water classifications. However, whereas these standards explicitly state that NPDES permits shall not be issued for some forms of pollutants, such as treated leachate in landfills, there are no such prohibitions regarding mercury discharges and NPDES permits specifically.[585] In fact, North Carolina's water quality standard regulations permit discharges of toxic pollutants, including mercury, into "high quality waters."[586] The laws also establish general limits on the discharge of toxic pollutants into outstanding resource waters allowed under NPDES permits.[587]

171. For the purposes of establishing effluent limitations, "toxic substances" are defined by regulation as:

> any substance, or combinations of substances, including disease-causing agents, which, after discharge, and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, has the potential to cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions or suppression of reproduction or growth) or physical deformities in such organisms or their offspring or other adverse health effects.[588]

172. North Carolina imposes detailed reporting requirements upon all dischargers of pollutants within the state.[589] Permit holders are required to conduct tests of their discharges, at intervals set by the state. Although some pollutants have a testing time requirement that is set out by rule, mercury does not and is instead classified with general toxics for the purposes of testing.[590] The particular toxic pollutants for which a facility must test are defined in the facility's NPDES permit.[591]

173. Those seeking an NPDES permit must submit an application to the Commission.[592] The same process is required for permit renewals.[593] All NPDES permit applicants must disclose any pollutants that "can reasonably be expected to be in the discharge."[594] As in other states, "major" facilities in North Carolina are required to submit a Fact Sheet with the application.[595] The Fact Sheet requires the permit applicant to provide a wide range of information, including information related to pollutant discharge amounts.[596] Successful permit applicants will receive their effluent discharge limitations in the NPDES permit.[597]

8.1.2.7 Ohio

174. A "pollutant" under the laws and regulations of Ohio includes toxic pollutants as identified under the CWA. As a result, mercury is a "pollutant" for the purposes of Ohio NPDES permitting.[598] All pollutant dischargers in Ohio must obtain an NPDES permit.[599] Permit applicants must disclose the pollutants that they currently are or intend to be discharging.[600] The regulatory criteria for NPDES permit issuance requires a finding that: 1) the facility involved will not exceed the allowed discharge criteria for pollutants, set out in the regulations; 2) "adequate" pollutant monitoring mechanisms are in place at the facility; and 3) discharge performance tests have been provided for, if requested by the Ohio EPA.[601] However, an application can be denied when the proposed discharge poses a hazard to navigation, does not meet the requirements set out by the Ohio EPA, or includes radiological materials or pollutants associated with chemical or biological warfare.[602] NPDES permits issued in Ohio may be renewed, subject to a renewal application requirement that has similar standards.[603] Permits may be revoked if the discharger has violated a permit requirement, including a limitation of pollutant discharge.[604]

175. The director of the Ohio EPA must set pollutant limitations for all point source facilities subject to the NPDES permitting regulations.[605] In order to set these limitations, the director must use the appropriate WQS, effluent limitations, anti-degradation standards, and rules promulgated for the particular geographic area in which the facility is located.[606] Regulations further require that "the permittee demonstrate to the director's satisfaction that the concentration of methylmercury in the edible portion of consumed species exposed to the discharge does not exceed 1.0 mg/kg."[607] Additionally, NPDES permits are subject to reopening in the event of changes in various measurements, including fish toxicity levels.[608] The Ohio regulatory scheme allows for the imposition of effluent limitations in any of the following instances: 1) the presence of "pollutants assigned to group five of the pollutant assessment;"[609] 2) the presence of "pollutants that are treatment plant design parameters;" or 3) pollutants that are required to be regulated under the CWA.[610]

176. Ohio uses a grouping system for assessing whether to establish WQBELs as part of the NPDES permit terms. This system consists of five categories that reflect an increasing "reasonable potential" to violate water quality standards:

> "Group one" pollutants have no applicable criteria and the director has determined that data are insufficient to calculate criteria or values. The reasonable potential for this group cannot be determined.
>
> "Group two" pollutants have minimal potential, based on water quality data, to cause or contribute to a water quality excursion.
>
> "Group three" pollutants have some potential, based on water quality data, to cause or contribute to water quality excursion: permit requirements may not be warranted based solely on water quality considerations.
>
> "Group four" pollutants have significant potential, based on water quality data, to cause or contribute to a water quality excursion; permit monitoring requirements are generally warranted based solely on water quality considerations.
>
> "Group five" pollutants have the highest potential, based on water quality data, to cause or contribute to a water quality excursion; permit limitations are generally warranted based solely on water quality considerations.[611]

177. Permits issued to group four of the pollution assessment carry a monitoring requirement for designated pollutants,[612] while those facilities determined to be in groups one, two, or three are subject to discretionary pollutant monitoring requirements.[613]

178. Pertinent regulations set out scientific information and calculations that must be used in order to determine water quality standards and effluent limitations. These procedures apply to mercury.[614]

8.1.2.8 Pennsylvania

179. As required under the CWA, with a limited number of exceptions, all persons seeking to discharge pollutants into Pennsylvania state waters must have an NPDES permit.[615] Once issued, an NPDES permit may be renewed, provided that the conditions of the permit have been met.[616] Renewal applicants must provide certain information for public notice of the renewal application, which requires the permit, local governmental approval, and detailed information on the pollutants to be discharged.[617] Upon request, the applicant may also be required to provide information regarding the present and future impact of its activities on the waters to which it will discharge pollutants.[618] Pollutant discharge limitations may be imposed for an applicant facility at or above limits required under federal law.[619] Permit holders must comply with the conditions of the permit, and the permit may be modified or revoked in the event of non-compliance.[620]

180. Pennsylvania state law adopts the terms of the CWA and its implementing CFR provisions verbatim.[621] For the purposes of its NPDES laws, however, Pennsylvania adopts the CWA definition of "toxic pollutants," which specifically includes:

> [t]hose pollutants, or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, may, on the basis of information available to the Administrator or Department, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations in these organisms or their offspring.[622]

181. Pennsylvania Code enumerates numerical water quality standards for "toxic pollutants" and has, in the case of mercury, adopted federally derived criteria as that pollutant's concentration standard.[623] Prior to 1997, however, the Pennsylvania Department of Environmental Protection (PADEP) did not appropriate funds to monitor for mercury in the atmosphere.[624]

8.1.2.9 Texas

182. All persons seeking to discharge pollutants into Texas state waters must have an NPDES permit issued by the Texas Commission on Environmental Quality (TCEQ).[625] Pollutant discharge limits for a particular Texas facility are based on the information provided in the permit application, in conjunction with the classification, if any, of the waterbody to which pollutants will be discharged.[626] Amidst the information required in applications for new permits as well as renewals is the impact of a facility on downstream water quality.[627] Applicants for the Texas version of an NPDES permit (TPDES) are required to submit a Fact Sheet with their applications.[628] Texas has adopted the federal regulations regarding pollutant-discharging facilities requiring NPDES/TPDES permits.[629] Texas has imposed strict notification requirements on those seeking a NPDES/TPDES permit.[630] Generally, Texas has adopted the NPDES laws and regulations found in the CWA and CFR, respectively, except in instances where the state intends to impose stricter limitations on pollution than are found at the federal level.[631]

183. In setting pollutant discharge limits, it is possible for the permitting authority to use both narrative and/or numerical formats, which are applicable to mercury discharge limits through the status of mercury as a "toxic pollutant" under federal—and subsequently Texas—law.[632] When addressing permits, the TCEQ may issue a permit if the discharge would raise the loading amount of a toxic pollutant in, among other specified situations, the edible portion of fish, in which mercury can bioaccumulate.[633] The preservation of aquatic life is also a key factor in determining water quality standards for toxic pollutants.[634] In order to establish effluent toxicity, the TCEQ uses set formulas in addition to numeric and narrative criteria.[635]

8.1.2.10 West Virginia

184. The West Virginia Water Pollution Act defines a "pollutant" as "industrial wastes, sewage or other wastes as defined in this section."[636] The West Virginia Code grants the Director of the Department of Environmental Protection (DEP) the authority to require and grant permits and other allowances for the discharge of dangerous or potentially dangerous substances into West Virginian waters.[637] The Code also allows the Director to revoke permits in the event that permit holders exceed their permit limitations.[638] Further, the Code requires that pollutant-related permits, such as NPDES permits, go through a public hearing process prior to issuance, and places certain statutory obligations on permittees, such as refraining from causing or allowing an increase in the types or amounts of pollutants entering into the state's waters.[639]

185. Under the terms of the West Virginia administrative rules and regulations, the DEP may impose conditions or restrictions on NPDES or other environmental permittees as necessary.[640] Decision regarding an NPDES permit application must be made in conjunction with the requirements of the CWA as well as various procedural and administrative requirements imposed by the DEP.[641]

186. For the purposes of West Virginia's NPDES regulations, the "discharge of a pollutant" is defined as:

> [a]ny addition of any pollutant or combination of pollutants to waters of the state from any point source; and This definition includes additions of pollutants into waters of the state from: surface runoff which is collected or channeled by man; storm water discharges from construction activity; storm water discharges from a municipal separate storm sewer system; discharges through pipes, sewers or other conveyances owned by the state, a municipality, or other person which do not lead to a treatment work; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works. This term does not include an addition of pollutants by any indirect discharger.[642]

187. A "point source" is defined as "any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, concentrated animal feeding operations, well, discrete fissure, container, rolling stock, or vessel or other floating craft, from which pollutants are or may be discharged."[643] The NPDES rules in West Virginia adopt the CWA's definition of "toxic pollutant."[644]

188. All persons or entities wishing to discharge wastewater into West Virginian waters from a point source must obtain an NPDES permit.[645] Those holding NPDES permits must comply with the conditions, rules, and regulations associated with the permit and the applicable state and federal rules, the duty to reapply for a permit as necessary and within the required timeframe set out in regulations, the duty to mitigate pollution, the requirement to keep proper and appropriate conditions at the facility for which the permit is issued, the duty to provide information to the state and its officers regarding plant activities and other relevant matters, the requirement to maintain adequate records of plan activities and pollutant emission rates, and the duty to report instances where the plant's effluent discharges exceeded those allowed under the terms of its NPDES permit.[646]

189. NPDES permits issued in West Virginia must contain certain provisions, although the DEP Director has discretionary authority to add supplemental conditions to the permit where he or she sees fit. The required provisions for each NPDES permit are: the use of technology-based effluent limitations and standards that are based on the CWA and its implementing CFR regulations; all other standards that are set out in the CWA and applicable CFR provisions; standards promulgated by West Virginia that are more stringent than federal laws and rules; and special limits and requirements for those permittees discharging toxic pollutants, as decided and set out by the DEP.[647] DEP calculates the standards for allowed discharges from NPDES-permitted facilities, using guidelines and regulations which are based on the category of pollutants emitted.[648] The DEP can also modify or revoke an NPDES permit after issuance, based on changed circumstances or violation of the permit terms.[649]

8.2 NPDES or State-issued Permit Decisions at the Power Plants Identified in Council Resolution 08-03

190. Pursuant to the Secretariat's Information Request appended to this factual record, many states made information available regarding the NPDES permitting decisions with respect to mercury discharges from coal-fired power plants. Additional information was determined to be available in the public domain for some of the thirty-six coal-fired power plants at issue. The CEC Secretariat also collected information by way of Freedom of Information Act[650] (FOIA) requests, or the respective state's equivalent statute. Despite these efforts by the Secretariat, however, certain information for specific coal-fired power plants was not made available. The power plants for which no relevant information was provided or made available pursuant to the Secretariat's requests are: Widows Creek (Alabama); Charles R. Lowman (Alabama); R.M. Schahfer (Indiana); Dan E. Karn (Michigan); J.C. Weadock (Michigan); Keystone (Pennsylvania); Homer City (Pennsylvania); Conemaugh (Pennsylvania); Armstrong (Pennsylvania); and Mount Storm (West Virginia).

8.2.1 Alabama

Table 1. Alabama Coal-fired Power Plants[651]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[652] (kg)
1	Widows Creek	8,868,307	0.4
2	Charles R. Lowman	3,472,719	0.4

8.2.1.1 Widows Creek

191. The Widows Creek Facility NPDES Permit AL0003875, made available by the state of Alabama, was issued on 8 March 2005, to become effective on 1 April 2005.[653] As such, this permit falls outside of the scope defined by Council Resolution 08-03.[654]

8.2.1.2 Charles R. Lowman

192. The Charles R. Lowman Facility NPDES Permit AL0003671, made available by the state of Alabama, was issued on 18 February 2005, to become effective on 1 March 2005.[655] As such, this permit falls outside of the scope defined by Council Resolution 08-03.

8.2.2 Illinois

Table 2. Illinois Coal-fired Power Plants[656]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[657] (kg)
1	Powerton	7,858,082	1.4
2	Joliet 29	5,411,689	0.9
3	Waukegan	4,230,118	0.9
4	Kincaid	3,888,878	0.4
5	Joliet 9	1,292,531	(Reported with Joliet 29)

8.2.1.3 Powerton Generating Station

193. The Illinois Environmental Protection Agency (IEPA) did not provide any NPDES permit information for the Powerton Generating Station, operated by Midwest Generation EME, LLC, regarding any permit that was issued by IEPA within the dates prescribed by Council as relevant to this factual record. IEPA did, however, provide the Secretariat with NPDES permit information for the Powerton Generating Station from as early as 17 August 2005.[658] As is the case for all Illinois NPDES Permits relevant to this Factual record, a mercury discharge concentration threshold of 0.0005 mg/l is incorporated into the permit by reference to 35 Ill. Admin. Code 304.126 at Attachment H, Standard Condition (25), of the permits. Aside from this reference to the Illinois Administrative Code, Permit IL0002232 for the Powerton Generating Station makes no reference to considerations of mercury discharge or any reasonable potential test.[659]

8.2.1.4 Joliet 29 Generating Station (Units 7 & 8)

194. The IEPA reissued, on 15 November 1995, an NPDES permit, to become effective on 1 December 1995, for the Joliet 29 Generating Station Units 7 & 8, operated by Commonwealth Edison Company.[660] The "receiving waters" listed on the permit include only the Des Plaines River, but the permit does not indicate which segment of the Des Plaines River receives the effluent discharge.[661] The Illinois Impaired Waters 303(d) List includes eighteen (18) segments of the Des Plaines River, all of which have mercury listed as a "Potential Cause of Impairment."[662] Furthermore, while none of the Des Plaines River segments have "Atmospheric Deposition" as a "Potential Source of Impairment," all segments do have "industrial point sources" listed as "Potential Source of Impairment."[663] As is the case for all aforementioned NPDES permits issued by the IEPA, this permit contains no reference to mercury outside of the 0.0005 mg/l threshold incorporated by reference, and it contains no discussion of any reasonable potential test.[664]

8.2.1.5 Waukegan Electric Generating Station

195. The IEPA, on 19 July 2000, reissued NPDES Permit IL0002259 to Waukegan Generating Station, operated by Midwest Generation, LLC.[665] The "receiving waters" for all permitted discharges under this permit is Lake Michigan.[666] Lake Michigan, while listed as a "Medium Priority" waterbody on Illinois's 2004 303(d) Impaired Waters List, is not identified as having any contamination caused by mercury,[666] although a report conducted for the US EPA indicated that mercury was present in nearly all sample types taken from Lake Michigan in 2004.[668] The state's 303(d) List does, however, identify this water as potentially contaminated by atmospheric deposition.[669] As is the case for all aforementioned NPDES permits issued by the IEPA, this permit contains no reference to mercury outside of the 0.0005 mg/l threshold incorporated by reference, and it contains no discussion of any reasonable potential test.[670]

8.2.1.6 Kincaid Generating Station

196. The IEPA, on 11 April 2000, issued a final NPDES Permit for wastewater discharge from the Kincaid Generating Station facility, operated by Kincaid Generation, LLC.[671] The "receiving waters" for all permitted discharges under this permit is Lake Sangchris.[672] Lake Sangchris was initially listed on Illinois 303(d) list in 1998 and remained listed on the 2004 Illinois 303(d) List.[673] "Potential Causes" for impairment of Lake Sangchris are identified as dissolved oxygen and excess algal growth.[674] Several "Potential Sources" of impairment are identified, all of which are nonpoint sources, but the 2004 303(d) List does not include "Atmospheric Deposition" as one of such sources.[675] As discussed above (see section 8.1.2.2), Illinois includes in its "General Effluent Standards" a threshold mercury discharge limit that is applicable to permit holders and non–permit holders alike[676] and that is incorporated by reference into all Illinois NPDES permits relevant to this factual record.[677] This threshold, as mentioned previously in this factual record, prohibits any discharge of contaminated water with a mercury concentration of greater than 0.0005 mg/l, with some expressly proscribed exceptions.[678] There is no further discussion of mercury or any reasonable potential test.

8.2.1.7 Joliet 9 Generating Station (Unit 6)

197. On 25 March 1996, the IEPA reissued final permit number IL0002216, to become effective on 1 April 1996, to Joliet 9 Generating Station (Unit 6).[679] This permit indicates that the Joliet 9 Generating Station (Unit 6) is operated by the Commonwealth Services Department.[680] The "receiving waters" of the permitted effluent discharge is the Des Plaines River.[681] The only reference to mercury in this permit, like the previously discussed Illinois NPDES permits, is by reference to the Illinois Administrative Code's "General Effluent Standards."[682]

8.2.3 Indiana

198. Council Resolution 08-03 effectively precludes consideration of the NPDES permits of fourteen (14) of Indiana's top fifteen (15) mercury emitting coal-fired power plant facilities.[683] Six (6) of those facilities are precluded because the 2002 TRI report listed their discharges of mercury to water as "unknown," whereas the remaining eight (8) facilities are precluded from consideration because the 2002 TRI report listed their discharges of mercury to water as "zero."[684] All fourteen (14) facilities precluded by Council Resolution 08-03 are identified in a 2005 report by the Commission for Environmental Cooperation as having emitted to air between 22 kgs and 467 kgs of mercury.[685]

Table 3. Indiana Coal-fired Power Plants[686]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[687] (kg)
1	R.M. Schahfer	8,756,429	0.9

8.2.3.1 R.M. Schahfer

199. The state of Indiana did not make available to the Secretariat any permit for this plant that falls within the relevant time period for this factual record. The information provided above was obtained from the US EPA EnviroFacts Warehouse Water Discharge Permits site.[688] The Indiana Department of Environmental Management issued NPDES permit number IN0053201 on 3 June 2004. While the EnviroFacts website does not provide access to this specific permit in its original format, it does identify the permitted facility outfalls and the parameter description for those outfalls.[689] This information indicates that mercury was included in the parameter description for eight (8) outfall locations, thereby indicating that mercury was considered in the permitting process and detected in measurable amounts such as to require a numeric WQBEL for mercury to be included in the permit.[690] No additional information has been made available regarding this facility.

8.2.4 Kentucky

Table 4. Kentucky Coal-fired Power Plants[691]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[692] (kg)
1	H.L. Spurlock	6,080,970	1.8
2	Mill Creek	9,075,622	2.3
3	Elmer Smith	2,185,345	25
4	Reid/Henderson/Green	3,501,986	0.4

8.2.4.1 H.L. Spurlock Power Station

200. The Kentucky Department for Environmental Protection (KDEP) granted the H.L. Spurlock Power Station a Kentucky Pollutant Discharge Elimination System (KPDES) Permit, which became effective on 1 November 2000.[693] This permitting action was a "reissuance of a KPDES permit for an existing source coal-fired steam electric power generation station."[694] The plain language of the final permit and attached Fact Sheet includes no explicit discussion of the "reasonable potential" test.[695] The permit's terms authorize the facility to discharge pollutants from nine (9) outfall locations, seven (7) of which are ultimately received by the Ohio River, while Outfall 8's receiving water is the Lawrence Creek and Outfall 9's receiving water is the plant intake system.[696] Both the Ohio River and the Lawrence Creek are classified as "Warm Water Aquatic Habitat and Primary/Secondary Contact Recreation" and are designated as "Water Quality Limited."[697] The effluent limitations set by the permit are narrative, and read: "[t]here shall be no discharge of floating solids or visible foam or sheen in other than trace amounts."[698]

201. At five (5) discharge outfalls of the H.L. Spurlock facility, mercury is accounted for in the "Effluent Characteristic" "Total Recoverable Metals."[699] This classification was made pursuant to 40 C.F.R. §122.45(b)(2)(ii)(c). The applicable water quality criteria and/or effluent guidelines for such outfalls are the federally promulgated guidelines, incorporated into the Kentucky Administrative Regulations by reference.[700] The permit indicates the "Reported Discharge" of both the monthly average and the daily maximum of Total Recoverable Metals was "N/R", or Not Reported, during the term of the permit preceding the permit at issue, with one exception.[701] That one exception is Outfall 005, which indicates its Reported Discharge of Total Recoverable Metals was 8.52 mg/l as a monthly average, and 8.92 mg/l as a daily maximum. The permit's proposed limits for all outfalls accounting for mercury as a "Total Recoverable Metal" are, simply, "Report."[702]

202. At two other facility outfall locations, mercury is accounted for as a "Priority Pollutant."[703] The H.L. Spurlock KPDES permit indicates that the facility did not report any discharge information for the duration of the immediately preceding permit. The proposed limits for monthly average discharges at both locations are "Report,"[704] whereas the daily maximum discharge limits are set at 0.0 mg/l. The Permit Fact Sheet further indicates that the "limits for [Priority Pollutants] are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5[…] [and] are representative of the [best available technology] (BAT) requirements for the discharge of this pollutant …"[705]

8.2.4.2 Mill Creek

203. The KDEP issued permit KY0003221 to the Mill Creek Generating Station, effective on 1 November 2002 and expired on 31 October 2007.[706] This permit reflects a correction from the previously issued permit, which, according to KDEP, incorrectly included effluent limitations and monitoring requirements for Total Recoverable Metals discharged from Outfall 001.[707] The corrected permit indicates that such limits and requirements were not, in fact, applicable to Outfall 001 of the Mill Creek facility.[708] As a result, the only outfall at which the KPDES permit requires consideration of mercury-laced effluent is Outfall 002.[709] The pollutant of concern is listed as Total Recoverable Metals, the parameters of which include mercury. The applicable water quality standard is narrative and reads: "[t]here shall be no discharge of floating solids or visible foam or sheen in other than trace amounts."[710] In 2004, KDEP issued a permit modification reducing the monitoring requirements for Total Recoverable Metals discharged from Outfall 002 from "1/Quarter" to "1/Year."[711] The issued reduction in monitoring requirements, however, is not reflected by the actual permit, but instead is confirmed only by a note photocopied onto the cover letter of the permit indicating that the change "should have" been reflected in the permit.[712] Unfortunately, this note is photocopied onto the cover of all three versions of this permit. Additionally, in the 2004 modified version of the permit, the parameters for Total Recoverable Metals are narrowed to exclude mercury from monitoring requirements.[713] There is no justification given for this exclusion. Aside from this modified version of the permit, all indications imply that mercury was intended to be included in these parameters for Outfall 002.[714] This permit is silent on considerations included in the permitting decisions concerning mercury.

8.2.4.3 Elmer Smith

204. The KDEP issued KPDES final permit number KY0001295 to the Elmer Smith Station in Daviess County, Kentucky, to become effective on 1 May 1996.[715] The Owensboro Municipal Utilities Company of Owensboro, Kentucky, operates this facility.[716] The permit authorized the facility to discharge from five (5) separate outfall locations, the waters of which, with the exception of Outfall 005, are ultimately received by the Ohio River.[717] The Ohio River is included on KDEP's 2004 303(d) Impaired Waters List, for impairments due to PCBs and dioxin, after having been delisted specifically for chlordane because of significantly reduced concentrations since the 2000 303(d) List.[718] The Ohio River is classified as "Warm Water Aquatic Habitat and Primary/Secondary Contact Recreation" and is designated as "Water Quality Limited."[719] Outfall 005's discharge is received by the facility's intake water supply.[720]

205. Of the five (5) permitted facility outfall locations, only Outfall 001 has an effluent limitation for Total Recoverable Metals, of which the parameters include mercury. The water quality standard is narrative, reading "[t]here shall be no discharge of floating solids or visible foam or sheen in other than trace amounts[,]" whereas the discharge limitation is "Report."[721] The monitoring requirements for this outfall call for a frequency of "1/Quarter" and the sample type required is "Grab."[722] The Permit's accompanying Fact Sheet indicates that Outfall 001 is an "existing source" and that pertinent factors in "methodologies used in determining limitations" for such sources include the fact that the "Best Practicable Technology Currently Available (BPT) and the Best Available Technology Economically Achievable (BAT)" are in place at Outfall 001 for Effluent Characteristic "Total Recoverable Metals," which includes mercury.[723]

8.2.4.4 Reid/Henderson/Green Power Plant

206. The KDEP issued permit number KY0001929 to the Reid/Henderson/Green Power Plant on 19 March 2004.[724] This permit became effective on 1 December 2004 and expired 30 November 2009.[725] This permit authorizes six (6) external outfall locations, one (1) emergency outfall location, and six (6) internal outfall locations, all of which exit the facility through a permitted external outfall location.[726] KDEP considered mercury at all six external outfall locations, identifying the metal as either a "Total Recoverable Metal" or a "Priority Pollutant."[727] The permit's accompanying Fact Sheet indicates that the justification for the limits imposed on mercury is consistent with the requirements of 401 KAR 5:065, Sections 4 and 5.[728] The Fact Sheet goes on to say that these limits are representative of federal requirements found at 40 CFR §423.13(d)(1) for "cooling tower blowdown."[729] There is no explicit reference to any "reasonable potential test" in either the permit or the accompanying Fact Sheet.[730]

8.2.5 Michigan

Table 5. Michigan Coal-fired Power Plants[731]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[732] (kg)
1	Dan E. Karn	4,474,257	0.4
2	Belle River	7,716,451	3.2
3	St. Clair	6,965,047	3.6
4	B.C. Cobb	2,188,545	0.9
5	J.C. Weadock	2,205,966	0.4

207. On 7 February 2011, the Secretariat requested guidance from the Michigan Department of Natural Resources and Environment (MDNRE) regarding whether NPDES permits for the state of Michigan were publicly available. The following day, a response was offered, but it provided access only to the most recent permits, all of which were outside the scope of this factual record. On 10 February 2011, the Secretariat submitted a formal request to the agency, identifying precisely which permits and Fact Sheets the Secretariat sought.[733] On 16 February 2011, the FOIA Coordinator of the MDNRE issued a response to this FOIA request indicating that a 10–business day extension would be invoked, pursuant to §5(2)(d) of FOIA.[734] This email cited "time constraints" as the grounds for this extension. This extended the statutory deadline for a response to 7 March 2011. On 24 March 2011, the Secretariat sent an email to the MDNRE FOIA Coordinator requesting an update regarding the status of the 10 February FOIA request.[735] In this email the Secretariat explicitly indicated to the MDNRE that the initial deadline and the extended deadline had both passed and that the Secretariat had not yet received the information or any status update. On 7 April 2011, the MDNRE sent the CEC an email indicating that an invoice was being prepared and, to expedite the process of copying and shipping, a payment in full would be appreciated. The Secretariat paid the full amount of the invoice on 15 April 2011. At the time of preparing this factual record, no relevant information has been received from the state of Michigan in response to this FOIA Request.

8.2.5.1 Dan E. Carn

208. No information is available at this time. See discussion in section 8.2.5 of this factual record.

8.2.5.2 Bell River

209. The Belle River NPDES permit was issued by the state of Michigan in 2004.[736] The Belle River NPDES permit specifically names several pollutants that are subject to limitations and monitoring requirements; however, mercury is omitted.[737] No reference to mercury or any reasonable potential analysis is included in this permit,[738] and no additional information requested has yet been received from the state of Michigan.

8.2.5.3 St. Clair

210. The St. Clair permit was issued by Michigan in 2004, and contains a numeric mercury discharge limitation of 1.3 μg/L.[739] No other information is available at this time, as discussed in section 8.2.5 of this factual record.

8.2.5.4 B.C. Cobb

211. The NPDES permit for the Cobb Power Plant was issued by the state of Michigan in 2003 and requires that the facility routinely monitor its discharge for mercury, although no discharge limit is set in the permit.[740] However, the permit does require that the facility participate in the Pollution Minimization Program for Total Mercury at the discretion of the state permitting authority.[741] No other information is available at this time; see discussion in section 8.2.5 of this factual record.

8.2.5.5 J.C. Weadock

212. No information was made available for this plant; see discussion in section 8.2.5 of this factual record.

8.2.6 North Carolina

Table 6. North Carolina Coal-fired Power Plants[742]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[743] (kg)
1	Roxboro	14,281,069	0.9
2	Belews Creek	16,912,850	0.4
3	Marshall	14,498,223	0.4
4	G.G. Allen	5,071,389	1.4
5	Sutton Steam Electric Plant	2,622,440	0.9
6	Asheville	2,628,074	0.4
7	Lee	1,969,494	0.4
8	Riverbend	1,660,438	0.4
9	Cliffside	2,723,353	0.4

8.2.6.1 Roxboro

213. The state of North Carolina made available to the CEC a portion of NPDES Permit Number NC0003425. This portion references only modifications to the original permit granted in 2005. Mercury is referenced twice, once as a "priority pollutant" discharged from Internal Outfall 005, and once as "Total Mercury" discharged from Internal Outfall 010.[744] As a priority pollutant, effluent standards of "no detectable amount" apply only when the Permit adds mercury for the purposes of "cooling tower maintenance" and do not apply otherwise.[745] As Total Mercury, the permit modification imposes only monitoring requirements from Internal Outfall 010 and does not indicate any effluent limitations.[746]

214. The Fact Sheet issued in conjunction with the 2002 Final NPDES Permit number NC0003425, and the permit to which the above modification was made were also made available. This Fact Sheet indicates that the permitting authority took measures to determine whether mercury had a reasonable potential to cause an excursion above applicable water quality standards.[747] The authority made this determination by measuring the "Projected Concentration before Treatment" and then applying an assumed seventy-five percent (75%) removal by treatment.[748] If this final load, post-treatment, was determined to have the reasonable potential to contribute to an excursion above water quality standards, the permit Fact Sheet indicated as much and monthly monitoring requirements were applied to the permit.[749] However, in this permit, the authority determined that mercury did not have a reasonable potential for such an excursion above water quality standards.[750]

8.2.6.2 Belews Creek Steam Electric Station

215. North Carolina modified NPDES permit number NC0024406 to Belews Creek Steam Station, operated by Duke Energy Corporation, effective 1 June 2005.[751] This modification to the permit is the only information made available to the CEC concerning this facility. This modification does highlight mercury, however. Monitoring for mercury is required at two outfall locations, one internal and one external. The permit does not impose a numeric limit on mercury at either outfall, but instead requires weekly monitoring and reporting requirements.[752]

8.2.6.3 Marshall Steam Station

216. North Carolina made available to the Secretariat a modified version of NPDES permit number NC0004978 for Marshall Steam Station, which was issued in 2005, outside the scope of this factual record.[753] Also made available was the Fact Sheet that accompanied the original, unmodified permit. The modified permit reflects consideration of mercury discharged from two outfall locations. The permit imposes at both outfall locations a weekly monitoring and reporting requirement.[754] The Fact Sheet, issued in conjunction with the original permit, indicates that a "reasonable potential analysis" was conducted at Outfall 002 for arsenic, selenium, copper, zinc and iron pursuant to EPA-recommended standards.[755] No reference to mercury was made in the Fact Sheet.[756]

8.2.6.4 G.G. Allen

217. No information was made available to the CEC concerning the G.G. Allen generating facility.

8.2.6.5 Sutton Steam Electric Plant

218. North Carolina issued the CP&L Sutton Steam Plant NPDES permit in 2002.[757] The permit requires testing of fish generally, although there is no mention of mercury as a cause of fish toxicity.[758] No specific mention of mercury is made in the Sutton NPDES permit.[759]

8.2.6.6 Asheville Steam Electric Generating Plant

219. North Carolina made available to the Secretariat an NPDES permit modification to NPDES permit number NC0000396, issued in 2007 to Asheville Steam Electric Generating Plant.[760] This document's date falls outside the scope of Council Resolution 08-03, however the document includes relevant discussion of a mercury-specific "reasonable potential" analysis which does concern a permit issued within the scope of the factual record, ultimately affirming a potential for mercury discharged from Outfall 001 to cause or contribute to an excursion above applicable water quality standards.[761]

8.2.6.7 H.F. Lee Steam Electric Plant

220. The Lee Power Plant's NPDES permit was issued by North Carolina in 2004.[762] Neither the NPDES permit nor the accompanying Fact Sheet contains any reference to mercury, although a "reasonable potential" analysis is applied to Outfall 002 for various other metals.[763]

8.2.6.8 Riverbend Steam Station

221. All information available to the Secretariat concerning the Riverbend Steam Station is dated outside the scope of Council Resolution 08-03.[764]

8.2.6.9 Cliffside Steam Station

222. All information available to the Secretariat concerning the Cliffside Steam Station is dated outside of the scope of Council Resolution 08-03.[765]

8.2.7 Ohio

Table 7. Ohio Coal-fired Power Plants[766]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[667] (kg)
1	Gen. J.M. Gavin	15,617,077	1.4
2	W.H. Zimmer	9,734,563	0.4

8.2.7.1 General James M. Gavin Plant

223. All information received by the Secretariat concerning Ohio Power Company's General James M. Gavin Plant is dated outside of the scope of Council Resolution 08-03.[768]

8.2.7.2 Wm. H. Zimmer Generating Station

224. The information obtained by the Secretariat concerning the Wm. H. Zimmer Generating Station, NPDES Permit No. OH0048836, is outside the scope of Council Resolution 08-03.[769]

8.2.8 Pennsylvania

Table 8. Pennsylvania Coal-fired Power Plants[770]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[771] (kg)
1	Keystone	11,790,991	0.4
2	Homer City	10,938,699	1.4
3	Bruce Mansfield	15,974,911	26
4	Conemaugh	12,584,027	0.9
5	Armstrong	2,140,768	0.4

8.2.8.1 Keystone

225. No relevant information was made available concerning Keystone Generating Facility.

8.2.8.2 Homer City

226. No relevant information was made available concerning Homer City Generating Facility.

8.2.8.3 Bruce Mansfield

227. No permits or Fact Sheets were made available by the Pennsylvania Department of Environmental Protection (PADEP) for the Bruce Mansfield Generating Facility. However, according to a 2006 report created by PennEnvironment and acquired by the Secretariat through independent research, the Bruce Mansfield Generating Facility, owned by First Energy, reportedly violated its NPDES permit requirements at least once between 1 July 2003 and 31 December 2004. Such violation allegedly was the exceeding of applicable effluent concentration limits by 264%.[772] This document did not reveal how many excursions took place, nor did it divulge whether the excursion was specifically related to mercury.[773]

8.2.8.4 Conemaugh

228. No relevant information was made available concerning Conemaugh Generating Facility.

8.2.8.5 Armstrong

229. No relevant information was made available concerning Armstrong Generating Facility.

8.2.9 Texas

Table 9. Texas Coal-fired Power Plants[774]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[775] (kg)
1	H.W. Pirkey	4,504,102	3.2
2	Welsh Power Plant	11,000,083	1.8

230. Council Resolution 08-03 effectively precludes consideration of two Texas power plants, Sam Seymour and Harrington Station, because the Sam Seymour Station was not included in the TRI report, and the Harrington Station failed to indicate in its TRI data collection process any discharges of mercury to water.

8.2.9.1 H.W. Pirkey

231. The TPDES permit excerpts in the HW Pirkey Power Plant TCEQ's submission indicate that the conclusion of the Texas Commission on Environmental Quality (TCEQ) that there would be no threat to aquatic life was based on evaluations conducted to assess the impact of effluent discharge on aquatic life and the affected waters. However, the permit does require that anti-degradation measures be implemented to protect some of the waters at issue.[776] Additionally, the TPDES permit was primarily concerned with the concentrations of selenium discharged from the H.W. Pirkey power plant.[777]

8.2.9.2 Welsh Power Plant

232. The TCEQ provided excerpted portions of the TPDES permit for the Welsh Power Plant. These portions explained that the TCEQ examined the available information and found that the effluent discharges from the Welsh Power Plant would not impair the waters into which the plant's discharges flow or cause aquatic damage.[779] The TPDES permit excerpts also explained that a portion of the waters into which the effluents flow are contaminated by bacteria; however, the discharges from the plant would not add to the load levels of bacteria.[779]

8.2.10 West Virginia

Table 10. West Virginia Coal-fired Power Plants[780]

No.	Plant	Electricity Generation (MWh)	Mercury and Mercury Compounds Discharged to Water[781] (kg)
1	Mount Storm	11,671,736	2.3

8.2.10.1 Mount Storm

233. No relevant information was made available to the Secretariat concerning the Mount Storm Generating Facility.

8.3 Mercury-impaired Waterways on 303(d) Lists in the Ten States of Concern

234. The following subsections (8.3.1 - 8.3.10) contain facts regarding the 303(d) lists of the ten US states identified by the Submitters. Specifically, pursuant to question four (4) of Council Resolution 08-03, these subsections and their accompanying endnotes identify which mercury-impaired waterways are included on the relevant CWA section 303(d) lists.

8.3.1 Alabama

235. In 1996, there were eighty-five waterways placed on Alabama's 303(d) List, eight of which were placed on the list because of contamination by "metals."[782] In connection with waters listed as impaired because of "metals," point sources of impairment were identified as "industrial" and "municipal."[783] A variety of nonpoint sources were also identified. However, none of these sources involved atmospheric deposition or emissions.[784] This list was followed by a lawsuit against the US EPA regarding the EPA's approval of Alabama's 303(d) List and the development of TMDLs for listed waterways in Alabama.[785] The result of this suit was the 1998 Consent Decree, under which EPA agreed to oversee the 303(d) List and TMDL process in Alabama and to become involved in the creation and implementation of both, if necessary.[786] The Alabama Consent Decree initially referred to 115 waterways in Alabama that required evaluation.[787]

236. By 1998, the number of waterways listed on Alabama's 303(d) List rose to 200.[788] Of these waterways, two were identified as being contaminated by mercury; both were used for fishing purposes.[789] In 2000, there were 193 waterways listed on the Alabama 303(d) List.[790] Eight of these waterways were impaired by mercury.[791] The source of impairment for six of these waterways was designated as unknown[792] and the source for two waterways was "contaminated sediments."[793] All of these waterways were used for fishing.[794] In 2002, 181 waterways were listed on Alabama's 303(d) List.[795] Eleven of these waterways were identified as being impaired by mercury and all but two were contaminated by unknown sources.[796] Of the eleven mercury-impaired waterways, three were newly added as a result of fish consumption warnings from the Department of Health.[797]

237. There were 280 waterways listed on the 2004 Alabama 303(d) List, although it should be noted that many of these were different segments of the same overall waterway.[798] Twenty-nine of these waterways were listed because of impairment from mercury,[799] and ten of the newly listed mercury impaired waterways were listed as a result of fish consumption advisories by the Department of Health.[800] Fishing was categorized as the primary use for all of these waterways listed in 2004, and all but three were deemed to have unknown sources as their sources of impairment.[801] Two waterways were impaired because of contaminated sediment,[802] and one because of "in place contamination."[803]

238. During the period from 2000 to 2004, the Alabama Department of Environmental Management did delist some waterways placed on 303(d) Lists, but no waterway impaired by mercury was delisted during this period.[804]

8.3.2 Illinois

239. For its 2004 303(d) List, the Illinois EPA employed hydrological units as the basic form of analysis. This analysis involves grouping individual waterways within the units' geographical designations and discussing both the waterways that comprise the hydrological units and the units as a whole.[805] Ultimately, the Illinois EPA placed 232 hydrological units on the 2004 303(d) List.[806] Within these units there were eighty-six waterway segments that were contaminated at least in part by mercury.[807] Other pollutants also contaminated many of these waterways, and the data provided on the 303(d) List did not isolate potential sources of impairment

from overall causes of impairment.[808] Nevertheless, atmospheric deposition was not mentioned as a source of impairment for any of the waterways listed as mercury-impaired. The most common impairment source listing for these waterways was "unknown sources."[809]

8.3.3 Indiana

240. Indiana Department of Environmental Management submitted to the CEC the *Indiana Integrated Water Monitoring and Assessment Report 2004*, which includes the state's 303(d) List of Impaired Waters.[810] IDEM's 303(d) Lists are developed using Indiana's §205(b) Assessment Database, which places all waters in one of five categories, depending on the level of attainment of water quality standards and designated use criteria.[811] Indiana's 2004 303(d) List is comprised of Category 5 waters, and is further delineated into two sub-categories, Category 5A waters, and Category 5B waters.[812] Waters are placed in Category 5A "if it is determined, in accordance with the state's assessment and listing methodology, that a pollutant has caused, is suspected of causing, or is projected to cause an impairment."[813] Such classification of a water segment will remain until TMDLs for all pollutants associated with the segment's impairment have been completed and approved by the US EPA.[814]

241. Category 5B waters, on the other hand, constitute waters included in the state's 303(d) list that are impaired specifically because of fish consumption advisories for PCBs and/or mercury.[815] Despite including such waters in the 2004 303(d) Impaired Waters List, "the state believes that a conventional TMDL is not the appropriate approach" to achieving WQSs in these waters and, as such, does not include Category 5B waters in the TMDL development schedule.[816] Instead, IDEM simply states that "the state will continue to work with the general public and US EPA on actual steps needed ultimately to address these impairments."[817] IDEM goes on to state that "[b]ecause each situation is unique, resources, and data sets are sometimes limited, the 2004 listing process may at times require IDEM staff members to apply rational professional discretion."[818] The state makes no reference to any authority for such "rational professional discretion" regarding its lack of TMDL development for mercury contaminated waters and, furthermore, makes no reference to what "actual steps" have been taken, are expected to be taken, or could potentially be taken to address the impairment of Category 5B waters.

8.3.4 Kentucky

242. The first available 303(d) List issued by the state of Kentucky was for 1990.[819] On this list, a number of streams are indicated as warm water aquatic life use–impaired because of priority organics.[820] Some of these streams have been listed for 20 years with no TMDL developed for the impaired segment, thus conflicting with the US EPA guidance suggesting TMDLs be developed within 8-13 years after listing,.[821] At least three stream segments included on the 1990 303(d) List remain listed today as impaired because of priority organics, including PCBs and methylmercury.[822] The 1992 Kentucky 303(d) List stated that mercury was one of the pollutants examined in the preparation of the list. However, none of the 148 impaired waterways on the list was explicitly stated to have been mercury-impaired.[823] The number of impaired waterways placed on Kentucky's 303(d) List rose to 196 streams and 34 lakes by 1998.[824] Combined, impaired streams in Kentucky accounted for 2,592 miles of streams within the state.[825] Only one of the listed waterways was impaired due to mercury—along with other causes—and no information on potential sources of this impairment was provided.[826]

243. By 2002, Kentucky, along with the US EPA and other federal regulatory agencies, began to examine the presence of mercury and other toxics in fish.[827] The fish testing (discovery of mercury contamination levels in fish) resulted in Kentucky placing more waterbodies on the 303(d) List because of mercury contamination[828] and the 2002 Kentucky 303(d) List named 597 waterways as being impaired.[829] Of these waterbodies, eighteen were identified as being impaired by mercury at some level,[830] and mercury was the sole cause of impairment for nine of these waterways.[831] Atmospheric deposition was explicitly named as the primary source of mercury contamination in these impaired waterways.[832]

244. Kentucky listed 740 waterways as impaired on its 2004 303(d) List.[833] Of these, twenty-seven were impaired by mercury,[834] with thirteen impaired solely by mercury.[835] Atmospheric deposition continued to be named as a frequent source of mercury impairment, and one waterway, Buck Creek of Cumberland River, was given a high priority status for TMDL development after it was discovered that the mercury-polluted waterway posed harm to a federally threatened/endangered species.[836]

8.3.5 Michigan

245. The only document available for Michigan within the scope of this factual record is the 2002 303(d) List. There were 351 impaired waterways placed in this list,[837] with 155 of them impaired due to mercury.[838] Of these 155 mercury impaired waterways, approximately fifty were impaired as a result of mercury levels related to fish consumption advisories[839] and fifteen were impaired as a result of mercury levels that exceeded set water quality standards for the waterway.[840]

8.3.6 North Carolina

246. In 1998, North Carolina described its 303(d) evaluation as a four-step process: information gathering, screening to decide what waters are impaired, confirming whether a TMDL already exists for the particular waters, and "prioritizing waters for TMDL development."[841] These criteria have largely remained the same since 1998. From 1998 onward, North Carolina's 303(d) Lists took fish contamination into account when establishing criteria for and placing waterways on the 303(d) List.[842]

247. Over 400 waterways were placed on North Carolina's 303(d) List in 1998.[843] Forty-one of these waterways were impaired in part because of mercury, thirty-eight of which were impaired solely by mercury.[844] In the majority of listings, the mercury impairment was caused by unknown sources, and in no listing was mercury contamination attributed to atmospheric deposition.[845] By 2000, 545 waterways were listed as impaired on North Carolina's 303(d) List, out of which thirty-nine were impaired because of mercury.[846] In all of these waterways, mercury was listed as the sole cause of contamination and subsequent impairment, with the focus of mercury impairment being on fish contamination sufficient to result in fish consumption advisories.[847] There was no mercury contamination source provided for any of these impaired waterways.[848]

248. North Carolina identified 756 impaired waterways on its 2002 303(d) List.[849] Sixty-four of these waterways were impaired as a result of mercury, and for all of these waterways, mercury was the only listed pollutant causing impairment.[850] Additionally, all of these waters were placed on the 303(d) List because of fish consumption advisories that were issued because of mercury contamination levels.[851] The presence of mercury was attributed to atmospheric deposition in eleven instances,[852] and the remaining waterways were identified as having been contaminated by mercury from unknown sources.[853]

249. In 2004, North Carolina placed 725 waterways on its 303(d) List.[854] Sixty-five waterways were listed because of mercury contamination,[855] and in only three instances were these waters contaminated by another pollutant in addition to mercury.[856] Again, all waterways placed on the list were identified as having been subject to fish consumption advisories.[857] Atmospheric deposition was credited for causing mercury impairment in eleven instances.[858]

8.3.7 Ohio

250. Ohio's 2002 303(d) List explicitly stated that because the Ohio EPA did not view contamination in sports fishing as a contaminated use sufficient to be evaluated for impairment, no waterways were placed on the list for mercury contamination because of fish consumption advisories.[859] This stance was changed in 2004 after the US EPA only partially approved and partially disapproved Ohio's 2002 303(d) List. The EPA's partial

disapproval resulted from its stance on evaluating waterways under fish contamination advisories for potential listing on the 303(d) List.[860] Consequently, twelve waterways were listed for mercury impairment on Ohio's 2004 303(d) List, although the source of this impairment was not provided.[861]

8.3.8 Pennsylvania

251. Pennsylvania's 2004 303(d) Impaired Waters List is divided into two categories: lakes requiring TMDLs, and streams requiring TMDLs.[862] Sixty-two (62) lakes are included on this list.[863] The listed cause of impairment for twenty-seven (27) of these lakes is mercury.[864] PADEP lists "atmospheric deposition" as the source of mercury impairment of all 27 of these lakes.[865] The streams listing contains several hundred streams listed as impaired, eighty-five (85) of which are impaired because of mercury.[866] The source of mercury causing impairment of these streams is listed as "unknown" for all.[867]

8.3.9 Texas

252. Texas makes available its 303(d) Lists from 1992 to the present. In 1992, 104 waterways were listed as impaired, but none was identified as impaired because of mercury.[868] The same is true of the 1994 Texas 303(d) List, which identified 114 waterways as being impaired but none because of mercury.[869] By 1996, 141 waterways were listed on Texas' 303(d) List.[870] From this time forward, the focus of mercury-related listings in Texas has been the presence of mercury-contaminated fish in its waters.[871] None of the Texas 303(d) Lists for the relevant period provided a source of mercury impairment for the waterways listed.[872] In 1996, Texas identified two waterways as impaired because of mercury.[873] By 1998, nineteen of the 147 waterways placed on Texas' 303(d) list were impaired because of mercury.[874]

253. Texas' 1999 303(d) List contained 200 entries for impaired waterways and again nineteen of these waters were impaired because mercury.[875] In its next 303(d) List, for 2002, Texas listed 300 waterways as impaired, thirteen of which were impaired because of mercury.[876] For 2004, Texas placed 307 waterways on its 303(d) List, thirteen of which were listed as impaired because of mercury. These waterways were identical to those identified on the 2002 303(d) List.[877]

8.3.10 West Virginia

254. For the relevant time period under review for this factual record, the state of West Virginia made available its 2004 303(d) List.[878] West Virginia placed 671 waterways on this 303(d) List,[879] and twelve for mercury.[880] For all mercury-impaired waterways the source of impairment was stated to be "unknown."[881]

8.4 US EPA Responses to Failure, If Any, of States to List Mercury-impaired Waterways[882]

255. The US EPA described its oversight role in the CWA 303(d) process in a 1991 document providing guidance on water quality–based decisions, which explains that EPA's oversight role is to ensure that each state's program is technically sound and that each state fully implements its program.[883] Since 1991, the EPA has issued a series of guidelines to states regarding listings on the 303(d) list, and related issues.[884]

256. As discussed above, once a state has prepared its 303(d) list, the state then submits the list to the EPA for review and approval or disapproval within thirty days.[885] The EPA may then approve, disapprove, or partially approve the 303(d) list.[886] If the list is not approved, the EPA, through the appropriate regional office, must develop a 303(d) list for the state.[887] The EPA has approved the 303(d) lists submitted by the ten states discussed above, but not without exception. An example of such an exception is the 2002 Ohio 303(d) List.[888] As previously mentioned, for this list Ohio declared it was unnecessary to evaluate the impact of pollutants on sport-fishing, because it did not recognize this as a use subject to 303(d) List.[889] In response, the EPA only partially approved the 2002 Ohio 303(d) List, which pressed Ohio to examine the issue and ultimately include sport fishing in its 2004 303(d) List.[890]

257. When lawsuits have been brought against the EPA and states for their handling of the 303(d) list creation and evaluation process, there have sometimes been affirmative powers and responsibilities, in addition to those statutorily required, assigned to the EPA, such as the 1998 Alabama Consent Decree[891] (see sections 8.3.1 and 8.5.1).

8.5 TMDLs for Mercury from Air Deposition in the Ten States of Concern.

258. Pursuant to question five (5) of Council Resolution 08-03, the following subsections (8.5.1 – 8.5.10) contain a discussion of what the ten states identified by the Submitters or the US EPA have done to account for mercury from air depositions in TMDL calculations established by the US EPA or the states.

8.5.1 Alabama

259. The state of Alabama conducted its TMDL establishment activities in compliance with federal requirements and the terms of a 1998 Consent Decree, until a federal judge determined in 2009 that the obligations created by this Consent Decree had been satisfied.[892] The Consent Decree ended a lawsuit in which it was alleged that neither the state of Alabama nor the US EPA was fulfilling its legal obligations to place impaired waters on the 303(d) List and develop the appropriate TMDLs for these waters.[893] Under the terms of the Consent Decree, the state of Alabama was to create the legally and factually appropriate TMDLs for a specific list of 115 waterways.[894] If the state of Alabama failed to uphold its responsibility, the EPA would then have to propose and ultimately establish TMDLs for the specified waterways, with public hearings and input.[895]

260. From 1997 to 31 December 2004 the EPA approved 126 TMDLs for Alabama waters.[896] None of these approved TMDLs was for mercury pollution explicitly, nor did any include load allocations for atmospheric deposition of mercury.[897]

8.5.2 Illinois

261. Of the over fifty TMDL assessment reports issued by the state of Illinois during the relevant time period for this factual record, none was for mercury.[898] However, within the TMDLs approved during this time, there is one reference to mercury pollution and impairment, including atmospheric deposition: the Illinois EPA's Big Muddy River/Kincaid Lake TMDL report from 2004 identifies mercury as a source of contamination and impairment for Kincaid Lake. Ultimately, this TMDL report does not address mercury loads, because "[t]he mercury TMDL will be addressed in a regional TMDL by the US EPA and will not be addressed at the state level. The regional TMDL will focus on air deposition of mercury."[899] No such regional TMDL has been created.[900]

8.5.3 Indiana

262. The 2005 Flatrock-Haw Creek Watershed TMDL indicates the area in question is impaired because of mercury.[901] However, the TMDL itself focuses solely on *E. coli*.[902] Similarly, the St. Joseph River TMDL report states that, along with *E. coli*, the St. Joseph River is impaired by mercury, but that the only TMDL being created at that point was for *E. coli*.[903] The same is true for the Middle West Fork White River TMDL Report.[904] With those exceptions, the other TMDLs approved for the state of Indiana during the relevant time did not include references to mercury pollution or impairment.[905] The lack of mercury-related TMDLs, despite the recognition of mercury as a cause of impairment, is in line with the state's position that TMDLs for mercury and PCBs are not the appropriate means to achieve compliance with applicable water quality standards.[906]

8.5.4 Kentucky

263. None of the TMDLs approved for the state of Kentucky during the relevant period was for mercury impairment. Moreover, none of the approved TMDLs for this time period made any reference to mercury.[907]

8.5.5 Michigan

264. In 2002, the state of Michigan approved a TMDL for mercury for Hammell Creek.[908] The area of Hammell Creek subject to the TMDL was impaired as a result of mercury levels that exceeded the established water quality standards.[909] The TMDL states that the source of mercury impairment for Hammell Creek was the discharge of mercury from a former mine site.[910] Ultimately, the mercury discharge into Hammell Creek was found to violate the established water quality standards to sustain aquatic life within the waterway.[911]

265. It is noted in the Detroit River TMDL for *E. coli* that the river is also impaired because of mercury. However, the TMDL does not include plans to set limits for mercury load levels or discuss the source of mercury in the Detroit River.[912]

266. The 2003 TMDL for Little Black Creek for biota notes that Little Black Creek is impaired by mercury—among several other pollutants—and that a TMDL for mercury in Mona Lake Proper, which is located in the same watershed as Little Black Creek, was scheduled to be developed in 2011.[913] However, this TMDL has not been approved nor did it appear to be available at the time of the development of this factual record.[914]

267. According to Michigan's 2002 303(d) List, the majority of TMDLs for mercury impairment were scheduled for development in 2011, yet were not available at the time of writing of this factual record, and in any event these would have been outside the temporal scope of this factual record.[915]

8.5.6 North Carolina

268. A TMDL for mercury was issued in 1999 for the Lumber River in North Carolina.[916] This TMDL was occasioned by the placement of eleven waterways associated with the Lumber River on North Carolina's 303(d) List for 1998.[917] All of these waterways were considered impaired, based on fish consumption advisories.[918] The intention was that this 1999 TMDL document would be the first of two documents produced in relation to mercury contamination and the Lumber River; the second document addressed air-based deposition as a source of impairment.[919] The 1999 document provides an overview of the mercury and methylmercury cycle, including bioaccumulation and the fish toxicity that results from it.[920] The TMDL states that the Lumber River Basin surface waters included in the TMDL study were not exceeding their water quality standards for mercury; rather, fish contamination was the sole impetus for establishing the TMDL.[921] The TMDL discusses the role of sediment contaminated with mercury (as a result of the mercury cycle) as part of the cause of fish contamination levels in the Lumber River Basin.[922] The TMDL then discusses the sources of mercury contamination in North Carolina and engages in a thorough evaluation of the impact of atmospheric deposition on mercury contamination, concluding that local, regional, and international sources contribute to the mercury levels found in the fish population of the Lumber River Basin.[923] However, the TMDL does not identify the source of mercury as coal-fired power plants and instead discusses a variety of industrial plants to which atmospheric deposition of mercury contamination could be attributed.[924] At the time of the TMDL, however, adequate data and associated modeling were not available to allow North Carolina to establish a load allocation for atmospheric deposition of mercury into the Lumber River Basin area.[925] Even then, the TMDL makes clear that determining how to bring knowledge from such data and models into a load allocation system would require the assistance of the US EPA because of its technicality and novelty.[926] Further, while the TMDL does identify a chlor-akali plant as the largest emitter of mercury into the air of North Carolina, it also mentions the difficulties associated with crafting a TMDL addressing airborne mercury loads when so much of the mercury that is atmospherically deposited in North Carolina allegedly comes from outside the state.[927] Ultimately, the TMDL provided that current holders of NPDES permits for mercury discharges in the Lumber River Basin would not be allowed to increase their discharges, but it concluded that the problem of mercury contamination could not be adequately addressed until more information was provided in Phase II of the TMDL.[928] The Phase II TMDL was not made available to the Secretariat by the state of North Carolina.[929]

8.5.7 Ohio

269. In its 2002 TMDL for the Upper Little Miami River watershed, the Ohio EPA identified a particular portion of the affected area (Little Beaver Creek) as being impaired by mercury. [930] However, the associated data for the TMDL established that the mercury impairment at issue was the result of urban runoff and industrial discharge, not atmospheric deposition.[931] It should be noted that the discussion of mercury contamination in the TMDL did reference the possibility of contamination from atmospheric deposition–based sources such as coal-fired power plants, when describing the general ways in which mercury contamination can occur in any waterway.[932]

270. The Upper Sandusky River Watershed TMDL was approved in 2004[933] during the time when the Ohio EPA was in the process of incorporating fish contamination as a part of its 303(d) List criteria. Thus, whereas fish contamination from mercury is referenced as occurring in the area subject to the TMDL, it was not explicitly made part of the TMDL and its requirements.[934] This TMDL did, however, note the danger of mercury as a soil contaminant and highlight the need for further study of methods to address the mercury contamination issue in the Upper Sandusky River Watershed.[935] The sources of the mercury contamination were not discussed, and the TMDL's ultimate suggestion was that the mercury-contaminated area should be addressed through remediation.[936]

8.5.8 Pennsylvania

271. Pursuant to the terms of a 1996 Consent Decree, the US EPA and the state of Pennsylvania agreed to enter into an agreement, setting out a "twelve-year schedule for establishment of TMDLs for all WQLs on Pennsylvania's 1996 [303(d)] List."[937] On 9 July 2009, the US EPA and PADEP announced that PADEP's obligations under this consent decree have been met.[938]

272. In 2004, Pennsylvania adopted the Lake Jean TMDL for phosphorous.[939] This TMDL mentioned that Lake Jean was subject to fish consumption advisories for mercury, as well as other toxic compounds, but stated that the TMDL for mercury impairment would be completed at a later time.[940] The Lake Jean TMDL identified the cause of mercury impairment in the waterway as atmospheric deposition but provided no further information.[941]

273. In 2005, the US EPA Region 3 office adopted the TMDL for mercury and nutrients for Lake Wallenpaupack, Pennsylvania.[942] This TMDL recognized the role of atmospheric deposition of mercury in the mercury impairment of the waterway, although it was not able to attribute it to any particular source, outside of a statement that such deposition was not attributable to local sources. Load amounts were established for mercury and nutrient impairments generally in the TMDL. However, there was no specific load limitation ascribed to coal-fired power plants or other identifiable sources of atmospheric deposition of mercury.

8.5.9 Texas

274. The state of Texas did not issue any TMDLs for mercury impairment, or any TMDLs that included a substantive discussion of mercury impairment, during the relevant time period.[943] A TMDL preliminary study was conducted in 2004 by the TCEQ for the Lavaca Bay/Chocolate Bay area, which had been listed as mercury-impaired on the state's 2004 303(d) List.[944] The source of mercury impairment in the waterway was identified as discharge from an industrial plant and, after further testing was conducted, the TCEQ recommended that a TMDL was unnecessary and that the waterway should be delisted for mercury impairment.[945]

8.5.10 West Virginia

275. The state of West Virginia did not issue any TMDLs for mercury impairment, or any TMDLs that included a substantive discussion of mercury impairment, during the relevant time period.[946]

8.6 Regional/Statewide Approaches to Mercury Monitoring and TMDLs

276. Recognizing the widespread nature of mercury deposition, states and regional entities have taken statewide and regional approaches to monitoring mercury emissions and deposition, and developing mercury TMDLs.[947] Pursuant to question five (5) presented by Council Resolution 08-03, this part of the Factual Record includes further facts about what states or the US EPA have done to account for mercury air deposition in other states.[948]

8.6.1 Minnesota Statewide Mercury TMDL

277. The Minnesota Statewide Mercury TMDL is relevant to this Factual Record because it represents an example of TMDLs for mercury from air deposition in "other US states"[949] and is directly referenced by the US EPA in their Response as "identify[ing] total [mercury] loadings from air sources."[950]

278. The state of Minnesota (MN) has set forth a statewide plan or TMDL to address mercury in its air, water, and fish. A TMDL typically is developed for a single pollutant-waterbody combination. However, because most of the mercury load is atmospheric and distributed across all waters of the state, Minnesota used a "statewide" approach in that the TMDL applies to mercury-impaired waters throughout the state. Minnesota's was the first such approach and served as a model for other similar TMDLs.

279. The Minnesota Statewide Mercury TMDL has been produced using mercury fish tissue data and relationships between mercury deposition and fish tissue to determine the amount of reductions in mercury deposition that will result in meeting the state's water and fish mercury targets. The MN TMDL is designed to ensure maximum reduction of mercury pollution needed to meet water quality standards. The state also compiled a detailed implementation plan for the TMDL. The plan operates under the working assumption that fish mercury concentrations will decline in all lakes and rivers when atmospheric loading is reduced.

280. The MN TMDL is designed to address mercury-impaired waterbodies across the entire state. The TMDL covers 820 lakes and 419 rivers, or a total of 1239 impaired waterbodies. To ensure all waters of the state would meet mercury water quality standards, fish tissue and other data from waters throughout the state was compiled and analyzed. The assessment concluded that waterbodies could be grouped into two regions (Northeast and Southwest) for purposes of the TMDL based on similarities in sensitivity of the waters within each Region to mercury loadings and bioaccumulation, and the influence of land use on water quality. For example, the Northeast Region is dominated by forest and wetlands, and cultivated lands dominate the Southwest region. As a result, there are differences mercury transport and transformation between each of the two regions. In turn, there are significant differences in water quality and fish tissue concentrations between the two regions and differences in the mercury load reductions needed to meet water quality standards in each Region were different. Thus, two separate TMDL calculations were done, one that applies to all the waters in the southwest region and one for all the waters in the northeast region.

281. The evaluation of present and future reductions was based on fish mercury data examined between 1988 and 1990. The fish mercury samples also correspond to the atmospheric mercury data used in the TMDL. The year 1990 was used at the baseline for the TMDL, as 1990 corresponds to the baseline for the Great Lakes mercury reduction goals. In addition, mercury use was relatively high prior to 1990 and then dropped beginning around the start of 1990. These previous reductions were also taken into consideration in the TMDL plan and accounted for 70% of the total reductions necessary to meet TMDL calculations, i.e., MN

had already achieved 70% of the reductions needed to achieve the TMDL goal. However, it was noted that several decades are needed to attain fish mercury reductions, as the researchers are unsure how long it will take for changes in mercury sources to be reflected in fish tissue samples. Waterbody mercury recycling and run-off of mercury from land surfaces are likely to contribute to aquatic mercury levels until such mercury becomes buried in the sediment.

282. With these considerations, the MN TMDL plan takes into account the higher frequency of fish consumption within the state over the national average. In Minnesota, waters are considered impaired when they do not meet legally enforceable water quality standards (e.g., water column concentrations of a pollutant), and also when there is a fish consumption advisory in place due to high levels of a contaminant (e.g., mercury), in fish. Minnesota issues advisories or warnings to the public regarding recommended levels of fish consumption. For this TMDL, the state used a TMDL target of 0.2 ppm mercury in fish, which is lower than the EPA-recommended fish tissue criterion of 0.3 ppm mercury in fish.

283. The state also labeled the source of mercury deposition as either in-state or out-of-state and determined that approximately 10% of the total mercury deposition received was due to in-state emissions. The TMDL identified the reductions that would be needed in the in-state emissions in order to achieve adequate water quality standards.

284. To determine reductions in mercury emissions that would in turn reduce mercury in fish tissue to the 0.2 ppm target, the MN TMDL plan uses a mercury reduction factor. The reduction factor assumes that reducing mercury emissions will result in a proportional decrease in fish mercury levels. The reduction factor was based on comparing the target fish mercury concentration (0.2 ppm) against mercury concentrations for a standard-length top predator fish. The reduction factor is the difference between the 90th percentile concentration in the standard length fish and the 0.2 ppm target. A 40-centimeter walleye (*Sander vitreus*) is used as the standard length fish to calculate the reduction factors. Based on the walleye mercury concentrations in 1990, a 65% and 51% reduction of fish-tissue mercury is needed in the Northeast and Southwest, respectively, to obtain target fish mercury concentrations. Using the walleye to determine the reduction factor ensures not only are top predator fish within water quality standards, but lower-trophic-position species as well. By protecting to the 90th percentile in standard length fish, the TMDL would achieve the target level in other biota as well as the water column.

285. The plan aims to achieve the greatest protection while accounting for outliers and uncertainty. Even when accounting for the greatest reduction in fish-tissue mercury concentrations, it is possible that some lakes will not meet the statewide TMDL due to individual lake chemistry or other factors, and there may be individual lakes where fish mercury concentrations will require a greater than 65% reduction. As of 2005, there was a 70% reduction in atmospheric mercury, resulting in a 24% reduction remaining in atmospheric statewide mercury emissions. At this point, the status of fish-tissue mercury reduction and the percentage of lakes in compliance with water quality standards remain unknown.

286. The information in this section was synthesized from the Minnesota Statewide Mercury Total Maximum Daily Load report by the Minnesota Pollution Control Agency.[951]

8.6.2 Florida Mercury TMDL Pilot Study

287. The Florida Mercury TMDL Pilot Study is relevant to this Factual Record as an example of "TMDL calculations for mercury from air deposition in other states" and, because the US EPA funded the study, it represents efforts by the US EPA to develop more effective TMDLs.[952] The Florida Mercury TMDL Pilot Study sought to examine modeling approaches that could potentially be used in developing mercury TMDLs where atmospheric deposition is the primary mercury source. Modeling approaches were examined using the Florida Everglades as a case study; a companion study was also done for Devil's Lake in Wisconsin (discussed in the

next section). In addition to examining modeling approaches, the pilot studies examined two key questions: what is the relationship between fish mercury levels and atmospheric mercury, and how long would it take for fish to respond to decreases in mercury loadings.

288. The Everglade ecosystem was under fish consumption advisories due to mercury. This resulted in the waters being listed as impaired under CWA §303(d) as they failed to meet water quality standards.

289. In the Everglades, roughly 95% of the mercury load was estimated to come from the atmosphere and included both local and distant sources. Information on the exact contribution from global sources was not known at the time of the study.

290. Atmospheric deposition models were used to simulate transport and deposition of mercury emissions. Those simulated estimates were then used as an input into the aquatic cycling models. The aquatic cycling models then modeled the environmental cycling of mercury, including the uptake by top predator fish. The two sets of models were conjunctively used to predict potential changes in largemouth bass mercury concentrations resulting from a reduction in mercury emissions.

291. The aquatic cycling model predicted a linear reduction in largemouth bass mercury concentrations following reductions in atmospheric mercury deposition. This pilot study concluded that to achieve the reduction in largemouth bass mercury concentrations necessary to meet Florida's fish advisory level of 0.5 ppm, current mercury deposition needs to be reduced by 80%. The model also predicted that fish mercury levels would respond relatively quickly to reductions in mercury loadings:, the models predicted the levels to be at 50% of the achievable long-term steady state in 10 years and 90% within 30 years. Such a decrease takes into account the contribution of mercury within the sediments, i.e., mercury in sediments can continue to be a source of mercury even if current loadings are reduced until it is buried deep enough in the sediments to be removed from the active zone.

292. Data used to calibrate the model had been collected previously from intensive studies within the Florida Everglades (i.e., a criteria for the pilot was that existing data be used, and thus no new data were collected for the pilot study). Aquatic-mercury-cycling data were collected from June 1995 to June 1996 and atmospheric deposition rates were from 1995 to 1996. Since both the aquatic mercury and atmospheric data are from the same time period, the study notes that it is reasonable to assume they represent "current" mercury values.

293. For the pilot study, limited information was available on global mercury transport and its role in the mercury cycle of the Florida Everglades. Yet, independent of the Florida Everglades TMDL pilot study, researchers using trace element signatures in atmospheric deposition determined that most of the atmospheric mercury deposition received in the Everglades does not originate locally. For purposes of the study, it was assumed that most of the mercury deposition was from local sources.

294. The pilot study concluded that, in general, it is feasible to combine atmospheric and aquatic cycling models to determine mercury concentrations across multiple aspects of the ecosystem. The pilot study pointed out that more information is needed to fully determine the contribution of global mercury to the Everglades. The aquatic cycling modeling component of the study also pointed out the uncertainties in the modeling, as data was not available for all of the chemical cycling processes (i.e., sulfate reduction) needed for the model. Uncertainties also remain in data needed for the atmospheric models, including processes affecting mercury transformation in the atmosphere and year-to-year variation in mercury deposition. Furthermore, as the study was conducted at a specific location, the specific results regarding predicted mercury reductions in fish may not be applicable to other areas, i.e., the Everglades are a unique system – a shallow marsh – and so may respond to changes in deposition differently from other ecosystems. Other areas of the Everglades may also respond differently. However, the overall modeling approach could be used elsewhere.

295. While this was a pilot study not intended to develop an actual TMDL for the Florida Everglades, recommendations regarding modeling tools and potential fish responses to mercury reductions were gathered from the study. Better estimates of mercury emissions as well as both local and global mercury deposition contributions are needed, according to the study. Data on a number of biogeochemical parameters would be needed for the aquatic cycling model to better gauge their influence on mercury and methylation processes. In all aspects of the models, better estimates of parameter and outcome uncertainties need to be obtained, as these uncertainties have the potential to affect decisions, leading to environmental implications.

296. Information in this section was synthesized from *Integrating Atmospheric Mercury Deposition and Aquatic Cycling in the Florida Everglades: An Approach for Conducting a Total Maximum Daily Load Analysis for an Atmospherically Derived Pollutant*.[953]

8.6.3 Mercury Inputs and Cycling in Devil's Lake, Wisconsin: A Pilot Study for Conducting a TMDL Analysis for an Atmospherically-derived Pollutant

297. The Wisconsin TMDL pilot study is the sister study to the Florida TMDL pilot study. Both studies were started in 1999 and overseen by the US EPA. Although the Wisconsin study was not a TMDL, it aimed to help determine what modeling approaches could be used when developing a TMDL where mercury is primarily from air deposition, as well as what uncertainties should be considered, in the models and model results. Similar to the Florida pilot, this study also examined how fish might respond to reductions in mercury loadings, including both the magnitude and timing of the response. Existing models (both peer-reviewed) and existing data were used in the pilot. The Wisconsin study is relevant to this Factual Record as an example of "TMDL calculations for mercury from air deposition in other states" and, because the US EPA funded the study, it represents efforts by the US EPA to develop more effective TMDLs.[954].

298. The study at Devil's Lake examined the predicted fish mercury concentrations and simulated aquatic cycling of mercury, using the Dynamic Mercury Cycling Model (D-MCM). The researchers aimed to identify parameters and variables that incorporate this uncertainty, such as yearly meteorological variations and atmospheric loadings. They used Monte Carlo analysis, with classification and regression tree analysis, to "statistically identify the most important meteorological parameters and conditions associated with certain ranges of daily wet and dry deposition and then ultimately infer year-to-year variation in mercury deposition due to changing meteorological conditions across a ten-year period."[955]

299. The Wisconsin Devil's Lake Pilot Study aimed to address five of the thirteen elements of the TMDL process as if it were a true TMDL; 1) identify waterbody, pollutant of concern, pollutant source, and priority ranking; 2) describe water quality standards and numeric water quality target; 3) identify reductions for point and nonpoint sources of pollution; 4) describe the linkage between water quality endpoints and pollutants of concern; and 5) identify margin of safety, seasonal variations, and critical conditions.

300. Similarly to Minnesota, Wisconsin also lists its lakes as impaired when fish mercury concentrations exceed consumption limits. In particular, the Wisconsin study has a statewide fish consumption advisory in addition to a special, more restrictive specific advisory for individual lakes based on reducing risk to the most sensitive populations (i.e., women of childbearing age and children under age 15). The individual consumption advisories are put in place when fish-tissue mercury concentrations are above 0.05 ppm, and waters are listed as impaired when game fish mercury concentrations are greater than 1 ppm and 0.21 ppm for pan fish.

301. The Regional Modeling System for Aerosols and Deposition (REMSAD) was used to estimate wet and dry mercury deposition over Devil's Lake. Inputs to the model included data on meteorological parameters, mercury emissions and speciation, and rates of atmospheric mercury chemistry reactions. Within the REMSAD

modeling, emissions from 300 individual sources of mercury were "tagged" to separate out relative mercury contributions from specific sources, source categories, or geographic regions. Using tags allowed the study to better identify mercury emissions from outside Wisconsin as compared to within the state. This substantially reduced the number of model runs or scenarios needed in order to develop the attribute information (i.e., as compared to "zeroing out" each source one at a time and then running the model to determine its contribution). The modeling also separated out contributions from states bordering Wisconsin, other states, Canada, global background and re-emissions of previously deposited mercury.

302. The D-MCM was also used to determine the aquatic cycling of mercury. The goal of the modeling was to examine the responses in fish tissue mercury levels to changes in mercury loads, including the magnitude and timing of changes in fish mercury concentrations due to changes in atmospheric mercury deposition.

303. After calibrated for environmental conditions and mercury deposition, the models were used to examine the change in fish-tissue mercury concentrations with various reductions in mercury loading. The predicted fish mercury concentrations for a five-year old walleye showed a linear decline with reductions in mercury deposition. The D-MCM predictions led to three key conclusions: 1) Methylation and demethylation are governed by the available supply of mercury and the rate of microbial activity. 2) The mercury substrate and organic matter decomposition rates will limit microbial methylation processes. 3) There is a linear relationship between the reduction in atmospheric mercury deposition and the loading of mercury from the watershed to Devil's Lake.

304. The model predicted the potential change in fish mercury related to atmospheric mercury deposition and examined the timing in which fish mercury concentrations would change with reductions in mercury loads. The "target" fish tissue concentration for purposes of the pilot was 0.3 ppm mercury in five-year old walleye. It was estimated that five-year-old walleye (the target fish) would reach a steady state of mercury concentrations in approximately 52 years, given a reduction in atmospheric deposition of 95%. This is due mainly to the exchange of methylmercury in the lake sediments with the pore water in the hypolimnion. The model estimated that it would take about 9.6 years for walleye mercury concentrations to reach equilibrium when the sediment exchange interface was reduced from 3 cm to 3 mm. Reducing the volume of sediment interaction with the pore water interface essentially reduced the amount of mercury methlyation in the hypolimnion.

305. The pilot, similar to the Florida pilot, examined modeling tools that could potentially be applied in the development of TMDLs for waterbodies where air deposition is the predominant mercury source. At the same time, the pilot study also examined data needs and uncertainties in both the atmospheric model, REMSAD, and the aquatic mercury-cycling model, D-MCM. The study examined the effects of uncertainty on the target numeric output predicted from the models as well as the natural variation. In the end, the study and models were able to provide a predicted relationship between atmospheric mercury deposition and the change in fish mercury concentrations, while assisting to reduce the levels of uncertainty associated with the various environmental parameters and conditions.

306. Information in this section was synthesized from the US EPA's *Mercury Inputs and Cycling in Devil's Lake, Wisconsin: A Pilot Study for Conducting a Total Maximum Daily Load Analysis for an Atmospherically-Derived Pollutant*.[956]

9. Closing Note

307. Factual records provide information regarding asserted failures to effectively enforce environmental law in North America since the entry into force of NAAEC on 1 January 1994, to enable submitters and other members of the public to draw their own conclusions regarding a particular Party's enforcement of environmental law, as well as provide valuable information to the Parties to the NAAEC as they seek to fulfill their obligations under the Agreement. Pursuant to Council Resolution 08-03, which determined its scope, this factual record provides information relevant to a consideration of the Submitters' assertions that the United States is failing to enforce §303 and §402 of the CWA in ten highlighted states by issuing or renewing NPDES permits (or allowing states to issue or renew such permits) that allow for point-source discharges of mercury that do not comply with, or that cause or contribute to non-attainment of, the water quality criteria for mercury in the receiving waterbodies. Although this factual record presents information covering a period between the beginning of 1994 and the end of 2004, it is still relevant today because the structure and function of the CWA has not significantly changed.

308. The stated goal of the Clean Water Act is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." CWA §303 requires that states create a list of impaired or threatened waters by identifying and establishing priority rankings for waters within each state's boundaries, for which existing effluent limitations are not stringent enough to implement any water quality standard applicable to such waters. Within the time period relevant to this factual record, there was one instance of a partially disapproved list, and no instance of a completely disapproved list. The US asserts that should the state fail to establish a Total Maximum Daily Load (TMDL) for pollutants identified by the EPA, the EPA is charged with a discretionary authority to establish such a TMDL. In a 1991 guidance document, the EPA made explicit its oversight role as one ensuring that each state's program is technically sound and that each state fully implements its program. Lawsuits have been brought against the EPA as well as states, regarding their CWA §303(d) list creation and evaluation processes. Some of these suits have resulted in affirmative powers and responsibilities, in addition to those statutorily required, being assigned to the EPA, such as in the 1998 Alabama Consent Decree.

309. All ten states of concern had at least one impaired waters list available from within the time period relevant to this factual record, with at least one water segment or body listed as impaired due to mercury contamination, and most of those states listing multiple segments and bodies as impaired due to mercury contamination. Whether or not these states had developed TMDLs for the mercury-impaired waters within their borders varied greatly from state to state. The US asserts that the EPA has complied with consent decrees that address TMDL development in four of the ten states, and that it has not exercised its discretionary authority in the other six states of concern.

310. Although the EPA is charged with administering the NPDES program, it may authorize the states to assume the permitting program, including administrative and enforcement responsibilities. The EPA has allowed all ten states of concern in this factual record to implement the NPDES program. The Secretariat reviewed permits and their accompanying Fact Sheets issued by the ten states for twenty-six coal-fired power plants listed in the TRI report as discharging mercury and mercury compounds to water. The TRI report listed ten additional power plants as having discharged mercury or mercury compounds into water, but no information was made available to the Secretariat for these by the state permitting agencies. The Secretariat found that the information included in the permits and Fact Sheets is relevant to mercury discharges to water, and furthermore, that the consideration of atmospheric deposition of mercury as a total load consideration varied greatly by state and by facility. Between 1993 and September 2004, the number of Fish Consumption Advisories (FCAs) related to mercury rose from 899 to 2347. The EPA indicated that in 2004, 35% of total

lake acres and 24% of total river miles in the United States were under FCAs. The US maintains that this rise in mercury-related FCAs is not inherently related to an increase in levels of mercury contamination, but instead that its increased efforts in monitoring and improved data analysis are the cause for the steep increase in mercury-related FCAs.

311. Information contained in this factual record shows that the amount of mercury present in the atmosphere has increased by 17% between 1990 and 2005 and that atmospherically deposited mercury transforms to methylmercury and bioaccumulates as it moves through the piscivorous food chain, which includes humans. This information also shows that the most significant anthropogenic contributor to this increase is the power generation industry using fossil fuel combustion. This factual record also contains information that pre-release control methods are considered the most effective means of controlling the amount of mercury and its related toxic substances in the atmosphere.

312. Today, because atmospheric mercury as it affects water is considered a non-point-source discharge, it is not as such subject to direct regulation under the Clean Water Act. Programs such as the TMDL program identify waters impaired by atmospheric mercury deposition and establish TMDLs identifying the reductions from all sources necessary to attain water quality standards. However, the CWA does not provide for direct regulation of such sources. The latter regulation is left to the state's TMDL programs, or a voluntary program known as "subcategory 5m" created by the US EPA in 2006, which was not in existence at the time of this Submission.

313. As provided in Article 15(3) of the NAAEC, this factual record is "without prejudice to any further steps that may be taken" with respect to the Submission.

Endnotes

(Endnotes)

1. North American Agreement on Environmental Cooperation ("NAAEC"), 13 Sept. 1993, reprinted in 32 I.L.M. 1480 (1993).
2. SEM-04-005 (*Coal-fired Power Plants*) Article 14(1) Submission (20 Sept. 2004) ("Submission"), at 11–12.
3. 40 C.F.R. §122.44(d)(1)(i).
4. Government of the United States, "Response to Submission SEM-04-005" (25 April 2005) ("Response").
5. "The EPA estimates that CAIR and CAMR, when fully implemented, will reduce domestic power plant mercury emissions by nearly 70 percent from 1999 levels. These reductions will address Submitters' core concerns." Response, *ibid*., at 3.
6. *Ibid*., at 24.
7. *Ibid.,* at 9, *see also ibid*., at 1, stating "nothing in the CAA or its implementing regulations requires CAA Title V permits to incorporate requirements under the CWA, such as water quality standards or antidegradation requirements."
8. *Ibid*., at 24.
9. *Ibid*.
10. *Ibid*.
11. Letter with Appendix from Judith E. Ayres, Assistant Administrator, US EPA, to Mr. William V. Kennedy, Executive Director, Commission for Environmental Cooperation (rcv'd 9 Sept. 2005) (on file with the Secretariat).
12. SEM-05-005 (*Coal-fired Power Plants*), Council Resolution 08-03 (23 June 2008) ("Council Resolution 08-03").
13. Freedom of Information Act (FOIA), 5 U.S.C. §552 (1966).
14. 33 U.S.C. §1251 *et seq.*
15. Submission, *supra* note 2, at 11–12.
16. Appendix 12 to Submission SEM-04-005 (*Coal-Fired Power Plants*), 18 January 2005 ("Appendix 12"), *available at:* http://www.cec.org/Storage/86/8196_04-5-RSUB_en.pdf (last visited 23 October 2013) at 10. This information is interpreted by the Secretariat not as primary evidence of non-enforcement, rather to give context to the assertions that the US is failing to enforce the CWA. *See* Notification*, infra* note 78 at 6.
17. The Submitters describe FCAs as "warning the general public and sensitive subpopulations, such as pregnant women, of the dangers of consuming this otherwise healthy food." *Ibid*., at 1.
18. Submission, *supra* note 2.
19. *Ibid*., at 12.
20. *Ibid.*, at 11–12.
21. *Ibid*.
22. *Ibid*., at 6.
23. *Ibid*.
24. *Ibid.*, at 12.
25. *Ibid*.
26. 33 U.S.C. §1313.
27. Submission, *supra* note 2, at 8–11.
28. *Ibid*., at 6–7.
29. Submission, *supra* note 2, at 7.
30. *Ibid*.
31. *Ibid*.
32. *Ibid.*, at 10.
33. *Ibid.*, at 7–8.
34. *Ibid.*, at 8.
35. *Ibid.*, at 11 (stating that, "[w]ithout a TMDL there is no way to control the cumulative effect of point and nonpoint source pollution—thus there is no way to implement the antidegradation provisions.").
36. *Ibid.*, at 9.
37. *Ibid*.
38. *Ibid*.
39. *Ibid*.

40. Submission, *supra* note 2, at 10 (stating that "a factual record would establish whether the [EPA] is allowing direct discharges of mercury to waterways that are currently under FCAs for mercury and thus no longer suitable for fishing").
41. Appendix 12, *supra* note 16.
42. SEM-04-005 (*Coal-Fired Power Plants*) Determination in Accordance with Article 14(1) [of NAAEC], Commission for Environmental Cooperation, 16 Dec. 2004 ("Determination"), *available at:* <http://www.cec.org/Storage/75/6862_04-5-DET14_1__en.pdf> (last visited 23 October 2013).
43. *See ibid.* at note 37.
44. Although the Submitters' assertions regarding NPDES and State discharge permits appear to implicate the TMDL scheme to some extent, those assertions do not incorporate the full scope of the Submitters' TMDL assertions.
45. Appendix 12, *supra* note 16, at 4.
46. *Ibid*.
47. *Ibid*.
48. *Ibid*., at 5–6.
49. *Ibid*., at 5–7.
50. *Ibid.*, at 7–8. This factual record does not, in accordance with Council Resolution 08-03, develop factual information concerning the Submitters' CAA assertions, and only mentions the CAA assertions for the purpose of summarizing the Submission and the Response.
51. *Ibid.*, at 8 (emphasis added).
52. *Ibid.*, at 10.
53. *Ibid.*, at 9.
54. *Ibid.,* at 13.
55. *Ibid.*, at 9.
56. *Ibid.*, at 13.
57. *Ibid*.
58. *Ibid.*, at 14; Appendix 12B; Appendix 12E.
59. Appendix 12, *supra* note 16, at 14.
60. *Ibid.*, at 15.
61. *Ibid*.
62. *Ibid.*, at 16.
63. *Ibid.*, at 17.
64. *Ibid*.
65. *Ibid.*, at 18.
66. *Ibid.*, at 18, 27–31.
67. *Ibid.*, at 39.
68. *Ibid.*, at 18.
69. *Ibid*.
70. *Ibid*.
71. *Ibid.*, at 11.
72. *Ibid*.
73. *Ibid*.
74. *Ibid*.
75. *Ibid*.
76. *Ibid.*, at 12.
77. *Ibid*.
78. SEM-04-005 (*Coal-Fired Power Plants*) Article 15(1) Notification to Council that Development of a Factual Record Is Warranted, Commission for Environmental Cooperation (5 December 2005) ("Notification"), at 8–13, *available at:* <http://www.cec.org/Storage/75/6868_04-5-ADV_en.pdf> (last visited 23 October 2012).
79. Response, *supra* note 4, at 1.
80. *Ibid.*, at 3.
81. *Ibid.*, at 3–5.

82. *Ibid.*, at 29–30.
83. *Ibid.*, at 21.
84. *Ibid.*, at 23.
85. *Ibid.,* at 3.
86. *Ibid*., at 22; *see also* 17–20. The CAIR and CAMR were issued by the US EPA on 10 March 2005 and 15 March 2005, respectively. *See also* US EPA Mercury and Toxics Standards, Regulatory Actions, *available at:* http://www.epa.gov/mats/actions.html (last visited 23 October 2013). On 16 March 2011, the US EPA proposed a rule, the Final Mercury and Air Toxics Standards (MATS), which would reduce emissions from new and existing coal- and oil-fired power plants. This rule replaced the court-vacated CAMR and was finalized on 21 December 2011. *See also* US EPA Clean Air Interstate Rule (CAIR), *available at:* http://www.epa.gov/cair/, (last visited 23 October 2013). On 10 January 2012, the US EPA restored 2012 allowances to all State accounts. The United States Court of Appeals for the DC Circuit vacated the rule, the Cross-State Air Pollution Rule (CSAPR), that the EPA had promulgated to replace CAIR. The court also ordered EPA to continue administering CAIR pending development of a valid replacement. On June 24, 2013, however, the U.S. Supreme Court granted certiorari to review the U.S. Court of Appeals of the D.C. Circuit's decision to strike-down CSAPR (EPA v. EME Homer City Generation, U.S., No. 12-1182, cert granted 6/24/13; American Lung Ass'n v. EME Homer City Generation, U.S., No. 12-1183, cert granted 6/24/13).
87. *Ibid.*, at 20.
88. *Ibid.*, at 24.
89. US EPA's 1985 implementing regulations define TMDL as "the sum of the 'wasteload allocations' assigned to point sources, the 'load allocations' assigned to nonpoint sources…, and a margin of safety;" that is, "a TMDL identifies the maximum amount of a pollutant that can be present in a waterbody and still attain State water quality standards (the 'loading capacity')." Response, *supra* note 4, at 31.
90. *Ibid*.
91. *Ibid*.
92. *Ibid*.
93. *Ibid*., at 37.
94. *Ibid*., at 38.
95. *Ibid*.
96. *Ibid*.
97. *Ibid*.
98. *Ibid.*, at 32 (citing *Pronsolino v. Nastri*, 291 F.3d 1123, 1129 (9th Cir. 2002)).
99. Response, *supra* note 4, at 24; *see also* at 32 (If a source of pollutants is a nonpoint source, that source is not subject to regulation under the NPDES program, [and] the existence of a TMDL does not provide any additional regulatory authorities").
100. *Ibid.*, at 33. This is the case, according to the US EPA, because while the CWA establishes the NPDES permitting program to govern wasteload allocations for point sources, it has no corresponding program for load allocations from nonpoint sources.
101. *Ibid*., at 33–34.
102. *Ibid.*, at 44. WQSs consist of three elements: (1) a designated "use" for the water (e.g., fishing, recreation, public water supply, etc.); (2) "criteria" that specify the amounts of various pollutants that may be present in the water without impairing the designated uses; and (3) an antidegradation policy to protect existing uses and high-quality waters. *Ibid*.
103. *Ibid.*, at 45. The federal antidegradation policy is codified at 40 C.F.R. Part 131.12. US EPA is responsible for reviewing State WQSs to ensure that they comply with the federal standard.
104. *Ibid.*, at 45 (noting that such methods are often referred to as "implementation procedures").
105. *Ibid.*, at 47 (citing *American Wildlands v. Browner*, 94 F. Supp. 2d 1150, 1161 (D. Colo. 2000)).
106. Response, *supra* note 4, at 49; *see also* at 28 (stating that "[w]hile nonpoint sources make a significant contribution to water pollution, Congress has chosen in the CWA not to give [US] EPA the power to regulate nonpoint sources" and that "[n]onpoint source controls, if enforceable at all, are enforceable only under State law.").
107. *Ibid.,* at 52.
108. *Ibid.*, at 52–53.
109. *Ibid.*, at 54.
110. *Ibid.* at 56.
111. *Ibid.*, at 56–58.
112. *Ibid.*, at 24.

113. *Ibid*., at 58.
114. *Ibid*., at 59.
115. *Ibid*., at 60.
116. *Ibid.*, at 5–6.
117. *Ibid.*, at 9, 56, 67.
118. *Ibid.*, at 63–65.
119. *Ibid*.
120. *Ibid.,* at 69–73.
121. *Ibid.,* at 69.
122. *Ibid.*, at 73–75.
123. *See* Supplemental Response from the Government of the United States of America regarding the Submission on Enforcement Matters 04-005 ("Supplemental Response"), *available at:* http://www.cec.org/Storage/86/8197_04-5-supp_RSP_EN.pdf (last visited 23 October 2013).
124. *Ibid*., at 2.
125. Response, *supra* note 4, at 73.
126. *See* Notification, *supra* note 78, at 29.
127. *Ibid*.
128. *Ibid.,* at 14.
129. Appendix 12, *supra* note 16 at 10.
130. FOIA, *supra* note 13.
131. Letter from Commission for Environmental Cooperation, sent to Michigan Department of Environmental Quality, re: FOIA Request (10 Feb. 2011) (on file with the Secretariat).
132. *See* Appendix 12, *supra* note 16.
133. Biographies of both technical experts may be found online at: http://www.briloon.org/about-bri/the-people-of-bri/staff (last visited 23 October 2013).
134. A biography of Professor Craig may be found online at: http://www.law.fsu.edu/faculty/rcraig.html (last visited 23 October 2013).
135. The Secretariat would like to thank its former legal interns Mark Silberstein, Esq., Leslie Welts, Esq., and Christopher Gutschenritter, Esq., for their valuable contributions toward the development of this factual record. Mr. Gutschenritter also provided valuable work as a consultant to the Secretariat after completion of his internship.
136. Federal Water Pollution Control Act, 33 U.S.C. §§1251 *et seq*. (1972) ("Clean Water Act" or "CWA").
137. 33 U.S.C. §1251(a).
138. 33 U.S.C. §407. The Refuse Act §13 prohibits throwing, discharging, or depositing "refuse matter of any kind" into "any navigable water of the United States." *Ibid.*
139. Federal Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155 (30 June 1948) ("FWCPA").
140. Robin Kundis Craig, *Environmental Law in Context* (2d ed. 2008), at 676, 771–2.
141. Pub. L. No. 92-500, 86 Stat. 816 (18 Oct. 1972).
142. Clean Water Act Amendments of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (27 Dec. 1977).
143. *Ibid. See also* US EPA, History of the Clean Water Act, *available at:* http://www.epa.gov/lawsregs/laws/cwahistory.html (last visited 23 October 2013).
144. *Ibid*. The term "point source" is defined in the CWA to mean, "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture." 33 U.S.C. §1362(14).
145. 33 U.S.C. §1319.
146. 33 U.S.C. §1342.
147. 33 U.S.C. §1344. The Section 404 "dredge and fill" permit program is mentioned for purposes of completeness and overview; however, the Section 402 National Pollution Discharge Elimination System (NPDES) permit program remains the primary program relevant to the factual record and is discussed at length in section 6.2.
148. The US EPA administers the NPDES permitting program and the Corps administers the dredge and fill permits. *See* Lynn M. Gallagher, *Clean Water Handbook* (Government Institutes 3d ed. 2003).
149. Craig, *supra* note 140, at 771.

150. 33 U.S.C. §1251(b).
151. *Ibid*. "The structure of the Clean Water Act (even more than the Clean Air Act) is a structure of *cooperative federalism*, where the state and federal governments each have distinct and important roles to play." Craig, *supra* note 140, at 677; *See also* Response, *supra* note 4, at 27.
152. *Arkansas v. Oklahoma*, 503 U.S. 91, 107 (1992).
153. 33 U.S.C. §1342(d)(4).
154. 33 U.S.C. §1342(d)(1), (4).
155. 33 U.S.C. §1342(d)(4).
156. 33 U.S.C. §1342(c)(3). Significantly, the CWA leaves the decisions of when to object at the discretion of the US EPA, but such details are generally addressed in a memorandum of agreement with each State at the time the US EPA delegates its NPDES permitting authority. 40 C.F.R. §123.24(d).
157. 33 U.S.C. §1342(a)(1), 1311(b)(1)(C); 40 C.F.R. §122.44(a), (d)(1).
158. 33 U.S.C. §1313(a), (c).
159. 33 U.S.C. §1329(b).
160. *See Oregon Natural Resources Council v. U.S. Forest Service*, 834 F.2d 842, 849 (9th Cir. 1987) (stating, "Nonpoint source pollution is not specifically defined in the [Clean Water Act], but is pollution that does not result from the 'discharge' or 'addition' or pollutants from a point source.").
161. *See Pronsolino v. Nastri*, 291 F.3d 1123, 1128 (9th Cir., 2002).
162. *Ibid*.
163. 40 C.F.R. §131.3 (b). For example, if a waterbody is being used for swimming and fishing prior to 28 November 1975, the State will embrace swimming and fishing as designated uses for that waterbody. Submission, *supra* note 2, at 9.
164. Water quality standards can be set using a numeric standard (such as pH, toxics, temperature, and nutrients) or a narrative standard (such as "No discharges of toxic pollutants in toxic amounts."). 33 U.S.C. §1313(c)(2)(B); *see also*: 40 C.F.R. §131.3(b), and §131.11(b); and *Natural Resources Defense Council, Inc. v. U.S. E.P.A.*, 16 F.3d 1395. 1400 (4th Cir. 1993).
165. 33 U.S.C. §1314.
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167. 33 U.S.C. §1313(d)(1)(A). 40 C.F.R. §130.7(b).
168. *Ibid.*
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170. 33 U.S.C. §1313(d). The TMDL program is further discussed below, in section 6.2.3.
171. Response, *supra* note 4, at 26.
172. 33 U.S.C. §1313(C); 40 C.F.R. §131.6, 131.12.
173. *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 718 (1994) (holding that States must implement their antidegradation policy in a manner "consistent" with existing uses of a stream, and thus can prohibit reductions in stream flows in order to protect existing fish populations).
174. US EPA, Office of Water, Overview of Impaired Waters and Total Maximum Daily Loads Program, *available at*: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm (last visited 23 October 2013).
175. *Ibid*.
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186. Oliver A. Houck, The Clean Water Act TMDL Program: Law, Policy, and Implementation (2d ed. 2002), at 60. *See also Water: Total Maximum Daily Loads (303d), EPA Guidance*, US EPA, *available at:* http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/guidance.cfm (last visited 23 October 2013).

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200. 33 U.S.C. §1313(e)(1) and (3).
201. 33 U.S.C. §1313(e)(2).
202. 33 U.S.C. §1313(e)(3).
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204. 33 U.S.C. §1329(h).
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206. Office of Wastewater Management, US EPA, National Pollution Discharge Elimination System (EPA NPDES), *available at:* http://cfpub2.epa.gov/npdes/index.cfm (last visited 23 October 2013).
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214. The US EPA and the Army Corps have issued broad regulations regarding the scope of the CWA's "waters of the United States." 33 C.F.R. §328.3(a) (Army Corps); 40 C.F.R. §230.3(s) (EPA). The US Supreme Court has partially invalidated these regulations, in *Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (concluding that CWA jurisdiction did not extend to isolated waters and invalidating the Migratory Bird Rule), and arguably in *Rapanos v. United States*, 547 U.S. 715 (2006) (issuing a plurality decision that questioned which non-navigable-in-fact waters were included), as well.
215. *See Rapanos,* 547 U.S., *supra* note 214, at 730; *see also* Office of Water, US EPA, Clean Water Act Jurisdiction at 2 (December 2, 2008), *available at*: http://www.epa.gov/owow/wetlands/pdf/RapanosGuidance6507.pdf (last visited 23 October 2013) (Clean Water Act Jurisdiction").
216. A plurality opinion is an opinion not receiving the assent of the majority of the Court. A concurring opinion may support either a majority opinion or an plurality opinion, but may include a differing rationale. The efficacy of a plurality opinion is debated, but generally interpreted on its narrowest grounds possible. *See Marks v. United States,* 430 U.S. 188 (1977) at 193 (explaining: [w]hen a fragmented Court decides a case and no single rationale explaining the result enjoys the assent of five Justices, the holding of the Court may be viewed as that position taken by those Members who concurred in the judgments on the narrowest grounds").
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227. *See generally*, Northeast Ohio Regional Sewer Dist. v. U.S. E.P.A., 411 F.3d 726, 730 (6th Cir., 2005); Piney Run Preservation Ass'n v. County Com'rs of Carroll County, MD, 268 F.3d 255, 268 (4th Cir., 2001).
228. Water Permitting 101, *supra* note 209, at 6–7.
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233. *See* NPDES Permit Program Basics, Frequently Asked Questions, *supra* note 210.
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235. *Ibid.* Permitting authorities generally start limiting effluents by setting technology-based effluent limitations and if there is reasonable potential that the water quality standards will be violated, permitting authorities must develop water quality–based effluent limitations for that NPDES permit.
236. Toxics Release Inventory (TRI) Program, US EPA, ("TRI Program"), *available at:* http://www.epa.gov/tri/ (last visited 23 October 2013).
237. 42 U.S.C. §11001 *et seq.*
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241. 42 U.S.C. §11023(a). EPCRA's three remaining components are (1) emergency planning; (2) emergency release notification; and (3) community right-to-know reporting. Adams et al., *supra* note 239, at 481.
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455. The Memorandum of Agreement must include: provisions for transferring pending permit applications, provisions specifying categories of permit applications that the State will send to the Regional Administrator for review, provisions specifying the frequency and content of reports, documents and other information which the State is required to submit to the US EPA, provisions on the State's compliance monitoring and enforcement program, provisions for joint processing of permits by the State and EPA when appropriate, and provisions for modifying the Memorandum of Agreement. 40 C.F.R. §123.24(b).
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463. 40 C.F.R. §123.25(a). As a matter of US law, a State may enact regulations that are more stringent than federal law requires, but may not enact regulations that are less stringent than federal law requires.
464. 40 C.F.R. §122.
465. 40 C.F.R. §122.2.
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468. *Ibid.* Under this section, neither mercury nor methylmercury are within the definition of "hazardous pollutants." *See also* 40 C.F.R. §116.
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472. 40 C.F.R. 122, App. D, Table III (1996).
473. 40 C.F.R. §401.15(45).
474. 40 C.F.R. §122.4.
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476. *Ibid*., at (a)(2).

477. *Ibid.* Specifically, applicants must provide the following information: the activities which would require an NPDES permit, contact information for the facility, information on the activities of the facility itself, information on other permits held/required by the facility and its operations, and a map of the facility.
478 40 C.F.R. §122.21(g)(1) (defining "outfall location" as: "the latitude and longitude to the nearest 15 seconds and the name of the receiving water").
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480. *Ibid.*
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485. 40 C.F.R. §125.3.
486. *Ibid.*
487. 40 C.F.R. 125.3(c)(2).
488. 47 Fed. Reg. 52,290 (19 Nov. 1982), codified at 40 C.F.R. Part 423.
489. 40 C.F.R. §423.13 (BAT-based effluent limitations); 40 C.F.R. §423.15 (new source performance standards).
490. *Ibid.*
491. Office of Water, US EPA, State Program Status, *available at:* http://cfpub.epa.gov/npdes/statestats.cfm (last visited 23 October 2013). The relevant permitting authority may determine whether the point source discharges have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standards by assessing the following factors: (1) the kind of water quality standards the State currently has in place for the water segment at issue, (2) the pollutant at issue, and (3) the specific "reasonable potential" determination methodologies the EPA may have approved for that State in the course of approving the State's NPDES permitting program.
492. 40 C.F.R. §122.44. *See also* 40 C.F.R. 122.41(a). Water quality criteria can be established by narrative statements representing a quality of water that supports a particular designated use (e.g., "No discharges of toxic pollutants in toxic amounts.") or by numeric pollutant concentration levels (e.g., 1.3 parts-per-billion). *Natural Resources Defense Council, Inc. v. U.S. E.P.A.*, 16 F.3d 1395, 1400 (4th Cir. 1993).
493. 40 C.F.R. §122.44.
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496. *Ibid.*
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502. 40 C.F.R. §124.10
503. *Ibid*.
504. 40 C.F.R. §124.11
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508. Ala. Admin. Code r. 335-6-6.02 (2008).
509. *Ibid.* Compare 33 U.S.C. §1362(13) (originating this definition).
510. *Ibid*.
511. ADEM Water Quality Criteria, Ala. Admin. Code r. 335-6-10, Table I (2008) (Water Quality Criteria").
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514. Ala. Admin. Code r. 335-6-6.08 (2008).

515. Ala. Admin. Code r. 335-6-6.12 (2008).
516. *Ibid.*
517. Ala. Admin. Code r. 335-6-6.14 (2008).
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525. *Ibid*.
526. 35 Ill. Admin. Code §309.105 (2010).
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528. 35 Ill. Admin. Code §309.113 (2010).
529. 35 Ill. Admin. Code §309.141 (2010).
530. 35 Ill. Admin. Code §309.143 (2010).
531. *Ibid*.
532. 35 Ill. Admin. Code §309.146 (2010).
533. *See* 35 Ill. Admin. Code §304.126 (2010).
534. *Ibid*.
535. *Ibid*.
536. *See* 35 Ill. Admin. Code §304.103 (2010).
537. 327 Ind. Admin. Code 5-2-3 (2009).
538. 327 Ind. Admin. Code 5-2-2 (2009).
539. IC 13-11-2-265 (2010). Defining "waters" as "1) the accumulations of water, surface and underground, natural and artificial, public and private; or 2) a part of the accumulations of water, that are wholly or partially within, flow through, or border upon Indiana. b) The term "waters" does not include: 1) an exempt isolated wetland; 2) a private pond; or 3) an off stream pond, reservoir, wetland, or other facility built for reduction or control of pollution or cooling of water before discharge. c) The term includes all waters of the United States, as defined in Section 502(7) of the Federal Clean Water Act (33 U.S.C. s. 1362(7)), that are located in Indiana."
540. 327 Ind. Admin. Code 5-1.5-40 (2009).
541. 327 Ind. Admin. Code 5-2-3 (2009).
542. 327 Ind. Admin. Code 5-2-4 (2009).
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546. 327 Ind. Admin. Code 5-3.5-2 (2009).
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548. *Ibid*.
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555. *Ibid*.
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562. 401 Ky. Admin. Regs. 5:080 (2008).
563. *Ibid*.
564. *See* generally, Letter from Joseph M. Lovett, Executive Director, Appalachian Center for the Economy and the Environment, Margaret C. Janes, Senior Policy Analyst, Appalachian Center for the Economy and the Environment, Jim Hecker, Environmental Enforcement Director, Public Justice, and Aaron Isherwood, Senior Staff Attorney, Sierra Club Environmental Law Program, to Hon. Lisa Jackson, Administrator, Environmental Protection Agency (15 March 2010) (on file with the Secretariat) (Petition"). *See also* Guidance Memorandum from Peter Silva, Assistant Administrator for Water, US EPA, and Cynthia Giles, Assistant Administrator for Enforcement and Compliance Assurance, US EPA, to Shawn Garvin, Regional Administrator, US EPA Region 3, A. Stanley Meiburg, Acting Regional Administrator, US EPA Region 4, and Bharat Mathur, Acting Regional Administrator, US EPA Region 5 (1 April 2010) (Guidance Memorandum") (on file with the Secretariat).
565. This guidance was challenged and a District Court judge held that EPA's interpretation was inconsistent with the CWA and implementing regulations. *See* Natl Mining Assn. v. EPA, 880 F. Supp. 2d 119 (D.D.C. July 13, 2012). This decision is currently being appealed.
566. Council Resolution 08-03, *supra* note 12, at 2, Question 1.
567. Guidance Memorandum, *supra* note 564, at 8.
568. *Ibid*.
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570. *Ibid.*, at 2.
571. *Ibid*.
572. Mich. Admin. Code r. 323.2104 (j) (2008).
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579. *See* Mercury Permitting Strategy: Applicable Rules and Regulations, Michigan Department of Environmental Quality ("MI Mercury Permitting Strategy"), *available at:* http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3713-96752--,00.html (last visited 23 October 2013).
580. *Ibid*. (Listing Michigan's "Mercury Multiple Discharger Variance," "Mercury Permitting Strategy," "Calculation of Level Currently Available (LCA) for Mercury in Proposed NPDES Permits," "Mercury Pollutant Minimization Program (PMP) Guidance," "Procedure for Reviewing Pollutant Minimization Programs (PMP)," etc.).
581. *See* MI Mercury Permitting Strategy, *supra* note 579.
582. N.C. Gen. Stat. §143-215.1 (2009).
583. *Ibid*.
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585. 15A N.C. Admin. Code 2B.0214(3)(b)(i)(I) (2009). *See also* 15A N.C. Admin. Code 2B.0215(I) (2009).
586. 15A N.C. Admin. Code 2B.0224 (2009).
587. 15A N.C. Admin. Code 2B.0225 (2009).
588. 15A N.C. Admin. Code 2B.0503(24) (2009). *See also* 33 U.S.C. §1362(13) (originating this regulatory definition).
589. 15A N.C. Admin. Code 2B.0505 (2009).
590. 15A N.C. Admin. Code 2B.0508 (2009).
591. *Ibid*.
592. 15A N.C. Admin. Code 2H.0105 (2009).
593. *Ibid*.
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595. 15A N.C. Admin. Code 2H.0108 (2009).
596. *Ibid*.
597. 15A N.C. Admin. Code 2H.0112 (2009); 15A N.C. Admin. Code 2H.0118 (2009).
598. Ohio Rev. Code Ann. §6111.01(A), (D) (2010); Ohio Admin. Code §3745-33-01 (2009).
599. Ohio Admin. Code §3745-33-02 (2009).
600. Ohio Admin. Code §3745-33-03 (2009).
601. Ohio Admin. Code §3745-33-04 (2009).
602. *Ibid*.
603. *Ibid.*
604. *Ibid.*
605. Ohio Admin. Code §3745-33-05(A) (2009).
606. *Ibid*.
607. *Ibid.*, at A(3).
608. Ohio Admin. Code §3745-33-07 (2009).
609. Ohio Admin. Code §3745-33-01(HH) (2009). For the purposes of NPDES permitting in Ohio, "reasonable potential" is defined as "the likelihood of a pollutant to cause or contribute to an excursion of water quality standards."
610. Ohio Admin. Code §3745-33-07 (2009).
611. Ohio Admin. Code §3745-33-01(HH)(1)-(5) (2009).
612. *Ibid*.
613. *Ibid*.
614. Ohio Admin. Code §3745-2-04 (2009).
615. 25 Pa. Code §92.3 (2010).
616. 25 Pa. Code §92.13 (2010).
617. 25 Pa. Code §92.21 (2010).
618. *Ibid*.
619. 25 Pa. Code §92.31 (2010).
620. 25 Pa. Code §92.51 (2010).
621. 25 Pa. Code §92.2 (2010); 25 Pa. Code §92.2b (2010).
622. 25 Pa. Code §92.1 (2010). *See also* 33 U.S.C. §1362(13) (originating this regulatory definition).
623. 25 Pa. Code §93.8c (2010).
624. *See generally*, Monitoring Pollutants in Rain, *available at:* http://www.dep.state.pa.us/dep/deputate/airwaste/aq/acidrain/acidrain.htm (last visited 23 October 2013) (describing the evolution of PADEP monitoring systems in conjunction with Pennsylvania State University).
625. 30 Tex. Admin. Code §279.4 (2010).
626. Texas Commission on Environmental Quality, Water Quality Division, *Procedures to Implement the Texas Surface Water Quality Standards* (January 2003), at 5, *available at:* http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-194.html (last visited 23 October 2013).
627. *Ibid*.
628. 30 Tex. Admin. Code §281.21 (e) (2010).
629. 30 Tex. Admin. Code §281.25 (2010).
630. 30 Tex. Admin. Code §279.5 (2010).
631. 30 Tex. Admin. Code §305p (2010).
632. Procedures to Implement the Texas Surface Water Quality Standards, supra note 626, at 24.
633. *Ibid.*, at 27.
634. *Ibid.* at 51.
635. *Ibid*. at 101.
636. W. Va. Code §22-11-3(17) (2009).
637. W. Va. Code §22-11-5 (13) (2009).
638. W. Va. Code §22-11-6 (2009).

639. W. Va. Code §22-11-8 (2009).
640. W. Va. Code R. §47-5A-3 (2009).
641. W. Va. Code R. §47-5A-4 (2009).
642. W. Va. Code R. §47-10-2(2.13) (2009).
643. W. Va. Code R. §47-10-2(2.37) (2009). *See also* 33 U.S.C. §1362(14) (originating this regulatory definition).
644. W. Va. Code R. §47-10-2(2.56) (2009).
645. W. Va. Code R. § 47-10-3 (2009).
646. W. Va. Code R. §47-10-5 (2009).
647. W. Va. Code R. §47-10-6 (2009).
648. W. Va. Code R. §§47-10-7–47-10-8 (2009).
649. W. Va. Code R. §47-10-9 (2009).
650. 5 U.S.C. §552 (1996).
651. *Source:* Supplemental Information to Submission on Enforcement Matters 04-005 (*Coal-fired Power Plants*), Appendix 12D, Waterkeeper Alliance, and Sierra Legal Defence Fund et al., (filed with the Secretariat on 18 Jan. 2005) ("Appendix 12D"). This table was modified pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
652. 2002 TRI reports, *supra* note 522.
653. Widows Creek Generating Station NPDES Permit No. AL0003875, Alabama Department of Environmental Management (2005).
654. *See* Council Resolution 08-03, *supra* note 12.
655. Charles R. Lowman Generating Station NPDES Permit No. AL0003671, Alabama Department of Environmental Management (2005).
656. *Source:* Appendix 12D, *supra* note 651. This table was modified pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
657. 2002 TRI reports, *supra* note 522.
658. Powerton Generating Station NPDES Permit No. IL0002232, Illinois Environmental Protection Agency, Public Notice No. JAN :05062801 (17 Aug. 2005), submitted with Letter from Janet Christer, FOIA Coordinator, Bureau of Water, Illinois Environmental Protection Agency, to the Secretariat of the Commission for Environmental Cooperation (7 February 2011).
659. *Ibid*.
660. Joliet 29 Generating Station Units 7 & 8 NPDES Permit No. IL0064254, Illinois Environmental Protection Agency (15 Nov. 1995).
661. *Ibid*; *see also* Joliet 29 Generating Station Units 7 & 8 NPDES Public Notice/Fact Sheet Permit No. IL0064254 (4 Oct. 1995).
662. Illinois Environmental Protection Agency, Bureau of Water, Watershed Management Section, Planning Unit, Illinois Section 303(d) List Pt. 1 (2004) at A-28, A-19, A-26, A-40, A15, A-36 (Illinois 303(d) List Part 1").
663. *Ibid*.
664. *Ibid*.
665. Waukegan Electric Station NPDES Permit No. IL0002259, Illinois Environmental Protection Agency (2000).
666. *Ibid.* at 1.
667. *See* Illinois 303(d) List Part 1, *supra* note 662, at A-57.
668. *See generally*, *Results of the Lake Michigan Mass Balance Study: Mercury Data Report*, US EPA 905 R-01-012 (February 2004), *available at:* http://www.epa.gov/glnpo/lmmb/results/mercury/lmmbhg.pdf (last visited 23 October 2013).
669. *Ibid*.
670. *See generally*, Waukegan Generating Station Permit No. IL0002259, *supra* note 665.
671. Kincaid Generating Station NPDES Permit No. IL0002241, Illinois Environmental Protection Agency (2000).
672. *Ibid*.
673. Illinois 303(d) List Part 1*,* supra note 662, at A-50 (2004).
674. *Ibid*.
675. *Ibid*.
676. 35 Ill. Admin. Code §309.146 (2010).
677. *See* Kincaid Permit, *supra* note 671, at Attachment H.

678. *Ibid.*, at Condition (25).
679. Joliet 9 Generating Station (Unit 6) NPDES Permit No. IL0002216, Illinois Environmental Protection Agency (1996).
680. *Ibid*.
681. *Ibid*. For discussion of the Des Plaines River, *see* Illinois 303(d) List Part 1 *supra* note 662, and surrounding discussion (discussing IEPA's 303(d) listing of the Des Plaines River due, in part, to mercury).
682. Joliet 29 Permit*, supra* note 679, at Attachment H, Standard Condition 25.
683. Council Resolution 08-03, *supra* note 12.
684. Compare Council Resolution 08-03, *ibid*., and US EPA, 2002 TRI reports, *supra* note 522.
685. *See North American Power Plant Air Emissions*, Commission for Environmental Cooperation (2005), Table 3.9 (listing mercury discharges to air for the following Indiana coal-fired power plant facilities: Rockport, Clifty Creek, Petersburg, Warrick, R. Gallagher, Cayuga, Wabash, Michigan City, Merom, State Line Generating, Frank E. Ratss, Bailly, Eagle Valley (H.T. Pritchard), and F.B. Culley).
686. *Source*: Appendix 12D, *supra* note 651. This table was modified pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
687. 2002 TRI reports, supra note 522.
688. NIPSCO R.M. Schahfer Gen. Station Water Discharge Permits (PCS), US EPA, *available at:* http://goo.gl/62pb74 (last visited 23 October 2013).
689. *Ibid*.
690. *Ibid*.
691. Source: Appendix 12D, *supra* note 651. This table was modified pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
692. 2002 TRI reports, *supra* note 522.
693. H.L. Spurlock Power Station KPDES Permit No. KY0022250, Kentucky Department for Environmental Protection (2000) (H.L. Spurlock Permit").
694. H.L. Spurlock Power Station KPDES Permit No. KY0022250 Fact Sheet, Kentucky Department for Environmental Protection (2000) (H.L. Spurlock Permit Fact Sheet"), at 2.
695. *See* generally, H.L. Spurlock Permit *supra* notes 693, and H.L. Spurlock Permit Fact Sheet, *supra* note 694.
696. *Ibid*.
697. *Ibid*. (Indicating Receiving Water Name, Stream Segment Use Classifications, and Water Quality Limited or Effluent Limited Status. A designation of Water Quality Limited indicates that the receiving waters are to be listed on the State's 303(d) Impaired Waters List; the Ohio river is included on the 2000 303(d) Impaired Waters List for PCBs [polychlorinated biphenyls] and chlordane contamination.)
698. *See* H.L. Spurlock Permit Fact Sheet, *supra* note 694, at I-1.
699. *Ibid*., at 3, 14, 18, 20, 22.
700. KPDES Permit Conditions, 401 KAR 5:065(2)(8) (2000) (Referencing 40 C.F.R. 136—Guidelines Establishing Test Procedures for the Analysis of Pollutants).
701. *See* H.L. Spurlock Permit Fact Sheet, *supra* note 694, at 3.
702. *Ibid*.
703. *Ibid.,* at 6, 9.
704. *Ibid*.
705. *Ibid.*, at 8 (noting that 401 KAR 5:065 Sections 4 and 5 are statutory references to 40 C.F.R. 122.44 and 122.45, thereby maintaining federal effluent limitation standards).
706. Mill Creek Generating Station KPDES Permit No. KY0003221, Kentucky Department for Environmental Protection (2002) (modified in 2004).
707. *Ibid*.
708. *Ibid*.
709. *Ibid*.
710. Mill Creek Generating Station KPDES Permit No. KY0003221, Kentucky Department for Environmental Protection (2002) (modified in 2004).
711. Mill Creek Generating Station KPDES Modified Permit No. KY0003221, Kentucky Department for Environmental Protection (2004) (Modified Permit").
712. *See ibid*., as provided by KDEP to the CEC. (Available in hard copy with the Secretariat).

713. Modified Permit*, supra* note 711.
714. *Ibid*.
715. Elmer Smith Station KPDES Permit No. KY0001295, Kentucky Department for Environmental Protection (1996).
716. *Ibid*.
717. *Ibid*.
718. Kentucky Department for Environmental Protection Final 2004 303(d) Impaired Waters List (2004). On file with the Secretariat.
719. Elmer Smith Station KPDES Permit No. KY0001295 Fact Sheet, Kentucky Department for Environmental Protection (1996).
720. Elmer Smith Station KPDES Permit, s*upra* note 715.
721. *Ibid*.
722. *Ibid*.
723. Elmer Smith Fact Sheet, *supra* note 719.
724. Reid/Henderson/Green Power Plant KPDES Permit No. KY0001929, Kentucky Department of Environmental Management (2004).
725. *Ibid*.
726. *Ibid*., at Cover Sheet.
727. *See ibid*.
728. Reid/Henderson/Green Power Plant KPDES Permit No. KY0001929 Fact Sheet, Kentucky Department of Environmental Management (2004).
729. *Ibid*., at 11.
730. *Ibid*. and compare Reid/Henderson/Green Power Plant KPDES Permit, *supra* note 724.
731. Source: Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
732. 2002 TRI reports, *supra* note 522.
733. Letter from Christopher R. Gutschenritter, Commission for Environmental Cooperation, sent to Michigan Department of Environmental Quality, re FOIA Request (10 Feb. 2011) (on file with the Secretariat).
734. *See ibid.*
735. *Ibid*.
736. DECO-Belle River Plant NPDES Permit No. MI0038172, Michigan Department of Environmental Conservation (2004), at 2.
737. *See generally, ibid.*
738. *Ibid*.
739. DECO-St. Clair Plant NPDES Permit No. MI0001686, Michigan Department of Environmental Conservation (2004), at pt. 1(A).
740. DECO-B C Cobb Plant NPDES Permit No. MI0001520, Michigan Department of Environmental Conservation (2003), at pt. 1.
741. *Ibid*.
742. Source: Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
743. 2002 TRI reports, *supra* note 522.
744. Roxboro Steam Electric Plant NPDES Permit No. NC0003425 Permit Modification, North Carolina Department of Environment and Natural Resources, Division of Water Quality (2005).
745. *Ibid*., at 3.
746. *Ibid*., at 7.
747. Roxboro Steam Electric Plant NPDES Permit No. NC0003425 Fact Sheet, North Carolina Department of Environment and Natural Resources, Division of Water (2002).
748. *Ibid.*, at 2.
749. *Ibid*.
750. *See ibid*. The Fact Sheet indicates that only Beryllium was found to be discharged such that an excursion above water quality standards may occur.
751. Belews Creek Steam Station NPDES Permit No. NC0024406 Permit Modification, North Carolina Department of Environment and Natural Resources, Division of Water (2005).
752. *Ibid*., at Part 1(2) and Part 1(3).

753. Marshall Steam Station NPDES Permit No. NC0004978 Permit Modification, North Carolina Department of Environment and Natural Resources (2005).
754. Marshall Steam Station NPDES Permit No. NC0004978 Fact Sheet, North Carolina Department of Environmental and Natural Resources (2005).
755. *Ibid*.
756. *Ibid*.
757. CP&L Sutton WWTP NPDES Permit No. NC0001422, North Carolina Department of Environment and Natural Resources, Division of Water Quality (2002).
758. *Ibid*., at (A)(12).
759. *See generally, ibid.*
760. Asheville Steam Electric Generating Plant NPDES Permit No. NC0000396 Permit Modification, North Carolina Department of Environment and Natural Resources, Division of Water Quality (2007).
761. *Ibid.,* at cover page.
762. H.F. Lee Steam Electric Plant NPDES Permit No. NC0003417, North Carolina Department of Environment and Natural Resources, Division of Water Quality (2004).
763. *Ibid*; H.F. Lee Steam Electric Plant NPDES Permit No. NC0003417 Fact Sheet, North Carolina Department of Environment and Natural Resources, Division of Water (2004).
764. Riverbend Steam Station NPDES Permit No. NC0004961, North Carolina Department of Environment and Natural Resources, Division of Water (2005); Riverbend Steam Station NPDES Permit No. NC0004961 Fact Sheet, North Carolina Department of Environment and Natural Resources (2005).
765. Cliffside Steam Station NPDES Permit No. NC0005088, North Carolina Department of Environment and Natural Resources, Division of Water (2007); Cliffside Steam Station NPDES Permit No. NC0005088 Fact Sheet, North Carolina Department of Environment and Natural Resources, Division of Water (2007).
766. *Source*: Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
767. 2002 TRI reports, *supra* note 522.
768. General James M. Gavin Plant NPDES Permit No. OH0028762 [Application to Modify Permit], Ohio Environmental Protection Agency (2010); General James M. Gavin Plant NPDES Permit No. OH0028762, Public Notice No. 10-11-070 [Fact Sheet to Application to Modify Permit], Ohio Environmental Protection Agency (2010).
769. Wm. H. Zimmer Generating Station NPDES Permit No. OH0048836, Ohio Environmental Protection Agency (2005); Wm. H. Zimmer Generating Station NPDES Permit No. OH0048836 Fact Sheet, Ohio Environmental Protection Agency (2005).
770. *Source:* Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
771. 2002 TRI reports, *supra* note 522.
772. PennEnvironment Research and Policy Center, *Troubled Waters: An Analysis of Clean Water Act Compliance, July 2003—December 2004* (Mar. 2006), at 63, *available at:* http://cdn.publicinterestnetwork.org/assets/qte-A3iodkyRppAQv-WPzQ/TroubledWaters.pdf (last visited 23 October 2013).
773. *See generally, ibid.*
774. *Source*: Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03 (23 June 2008), for the purposes of this factual record.
775. 2002 TRI reports, *supra* note 522.
776. *Ibid*.
777. TCEQ submission, at 6.
778. TCEQ submission, at 4–5.
779. TCEQ submission, at 5–6.
780. *Source*: Appendix 12D, *supra* note 651. This table was modified by the author pursuant to the scope of Council Resolution 08-03, *supra* note 12, for the purposes of this factual record.
781. 2002 TRI reports, *supra* note 522.
782. Alabama Department of Environmental Management, Final 1996 303(d) List, *available at:* http://adem.alabama.gov/programs/water/wquality/1996AL303dList.pdf (last visited 23 October 2013). These waterways were: Pond Creek; Village Creek; Camp Bridge; Short Creek; Hurricane Creek; Bayview; Coon-Flat Rock Creek; and Mobile Bay.
783. *Ibid*.

784. *Ibid*.

785. *See* Alabama Department of Environmental Management, What is the TMDL development schedule?, *available at:* http://adem.alabama.gov/programs/water/tmdl.cnt (last visited 23 October 2013); Alabama Consent Decree, *infra* note 786.

786. Edward W. Mudd, II et al. v. John Hankinson et al., No. CV-97-S-0714-M, and Alabama Rivers Alliance, Inc. v. John Hankinson et al., No. CV-97-S-2518-M (N.D. Ala. 5 Nov. 1998) (Alabama Consent Decree").

787. *Ibid*.

788. Alabama Department of Environmental Management, Final 1998 303(d) List, *available at:* http://adem.alabama.gov/programs/water/wquality/1998AL303dList.pdf (last visited 23 October 2013).

789. *Ibid*. The waterways were: the Gulf of Mexico and Fish River.

790. Alabama Department of Environmental Management, Final 2000 303(d) List, *available at:* http://adem.alabama.gov/programs/water/wquality/2000AL303dList.pdf (last visited 23 October 2013).

791. *Ibid*. It should be noted that the eight waterways placed on the 303(d) List in 2000 were also identified by the Alabama Department of Health as having fish mercury level rates high enough to warrant public warnings regarding fish consumption from these waterways. *See* data in *ibid*, at pt. 5.

792. *Ibid*. These waterways were: Chickasaw Creek; Mobile River; Bay Minette Creek; Fowl River; Fish River; and the Gulf of Mexico.

793. *Ibid*. These waterways were: Cold Creek Swamp and Olin Basin.

794. *Ibid*.

795. Alabama Department of Environmental Management, Final 2002 303(d) List, *available at:* http://adem.alabama.gov/programs/water/wquality/2002AL303dList.pdf (last visited 23 October 2013).

796. *Ibid*. Those waterways contaminated by unknown sources were: Escatawpa River; Chickasaw Creek; Bay Minette Creek; Tensaw River; Mobile River; Fowl River; Fish River; the Gulf of Mexico; and Styx River. *Ibid*. The two remaining waterways, Olin Basin and Cold Creek Swamp, were impaired due to "contaminated sediment." *Ibid*.

797. Alabama Department of Environmental Management, Final 2002 303(d) Fact Sheet, *available at:* http://adem.alabama.gov/programs/water/wquality/2002AL303dFactSheet.pdf (last visited 23 October 2013).

798. *Ibid*.; Alabama 2002 303(d) List, *supra* note 795.

799. Alabama 2002 303(d) List, *supra* note 795. These waterways were: Valley Creek; Opossum Creek; Escatawpa River; Cold Creek Swamp; Chickasaw Creek; Bay Minette Creek; Tensaw River; Middle River; Mobile River; Fowl River; Fish River; the Gulf of Mexico; Yellow River; Blackwater River; Styx River; Conecuh River; Little Escambia Creek; Big Escambia Creek; Tombigbee River; and Olin Basin. *Ibid*.

800. Alabama 2002 303(d) List Fact Sheet, *supra* note 797

801. *Ibid*.

802. *Ibid*. These waterways were: Cold Creek Swamp and Olin Basin.

803. *Ibid*. This waterway was the Tombigbee River.

804. Alabama 2002 303(d) List Fact Sheet, *supra* note 797; Alabama Department of Environmental Management, Final 2004 303(d) List Fact Sheet, *available at:* http://adem.alabama.gov/programs/water/wquality/2004AL303dFactSheet.pdf (last visited 23 October 2013); Alabama Department of Environmental Management, Final 2006 Fact Sheet, *available at:* http://adem.alabama.gov/programs/water/wquality/2006AL303dFactSheet.pdf (last visited 23 October 2013); Alabama Department of Environmental Management, Final 2002 Fact Sheet, *available at:* http://adem.alabama.gov/programs/water/wquality/2008AL303dList.pdf (last visited 23 October 2013).

805. Illinois Environmental Protection Agency, Bureau of Water, Watershed Management Section, Planning Unit, Illinois Section 303(d) List Pt. 1 (2004).

806. *Ibid*., at Appendix.

807. *Ibid*.

808. *Ibid*.

809. *Ibid*.

810. IDEM Office of Water Quality, Watershed Branch, *Indiana Integrated Water Monitoring and Assessment Report 2004* (2004) (Indiana Integrated Report").

811. *Ibid.*, at Appendix E, E-7.

812. *Ibid*.

813. *Ibid*., at E-8.

814. *Ibid*.

815. *Ibid*.
816. *Ibid*.
817. *Ibid*., at E-9.
818. *Ibid*.
819. Kentucky Department for Environmental Protection, Division of Water, 1990 303(d) List for Kentucky (1990).
820. *Ibid*.
821. Petition, *supra* note 564, at 22.
822. *Ibid*.
823. Kentucky Department for Environmental Protection, Division of Water, Final 303(d) List for Kentucky (1992).
824. Kentucky Department for Environmental Protection, Division of Water, 1998 303(d) List for Kentucky (1998), at 22.
825. *Ibid*.
826. *Ibid*. The identified impaired waterway was Bayou Creek.
827. Kentucky Natural Resources and Environmental Protection Cabinet, Kentucky Division of Water, 2002 303(d) List of Waters for Kentucky (2002).
828. *Ibid.*
829. *Ibid.*
830. *Ibid*. These waterways were: Mill Creek of Salt River; Salt River of Ohio River; Bayou Creek of Ohio River; Buck Creek of Cumberland River; Little River of Cumberland River; West Fork of Clarks River; Rock Creek of South Fork Cumberland River; Ohio River of Mississippi River (2 segments); Herrington Lake; Cave Run Lake; McNeely Lake; Metropolis Lake; Lake Cumberland; Barren River Lake; Green River Lake; Paintsville Reservoir; and Grayson Lake.
831. *Ibid*. These waterways were: Buck Creek of Cumberland River; West Fork of Clarks River; Rock Creek of South Fork Cumberland River; Cave Run Lake; Metropolis Lake; Lake Cumberland; Barren River Lake; Paintsville Reservoir; and Grayson Lake.
832. *See ibid*.
833. Kentucky Natural Resources and Environmental Protection Cabinet, Kentucky Division of Water, 2004 303(d) List of Waters for Kentucky (2004).
834. *Ibid*. These waterways were: Mill Creek of Salt River; Salt River of Ohio River; Bayou Creek of Ohio River; Buck Creek of Cumberland River; Little River of Cumberland River; West Fork of Clarks River (2 segments); Rock Creek of South Fork Cumberland River; Mud River of Green River; Green River of Ohio River; Ohio River (5 segments); Herrington Lake; Guist Creek Lake; Cave Run Lake; McNeely Lake; Metropolis Lake; Lake Cumberland; Barren River Lake Reservoir; Green River Lake; Rough River Lake; Paintsville Reservoir; and Grayson Lake.
835. *Ibid*. These waterways were: Mill Creek of Salt River; Buck Creek of Cumberland River; West Fork of Clarks River (2 segments); Rock Creek of South Fork Cumberland River; Green River of Ohio River; Cave Run Lake; Metropolis Lake; Lake Cumberland; Barren River Lake Reservoir; Rough River Lake; Paintsville Reservoir; and Grayson Lake.
836. *Ibid*.
837. Michigan Department of Environmental Quality, Surface Water Quality Division, Clean Water Act Section 303(d) List (2002) (2002 MI 303(d) List").
838. *Ibid*. These waterways were: Arbutus Lake; Au Sable River; Au Train Lake; Austin Lake; Beuton Lake; Bass Lake; Bear Lake; Beatons Lake; Beaufort Lake; Beaver Lake; Big Bear Lake; Bills Lake; Bishop Lake; Bond Falls Flowage; Burt Lake; Cable Lake; Caribou Lake; Caro Impoundment; Carp Creek; Carp Lake; Cass Lake; Cass River; Chalk Hills Impoundment; Chaney Lake; Chicagon Lake; Clark Lake; Clear Spring Lake; Clinton River; Cold Water Lake (2 segments); Craig Lake; Crooked Lake; Croton Pond; Detroit River; Duck Lake; Echo Lake; Elk Lake; Ellsworth Lake; Escanaba River; Fenner Lake; Fenton Lake; Fish Lake; Forestville Basin; Fortune Lake; Four Mile Lake; Fumee Lake; Goose Lake; Grand River; Grand Sable Lake; Green Bay; Green Lake; Greenwood Reservoir; Gull Lake; Gulliver Lake; Hamilton Lake; Hamlin Lake; Hammell Creek; Heron Lake; Higgins Lake; Hubbard Lake; Intermediate Lake; Jordan Lake; Kalamazoo River; Klinger Lake; Lake Ann; Lake Bellaire; Lake Besser; Lake Emily; Lake Gogebic; Lake Independence; Lake Margrethe; Lake Michigan (2 segments); Lake Mitchell; Lake Nepessing; Lake Orion; Lake Ponemah; Lake St. Clair; Lake Superior; Lakeville Lake; Langford Lake; Lilly Lake; Lincoln Lake; Little Bay De Noc; Littlefield Lake; Long Lake; Lower Trout Lake; Maceday Lake; Manistee Lake; Manistique River; Marion Lake; Marten Lake; Menominee River; Michigamme River; Milakokia Lake; Millecoquins Lake; Mona Lake; Moores Park Impoundment; Mullett Lake; Muskegon Lake; Nawakwa Lake; Net River; Nettie Lake; Orchard Lake; Ottawa Lake; Otter Lake; Paint River Pond; Perch Lake; Pere Marquette River; Pickerel Lake; Pike Lake; Pine Lake (2 segments); Pomeroy Lake; Portage Lake (2 segments); Rainbow Lake; Randall Lake; Reeds Lake; Rice Lake; Rifer Lake; River Raisin; Round Lake (2 segments); Runkle Lake; Saginow Bay; Saginow River; Sanford Lake; Schweitzer Reservoir;

Second Sister Lake; Selkirk Lake; Shiawasee River; Siskiwit Lake; Six Mile Lake; South Lake; St. Clair River; St. Joseph River; St. Mary's River; Stony Creek Impoundment; Sunset Lake; Thousand Island Lake; Todd Lake; Unnamed Lake (2 segments); Vandercook Lake; Vermilac Lake; Victoria Reservoir; Wabasis Lake; Walled Lake; Wamplus Lake; West Branch Lakes; and White Lake.

839. *Ibid*. These waterways were: Au Sable River; Beuton Lake; Bear Lake; Caro Impoundment; Carp Creek; Cass Lake; Cass River; Chaney Lake; Clear Spring Lake; Detroit River; Elk Lake; Goose Lake; Green Bay; Greenwood Reservoir; Gull Lake; Higgins Lake; Lake Michigan (2 segments); Lake Nepessing; Lake Orion; Lake St. Clair; Lake Superior; Langford Lake; Little Bay De Noc; Maceday Lake; Manistee Lake; Manistique Lake; Menominee River; Michigamme River; Mona Lake; Muskegon Lake; Net River; Paint River Pond; Pere Marquette River; Portage Lake; Randall Lake; Reeds Lake; Rifer Lake; Round Lake; Saginow Bay; Selkirk Lake; Siskiwit Lake; St. Clair Reservoir; St. Mary's River; Stony Creek Impoundment; Unnamed Lake (2 segments); Walled Lake; West Branch Lakes; and White Lake.
840. *Ibid*. These waterways were: Clinton River; Detroit River; Escanaba River; Grand River; Hammell Creek; Kalamazoo River; Manistique River; Menominee River; Muskegon Lake; Pere Marquette River; Rifer Lake; River Raisin; Saginaw River; Shiawasee River; and St. Joseph River.
841. Department of Environment and Natural Resources, Division of Water Quality, North Carolina's 1998 303(d) List (1998), at 2.
842. *Ibid*. at 8, 13; Department of Environment and Natural Resources, Division of Water Quality, North Carolina Water Quality Assessment and Impaired Waters List (2002 305(b) and 303(d) Report), at 10 (2002).
843. *Ibid*.
844. *Ibid*. These waterways were: Catawba River; High Shoals Creek; North Harper Creek; Drowning Creek (4 segments); Lumber River (13 segments); Big Swamp (2 segments); Porter Swamp; Ashpole Swamp (2 segments); Waccamaw River (6 segments); Big Creek; White Marsh (3 segments); Pages Lake; Watson Lake; and Phelps Lake.
845. *Ibid*.
846. Department of Environment and Natural Resources, Division of Water Quality, North Carolina's 2000 303(d) List. These waterways were: South River (3 segments); Black River; Bay Tree Lake; the Atlantic Ocean (7 segments); Drowning Creek (4 segments); Lumber River (13 segments); Porter Swamp; Bog Swamp (2 segments); Ashpole Swamp (2 segments); Waccamaw Swamp (6 segments); Big Creek; White Marsh (3 segments); Pit Links Lake; Watsons Lake; Aberdeen Creek; Phelps Lake; and Ledbetter Lake.
847. *Ibid*.
848. *Ibid*.
849. Department of Environment and Natural Resources, Division of Water Quality, North Carolina Water Quality Assessment and Impaired Waters List (2002 305(b) and 303(d) Report) (2002).
850. *Ibid*. These waterways were: the Atlantic Ocean (7 segments); South River (3 segments); Bay Tree Lake; Black River; Chowan River; Drowning Creek (4 segments); Aberdeen Creek; Watsons Lake; Pit Links Lake: Lumber River (15 segments); Porter Swamp; Big Swamp (2 segments); Ashpole Swamp (2 segments); Waccamaw River (5 segments); Big Creek; White Marsh (3 segments); Phelps Lake; Roanoke River (3 segments); Welch Creek; Abermarle Sound; Cashie River (5 segments); New River; Brinson Creek; Northeast Creek; and Ledbetter Lake.
851. *Ibid*.
852. *Ibid*. These waterways were: Chowan River; Roanoke River (3 segments); Welch Creek; Albermarle Sound; and Cashie River.
853. *Ibid*.
854. Department of Environment and Natural Resources, Division of Water Quality, North Carolina Water Quality Assessment and Impaired Waters List (2004 Integrated 305(b) and 303(d) Report) (2004).
855. *Ibid*. These waterways were: the Atlantic Ocean (7 segments); South River (3 segments); Bay Tree Lake; Black River; Chowan River (2 segments); Drowning Creek (4 segments); Aberdeen Creek; Watsons Lake; Pit Links Lake; Lumber River (13 segments); Porter Swamp; Big Swamp (2 segments); Ashpole Swamp (2 segments); Waccamaw River (6 segments); Big Creek; White Marsh (3 segments); Neuse River (2 segments); Phelps Lake; Roanoke River (3 segments); Welch Creek; Albermarle Sound; Cashie River (4 segments); New River; Brinson Creek; Northeast Creek; Pee Dee River; and Hitchcock Creek.
856. *Ibid*. These waters were also contaminated with dioxins: Roanoke River (1 segment); Welch Creek; and Albermarle Sound.
857. *Ibid*.
858. *Ibid*. These waterways were: Chowan River (2 segments); Roanoke River (3 segments); Welch Creek; Albermarle Sound; and Cashie River (4 segments).
859. State of Ohio, Environmental Protection Agency, *Ohio 2002 Integrated Water Quality Monitoring and Assessment Report*, at 10–11, 38 (2002).

860. State of Ohio, Environmental Protection Agency, Ohio 2004 Integrated Water Quality Monitoring and Assessment Report, at 28 (2004).
861. *Ibid*. at 44. These waterways were: Auglaize River; Grand River; New Lyme Lake; E. Br. Black River; Little Miami River (2 segments); Little Scioto River; Vermillion River; Paint Creek; Stillwater River; St. Mary's River; and Symmes Creek.
862. Pennsylvania Department of Environment and Natural Resources, 2004 303(d) Category 5 Waters Requiring TMDLs (2004).
863. *Ibid*.
864. *Ibid*.
865. *Ibid*.
866. *Ibid*.
867. *Ibid*.
868. Texas Commission for Environmental Quality, 1992 303(d) Impaired Waters List (1992).
869. Texas Commission for Environmental Quality, 1994 303(d) Impaired Waters List (1994).
870. Texas Commission for Environmental Quality, 1996 303(d) Impaired Waters List (1996).
871. *See supra* notes 868, 869, 870.
872. *Ibid*.
873. State of Texas 1996 303(d) List (1996), *supra* note 870. These waterways were: Caddo Lake and Sam Rayburn Reservoir.
874. Texas 1998 Clean Water Act 303(d) Impaired Waters List (1998). These waterways were: Caddo Lake; Big Cypress Creek; Toledo Bend River; B.A. Steinhagen Reservoir; Sam Rayburn Reservoir; San Jacinto River Tidal; Lake Houston; Houston Ship Tidal; Houston Ship Channel (2 segments); Lake Conroe; Buffalo Bayou Tidal; Old Brazos River Channel Tidal; Trinity Bay; East Bay; West Bay; Lake Galveston Bay; Lavaca Bay/Chocolate Bay; and Cox Bay.
875. Texas 1999 Clean Water Act 303(d) Impaired Waters List (1999). These waterways were: Caddo Lake; Big Cypress Creek; Toledo Bend River; B.A. Steinhagen Reservoir; Sam Rayburn Reservoir; San Jacinto River Tidal; Lake Houston; Houston Ship Tidal; Houston Ship Channel; Lake Conroe; Buffalo Bayou Tidal; Old Brazos River Channel Tidal; Trinity Bay; East Bay; West Bay; Lake Galveston Bay; Lavaca Bay/Chocolate Bay; Cox Bay; and the portions of the Gulf of Mexico over which Texas exercises jurisdiction.
876. Texas 2002 303(d) Impaired Waters List (2002). These waterways were: Lake Meredith; Caddo Lake; Big Cypress Creek; Black Cypress Creek; Lake Daingerfield; Toledo Bend Reservoir; BA Steinhagen Reservoir; Lake Ratcliff; Lake Kimball; Sam Rayburn Reservoir; Angelina River; Lavaca Bay/Chocolate Bay; and the portions of the Gulf of Mexico over which Texas exercises jurisdiction.
877. Texas 2004 303(d) Impaired Waters List (2004). These waterways were: Lake Meredith; Caddo Lake; Big Cypress Creek; Black Cypress Creek; Lake Daingerfield; Toledo Bend Reservoir; B.A. Steinhagen Reservoir; Lake Ratcliff; Lake Kimball; Sam Rayburn Reservoir; Angelina River; Lavaca Bay/Chocolate Bay; and the portions of the Gulf of Mexico over which Texas exercises jurisdiction.
878. *See* West Virginia Section 303(d) List and Supplements (2004); *available at:* http://www.dep.wv.gov/WWE/watershed/IR/Documents/IR_2004_Documents/WV_2004IR_303(d)_List_and_Supplements_Only.pdf (last visited 23 October 2013).
879. *Ibid*.
880. *Ibid*. These waterways were: Cheat Lake; Dry Fork; Shavers Fork; Shenandoah River; South Fork/South Branch; Kanawha River; Tygart Valley River; Tygart Lake; Summerville Lake; Elk Fork Lake; and Beech Fork Lake.
881. *Ibid*.
882. This section provides factual information responding to question six (6) of Council Resolution 08-03.
883. *See* Guidance for Water Quality-Based Decisions: The TMDL Process, United States Environmental Protection Agency (1991), at 2, available at: http://water.epa.gov/scitech/datait/models/upload/1999_11_05_models_SASD0109.pdf (last visited 23 October 2013).
884. *See* US EPA, New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs), memorandum, United States Environmental Protection Agency (1997), *available at:* http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/ratepace.cfm (last visited 23 October 2013).
885. *Ibid.*; 33 U.S.C. §1313(d).
886. *Ibid*.
887. *Ibid*. 40 C.F.R. §130.7(d)(2).
888. *Ibid*.
889. *Ibid*.
890. Compare *ibid* and Ohio Section 303(d) Impaired Waters Listing, Ohio Environmental Protection Agency (2004).

891. Alabama Consent Decree, *supra* note 786.

892. *Edward W. Mudd, II et al. v. John Hankinson et al.*, No. CV-97-S-0714-M (N.D. Ala. 30 Oct.2009) and *Alabama Rivers Alliance, Inc. v. John Hankinson et al.*, No. CV-97-S-2518-M (N.D. Ala. 30 Oct. 2009) (Order of Dismissal) (Alabama Consent Decree Order of Dismissal").

893. Alabama Consent Decree, *supra* note 786.

894. *Ibid*., at 9.

895. *Ibid*., at 9–10.

896. *See* Approved TMDLs for Alabama Waterbodies, *available at:* http://adem.alabama.gov/programs/water/approvedTMDLs.htm (last visited 23 October 2013).

897. *Ibid*.

898. Illinois Environmental Protection Agency, TMDL Report Status, *available at:* http://www.epa.state.il.us/water/tmdl/report-status.html (last visited 23 October 2013).

899. Illinois Environmental Protection Agency, Bureau of Water, *Big Muddy River/Kincaid Lake TMDL Report* (2004), at 43. The TMDL report went on to explain: "The 'fast track' involves actions that can be implemented immediately, including pollution prevention and the 'virtual elimination' project. The 'science track' includes the study and assessment of the problems and solutions through modeling, monitoring, and emission inventories. The 'virtual elimination' project, a cooperative Canadian-U.S. strategy to virtually eliminate persistent toxic substances in the Great Lakes Basin (the Bi-national Strategy), seeks to achieve quantifiable reduction goals between now and 2005 for specific toxic substances, including mercury (U.S. EPA 2003). Mercury is addressed by U.S. EPA with these strategies; therefore, Illinois EPA does not address it as part of this TMDL."

900. *See* United States Environmental Protection Agency, Region 5, Total Maximum Daily Load (TMDL) Program, *available at:* http://www.epa.gov/r5water/wshednps/watersheds.html - tmdls (last visited 23 October 2013).

901. Indiana Department of Environmental Management, Total Maximum Daily Load for *Escherichia coli* (*E. coli*) for the Flatrock–Haw Creek Watershed (2005).

902. *Ibid*., at 1.

903. Indiana Department of Environmental Management, Total Maximum Daily Load for *Escherichia coli* (*E. coli*) for the St. Joseph River (2004).

904. Indiana Department of Environmental Management, Total Maximum Daily Load for *Escherichia coli* (*E. coli*) for the Middle West Fork White River (2005).

905. *See* Indiana Department of Environmental Management, Indiana TMDL Projects and Reports, *available at:* http://www.in.gov/idem/nps/2652.htm (last visited 23 October 2013).

906. Indiana Integrated Report, *supra* note 810, at Appendix E-7.

907. *See* Kentucky Division of Water, *available at:* http://water.ky.gov/waterquality/Pages/ApprovedTMDLs.aspx (last visited 23 October 2013).

908. Michigan Department of Environmental Quality, Surface Water Quality Division, Total Maximum Daily Load for Mercury for Hammell Creek (2002).

909. *Ibid*., at 1.

910. *Ibid*.

911. *Ibid*., at 1-2.

912. Michigan Department of Environmental Quality, Surface Water Quality Division, Total Maximum Daily Load for *E. coli* for the Detroit River, at 48 (2008).

913. Michigan Department of Environmental Quality, Surface Water Quality Division, Total Maximum Daily Load for Biota for Little Black Creek, at 1 (2003).

914. Michigan Department of Environmental Quality, Surface Water Quality Division, Approved Total Maximum Daily Loads, *available at:* http://www.michigan.gov/documents/deq/wb-swas-tmdl-approvedlist_212987_7.pdf (last visited 23 October 2013).

915. 2002 MI 303(d) List, *supra* note 831. The total number scheduled for 2011 was 115.

916. North Carolina Department of Environment and Natural Resources, TMDL Study Phase I: Mercury Loads to Impaired Waters in the Lumber River Basin (1999).

917. *Ibid*., at 1.

918. *Ibid*.

919. *Ibid*., at 2. This second document was not made available to the Secretariat.

920. *Ibid*., at 8–9.

921. *Ibid*., at 10.

922. *Ibid*.
923. *Ibid*., at 18–25.
924. *Ibid*., at 23.
925. *Ibid*., at 37.
926. *Ibid*.
927. *Ibid*.
928. *Ibid*., at 39.
929. *See* North Carolina Division of Water Quality, North Carolina TMDLs, *available at:* http://portal.ncdenr.org/web/wq/ps/mtu/tmdl/tmdls/tmdltable (last visited 23 October 2013).
930. Ohio Environmental Protection Agency, Division of Surface Water, Upper Little Miami River Watershed TMDL, *available at:* http://epa.ohio.gov/portals/35/tmdl/ULMR_finalreport.pdf (last visited 23 October 2013).
931. *Ibid*., at Appendix. F, at 21–22.
932. *Ibid*., at 21.
933. *See* Ohio Environmental Protection Agency, Division of Surface Water, Upper Sandusky River Watershed TMDL, *available at:* http://epa.ohio.gov/portals/35/tmdl/Sandusky_upper_final_Report.pdf (last visited May 24, 2012).
934. *Ibid.*, at 2.
935. *Ibid.*, at 37.
936. *Ibid.*, at 94.
937. *American Littoral Society, et al. v. EPA*, No. 96-489 (E.D. Pa. Jan. 1996) (Pennsylvania Consent Decree").
938. US Environmental Protection Agency, TMDLs, Lawsuits, *available at:* http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/lawsuit.cfm (last visited 23 October 2013).
939. United States Environmental Protection Agency, Mid-Atlantic Water, Lake Jean TMDL (2004), *available at:* http://www.epa.gov/reg3wapd/tmdl/pa_tmdl/LakeJean/index.htm (last visited 23 October 2013).
940. *Ibid.*, at 2.
941. *Ibid.*, at 3.
942. *See* United States Environmental Protection Agency, Mid-Atlantic Water, Nutrients and Mercury TMDLs Lake Wallenpaupack, Pike and Wayne Counties, Pennsylvania (2005), *available at:* http://www.epa.gov/reg3wapd/tmdl/pa_tmdl/LakeWallenpaupack/index.htm (last visited 23 October 2013).
943. *See* Texas Commission on Environmental Quality, Approved TMDLs and Implementation Plans, *available at:* http://www.tceq.state.tx.us/implementation/water/tmdl/nav/tmdlsapproved.html (last visited 23 October 2013).
944. Texas Commission on Environmental Quality, *Lavaca Bay Mercury Total Maximum Daily Load (TMDL) Study, Final Report* (2004), at 68, *available at:* http://www.tceq.texas.gov/assets/public/implementation/water/tmdl/27lavacabay/27-lavacabayhg-finalreport.pdf (last visited 23 October 2013).
945. *Ibid*.
946. *See* United States Environmental Protection Agency, Mid-Atlantic Water, West Virginia TMDLs, *available at:* http://www.epa.gov/reg3wapd/tmdl/index.htm (last visited 23 October 2013).
947. *See* discussion *infra* sections 8.6.1–8.6.3.
948. Council Resolution 08-03, *supra* note 12.
949. *Ibid*., at 2.
950. Response, *supra* note 4, at 36.
951. Minn. Pollution Control Agency, Minnesota statewide mercury total maximum daily load, available at: http://www.pca.state.mn.us/index.php/view-document.html?gid=8507 (2007) (Last visited 23 October 2013).
952. Council Resolution 08-03, *supra* note 12.
953. Atkeson, T., Axelrad, D., Pollman, C., Keeler, G., Integrating atmospheric mercury deposition and aquatic cycling in the Florida Everglades: An approach for conducting a total maximum daily load analysis for an atmospherically derived pollutant—Final report, Fla. Dep't of Envtl Protection (2003).
954. Council Resolution 08-03, *supra* note 12.
955. *Infra* note 956, at 3.
956. US EPA, Mercury inputs and cycling in Devil's Lake, Wisconsin: A pilot study for conducting a total maximum daily load analysis for an atmospherically-derived pollutant, Watershed Branch, Office of Wetlands, Oceans and Watersheds, Washington, D.C. (2006), available at: http://www.epa.gov/owow/tmdl/mercury/pdf/devilslakefinalreport.pdf (last visited 23 October 2013).

Appendices

APPENDIX 1

Council Resolution 08-03

23 June 2008

COUNCIL RESOLUTION 08-03

Instruction to the Secretariat of the Commission for Environmental Cooperation regarding the Submission on Enforcement Matters SEM-04-005 asserting that the United States of America is failing to effectively enforce provisions of the Clean Air Act and Clean Water Act with regard to mercury from coal-fired power plants

THE COUNCIL:

SUPPORTIVE of the process set forth in Articles 14 and 15 of the North American Agreement on Environmental Cooperation (NAAEC) regarding submissions on enforcement matters and the preparation of factual records;

HAVING CONSIDERED the submission filed by Waterkeeper Alliance, Friends of the Earth Canada, Friends of the Earth – United States, Earth Roots, the Centre for Environmentally Sustainable Development, Great Lakes United, Pollution Probe, and Sierra Club – US and Canada (the " submitters"), on 20 September 2004, as well as the revised submission filed by the submitters on 18 January 2005;

ALSO, HAVING CONSIDERED the response provided by the United States of America on 25 April 2005, as well as the supplemental information provided by the United States on 29 September 2005;

HAVING REVIEWED the Secretariat's determinations and recommendations in this matter, including the Secretariat's notification to the Council on 5 December 2005, recommending the development of a factual record on some of the issues raised by the submitters (the "notification"); and

RECOGNIZING that the Secretariat recommended against the preparation of a factual record on other issues raised by the submitters, including all of the Clean Air Act issues, due to, among other things, pending judicial or administrative proceedings;

HEREBY UNANIMOUSLY:

INSTRUCTS the Secretariat to develop a factual record for SEM-04-005, in accordance with Article 15 of the NAAEC and the *Guidelines for Submissions on Enforcement Matters under Articles 14 and 15 of the North American Agreement on Environmental Cooperation*, with regard to the following questions identified by the Secretariat in its notification:

(1) Concerning National Pollutant Discharge Elimination System (NPDES) permits, or NPDES-equivalent permits, under the US Clean Water Act (CWA), for the forty coal-fired power plants reporting direct surface water discharges of mercury on the 2002 US Toxics Release Inventory in the ten US states identified by the submitters, did the relevant permitting authority determine that point source discharges for each coal-fired power plant would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury (see 40 US Code of Federal Regulations section 122.44(d)(1)(i))?

(2) If so, what information was used by the relevant permitting authority to make that determination?

(3) What information is generally used to make NPDES or US state-issued permitting decisions for point source discharges of mercury from coal-fired power plants?

(4) With regard to the ten US states identified by the submitters, which mercury-impaired waterways are included on CWA section 303(d) lists?

(5) With regard to the ten US states identified by the submitters, what have the states or the US Environmental Protection Agency (EPA) done to account for mercury from air depositions in Total Maximum Daily Load (TMDL) calculations established by EPA or by a state, and what are some of the examples of TMDL calculations for mercury from air deposition in other US states?

(6) What has been EPA's response to a failure, if any, by any of the US states to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways?

DIRECTS the Secretariat to provide to the Council, in advance of developing the factual record, the Secretariat's overall work plan for gathering the relevant facts for the factual record, and to provide the Parties to the NAAEC with the opportunity to comment on that work plan; and

FURTHER DIRECTS the Secretariat to consider, in developing the factual record on these six questions, facts relevant to whether the Party concerned "is failing to effectively enforce its environmental law" since the entry into force of the NAAEC on 1 January 1994. In considering such an alleged failure to effectively enforce, relevant facts prior to 1 January 1994, may be included in the factual record.

APPROVED ON BEHALF OF THE COUNCIL:

_____

David McGovern
Government of Canada

_____

Enrique Lendo Fuentes
Government of the United Mexican States

_____

Scott Fulton
Government of the United States of America

APPENDIX 2

Secretariat's overall plan to develop a factual record

Secretariat of the Commission for Environmental Cooperation

Overall Plan to Develop a Factual Record

Submission I.D.:	**SEM-04-005** ***(Coal-fired Power Plants)***
Submitter(s):	Friends of the Earth Canada Friends of the Earth-US Earthroots Centre for Environmentally Sustainable Development Great Lakes United Pollution Probe Waterkeeper Alliance Sierra Club (US and Canada)
Represented by:	Waterkeeper Alliance and Ecojustice (formerly Sierra Legal Defence Fund)
Party:	United States
Date of this plan:	5 August 2008

Background

On 20 September 2004, the organizations listed above ("the Submitters") listed above filed with the Secretariat of the Commission for Environmental Cooperation (the "Secretariat") a submission on enforcement matters pursuant to Article 14 of the *North American Agreement on Environmental Cooperation* ("NAAEC" or "Agreement"). The Submitters assert that the United States is failing to effectively enforce the federal Clean Water Act (CWA) against coal-fired power plants for mercury emissions that are allegedly degrading thousands of rivers, lakes and other waterbodies across the United States.

The Submitters assert that the number of fish consumption advisories—that warn of the presence of mercury in the fish—has risen from 899 to 2347 since 1993 and that, according to the US Environmental Protection Agency, 35% of the total lake acres and 24% of the river miles in the United States are now under fish consumption advisories. They contend that the US Environmental Protection Agency (EPA) "is allowing both nonpoint and point source discharges of mercury from coal-fired power plants that are contributing to a steady degradation of the nation's waterways as evidenced by increasing mercury fish advisories and the effective withdrawal of existing uses (fishable) of many of these water bodies." According to the Submitters, these discharges include both air emissions of mercury that fall back to the earth in the form of precipitation or as dry particles and direct discharges to water.

The Submitters assert that mercury discharges to air and water contravene the National Pollutant Discharge Elimination System (NPDES) provisions under section 402 of the CWA and Water Quality Standards (WQS) provisions under section 303 of the CWA, respectively. Specifically, they assert that the United States, through the EPA, is failing to effectively enforce these provisions by issuing NPDES permits or delegating the issuance of State Pollutant Discharge Elimination System permits that allow for ongoing point source discharges of mercury into US waterways; approving inadequate state anti-degradation policies and implementation procedures that fail to safeguard water bodies; and failing to use its authority to require states to pass Total Maximum Daily Loads (TMDLs) for mercury where WQS are not being met or a beneficial use has been lost, and to issue its own TMDLs where state action is inadequate.

On 24 February 2005, the Secretariat determined that submission, as supplemented on 18 January 2005, pursuant to the Secretariat's determination that the original submission lacked sufficient information, met the requirements set forth in Article 14(1) of the NAAEC and requested a response from the United States in accordance with Article 14(2) of the NAAEC. The United States submitted its response on 25 April 2005, and provided supplemental information on 29 September 2005.

After consideration of the submission in light of the response of the United States, on 5 December 2005, the Secretariat issued a Notification to Council that development of a factual record is warranted. The Secretariat concluded that the response leaves open central questions raised in the submission concerning EPA's fulfillment of its obligations under §§303 and 402 of the CWA. In particular, the Secretariat considered that a factual record would shed light on the Submitters' assertions that:

1. EPA is failing to effectively enforce the CWA by issuing or renewing federal NPDES permits (or allowing states to issue or renew such permits) that allow for point source discharges of mercury into impaired waterways, and
2. EPA is neglecting to account for airborne mercury when implementing CWA provisions requiring the promulgation of TMDLs for mercury-impaired waterways.

In its Notification, the Secretariat determined that the asserted failure to directly control or regulate nonpoint air emissions of mercury from coal-fired power plants as a means of meeting requirements of the CWA would risk duplicating or interfering with pending proceedings challenging rules under the Clean Air Act regarding such emissions. Accordingly, the Secretariat declined to proceed further with that aspect of the submission. The Secretariat also dismissed some of the allegations concerning the anti-degradation policies and implementation procedures.

On 23 June 2008, in Council Resolution 08-03, the Council unanimously decided to instruct the Secretariat to develop a factual record, in accordance with Article 15 of the NAAEC and the *Guidelines for Submissions on Enforcement Matters Under Articles 14 and 15 of the NAAEC* (the *Guidelines*) with respect to submission SEM-04-005 (*Coal-fired Power Plants*) and with regard to questions identified by the Secretariat in its notification (see "**Overall Scope of the Fact Finding**,").

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The Council directed the Secretariat to provide the Parties with an overall work plan for gathering relevant facts and to provide the Parties with an opportunity to comment on the plan. The Council also directed the Secretariat that in preparing the factual record, it may include any relevant facts that existed before the entry into force of the NAAEC on 1 January 1994.

Under Article 15(4) of the NAAEC, in developing a factual record, "the Secretariat shall consider any information furnished by a Party and may consider any relevant technical, scientific or other information: (a) that is publicly available; (b) submitted by interested nongovernmental organizations or persons; (c) submitted by the Joint Public Advisory Committee (JPAC); or (d) developed by the Secretariat or by independent experts."

Overall Scope of the Fact Finding

To prepare the factual record, the Secretariat will gather and develop factual information relevant to the following questions concerning the alleged failure to effectively enforce §§303 and 402 of the CWA, as identified in Council Resolution 08-03:

1. Concerning National Pollutant Discharge Elimination System (NPDES) permits, or NPDES-equivalent permits, under the US Clean Water Act (CWA), for the forty coal-fired power plants reporting direct surface water discharges of mercury on the 2002 US Toxics Release Inventory in the ten US states identified by the submitters, did the relevant permitting authority determine that point source discharges for each coal-fired power plant would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury (*see* 40 US Code of Federal Regulations section 122.44(d)(1)(i))?
2. If so, what information was used by the relevant permitting authority to make that determination?
3. What information is generally used to make NPDES or US state-issued permitting decisions for point source discharges of mercury from coal-fired power plants?
4. With regard to the ten US states identified by the submitters, which mercury-impaired waterways are included on CWA section 303(d) lists?
5. With regard to the ten US states identified by the submitters, what have the states or the US Environmental Protection Agency (EPA) done to account for mercury from air depositions in Total Maximum Daily Load (TMDL) calculations established by EPA or by a state, and what are some of the examples of TMDL calculations for mercury from air deposition in other US states?
6. What has been EPA's response to a failure, if any, by any of the US states to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways?

Overall Plan

The execution of the overall plan, prepared in accordance with Council Resolution 08-03, will begin as of **29 August 2008**. All other dates mentioned are best estimates. The overall work plan is as follows:

Through public notices or direct requests for information, the Secretariat will explain the scope of the fact finding, and will invite the Submitters; JPAC; the general public; the regulated community (including power plants referred to in Council Resolution 08-03); and non governmental organizations to submit relevant information (section 15.2 of the *Guidelines*). [**beginning September 2008**]

The Secretariat will directly request information relevant to the scope of the factual record from the relevant federal government authorities of the United States, and from state and local authorities in the United States, as appropriate, and shall consider any information furnished by a Party (Articles 15(4) and 21(1)(a) of the NAAEC). [**beginning September 2008**]

The Secretariat will, as appropriate, hold fact-gathering meetings with individuals or organizations interested in submitting relevant information. [**September 2008–March 2009**]

The Secretariat will gather relevant technical, scientific or other information that is publicly available, including from existing databases, public files, information centers, libraries, research centers and academic institutions. [**September 2008–March 2009**]

The Secretariat, as appropriate, will develop, through independent experts, technical, scientific or other information relevant to the factual record. [**September 2008–March 2009**]

The Secretariat, as appropriate, will collect relevant technical, scientific or other information for the preparation of the factual record, from interested nongovernmental organizations or persons, the JPAC or independent experts. **[September 2008–March 2009]**

In accordance with Article 15(4) of the NAAEC, the Secretariat will prepare the draft factual record based on the information gathered and developed. **[by June 2009]**

The Secretariat will submit a draft factual record to Council, and any Party may provide comments on the accuracy of the draft within 45 days thereafter, in accordance with Article 15(5) of the NAAEC. **[June 2009]**

As provided by Article 15(6) of the NAAEC, the Secretariat will incorporate, as appropriate, any such comments in the final factual record and submit it to Council. **[July 2009]**

The Council may, by a two-thirds vote, make the final factual record publicly available, normally within 60 days following its submission, according to Article 15(7) of the NAAEC.

Additional Information

The submission, the Party's response, the Secretariat's determinations, the Council Resolution, and a summary of these are available in the Registry on Citizen Submissions on the CEC home page <www.cec.org>, or upon request to the Secretariat at the following address:

Secretariat of the CEC
Submissions on Enforcement Matters Unit
393 St-Jacques St. West, Suite 200
Montreal, QC H2Y 1N9
Canada

APPENDIX 3

Request for information for preparation of a factual record

Secretariat of the Commission for Environmental Cooperation

Request for Information
for Preparation of a Factual Record
Submission SEM-04-005 (*Coal-fired Power Plants*)
15 September 2008

Contents

1. The factual record process

The Commission for Environmental Cooperation (CEC) of North America is an international organization created under the North American Agreement on Environmental Cooperation (NAAEC) by Canada, Mexico and the United States. The CEC operates through three organs: a Council, made up of the highest-level environmental official in each member country; a Joint Public Advisory Committee (JPAC), composed of five citizens from each country; and a Secretariat located in Montreal.

Article 14 of NAAEC allows persons or nongovernmental organizations in North America to inform the Secretariat, in a submission, that any member country (also called a "Party") is failing to effectively enforce its environmental law. This initiates a process of review of the submission, after which the Council may instruct the Secretariat to prepare a factual record in connection with the submission. A factual record seeks to provide detailed information to allow interested persons to assess whether a Party has effectively enforced its environmental law with respect to the matter raised in the submission.

Under Article 15(4) and 21(1)(a) of NAAEC, in developing a factual record, the Secretariat shall consider any information furnished by a Party and may ask a Party to provide information. The Secretariat also may consider any relevant technical, scientific or other information that is publicly available; submitted by JPAC or by interested nongovernmental organizations or persons; or developed by the Secretariat or independent experts.

On 23 June 2008, in its Resolution 08-03, the Council decided unanimously to instruct the Secretariat to develop a factual record in connection with submission SEM-04-005 (*Coal-fired Power Plants*), in accordance with Article 15 of NAAEC and the *Guidelines for Submissions on Enforcement Matters under Articles 14 and 15 of the North American Agreement on Environmental Cooperation* (the "Guidelines"). The Secretariat is now requesting information relevant to matters to be addressed in the factual record. The following sections provide background on the submission and describe the kind of information requested.

2. The *Coal-fired Power Plants* submission and Council's instructions

On 20 September 2004, several US and Canadian nongovernmental organizations (the "Submitters")[1] presented to the Secretariat of the CEC a submission—in accordance with Article 14 of NAAEC— asserting that that the United States is failing to effectively enforce the federal Clean Water Act (CWA) against coal-fired power plants for mercury emissions that are allegedly degrading thousands of rivers, lakes and other waterbodies across the United States.

The Submitters assert that the number of fish consumption advisories—that warn of the presence of mercury in the fish—has risen from 899 to 2347 since 1993 and that, according to the US Environmental Protection Agency (EPA), 35 percent of the total lake acres and 24 percent of the river miles in the United States are now under fish consumption advisories. They contend that the EPA "is allowing both nonpoint and point source discharges of mercury from coal-fired power plants that are contributing to a steady degradation of the nation's waterways as evidenced by increasing mercury fish advisories and the effective withdrawal of existing uses (fishable) of many of these water bodies." According to the Submitters, these discharges include both air emissions of mercury that fall back to the earth in the form of precipitation or as dry particles and direct discharges to water.

The Submitters assert that mercury discharges to air and water contravene the National Pollutant Discharge Elimination System (NPDES) provisions under section 402 of the CWA and Water Quality Standards (WQS) provisions under section 303 of the CWA, respectively. Specifically, they assert that the United States, through the EPA, is failing to effectively enforce these provisions by:

1) issuing NPDES permits or delegating the issuance of State Pollutant Discharge Elimination System (SPDES) permits that allow for ongoing point source discharges of mercury into mercury-impaired US waterways;
2) approving inadequate state anti-degradation policies and implementation procedures that fail to safeguard water bodies; and
3) failing to use its authority to require states to pass Total Maximum Daily Loads (TMDLs) for mercury where WQS are not being met or a beneficial use has been lost, and to issue its own TMDLs where state action is inadequate.

The United States responded to the submission on 25 April 2005, and provided supplemental information on 29 September 2005. On 5 December 2005, the Secretariat notified the Council that it considered that the submission warranted a factual record.

On 23 June 2008, in its Resolution 08-03, the Council decided unanimously to instruct the Secretariat to develop a factual record, in accordance with Article 15 of NAAEC and the Guidelines, with regard to the following questions identified by the Secretariat in its notification:

(1) Concerning National Pollutant Discharge Elimination System (NPDES) permits, or NPDES-equivalent permits, under the US Clean Water Act (CWA), for the forty coal-fired power plants reporting direct surface water discharges of mercury on the 2002 US Toxics Release Inventory in

1 The Submitters are Friends of the Earth Canada, Friends of the Earth-US, Earthroots, Centre for, Environmentally Sustainable Development, Great Lakes United, Pollution Probe, Waterkeeper Alliance, and Sierra Club (US and Canada), represented by Waterkeeper Alliance and Ecojustice.

the ten US states identified by the submitters,[2] did the relevant permitting authority determine that point source discharges for each coal-fired power plant would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury (*see* 40 US Code of Federal Regulations section 122.44(d)(1)(i))?

(2) If so, what information was used by the relevant permitting authority to make that determination?

(3) What information is generally used to make NPDES or US state-issued permitting decisions for point source discharges of mercury from coal-fired power plants?

(4) With regard to the ten US states identified by the submitters, which mercury-impaired waterways are included on CWA section 303(d) lists?

(5) With regard to the ten US states identified by the submitters, what have the states or the US Environmental Protection Agency (EPA) done to account for mercury from air depositions in Total Maximum Daily Load (TMDL) calculations established by EPA or by a state, and what are some of the examples of TMDL calculations for mercury from air deposition in other US states?

(6) What has been EPA's response to a failure, if any, by any of the US states to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways?[3]

The Council directed the Secretariat to consider, in developing the factual record, whether the Party concerned "is failing to effectively enforce its environmental law" since the entry into force of NAAEC on 1 January 1994. In considering such an alleged failure to effectively enforce, the factual record may include relevant facts that existed prior to 1 January 1994.

3. Request for information

The Secretariat seeks factual information relevant to the six categories above that are listed in Council Resolution 08-03.

The power plants and US states referred to in information categories 1, 4-6 are listed in the table below.

US State (categories 4-6)	Power plant name (category 1)
Alabama	• Widows Creek • Charles R. Lowman
Illinois	• Powerton • Joliet 29 • Waukegan • Kincaid • Joliet 9
Indiana	• R M Schahfer
Kentucky	• H L Spurlock • Mill Creek • Elmer Smith • R D Green
Michigan	• Dan E Karn • Belle River • St. Clair • B C Cobb • J C Weadock
North Carolina	• Roxboro • Belews Creek • Marshall • G G Allen • L V Sutton • Asheville • Lee • Riverbend • Cliffside •
Ohio	• Gen J M Gavin • W H Zimmer
Pennsylvania	• Keystone • Homer City • Bruce Mansfield • Conemaugh • Armstrong
Texas	• H W Pirkey • Welsh Power Plant
West Virginia	• Mount Storm

2 Note that appendix 12 D of the submission refers to 36 power plants in 10 states, which are listed below in Section 3. Request for Information.
3 SEM-04-005 (*Coal-fired Power Plants*) Council Resolution 08-03 (23 June 2008).

4. Examples of relevant information

This section provides examples of the kind of factual information that the Secretariat is seeking in connection with the factual record. Information that the Secretariat receives will be considered for inclusion in the factual record. Examples of potentially relevant information include the following:

(1) *Information category 1*: Factual information regarding whether the relevant NPDES or equivalent permitting authority determined that point source discharges for each coal-fired power plant listed above would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury (s*ee* 40 US Code of Federal Regulations (CFR) section 122.44(d)(1)(i)). Relevant information could include, but is not limited to:

a. information regarding when and how often such determinations were made, and
b. Information regarding whether any such determinations are scheduled for review or updating.

(2) *Information category 2:* Factual information regarding what information was used by the relevant permitting authority to determine that point source discharges for a coal-fired power plant listed above would not have the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for mercury, where such a determination was made. Relevant information could include, but is not limited to:

a. information regarding consideration of the criteria listed in 40 CFR 122.44(d)(1)(ii),
b. information regarding consideration of non-point sources of mercury (including air deposition),
c. information regarding consideration of the cumulative impact of point and non-point sources of mercury on the quality of receiving water bodies,
d. information regarding consideration of knowledge, or lack of knowledge, of the water quality of receiving water bodies,
e. information regarding consideration of any existing or pending TMDLs for the receiving water bodies, and
f. information regarding consideration of data derived from the Toxics Release Inventory.

(3) *Information category 3:* Factual information relevant to what information is generally used to make NPDES or US state-issued permitting decisions for point source discharges of mercury from coal-fired power plants, including decisions related to initial permit issuance, permit review, permit amendment and permit re-issuance, for both new and existing sources. Relevant information could include, but is not limited to:

a. information regarding consideration of the criteria listed in 40 CFR 122.44(d)(1)(ii),
b. information regarding consideration of non-point sources of mercury (including air deposition),
c. information regarding consideration of the cumulative impact of point and non-point sources of mercury on the quality of receiving water bodies,
d. information regarding consideration of knowledge, or lack of knowledge, of the water quality of receiving water bodies, including knowledge related to fish consumption advisories,
e. information relevant to use of analytical methods used for determining effluent and receiving water quality in making permitting decisions;
f. information regarding consideration of any existing or pending TMDLs for the receiving water bodies, and
g. information regarding consideration of data derived from the Toxics Release Inventory.

(4) *Information category 4:* Factual information relevant to which mercury-impaired waterways are included on CWA section 303(d) lists for the ten states listed above. Relevant information could include, but is not limited to:

a. information regarding when the relevant CWA section 303(d) lists were initially made and subsequently updated, and
b. information regarding the use of fish consumption advisories, if any, in determining the inclusion or not of a waterway on the relevant CWA section 303(d) lists.

(5) *Information category 5:* Factual information relevant to what the ten states listed above or the EPA have done to account for mercury from air deposition in TMDL calculations established by EPA or by a state, and relevant to examples of TMDL calculations for mercury from air deposition in other US states. Relevant information could include, but is not limited to:

a. information regarding methodologies available for including mercury from air deposition in TMDL calculations, including i) information on methodologies for accounting for coal-fired power plants (individually or otherwise), and ii) information on how mercury emissions from US coal-fired power plants are considered relative to other US sources of mercury air emissions (e.g., use of information from the EPA National Emissions Inventory and other databases),
b. information on how the available methodologies have been applied in requesting or establishing state or regional mercury TMDLs, and the results from those applications,
c. a list of states that have incorporated mercury air deposition considerations in requesting or establishing mercury TMDLs, and a list of EPA-approved mercury TMDLs that take into account mercury deposition from air, and
d. information regarding of the chronology with which states have taken action to account for mercury from air deposition in TMDL calculations.

(6) *Information category 6:* Factual information relevant to what EPA's response has been to a failure, if any, by any of the US states, including the ten states listed above, to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways. Relevant information could include, but is not limited to:

a. information regarding factors EPA considers to determine whether a state has failed to list mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways, including factors related to timeliness, and
b. information regarding EPA's consideration of how the performance of states that have not listed mercury-impaired waterways in accordance with CWA section 303(d) or to establish TMDLs for such waterways, if any, compares with the performance of states that have prepared such CWA section 303(d) lists and/or established such TMDLs.

(7) *Information category 7:* Any other technical, scientific or other information that could be relevant to the matters identified in Council Resolution 08-03.

5. Additional background information

The submission, United States' response, the Secretariat determinations, the Council Resolution 08-03, the overall plan to develop the factual record and other information are available in the Citizen Submissions on Enforcement Matters section of the CEC web site: <http://www.cec.org>. These documents may also be requested from the Secretariat.

6. Where to Send Information

Relevant information for the development of the factual record may be sent to the Secretariat until 31 December 2008, by e-mail to dmillan@cec.org or by regular mail to the following address:

Secretariat of the CEC
Submissions on Enforcement Matters Unit (SEM Unit)
393, rue St-Jacques ouest, bureau 200
Montreal, QC H2Y 1N9
Canada
Tel. (514) 350-4300

Please reference SEM-04-005 *(Coal-fired Power Plants)* in all correspondence.

For any questions, please call (514) 350-4300 or send an e-mail to the attention of Paolo Solano, at <dmillan@cec.org>.

APPENDIX 4

Information Requests to Power Plants, NGOs, JPAC and other Parties to the NAAEC

Form Letter to Power Plants

September 2008

Re: Request for information relevant to the factual record for the Coal-fired Power Plants submission (SEM-04-005)

The Secretariat of the Commission for Environmental Cooperation of North America recently began the process of preparing a "factual record" regarding the assertions that the United States, through the U.S. Environmental Protection Agency, is failing to effectively enforce the federal Clean Water Act (CWA) against coal-fired power plants for mercury emissions that are allegedly degrading thousands of rivers, lakes and other waterbodies across the United States. These assertions were made in a "submission" filed with the Secretariat in September 2004 by the Waterkeeper Alliance and Ecojustice on behalf of several U.S. and Canadian non-governmental organizations.[1]

I wish to emphasize that while the [POWER PLANT NAME] is one of the power plants to be included in the factual record, the focus of the factual record is on the federal government's enforcement activities. The factual record will reach no legal conclusion, impose any sanctions or conditions or make recommendations regarding any compliance issues addressed. Rather, the purpose of a factual record is to present a detailed and comprehensive set of facts that will allow members of the public to draw their own conclusions regarding the matters addressed.

I am writing to invite the [POWER PLANT NAME] to submit information relevant to the factual record. While the company is not required to do so, your voluntary cooperation with the factual record process will greatly enhance our ability to present a comprehensive and balanced set of facts, including facts that present your company's perspective.

The attached Request for Information explains the citizen submissions process and factual records, gives background about the Coal-fired Power Plant submission (SEM-04-005), describes the scope of the information to be included in the factual record and provides examples of information that might be relevant. We are accepting information for possible consideration in connection with the factual record until 31 December 2008. Following a review of this information, we will determine the need for follow-up, including a possible visit to the facility should your company wish to provide such access.

Several of the examples of relevant information may describe information that is voluminous or in tabular form (e.g. permit data). In such cases, we would prefer to receive summary reports and to receive the information electronically, at info@cec.org.

We appreciate your consideration of this request and look forward to any relevant information you are able to provide. Please feel free to contact me at (514) 350-4321 or psolano@cec.org with any questions you may have.

Sincerely,

Acting Director
Submissions on Enforcement Matters Unit
Enc.

1 The Submitters are Friends of the Earth Canada, Friends of the Earth-US, Earthroots, Centre for, Environmentally Sustainable Development, Great Lakes United, Pollution Probe, Waterkeeper Alliance, and Sierra Club (US and Canada), represented by Waterkeeper Alliance and Ecojustice.

Form Letter to NGOs

September 2008

Re: Request for information relevant to the factual record for submission SEM-04-005 (*Coal-fired Power Plants*)

The Secretariat of the Commission for Environmental Cooperation of North America recently began the process of preparing a "factual record" regarding the assertions that the United States, through the U.S. Environmental Protection Agency, is failing to effectively enforce the federal Clean Water Act (CWA) against coal-fired power plants for mercury emissions that are allegedly degrading thousands of rivers, lakes and other waterbodies across the United States. These assertions were made in a "submission" filed with the Secretariat in September 2004 by the Waterkeeper Alliance and Ecojustice on behalf of several U.S. and Canadian non-governmental organizations. The factual record will reach no legal conclusion, impose any sanctions or conditions or make recommendations regarding any compliance issues addressed. Rather, the purpose of a factual record is to present a detailed and comprehensive set of facts that will allow members of the public to draw their own conclusions regarding the matters addressed.

I am writing to invite you to submit information relevant to the factual record. The attached Request for Information explains the citizen submissions process and factual records, gives background about the Coal-fired Power Plant submission (SEM-04-005), describes the scope of the information to be included in the factual record and provides examples of information that might be relevant. We are accepting information for possible consideration in connection with the factual record until 15 December 2008.

We appreciate your consideration of this request and look forward to any relevant information you are able to provide. Please feel free to contact me at (514) 350-4321 or psolano@cec.org with any questions you may have.

Memorandum

DATE:	15 September 2008
A / PARA / TO:	Chair, JPAC
CC:	JPAC Members, CEC Executive Director, JPAC Liaison Officer
DE / FROM:	Interim Director, Submissions on Enforcement Matters Unit
OBJET / ASUNTO /RE:	Request for information relevant to the factual record for submission SEM-04-005 (*Coal-fired Power Plants*)

As you know, the CEC Secretariat recently began the process of preparing a factual record for submission SEM-04-005 (*Coal-fired Power Plants*). This submission was filed with the Secretariat in September 2004 by Waterkeeper Alliance and others. The factual record will focus on six questions concerning the alleged failure to effectively enforce §§303 and 402 of the Clean Water Act, as identified in Council Resolution 08-03.

I am writing to invite the JPAC to submit information relevant to the factual record, consistent with Article 15(4)(c) and Article 16(5) of the NAAEC. For example, in addition to providing information directly responsive to this request, JPAC members might be able to identify sources of information that the Secretariat could pursue in connection with the factual record. The attached Request for Information, which is posted on the CEC website, gives background about the Coal-fired Power Plants submission, describes the scope of the information to be included in the factual record, and provides examples of information that might be relevant. We will accept information for possible consideration in connection with the factual record until 31 December 2008.

We appreciate your consideration of this request and look forward to any relevant information you are able to provide. Please feel free to contact me at (514) 350-4321 or <psolano@cec.org> if you have questions regarding this request or the factual record process.

Letter to the Other Parties of the NAAEC (Canada and Mexico)

September 2008

Re: Invitation to provide information relevant to the factual record for submission SEM-04-005 (*Coal-fired Power Plants)*

Dear Minister:

As you know, the CEC Secretariat recently began the process of preparing a factual record for submission SEM-04-005 (*Coal-fired Power Plants)*, consistent with Council Resolution 08-03. I am writing to invite the [Canadian] [Mexican] Party to submit information relevant to the factual record, in accordance with Article 15(4) of the NAAEC.

The attached Request for Information, which will be posted on the CEC website, provides background information on the *Coal-fired Power Plants* submission, describes the scope of the information to be included in the factual record, and provides examples of information that might be relevant. We will accept information for consideration in connection with the factual record until 15 December 2008.

We appreciate your consideration of this request and look forward to any relevant information you are able to provide. For any questions, please send an email to the attention of Paolo Solano, at psolano@cec.org.

Sincerely,

Interim Director
Submissions on Enforcement Matters Unit

cc: Semarnat
US EPA
Environment Canada
CEC Executive Director

Enclosure

APPENDIX 5

Information Request to United States Authorities

Memorandum

DATE:	15 September 2008
A / PARA / TO:	US EPA
CC:	Semarnat Environment Canada CEC Executive Director
DE / FROM:	Interim Director, Submissions on Enforcement Matters Unit
OBJET / ASUNTO /RE:	Request for information relevant to the factual record for the submission SEM-04-005 (*Coal-fired Power Plants*).

As you know, the CEC Secretariat recently began the process of preparing a factual record for submission SEM-04-005 (*Coal-fired Power Plants*), consistent with Council Resolution 08-03.

Pursuant to Articles 15(4) and 21(1) of the NAAEC, I am writing to request from the Government of the United States information relevant to the Coal-fired Power Plants factual record. The attached Request for Information describes the scope of the information to be included in the factual record and provides examples of relevant information. We ask that you provide any and all information responsive to the Request for Information by 15 December 2008, or to propose an alternate schedule if this date is not feasible. Following a review of this information, we may request follow-up information or meetings with government representatives to assist in our understanding of the facts or to gather additional information.

To assist in our understanding of the information you provide, we request that you present the information in a manner that indicates how the information provided responds to the questions and examples included in that information request. In addition, if requested information has not been or will not be provided because it is non-existent, confidential or privileged, or otherwise unavailable, please provide an explanation consistent with Article 21(3).

We appreciate the Government of United States' consideration of this request. I can be reached at (514) 350-4321 or psolano@cec.org should there be any questions regarding it.

APPENDIX 6

List of information received for the factual record

DATE MM/DD/YY	AUTHOR	DOCUMENT	RECEIVED FROM
12/11/2008	Michael S. Bank, et al.; Neil M. Burgess, et al.; Celia Y Chen, et al.; Mark Cohen, et al.; Ian Dennis, et al.; David C. Evers, et al.; Florida Dept of Environmental Protection; Hubbard Brook Research Foundation; ICF International; Neil Kamman, et al.; Gerald J. Keeler, et al.; NESCAUM; US EPA; Connecticut Dept of Environmental Protection; Chris M. Pennuto, et al.; Ethan Perry, et al.; James B. Shanley, et al.	Cover letter and CD with the following documents: 1. *Mercury Bioaccumulation in Northern Two-lined Salamanders from Streams in the Northeastern United States;* 2. *Mercury and other Contaminants in Common Loons Breeding in Atlantic Canada;* 3. *Patterns of Hg Bioaccumulation and Transfer in Aquatic Food Webs Across Multi-lake Studies in the Northeast US;* 4. *Modeling the atmospheric transport and deposition of mercury to the Great Lakes;* 5. *Supplementary Material for Modeling the Atmospheric Transport and Deposition of Mercury to the Great Lakes;* 6. *Distribution Patterns of Mercury in Lakes and Rivers of Northeastern North America;* 7. *Biological Mercury Hotspots in the Northeastern United States and Southeastern Canada;* 8. *The extent and effects of mercury pollution in northeastern North America;* 9. *Patterns and Interpretation of Mercury Exposure in Freshwater Avian Communities in Northeastern North America;* 10. *Mercury in Northeastern North America: A synthesis of Existing Databases;* 11. *Florida Pilot Mercury Total Maximum Daily Load (TMDL) Study: Application of the Everglades Mercury Cycling Model (E-MCM) to Site WCA 3A-15;* 12. *Florida Pilot Mercury Total Maximum Daily Load (TMDL) Study: Response to Reviewer Comments;* 13. *Modeled Deposition of Speciated Mercury to the SFWMD Water Conservation Area 3A: 22 June 1995 to 21 June 1996;* 14. *Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida;* 15. *Linking Mercury Science with Public Policy in the Northeastern United States;* 16. *Model-Based Analysis and Tracking of Airborne Mercury Emissions to Assist in Watershed Planning;* 17. *Mercury in Freshwater Fish of Northeast North America – A Geographic Perspective Based on Fish Tissue Monitoring Databases;* 18. *Long-term Atmospheric Mercury Wet Deposition at Underhill, Vermont;* 19. *Sources of Mercury Wet Deposition in Eastern Ohio;* 20. *NESCAUM Tracking Progress in Reducing Mercury Air Emissions;* 21. *USEPA Letter Notification of Approval of Northeast Mercury TMDL;* 22. *Northeast Regional Mercury Total Maximum Daily Load;* 23. *Mercury in the Northern Crayfish, Orconectes virilis (Hagen), in New England, USA;* 24. *Deconstruction of Historic Mercury Accumulation in Lake Sediments, Northeastern United States;* 25. *Physical Controls on Total and Methylmercury Concentrations in Streams and Lakes of the Northeastern USA.*	Ann Weeks Litigation Director Clean Air Task Force Boston, MA
12/15/2008	Texas Commission on Environmental Quality	Letter in response to the CEC's Information Request (Categories 1 to 7): providing specific information on the two TPDES permits in the request, Welsh Power Plant and the H. W. Pirkey Power Plant; and outlining the procedures for implementing the surface water quality criteria in general and as related to coal-fired power plants or other facilities.	L'Oreal W. Stepney Director Water Quality Division, TCEQ
12/17/2008	Reliant Energy	Letter to CEC stating that its Keystone and Conemaugh Stations operate under valid NPDES permits for wastewater discharges and Federal Operating Permits for air emissions; and that both of these plants are regulated under the Pennsylvania Mercury Rule. Reliant also mentions that it supports the information submitted by the UWAG for the factual record.	J.D. Furstenwerth Director Environmental Dept, Reliant Energy

DATE MM/DD/YY	AUTHOR	DOCUMENT	RECEIVED FROM
12/19/2008	Owensboro Municipal Utilities	Letter to the CEC advising that their response for the Elmer Smith Station is covered by the letter to be submitted by the UWAG.	Kevin D. Frizzell Director of Power Production, OMU
12/29/2008	First Energy	Letter informing the CEC that no mercury was detected in the water discharges of its Bruce Mansfield Plant; and that mercury monitoring results on the State 2C applications were reported below detection level. Additional information is provided in a letter and material submitted by UWAG, 29 December 2008.	Daniel V. Steen, VP, Environmental, First Energy, Akron, Ohio
12/29/2008	Utility Water Act Group (UWAG)	Letter to the CEC submitted by UWAG (218 individual energy companies; and the Edison Electric Institute, the National Rural Electric Cooperative Association, the American Public Power Association: TRI Data/ Measurements below detection limit/ Mercury in Intake Water/ Reasonable Potential Calculations/ Ongoing administrative proceedings/ Enforcement of the Clean Air Act as Distinguished from the Clean Water Act/ Fish Advisories/ Mercury from Foreign Sources; and various documents submitted by UWAG: Regulatory Impact Analysis of the Clean Air Mercury Rule, March 2005 (US EPA); • Electric Power Research Institute Comments on US EPA Revision of December 2000 Regulatory 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 Federal Register / Vol. 70, No. 208 / Friday, October 28, 2005 / Proposed Rules, December 19, 2005; • United States Environmental Protection Agency Comments of the Utility Air Regulatory Group on the Proposed National Emission Standards For Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (69 Fed. Reg. 4652 (January 30, 2004) and Supplemental Notice for the Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units • (69 Fed. Reg. 12398 (March 16, 2004); • Regulatory Impact Analysis of the Clean Air Mercury Rule, Final Report (US EPA, March 2005).	Angela M. Grooms Chair, UWAG
12/31/2008	Tennessee Valley Authority (TVA)	Letter to CEC on TVA's Widows Creek Fossil Plant in Alabama: Toxics Release Inventory Data/ Reasonable Potential Determination/ Mercury-impaired Waterways in Alabama/ Air Emissions of Mercury. TVA also states that it supports the information submitted by the UWAG for the factual record.	Cynthia M. Anderson for Gordon G. Park, Manager, Env. Affairs Fossil Power Group, TVA
12/31/2008	American Electric Power (AEP)	Letter to CEC providing 'all known factual information on the following facilities identified in Section 3' of the CEC's Info Request: *General James M. Gavin Power Plant* (Ohio Power Company); and *H.W. Pirkey* and *Welsh Power Plants* (Southwestern Electric Power Company). AEP also states that it supports the information submitted by the UWAG for the factual record.	John McManus, VP, Env. Services, Columbus, Ohio AEP
03/02/2009	University of Pittsburgh's Environmental Law Clinic on behalf of the Waterkeeper Alliance (CFPP Submitters)	Response to CEC Info Request: Factual information on Mercury Speciation, Cycling, Health Impacts; and legal processes and methodologies available to regulate mercury emissions from coal-fired power plants (with appendices).	Emily Collins University of Pittsburgh School of Law
04/03/2009	Utility Water Act Group (UWAG)	Letter: Supplement to Utility Water Act Group Letter of December 29, 2008 – Information for the draft factual record, such as: Measurement of mercury in a discharge of wastewater (below the detection limit of the analytical method); Reasonable potential; Possible Technical Consultants for the CEC; NPDES permits issued in the Great Lakes States.	Angela M. Grooms Chair, UWAG

APPENDIX 7

Appendix 12D and D.1 of the additional information received from the Submitters on 18 January 2005

Appendix 12D: Top 15 State by State emitters sorted by 2002 emissions to air with corresponding discharges to water (CEC/EPA data)

Source: CEC Report (See: http://www.cec.org/files/PDF/POLLUTANTS/PowerPlant_AirEmission_en.pdf)

ALABAMA

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[1],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[2], kg
1	James H Miller Jr,	18,592,131	717	0.039	0
2	E C Gaston	12,639,541	417	0.033	0
3	Gorgas	7,216,594	374	0.052	0
4	Barry	16,718,579	213	0.013	0
5	Widows Creek	8,868,307	181	0.02	0.4
6	Greene County	3,892,941	100	0.026	0
7	Colbert	6,305,034	98	0.016	Unknown
8	Charles R Lowman	3,472,719	72	0.021	0.4
9	Gadsden	484,718	48	0.1	0

ILLINOIS

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[3],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[4], kg
1	Powerton	7,858,082	584	0.074	1.4
2	Joliet 29	5,411,689	364	0.067	0.9
3	Will County	5,419,706	348	0.064	0
4	Waukegan	4,230,118	317	0.075	0.9
5	Joppa Steam	8,075,552	262	0.032	Unknown
6	Baldwin	12,454,874	223	0.018	0
7	Newton	7,886,447	168	0.021	Unknown
8	Kincaid	3,888,878	166	0.043	0.4
9	Crawford	2,575,482	162	0.063	0
10	Coffeen	5,257,211	97	0.019	0
11	Joliet 9	1,292,531	89	0.069	(reported with Joliet 29)
12	Fisk	1,299,559	84	0.064	0
13	Edwards Station	3,536,593	66	0.019	Not available[5]
14	Hennepin	2,045,489	45	0.022	0
15	Wood River	2,205,841	42	0.019	0

INDIANA

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[6],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[7], kg
1	Rockport	16,643.32	467	0.028	0
2	Clifty Creek	7,838,812	221	0.028	0
3	R M Schahfer	8,756,429	167	0.019	0.9
4	Petersburg	11,641,137	104	0.009	Unknown
5	Warrick	1,044,762	96	0.092	0
6	R Gallagher	2,253,862	96	0.042	0
7	Cayuga	5,930,084	92	0.015	0
8	Wabash River	5,744,472	88	0.015	0
9	Michigan City	2,487,472	56	0.023	Unknown
10	Merom	6,643,503	52	0.008	Unknown
11	State Line Generating	1,599,873	51	0.032	0
12	Frank E Ratss	1,517,924	31	0.02	Unknown
13	Bailly	2,831,251	29	0.01	Unknown
14	Eagle Valley (H T Pritchard)	1,332,751	26	0.02	Unknown
15	F B Culley	2,417,245	22	0.009	0

KENTUCKY

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[8],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[9], kg
1	Paradise	14,130,150	296	0.021	0
2	Ghent	11,533,151	203	0.018	0
3	Big Sandy	5,752,379	189	0.033	0
4	H L Spurlock	6,080,970	152	0.025	1.8
5	Coleman	2,864,421	119	0.042	Unknown
6	E W Brown	3,992,354	97	0.024	0
7	Mill Creek	9,075,622	89	0.01	2.3
8	East Bend	2,941,427	81	0.027	0
9	John S Cooper	2,100,208	70	0.033	0
10	Trimble County	3,929,027	42	0.011	Unknown
11	Shawnee	8,826,178	32	0.004	Unknown
12	Elmer Smith	2,185,345	30	0.014	25
13	R D Green	3,501,986	26	0.008	0.4
14	Green River	719,410	20	0.028	0
15	D B Wilson	2,849,550	19	0.007	0

MICHIGAN

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[10],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[11], kg
1	Monroe	16,720,823	344	0.021	0
2	J H Campbell	9,269,258	248	0.027	Unknown
3	Dan E Karn	4,474,257	116	0.026	0.4
4	Belle River	7,716,451	98	0.013	3.2
5	St. Clair	6,965,047	97	0.014	3.6
6	Eckert Station	1,540,404	90	0.058	0
7	Trenton Channel	4,339,844	70	0.016	0
8	J R Whiting	2,262,790	70	0.031	0
9	B C Cobb	2,188,545	59	0.027	0.9
10	J C Weadock	2,205,966	59	0.027	0.4
11	River Rouge	3,401,765	52	0.015	0
12	Presque Isle	3,140,761	40	0.013	0
13	Erickson	809,058	21	0.026	0

NORTH CAROLINA

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[12],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[13], kg
1	Roxboro	14,281,069	352	0.025	0.9
2	Belews Creek	16,912,850	269	0.016	0.4
3	Marshall	14,498,223	243	0.017	0.4
4	G G Allen	5,071,389	98	0.019	1.4
5	L V Sutton	2,622,440	78	0.03	0.9
6	Asheville	2,628,074	64	0.025	0.4
7	Lee	1,969,494	55	0.08	0.4
8	Cape Fear	1,857,910	45	0.024	0
9	Riverbend	1,660,438	40	0.024	0.4
10	Cliffside	2,723,353	35	0.013	0.4
11	Buck	1,249,807	35	0.028	0
12	W H Weatherspoon	794,816	20	0.025	Unknown

OHIO

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[14],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[15], kg
1	Conesville	10,158,928	451	0.044	0
2	Eastlake	6,724,187	381	0.057	0
3	J M Stuart	15,351,286	318	0.021	0
4	Cardinal	8,555,500	266	0.031	0
5	W H Sammis	15,521,117	263	0.017	0
6	Gen J M Gavin	15,617,077	238	0.015	1.4
7	Avon Lake	4,169,683	228	0.055	0
8	Kyger Creek	6,852,119	209	0.03	0
9	Muskingum River	8,359,764	198	0.024	0
10	Walter C Beckjord	6,756,632	178	0.026	0
11	Miami Fort	7,587,241	160	0.021	0
12	Bay Shore	3,538,463	103	0.029	0
13	W H Zimmer	9,734,563	90	0.009	0.4
14	Ashtabula	1,236,725	79	0.064	0
15	Killen Station	3,612,949	71	0.02	0

PENNSYLVANIA

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[16],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[17], kg
1	Keystone	11,790,991	787	0.067	0.4
2	Homer City	10,938,699	743	0.068	1.4
3	Montour	9,263,444	634	0.068	Unknown
4	Bruce Mansfield	15,974,911	528	0.033	26
5	Shawville	2,991,436	377	0.126	0
6	Brunner Island	9,994,684	235	0.024	Unknown
7	Hatfield's Ferry	9,753,564	227	0.023	Unknown
8	Conemaugh	12,584,027	224	0.018	0.9
9	Armstrong	2,140,768	154	0.072	0.4
10	Sunbury	1,714,652	135	0.079	0
11	Cheswick	3,021,295	105	0.035	0
12	New Castle	1,577,573	105	0.066	0
13	Portland	1,915,994	57	0.03	0
14	Martins Creek	2,402,706	33	0.014	Unknown
15	Elrama	2,321,405	31	0.013	0

TEXAS

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[18],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[19] kg
1	Monticello	13,127,881	849	0.065	0
2	Martin Lake	14,825,001	547	0.037	0
3	Big Brown	7,920,848	473	0.06	0
4	Limestone	11,385,520	407	0.036	0
5	H W Pirkey	4,504,102	382	0.085	3.2
6	Sam Seymour	11,749,703	361	0.031	Not available[20]
7	W A Parish	20,026,008	240	0.012	0
8	Welsh Power Plant	11,000,083	217	0.02	1.8
9	Harrington Station	7,831,512	130	0.017	Unknown[21]
10	Gibbons Creek	3,230,078	122	0.038	Unknown
11	Sandow	3,943,323	116	0.029	Unknown
12	J K Spruce	4,135,806	114	0.028	0
13	Oklaunion	4,264,449	78	0.018	Unknown
14	Tolk Station	7,662,008	69	0.009	Unknown
15	San Miguel	2,855,097	60	0.021	Unknown

WEST VIRGINIA

No.	Plant	Electricity Generation, MWh	Mercury Emissions to Air[22],kg	Mercury Emission Rate, kg/GWh	Mercury and Mercury Compounds Discharged to Water[23], kg
1	Mount Storm	11,671,736	521	0.045	2.3
2	John E Amos	17,995,089	450	0.025	0
3	Phil Sporn	5,361,190	230	0.043	0
4	Mountaineer	8,985,024	211	0.023	0
5	Mitchell	9,231,567	204	0.022	0
6	Fort Martin	7,855,193	195	0.025	Unknown
7	Harrison	12,927,422	133	0.01	Unknown
8	Kammer	4,029,061	117	0.029	0
9	Kanawha River	2,571,055	70	0.027	0
10	Albright	1,374,335	64	0.025	Unknown
11	Pleasants	7,629,209	56	0.007	Unknown
12	Willow Island	1,151,588	37	0.032	Unknown
13	Rivesville	386,259	20	0.051	Unknown

Appendix 12D.1: Methodology for creating TRI reports

To generate the TRI reports using the TRI explorer first go to: http://www.epa.gov/triexplorer/

Under "Reports", which allows the user to select the type of report, we selected "Facility".

Then under "Geographic Location" we selected the State being researched (i.e. the ten states subject to our inquiry).

Then under "Chemical Released" we selected "Select specific chemical(s)". This produced a list of TRI chemicals. We scrolled through the list of chemicals and selected both "Mercury" and "Mercury Compounds".

Then under "Industry" we selected "SIC 4911,4931, 4939 - Electric Utilities".

Finally, under "Year of Data" we selected the most recent year for which data is available "2002".

Next to all those selections is a column that defines the report columns to include in the final report.

Since our interest is in On Site releases we selected "Total On Site Disposal or Other Releases" and the two "Details" boxes below that. We also selected "Total On and Off Site Disposal and Other Releases", although that was not necessary to obtain the information we required.

Once all of that is done we selected the "Generate Report" button.

Once this report was generated we sorted the information in descending order according to the column titled "Surface Water Discharges" by selecting the downward arrow under the column heading. This sorted the list of plants in order from greatest to least in terms of quantity of Mercury and Mercury Compounds released to surface water.

We then printed the reports and downloaded and saved the data in Microsoft Excel.

(Footnotes)

1. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
2. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
3. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
4. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
5. Facility not listed in TRI report.
6. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
7. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
8. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
9. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
10. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
11. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
12. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
13. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
14. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
15. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
16. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
17. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
18. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
19. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.
20. Facility not listed in TRI report.
21. Reported as "." in TRI data which indicates that the facility left that cell blank in its submission.
22. CEC. 2005. North American Power Plant Air Emissions. Table 3.9.
23. United States Environmental Protection Agency. 2002. Toxic Release Inventory (TRI) reports.

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