112(g) Case-By-Case Maximum Achievable Control Technology Determination
Plant Washington, Power4Georgians, LLC
Construction/Operation of a Coal Fired Power Plant
Located in Sandersville, Georgia (Washington County)

NOTICE OF MACT APPROVAL

SIP Permit Application No. 17924
August 2009

Reviewing Authority

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch
Stationary Source Permitting Program (SSPP)

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Table of Contents

Executive Summary 1
Assessment 2
1. Plant Description 2
2. Regulatory Background 2
   a. MACT Regulation of EGUs 3
   b. Section 112(g) Requirements 3
   c. Implementing Section 112(g) 3
   d. Determination of a "Similar Source" 4
   e. Practical Considerations in Comparing Data from Sources 5
   f. HAPs to be considered 6
3. 112(g) Determination for Coal-Fired Boiler 8
   a. MACT Determination for Mercury Emissions 8
   b. MACT Determination for Non-Mercury Metals Emissions 15
   c. MACT Determination for Acid Gases 25
   d. MACT Determination for Organics 29
4. Auxiliary Boiler Case-by-Case MACT 33
   a. MACT Determination for Inorganic Metal HAPs 33
   b. MACT Determination for Inorganic (HCl and HF) HAPs 36
   c. MACT Determination for Organic HAPs 38
5. Proposed MACT Limits and Requirements 40
   a. General Requirements 40
   b. Emission Limits 41
   c. General Compliance Requirements 41
   d. Initial Compliance Requirements 42
   e. Continuous Compliance Requirements 43
   f. Notification Requirements 45
   g. Recordkeeping Requirements 45
   h. Reporting Requirements 46
   i. Other Requirements 48

Table I – Summary of MACT ... 1
Table II – List of HAPs Emitted from Coal-Fired Power Plants ... 6
Table III - Mercury Stack Test Results for Coal-Fired Facilities ... 9
Table IV – Mercury 112(g) Determinations ... 9
Table V – DOE/NETL Testing Program Results ... 11
Table VI - Mercury Stack Test Results for Sub-bituminous-Fired Facilities ... 13
Table VII - MACT Limits for Mercury in Recent Permits and Draft Permits ... 13
Table VIII - Test Results for Non Mercury Metals at Select Facilities ... 16
Table IX - $PM_{filterable}$ Limits in Recent Permits and Draft Permits ... 17
Table X - $PM_{filterable}$ Limits and Test Results at Select Facilities ... 19
Table XI - $PM_{filterable}$ Limits in Recent Permits and Draft Permits ... 19
Table XII - HF and HCl Stack Test Results ... 25
Table XIII – Recent Acid Gas Limits in 112(g) Determinations ... 25
Table XIV - HF and HCl Stack Test Results ... 27
Table XV - Recent Acid Gas Limits in 112(g) Determinations ... 28
Table XVI – Recent CO 112(g) Determinations ... 30
Table XVII - CO Stack Test Results ... 31
Table XVIII – Recent CO Limits in Recent Permits and Draft Permits ... 31
Table XIX – PM Limits in Recent Permits and Draft Permits ... 35
Table XXII – Emission Limitations ... 41
Table XXIII – Initial Compliance Requirements ... 42
Table XXIV – Continuous Compliance Requirements ... 43

Executive Summary

On January 17, 2008 and updated on December 3, 2008, Plant Washington, Power4Georgians, LLC (Plant Washington) submitted an Application for Notice of MACT Approval to the Georgia Environmental Protection Division, Air Protection Branch, subsequently referred to as the Division, providing this maximum achievable control technology (MACT) assessment for hazardous air pollutant (HAP) emissions from the above facility. This assessment provides (1) a plant description; (2) regulatory background on application of maximum achievable control technology to electric generating units under § 112(g) of the Clean Air Act; (3) a discussion of practical factors to be accounted for in determining the appropriate limit; (4) a list of the hazardous air pollutants to be considered; and (5) an assessment of MACT emission limitations under § 112(g).

Table I – Summary of MACT for Coal-Fired Boiler

HAP	Control Technology Employed by Plant Washington	MACT Emission Limit	Performance Indicator (or surrogate)
Mercury (Hg)	Activated Carbon Injection (ACI)	13 x 10^{-6} lb/MW-hr	Direct via a Mercury CEMS
Non-mercury Metal HAPs	Fabric filter	0.012 lb/MMBtu $PM_{filterable}$	Indirect via a PM CEMS
Hydrochloric Acid (HCl)	Wet scrubber and fabric filter	3.22 x 10^{-4} lb/MMBtu (Sub-Bituminous) 1.36 x 10^{-3} lb/MMBtu (50/50 Coal Blend) 2.40 x 10^{-3} lb/MMBtu (Bituminous)	Direct compliance tested via stack tests: indirect monitoring via SO_2 CEMS
Hydrogen Fluoride (HF)	Wet scrubber and fabric filter	2.17 x 10^{-4} lb/MMBtu	Direct compliance tested via stack tests: indirect monitoring via SO_2 CEMS
Organic HAPs	Good combustion practices	0.10 lb/MMBtu CO	Indirect via a CO CEMS

Assessment

This Case-by-Case Maximum Achievable Control Technology (MACT) Assessment provides (1) background information on the Plant Washington project and its regulatory status, and (2) a MACT Assessment for mercury (Hg), non-mercury metal hazardous air pollutants (HAPs), acid gas HAPs (HF and HCl), and organic HAPs as requested by the Georgia Environmental Protection Division (EPD) – Air Protection Branch.

1. **Plant Description**

   Plant Washington, Power4Georgians, LLC (Plant Washington) has applied for a Prevention of Significant Deterioration (PSD) Air Quality Permit by submitting an application on January 17, 2008 and updated on December 3, 2008 for the construction and operation of a pulverized coal-fired power plant. The Plant Washington facility will consist of one nominal 850 MW pulverized coal-fired boiler. The facility will burn primarily either sub-bituminous coal (identified in the PSD Permit as Powder River Basin coal (PRB)) or a 50/50 Blend of PRB and Illinois #6 bituminous coal (identified in the PSD Permit as 50/50 Blend).

   As will be detailed in the following sections, the Plant Washington project will include multiple control technologies and practices to minimize air emissions: low NOx burners, over-fire air, good combustion practices, selective catalytic reduction (SCR) for the control of Nitrogen Oxides (NOx), Carbon Monoxide (CO), and Volatile Organic Compounds (VOC); fabric filter baghouse for the control of particulate matter (PM), including non-mercury metallic HAPs; wet scrubber for the removal of sulfur dioxide (SO_2), sulfuric acid mist (H_2SO_4), acid gas HAPs, hydrochloric acid (HCl) and hydrogen fluoride (HF); activated carbon injection (ACI) for the control of mercury emissions.

2. **Regulatory Background**

   EPA promulgated the *Clean Air Mercury Rule (CAMR)* on May 18, 2005 which required Georgia and other States to adopt and submit revisions to their State Implementation Plants (SIPs), under the requirements of 40 CFR Part 60 Subpart B, that would eliminate specified amounts of mercury emissions from coal-fired electric utility generating units [EGUs]. All applicable coal-fired EGU's whose nameplate capacity is greater than or equal to 25 Megawatts (MW) would have become subject to the state rule implementing CAMR on January 1, 2010 (391-3-1-.02(14)).

a. MACT Regulation of EGUs

In February 2008, the United States Court of Appeals for the D.C. Circuit vacated the United States Environmental Protection Agency's (EPA) rule de-listing coal-fired electric utility steam generating units (EGU) from Section 112(c) of the Clean Air Act (CAA).[1] Therefore, Plant Washington submitted an application to obtain preconstruction review and approval required by Section 112(g)(2)(B) of the CAA and its accompanying regulations, 40 CFR 63.40-44. The Application for Notice of MACT of Approval noted as Application No. 17924, contains a detailed discussion of the regulatory rationale for controlling HAPs in EGUs and the facility's thoughts on the current status of the path of regulation for these sources.

b. Section 112(g) Requirements

Section 112(g) requires a case-by-case MACT for major sources of HAP emissions where EPA has not yet promulgated a MACT standard for a listed source category. Section 112 defines a "major source" of HAPs as one that has the potential to emit 10 tons per year of any single HAP or 25 tons per year of any combination of HAPs. A major source as defined in Section 112 must determine the following for each of the applicable Hazardous Air Pollutants:

> the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source, and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed or reconstructed major source.

c. Implementing Section 112(g)

Section 112(g)(2)(B) states that for a new facility that is major for HAP emissions, where EPA has not yet promulgated a MACT standard for a listed category, that a case-by-case MACT analysis and emissions limitations shall be made by the permitting authority. This analysis is set forth in 40 CFR 63.43 (d) as described below.

Section 112(g) requires the setting of emission limits on HAPs using a two-part analysis: (1) a determination of the emission limitation achieved in practice by the best controlled similar source (otherwise known as the MACT Floor); and (2) the level of additional control, if any, that can be achieved by the source taking into consideration, cost, energy requirements, and non-air quality-related health and environmental impacts. The case-by-case MACT emission limit cannot exceed the MACT Floor.

[1] *New Jersey v. EPA,* 517 F.3d 574 (D.C. Cir. 2008)

d. Determination of a "Similar Source"

The facility's first step is to identify the emission limit of the best controlled similar source demonstrated in practice or the "MACT Floor." It is important to recognize that reductions in certain pollutants can result in an increase of other pollutants, e.g., lower CO or organic HAP emissions may result in higher NOx emissions. Therefore, the best controlled similar source may not have the lowest emission limit for each individual pollutant. After establishing the MACT Floor for that similar source, the facility must further examine ways to reduce the emissions "beyond the MACT Floor." Thus, the case-by-case MACT analysis starts with a comparison of "similar sources" consistent with EPA's proposed MACT and other categorical MACT rules. In its proposed rule for EGUs, EPA categorized and sub-categorized similar sources by fuel rank and combustion type. EPA has also indicated that it is also appropriate to sub-categorize by design size, and size has been used in setting several MACT standards.

1) Coal Rank

In its proposed MACT, EPA sub-categorized coal-fired EGUs based on the rank of coal (e.g., bituminous, sub-bituminous, lignite, and waste coal).[2] EPA identified fuel rank as an important factor in assessing HAP control technology because of the chemistry of controlling trace amounts of emissions and the variability of HAPs in the various coal ranks. For example, it is recognized that bituminous coal typically contains more chlorine and other halogenated compounds (halides) than sub-bituminous coals. Halides increase acid gas formation; on the other hand higher halide content promotes mercury control.

2) Type of Combustion

In its 2004 proposed rule, EPA noted that the establishment of a MACT Floor for coal-fired EGUs had to take into account unit-specific coal properties and boiler technology. The EPA-proposed rule placed EGUs into categories based on combustion design and further sub-categorized by fuel rank. EPA's sub-categorization according to coal rank recognized that differences in coal rank reflect differences in among other things, carbon content of the coal, volatile-matter content, heating value and agglomerating properties.

3) Design Size

In developing other MACT standards EPA has historically recognized that size is an important factor when designating sub-categories. With respect to EGUs, the design size of the unit is also important when determining the similarity of a source, since size affects the ability to control fuel consumption, air flow, overall cycle efficiency, and emission production – all factors that are relevant for comparison of performance of control technologies.

[2] See 69 Fed. Reg. 4652. 4662-63 (Jan. 30, 2004)

e. Practical Considerations in Comparing Data from Sources

It is also important to note several other practical factors in evaluating data from other sources and determining which one is the best controlled similar source.

1) Achievability

MACT limits must be continuously achievable. That is, they must be able to be met continuously under reasonably foreseeable worst-case conditions[3]. Thus, there is a need for a "safety margin" in setting MACT emission limits. Coal quality, boiler operation, and the control devices are subject to variability in operation, and that variability needs to be addressed in developing emission rates. Coal properties that affect emissions vary widely from mine to mine, from seam to seam and even within a single seam.

In addition, EGU boilers experience different operating conditions, including, but not limited to, varying load operation and maintenance activities such as on line soot blowing. A unit must be able to attain those standards under all operating conditions. Thus, any enforceable permit limit must account for reasonable variations in coal properties, operating conditions, and other factors in order to ensure that MACT limits are continuously achievable.

2) Method of measurement

Related to variability is the issue of how data is measured. In evaluating the emission rates that may have been achieved by other "similar" sources, it is important to compare units with similar methods of measurement. As an example, hydrogen chloride (HCl), hydrogen fluoride (HF) and lead (Pb) emissions are directly related to the amount of the pollutant in the fuel, which also varies even within the same coal seam. A case-by-case MACT standard that will be continuously monitored with mercury continuous emissions monitoring system (CEMS) is a fundamentally more stringent limit, since it will record the actual mercury emissions emitted by the facility, including all of the variations in operating conditions, coal properties, mercury content, unburned carbon in fly ash, sorbent reactivity, and other factors that will occur every day.

3) "Demonstrated in practice"

The MACT floor is defined as "[t]he emission limitation which is not less stringent than the emission limitation achieved in practice by the best-controlled similar source . . ."[4]. The case-by-case MACT floor should therefore be established based on the lowest permit limit for which the best-controlled similar source has demonstrated continuous compliance in practice, including consideration of the specific requirements for compliance demonstration (i.e., monitoring method).

[3] Sierra Club v. EPA, 167 F .3d 658, 665 (D.C. Cir. 1999).
[4] 40 CFR 63.41

f. HAPs to be considered

In its proposed 2004 MACT rule, EPA established a MACT limit only for mercury for coal-fired EGUs. This Assessment goes beyond mercury and evaluates the HAPs that are expected to be emitted from sources similar to Plant Washington and is based on EPA's studies conducted under CAA § 112(n). The lists of HAPs that are potentially emitted from a coal-fired power plant are provided in Table II below. As shown in the table, using these properties, all HAPs can be placed into the four categories to be evaluated: mercury; particulate HAPs; acid gas HAPs; and organic HAPs.

Table II – List of HAPs Emitted from Coal-Fired Power Plants

Organics		Acid Gases
PAHs	Methyl methacrylate	Hydrochloric Acid
Acetaldehyde	Methyl tert butyl ether	Hydrogen Fluoride
Acetophenone	Methylene chloride	
Acrolein	Phenol	**Non-mercury Metals**
Benzene	Propionaldehyde	Antimony (Sb)
Benzyl chloride	Tetrachloroethylene	Arsenic (As)
Bis(2-ethylhexyl)phthalate	Toluene	Beryllium (Be)
Bromoform	1,1,1-Trichloroethane	Cadmium (Cd)
Carbon disulfide	Styrene	Chromium (Cr)
2-Chloroacetophenone	Xylenes	Cobalt (Co)
Chlorobenzene	Vinyl acetate	Lead (Pb)
Chloroform	Dioxins	Manganese (Mn)
Cumene	Hexachlorobenzene	Nickel (Ni)
Cyanide	Carbon tetrachloride	Selenium (Se)
2,4-Dinitrotoluene	Quinoline	
Dimethyl sulfate	1,1-Dichloroethylene	
Ethyl benzene	N-nitrosodimethylamine	Mercury
Ethyl chloride	1,1,2-Trichloroethane	
Ethylene dichloride	Trichloroethylene	
Ethylene dibromide	Pentachlorophenol	
Formaldehyde	Trans 1,3 – Dichloropropene	
Hexane	Cresols	
Isophorone	Dibuyl phthalate	
Methyl bromide	Methyl isobutyl ketone	
Methyl chloride	Phthalic anhydride	
Methyl ethyl ketone	Methyl iodine	
Methyl hydrazine		

Given the variety of coal ranks that are to be utilized and the suitable combustion technology, it is necessary to assess each HAP that may be emitted and to determine the physical and chemical properties of that HAP that can be utilized to separate it from the flue gas and to capture it.

EPA and the courts have indicated that HAPs can be characterized and controlled together using surrogates for measuring compliance when three factors are met: 1) whether the HAPs to be regulated are "invariably present" in the emissions of the proposed surrogate; 2) whether the pollution control technology used for the surrogate "indiscriminately captures" the HAPs to be regulated along with the emission of the proposed surrogate; and 3) whether the pollution control technology used for the surrogate is the only means by which a facility could reduce the emissions of the HAPs to be regulated.[5] The case-by-case MACT Assessment provided below for Plant Washington assesses the control technologies that applies to the separate groupings of HAPs and, where appropriate, the air pollutants that are used as a surrogate. The groupings and surrogates for MACT Assessment are:

- Mercury
- Non-mercury Metal HAPs (filterable particulate matter as surrogate)
- Acid Gases (SO_2 as surrogate monitoring pollutant)
- Organic HAPs (CO as surrogate)

Each HAP category will be addressed to determine the best control mechanism and the best indicator to show maximum control.

[5] *See Sierra Club v. EPA*, 353 F.3d at 984 (citing *Nat'l Lime Ass'n*, 233 F.3d at 639).

3. 112(g) Determination for Coal-Fired Boiler

a. MACT Determination for Mercury Emissions

<u>Applicant's Proposal</u>

In Application 17924, Plant Washington submitted a case-by-case MACT Analysis for Mercury. The analysis submitted is summarized below, but the complete analysis is located in the above referenced application.

(1) Mercury MACT Floor

Plant Washington evaluated a number of sources to determine the Mercury MACT Floor. These sources included EPA Regulations and background documents, other state regulations, and other information like performance tests from similar sources. Plant Washington proposes using two types of coal as fuels in the pulverized coal-fired boilers. The primary fuel is Powder River Basin coal (PRB) which is a sub-bituminous classification of coal. The secondary fuel is a 50/50 blend of Illinois #6 and PRB which Illinois #6 is a bituminous classification of coal. From this point on the coal types will be referenced by the classification type and not their common name. Each coal type has different emissions based on the content in the coal itself. EPA has stated previously that each coal type has different levels of chlorine and mercury which affects the speciation of the mercury and the ability for the control device to remove the mercury from the gas stream. Additionally, differences in heat content and mercury content can also affect mercury emissions. Plant Washington chose to only set a mercury MACT floor for sub-bituminous coal. A floor level has not been calculated for the blend of bituminous and sub-bituminous coals planned for use as Plant Washington because it is uncertain whether any improvement over the sub-bituminous level would result by the 50/50 blend of coal types.

Plant Washington reviewed information from EPA Regulations, other state regulations, and recent test data from existing facilities. The EPA Regulations reviewed included the originally proposed MACT standard, 40 CFR Part 63, Subpart UUUUU, and the vacated New Source Performance Standard (NSPS) associated with CAMR. All information regarding any EPA data, rules or regulations are detailed in Air Quality Application No. 17924.

Second, Plant Washington reviewed state mercury regulations. Of the multitude of states with current regulations, Connecticut had the lowest mercury emission limit for bituminous coal-fired units. Connecticut has a limit of 6.0×10^{-6} lb/MWhr.

Finally listed in Table III below is the available test data from an operating facility.

Table III - Mercury Stack Test Results for Coal-Fired Facilities

Facility	Coal Type	Testing Date	Testing Results (3-run Avg.) Emission Rate	Permitted Limit	Equivalent Emission Rate During Stack Testing
Santee Cooper Cross Unit 3	Bituminous	January 2007	7.2×10^{-7} lb/MMBtu 4.2×10^{-3} lb/hr	3.6×10^{-6} lb/MMBtu	7.2×10^{-6} lb/MW-hr
Walter Scott Jr. Energy Center Unit 4	Sub-bituminous (PRB)	August 2007	1.23×10^{-6} lb/MMBtu 9.1×10^{-3} lb/hr	1.7×10^{-6} lb/MMBtu	10.5×10^{-6} lb/MW-hr

Table IV below identifies facilities that have also conducted 112(g) determinations for Hg and are similar to the proposed facility. Many of these facilities have not yet been constructed but are proposing the same emissions control strategies for the control of mercury as Plant Washington.

Table IV – Mercury 112(g) Determinations

Facility	HG Control Strategy*	Coal Type	Emission Rate	Faculty Status
Thoroughbred Generating Station	Multi-pollutant controls including SCR, fabric filter baghouse, wet scrubber, wet ESP	Bituminous (Illinois)	3.26×10^{-6} lb/MMBtu	Not Yet Constructed
Roundup Power Project	Multi-pollutant controls including SCR, SDA, fabric filter baghouse	Sub-bituminous	2.69×10^{-6} lb/MMBtu	Not Yet Constructed
Midamerican Energy Company – Walter Scott Jr. Energy Center CFEC4 Boiler	Multi-pollutant controls including SCR, SDA, fabric filter baghouse, with sorbent injection (activated carbon injection)	Sub-bituminous (PRB)	1.7×10^{-6} lb/MMBtu	Operational
Santee Cooper Cross Generating Station	Multi-pollutant controls including SCR, ESP, and WFGD	Bituminous	3.6×10^{-6} lb/MMBtu	Operational
LS Power Longleaf	Multi-pollutant controls including SDA and fabric filter baghouse, with activated carbon injection	Sub-bituminous and Bituminous	Sub-bituminous: 15×10^{-6} lb/MW-hr Bituminous: 6×10^{-6} lb/MW-hr	Not Yet Constructed
Tuscon Electric Power company Springerville Generating Station	Multi-pollutant controls including SCR, SDA and fabric filter baghouse	Sub-bituminous	6.9×10^{-6} lb/MMBtu	Operational
Corn Belt Energy Corporation – Elkhart	Multi-pollutant controls including SCR, ESP, and WFGD	Bituminous (Illinois)	4×10^{-6} lb/MMBtu	Not Yet Constructed
LS Power Plum Point	Multi-pollutant controls including SCR, SDA, fabric filter baghouse	Sub-bituminous (PRB)	12.8×10^{-6} lb/MMBtu	Not Yet Constructed
City Utilities Springfield Southwest Station	Multi-pollutant controls including SCR, SDA, fabric filter baghouse, activated carbon injection optional	Sub-bituminous	7.5×10^{-6} lb/MMBtu	Not Yet Constructed
Omaha Public Power District	Multi-pollutant controls including SCR, SDA, fabric filter baghouse, with activated carbon injection	Sub-bituminous	18×10^{-6} lb/MW-hr	Not Yet Constructed
AMP Meigs	Multi-pollutant controls including SCR, fabric filter baghouse, wet scrubber, wet ESP	Bituminous	1.9×10^{-6} lb/MMBtu Determined for State BACT	Not Yet Constructed
Intermoutain Unit 3	Multi-pollutant controls including SCR, WFGD, and fabric filter baghouse	Sub-bituminous and Bituminous	Sub-bituminous: 20×10^{-6} lb/MW-hr Bituminous: 6×10^{-6} lb/MW-hr	Not Yet Constructed

Facility	HG Control Strategy*	Coal Type	Emission Rate	Faculty Status
WE Elm Road	Multi-pollutant controls including SCR, fabric filter baghouse, wet scrubber, wet ESP	Bituminous	1.12×10^{-6} lb/MMBtu	Not Yet Constructed
Weston Unit 4	Multi-pollutant controls including SCR, dry scrubber, fabric filter baghouse, and activated carbon injection	Sub-bituminous (PRB)	1.70×10^{-6} lb/MMBtu	Operational
Longview Power (Maidsville)	Multi-pollutant controls including SCR, WFGD, fabric filter baghouse, and duct sorbent injection	Bituminous	2.39×10^{-6} lb/MMBtu	Not Yet Constructed
Wygen Unit 2	Multi-pollutant controls including SCR, dry scrubber, fabric filter baghouse, and activated carbon injection	Sub-bituminous	20×10^{-6} lb/MW-hr	Operational
Santee Cooper Pee Dee Generating Station	Multi-pollutant controls including SCR, WFGD, fabric filter baghouse	Bituminous	8×10^{-6} lb/MW-hr (46.3 lbs/yr)	Not Yet Constructed
Trimble County Generating Station	Multi-pollutant controls including SCR, WFGD, ESP, and fabric filter baghouse, and wet ESP	Sub-bituminous and Bituminous – Performance Coal 70/30 Bit/Sub Split	13×10^{-6} lb/MW-hr	Not Yet Constructed
Cliffside Station Unit 6	Multi-pollutant controls including SCR, dry scrubber, fabric filter baghouse, and wet scrubber	Primary Fuel Bituminous – Up to a 50/50 Blend of Bituminous and Sub-bituminous	14×10^{-6} lb/MW-hr	Not Yet Constructed
John W Turk Jr	Multi-pollutant controls including SCR, dry scrubber, fabric filter baghouse, and activated carbon injection	Sub-bituminous	1.7×10^{-6} lb/MMBtu	Not Yet Constructed
Consumers Energy (ASPC)	Multi-pollutant controls including SCR, wet scrubber, fabric filter baghouse, and activated carbon injection	Bituminous and Sub-bituminous – Up to a 50/50 Blend	14×10^{-6} lb/MW-hr	Not Yet Constructed

*SCR – Selective Catalytic Reduction, ESP – Electrostatic Precipitator, SDA – Spray Dryer Absorber, WFGD – Wet Flue Gas Desulfurization

Plant Washington evaluated a number of sources including EPA regulations – The National Emissions Standard for Hazardous Air Pollutants (NESHAP) for Electric Utility Units (2004) and associated reference documents, similar sources as listed above and state regulations. Based on a thorough review of the available information in accordance with 40 CFR 63.43, the combined use of a mercury specific control technology, sorbent injection using activated carbon, and multi-pollutant control technologies including SCR, fabric filter baghouse, and a wet scrubber is believed to be the MACT floor for the control of mercury emissions for the Plant Washington facility.

In addition to the facilities listed in Table IV, Plant Washington examined several circulating fluidized bed combustor (CFB) facilities that have low mercury limits. These facilities include: Dominion – Virginia City; Nevco-Sevier; and Wolverine. All of these facilities were not used in Plant Washington's evaluation due to the major differences in coal type. The following are the differences in coal between Plant Washington and the listed facilities: Dominion is permitted to use waste coal; Nevco will burn a substantially lower mercury content Utah bituminous coal; Wolverine is permitted to use high quantities of pet coke.

Based on the above information and additional supporting documentation contained in Notice of MACT Approval in Application No. 17924, Plant Washington proposes a MACT floor of 1.68 x 10^{-6} lb/MMBtu, equivalent to 15.0 x 10^{-6} lb/MWhr.

A floor level has not been calculated for the blend of bituminous and sub-bituminous coals planned for use at Plant Washington because it is uncertain whether any improvement over the sub-bituminous level would result by blending of sub-bituminous coal.

(2) Beyond the Floor Analysis

To investigate any further reductions beyond the MACT Floor set by Plant Washington, the facility evaluated a number of U.S Department of Energy's National Energy Technology Laboratory (DOE/NETL) optimization studies and testing programs for coal fired power plants throughout the United States.

DOE/NETL with the U.S. EPA and Electric Power Research Institute (EPRI), state and local agencies, power plant facilities, and others manages a significant research and development program for control of mercury emissions from coal fired power generation facilities. DOE/NETL initiated a research and development program in the 1990s evaluating mercury specific control technologies such as sorbent injection and mercury oxidation concepts. The research and development program has been implemented in separate phases, with Phase II of the research and development program completed in 2007. Phase III projects were initiated in 2006 and have not yet been completed. The following table is a summary of the information available to date on the DOE/NETL Phase II and Phase III studies, indicating the average total mercury removal (from co-benefit controls and new technology), the technology under investigation, the coal type utilized during the testing, and the standard emission controls systems.

Table V – DOE/NETL Testing Program Results

Facility	Technology Under Review	Coal Type in Use	Control Technology in Use	Average Total Mercury Removal
Holcomb Unit 1	Blending coal Coal Additives Enhanced Activated Carbon	PRB PRB and Bituminous during Blending Evaluations	Spray Dryer Absorber and Fabric Filter	93%
Meramec Unit 2	Coal Additives Enhanced Activated Carbon	PRB	Cold Side ESP	92.6%
Laramie River Unit 3	Blending coal Coal Additives Enhanced Activated Carbon	PRB PRB and Bituminous during Blending Evaluations	Spray Dryer Absorber and Cold Side ESP	>90%
Monroe Unit 4	Blending coal SCR System Enhanced Activated Carbon	PRB/Bituminous Blend	SCR and Cold Side ESP	81%
Labadie Unit 2	Enhanced Activated Carbon – Impacts of SO_3	PRB	Cold Side ESP	50% - >90%

Facility	Technology Under Review	Coal Type in Use	Control Technology in Use	Average Total Mercury Removal
Stanton Unit 1	Enhanced Activated Carbon	PRB	Cold Side ESP	85%
St. Clair Unit 1	Enhanced Activated Carbon	PRB/Bituminous Blend	Cold Side ESP	94%
Monticello Unit 3	Oxidation Catalysts Injection of Halogen Salts Wet Scrubber Additives	Texas Lignite/PRB Blend	Cold Side ESP and Wet Scrubber	65% - 92%
Big Brown Unit 2	Enhanced Powdered Activated Carbon and TOXECON	Texas Lignite/PRB Blend	Cold Side ESP and COHPAC Fabric Filter	74%
Dave Johnston Unit 3	Enhanced Powdered Activated Carbon and Mer-Cure	PRB	Cold Side ESP	92%
Independence Unit 1	Enhanced Powdered Activated Carbon and TOXECON II	PRB	Cold Side ESP	60% - 90%
Louisa Unit 1	Coal Additives	PRB	Hot Side ESP	No Increase of Mercury Removal Due to Use of Additive
Crawford Unit 7	Enhanced Activated Carbon	PRB	Cold Side ESP	81%
Will County Unit 3	Enhanced Activated Carbon	PRB	Cold Side ESP	60% - 73%
Fayette Unit 3	Enhanced Activated Carbon	PRB	Cold Side ESP and Wet Scrubber	80% - 90%
Hawthorne Unit 5	Enhanced Activated Carbon	PRB	SCR, Spray Dryer Absorber and Fabric Filter	>90%
Hardin Station	Long Term Evaluation Activated Carbon Injection	PRB	Spray Dryer Absorber and Fabric Filter	90%
Limestone Station Unit 1	Enhanced Powdered Activated Carbon and TOXECON II	Texas Lignite/PRB Blend	Cold Side ESP and Wet Scrubber	60% - 90%

Although the DOE/NETL studies to date have promising results, the long term effective performance of these units is still unknown. The Plant Washington emissions control scheme consisting of an SCR, fabric filter baghouse, and a wet scrubber has been determined as an effective method for the control of mercury. These controls are determined to be the Best Demonstrated Technology (BDT) for control of mercury emissions by the USEPA in development of the NSPS and CAMR mercury regulations.

The pollutant control strategy for Plant Washington, including use of SCR, a fabric filter baghouse, a wet scrubber, and sorbent injection for the control of mercury emissions were determined to be the Best Available Control Technology (BACT) for control of mercury emissions. The current plan for the facility is use of powdered activated carbon for sorbent injection. Plant Washington will continue to monitor the development of alternative control strategies and their control effectiveness for control of mercury.

Based on the above information that Plant Washington has reviewed, no available information justifies MACT emission limits for mercury that are beyond the proposed MACT floor.

(3) The MACT Emissions Limitation for Mercury

Plant Washington proposes as MACT for mercury the use of ACI, along with a mercury limit of:

15 x 10^{-6} lb/MWhr (gross) for sub-bituminous coal (1.68 x 10^{-6} lb/MMBtu).

Plant Washington also proposes that a mercury CEMS be utilized to demonstrate compliance with the proposed annual average limit.

<u>EPD Review</u>

(4) Mercury MACT Floor

EPD has additional stack test reports and emission results for several other coal-fired power plants not listed in Plant Washington's 112(g) application. These test results are listed below in Table VI.

Table VI - Mercury Stack Test Results for Sub-bituminous-Fired Facilities

Plant	Test Date	Test Result	Approx. Lb/MWhr equivalent
Sub-bituminous – co-controls			
Tucson Electric Springerville Unit 3	Aug. 24-25, 2006	2.27 x 10^{-6} lb/MMBtu	21.7 x 10^{-6}
Sub-bituminous - ACI			
Weston 4	July 7-11, 2008	1.4 lb/TBtu	~8.79 x 10^{-6}
Newmont Nevada TS Power Plant	June 23-24, 2008	<0.0076 lb/GWhr	<7.6 x 10^{-6}

EPD has additional recent permits for other coal-fired power plants not listed in Plant Washington's 112(g) application. These permits are listed below in Table VII.

Table VII - MACT Limits for Mercury in Recent Permits and Draft Permits

Facility	State	Permit Limit	(Draft) Permit Date	Notes
Coal Blends (including waste coal and bituminous coal)				
NRG Limestone	Texas	12 to 15 x 10^{-6} lb/MWhr	August 2008	Draft MACT Permit
Sub-bituminous Coal				
Comanche	Colorado	20 x 10^{-6} lb/MWhr	June 2005	PSD Permit

(5) Beyond the Floor Analysis

EPD is aware of Mid-Michigan Energy, LLC that is currently being reviewed by Michigan Department of Environmental Quality, Air Quality Division (Michigan DEQ). Mid-Michigan submitted a letter dated January 12, 2009 to Michigan DEQ proposing a mercury limit of 13×10^{-6} lb/MWhr while firing sub-bituminous coal as a fuel in the boilers[6]. EPD believes this provides substantiation to lower the current proposed mercury limit from 15×10^{-6} lb/MWhr to 13×10^{-6} lb/MWhr while firing sub-bituminous coal.

(6) The MACT Emissions Limitation for Mercury

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and disagrees with Plant Washington's selection of the MACT emission limitation for mercury. EPD has chosen to lower the mercury limit as stated above.

(7) Conclusions

EPD sets as the MACT emission limitations for mercury the use of ACI, along with a mercury limit of:

- 13×10^{-6} lb/MW-hr (gross) for sub-bituminous and bituminous coal.

Mercury CEMS will be utilized to demonstrate compliance with the proposed 12-month rolling average limit.

[6] Letter dated January 12, 2009, Mid-Michigan Energy, LLC to Michigan Department of Environmental Quality, Air Quality Division

b. MACT Determination for Non-Mercury Metals Emissions

Applicant's Proposal

(1) $PM_{filterable}$ as a Surrogate for Non-Mercury Metal HAP Emissions

Plant Washington proposes to use filterable particulate matter ($PM_{filterable}$) as a surrogate for non-mercury metal HAPs. In general, the use of a surrogate in MACT standards has been widely accepted by EPA, state permitting agencies, and the courts. Plant Washington submitted as additional documentation court cases, EPA determinations, and draft or issued Notice of MACT approval permits for several states in the case-by-case MACT application No. 17924. As one court noted, the reasonableness of the use of a surrogate depends on several factors, including (1) whether the HAPs to be regulated are "invariably present" in the emissions of the proposed surrogate; (2) whether the pollution control technology used for the surrogate "indiscriminately captures" the HAPs to be regulated along with emissions of the proposed surrogate; and (3) whether the pollution control technology used for the surrogate is the only means by which a facility could reduce the emissions of the HAPs to be regulated.[7]

Plant Washington states that for non-mercury metal HAPs, the use of $PM_{filterable}$ satisfies all of these factors and therefore is an appropriate surrogate for continuous compliance with the associated permit limits.

(2) Non-Mercury Metal MACT Floor

Plant Washington evaluated a number of sources to determine the non-mercury metal MACT Floor. These sources included EPA Regulations and background documents, and other information like performance tests from similar sources. Stack test and $PM_{filterable}$ permit limits from other similar sources in operation are listed below in Table VIII.

[7] *See Sierra Club v. EPA*, 353 F.3d at 984 (citing *Nat'l Lime Ass'n*, 233 F.3d at 639).

Table VIII - Test Results for Non Mercury Metals at Select Facilities

Facility	Pollutant	Tested Emission Rate (lb/MMBtu)	Permit Limit (lb/MMBtu)
Walter Scott, Jr. Energy Center Unit 4	Total Select Metals (TSM)	3.1×10^{-5}	1.04×10^{-4}
Santee Cooper Cross Unit 3	Antimony	$< 1.4 \times 10^{-7}$	7.0×10^{-7}
	Arsenic	2.5×10^{-6}	1.6×10^{-5}
	Beryllium	3.4×10^{-8}	8.44×10^{-7}
	Cadmium	7.5×10^{-7}	2.1×10^{-6}
	Chromium	3.5×10^{-6}	1.4×10^{-5}
	Cobalt	2.7×10^{-7}	4.0×10^{-6}
	Lead	2.2×10^{-6}	1.69×10^{-5}
	Manganese	4.7×10^{-5}	2.0×10^{-5}
	Nickel	6.3×10^{-6}	1.1×10^{-5}
	Selenium	3.2×10^{-5}	5.2×10^{-5}

While the test results suggest that emission levels of Selected Metals are well below the permitted levels that have been achieved in single stack tests, the results of these stack tests do not provide a sufficient basis upon which to establish a MACT floor below the permitted limits. A stack test is a one-time picture of emissions over a 3-hour period and cannot always accurately represent emissions over the long term. Relying on stack test results to inform a MACT determination is difficult since Plant Washington will utilize a CEMS to ensure compliance with its $PM_{filterable}$ permit limit. The CEMS will measure $PM_{filterable}$ emissions at all times. For these reasons, the reported stack test results from similar sources do not establish MACT floor levels.

In addition to the above stack test data for non-mercury metals, Plant Washington also reviewed multiple permitting decisions throughout the United States. These facilities and their corresponding $PM_{filterable}$ limits are listed below in Table IX.

Table IX - $PM_{filterable}$ Limits in Recent Permits and Draft Permits

Facility	Non-Mercury Metal Control Strategy	Reduction	Non-Mercury Metal	Emission Limit (lb/MMBtu)
Thoroughbred Generating Station	ESP, WFGD, and WESP	98%	Beryllium	9.4×10^{-7}
			Lead	3.86×10^{-6}
Roundup Power Project	Fabric Filter technology	95%	Arsenic	9.41×10^{-7}
			Beryllium	3×10^{-8}
			Cadmium	6.3×10^{-7}
			Chromium	2.79×10^{-6}
			Lead	3.36×10^{-6}
			Manganese	7.81×10^{-6}
			Nickel	2.73×10^{-6}
Midamerican Energy Company – Walter Scott Jr. Energy Center CFEC4 Boiler	Fabric Filter technology	Not indicated	Total Selected Metals (TSM)	1.04×10^{-4}
Santee Cooper Cross Generating Station	ESP	Not indicated	Antimony	7.0×10^{-7}
			Arsenic	1.6×10^{-5}
			Beryllium	8.44×10^{-7}
			Cadmium	2.1×10^{-6}
			Chromium	1.4×10^{-5}
			Cobalt	4.0×10^{-6}
			Lead	1.69×10^{-5}
			Manganese	2.0×10^{-5}
			Nickel	1.1×10^{-5}
			Selenium	5.2×10^{-5}
LS Power Longleaf	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.01 lb/MMBtu Filterable PM Compliance Per CEM
John W Turk Jr	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.012 lb/MMBtu Filterable PM_{10} 0.025 lb/MMBtu Total PM_{10} Compliance Per Annual 3-hr Stack Test
Santee Cooper Pee Dee Generating Station	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.012 lb/MMBtu Filterable PM_{10} Compliance Per Annual Stack Test and Bag Leak Detection System (BLDS)
Consumers Energy Karn/Weadock Generating Station	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.012 lb/MMBtu Filterable PM Compliance Per Continuous Opacity Monitoring System (COMS), BLDS, or CEM
Cliffside Station Unit 6	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.012 lb/MMBtu Filterable PM Compliance Per Periodic Stack Test (3-hr.)
Hunter Unit 4	Fabric Filter technology	99%	N/A	PM Surrogate Limit 0.015 lb/MMBtu Filterable PM_{10} Compliance Per Stack Test (3-hr.)

Plant Washington evaluated a number of facilities using the PM filterable surrogate approach. Three facilities have demonstrated compliance with a filterable PM limit of 0.012 lb/MMBtu. However, these facilities conducted only a short term compliance test (3 test runs of a maximum of 2 hours per each test run), and these results would not be indicative of long term performance of these units. At Plant Washington, compliance with the permitted filterable PM limit will be on a continuous basis, with the filterable PM limit established on a 24-hr. block average basis.

Also, these facilities were effectively demonstrating compliance following a fabric filter baghouse. At Plant Washington, the facility baghouse will be followed by a wet scrubber, which will be utilized for the control of SO_2 emissions. On occasion the mist generated in the wet scrubber could introduce a small amount of filterable particulate into the flue gas stream. This phenomenon has been observed in wet scrubber and were not as effective in eliminating mist at times depending on operating conditions. The wet scrubber would potentially add PM to the exhaust gas stream, not HAPs.

Based on the above information, Plant Washington proposes the use of a fabric filter and a $PM_{filterable}$ limit of 0.012 lb/MMBtu as the MACT floor for non-mercury metal HAPs.

(3) Beyond the Floor Analysis

Plant Washington reviewed information about adding additional or alternative particulate control devices such that technologies in series could have the potential to remove more particulate matter than just one device. Plant Washington found data to support the contrary. There is no data to suggest that the use of an additional control device in series with the fabric filter will result in any measurable increase in $PM_{filterable}$ removal efficiency already achieved.

While PM CEMS are currently proposed for facilities such as the Desert Rock and Longleaf facilities with a low filterable PM limit (0.01 lb/MMBtu), achieving such low limits with the control strategy planned for Plant Washington, on a long term basis, has not yet been demonstrated. Therefore, selection of a lower filterable PM limit for surrogate monitoring is determined to be infeasible at this time.

(4) The MACT Emissions Limitation for Non-Mercury Metal HAPs

Plant Washing proposes as MACT for non-mercury metal HAPs the use of a fabric filter and a $PM_{filterable}$ emission limit of 0.012 lb/MMBtu. Plant Washington proposes that the PM CEMS be utilized as a surrogate for the direct measurement of non-mercury metal HAPs. This CEMS system will allow for continuous monitoring of $PM_{filterable}$ ensuring that the facility remains in compliance with the corresponding permit limits.

EPD Review

(5) $PM_{filterable}$ as a Surrogate for Non-Mercury Metal HAP Emissions

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's selection of the $PM_{filterable}$ as a surrogate for non- mercury metal HAP Emissions.

(6) Non-Mercury Metal MACT Floor

EPD has additional stack test reports and emission results for several other coal-fired power plants not listed in Plant Washington's 112(g) application. These test results are listed below in Table X.

Table X - $PM_{filterable}$ Limits and Test Results at Select Facilities

Facility	Filterable Permit Limit (lb/MMBtu)	Test Result (lb/MMBtu)	Test Date
Wygen II	0.012	0.001	March 2008
Tucson Electric - Springerville Unit 3	0.015	0.0020(1)	Nov. 2006
Hardin	0.015	0.0072	May 2006

(1) Retest results – the initial test failed the limit due to incorrect installation of bags in the baghouse.

EPD has additional recent permits other coal-fired power plants not listed in Plant Washington's 112(g) application. These permits are listed below in Table XI.

Table XI - $PM_{filterable}$ Limits in Recent Permits and Draft Permits

Facility	State	Filterable Permit Limit (lb/MMBtu)	(Draft) Permit Date	Notes
NRG Limestone	Texas	0.012	August 2008	Draft MACT Permit
Desert Rock	EPA Region 9 (New Mexico Tribal Lands)	0.010	July 2008	PSD Permit
Comanche	Colorado	0.012	June 2005	PSD Permit

(7) Beyond the Floor Analysis

EPD questioned Plant Washington's analysis that utilizing a wet scrubber for SO_2 control will contribute a small amount of filterable particulate into the gas stream. Plant Washington stated that this phenomenon has been observed in wet scrubber units utilizing multiple spray levels for SO_2 control, where the mist eliminators in the wet scrubber were not as effective in eliminating mist at times depending on operating conditions. The wet scrubber would potentially add PM to the exhaust gas stream, not HAPs. EPD requested more documentation from Plant Washington to support this theory.

Plant Washington submitted a letter dated May 28, 2009 with the purpose of discussing the PM limit and submitting supporting documentation to substantiate their analysis. The following is the PM specific information as requested by EPD.

PM Limit Evaluation

Further questions have been raised regarding the proposed filterable PM emission limit for the main boiler at Plant Washington, 0.012 lb/MMBtu, in light of the proposal by the Longleaf Energy Station to reduce their filterable PM limit to 0.010 lb/MMBtu as part of the 112(g) Case-by-Case MACT application submitted for that facility in October 2008. One of the main differences between the Longleaf Energy Station and Plant Washington is the difference in the SO_2 emissions control strategy. Plant Washington will utilize a wet scrubber while the Longleaf Energy Station will utilize a dry scrubber for control of SO_2 emissions (as well as other pollutants).

There are several operational issues that could cause a sudden increase or variability in PM CEMS readings from the main boiler unit. Those items include;

1. Carry over of mist from the wet scrubber introducing filterable PM into the gas stream. This would occur following the main PM control device for Plant Washington (fabric filter baghouse), and would not occur with a facility utilizing a dry scrubber (i.e. Longleaf Energy Station).
2. Soot blowing of the boiler causing a sudden increase in the PM loading to the baghouse system.
3. A change in load conditions/demand on the facility causing a sudden increase to the PM loading to the baghouse system.
4. The cleaning of a baghouse system.
5. The response and variability of the PM CEMS device to changes in emissions.

The following discussions address the different topics addressed above;

Wet Scrubber Mist Carry Over

As discussed in Section 4.3.1 of the application, the wet scrubber for Plant Washington is downstream of the Particulate Matter (PM) control device. On occasion, the mist generated in the wet scrubber could introduce a small amount of filterable PM into the flue gas stream. The amount of mist carryover would be a function of the effectiveness of the mist eliminators used on the wet scrubber system. Mist eliminators are vanes installed inside the top of the wet scrubber to cause the flue gas exhaust stream to make changes in direction. These changes in direction cause the exhaust stream to impact the vanes, thereby causing the mist to drain back into the scrubber.

Discussions with an engineering design company indicated that there is a potential for carry over of wet scrubber slurry from a wet scrubber into the exhaust gas stack, particularly when all spray levels are in use. In order to meet the proposed BACT emission limits for SO_2, and the minimum removal efficiency for the wet scrubber for Plant Washington, it may be necessary to incorporate up to five spray levels into the wet scrubber. Operation of this many spray levels increases the chances of mist carryover from the wet scrubber into the flue gas stream.

A review of documentation on this issue found several technical documents regarding the potential for PM mist carryover from wet scrubbers. One document was a Burns & McDonnell technical paper from November 2006 titled *PM CEMS: The Current Reality of Monitoring Particulate Matter*. In that document, the following statement was made; "[S]ome types of PM CEMS are not appropriate for use with certain other add-on control device chains. Optical instruments (light scattering, light extinction, optical scintillation) should be avoided on units controlled with a wet FGD unless the PM CEMS can remove the water droplets by heating the sample sufficiently." This is, therefore, inferring that there could be interferences with a PM CEMS following a wet scrubber.

A case study within this technical document was discussed, which involved installation of a PM CEMS following the wet scrubber at the Henderson Municipal Power and Light II Plant in Henderson, Kentucky. The results of this case study indicated that , after the PM CEMS was installed and certified, problems with the PM CEMS were encountered involving plugging of the monitor and probe. It was discovered that the problems were the result of excessive mist carryover from the wet scrubber, resultant from blockages in the mist eliminator. The problem was resolved by varying the temperature within the PM CEMS system. However, it was indicated that as a result of the study the PM CEMS device was now being used by plant personnel as an indication of maintenance issues with the wet scrubber. Therefore, the potential for mist carryover impacts from a wet scrubber negatively impacting a PM CEMS device have been well documented in literature, and this documentation supports the fact that PM is emitted due to wet scrubber operation.

A second document reviewed was a response to comments on a PSD permit application by the Basin Electric Power Cooperative to the South Dakota Department of Environment and Natural Resources. This document discussed use of mist eliminators for wet scrubbers, and discussed that guaranteed carryover emission rates from mist eliminators typically ranged from 0.01 to 0.015 grains per dry standard cubic foot of flue gas. Also, it was stated that these guarantees typically exclude droplets smaller than 40 microns in size. A carry over of PM ranging from 0.01 to 0.015 grains per dry standard cubic foot would translate for Plant Washington to values between 0.02 to 0.03

lb/MMBtu based on the stack conditions for the main boiler for Plant Washington. These value are higher than the proposed PM filterable limit of Plant Washington of 0.012 lb/MMBtu, and higher than the NSPS standard of 0.015 lb/MMBtu. The reportedly high level of guaranteed emission rates indicated for mist eliminators in wet scrubbers tends to indicate concern by equipment vendors regarding the level of mist carryover in wet scrubbers.

A review of available technical documentation indicates that wet scrubber mist carry over has been documented in literature, and could potentially introduce additional PM into the main boiler exhaust gas at Plant Washington. The phenomenon of mist carry over could potentially occur from wet scrubber systems operating at a very high removal efficiency of SO_2, as is the case with Plant Washington. Mist carry over would not be expected from systems utilizing a dry scrubber such as the Longleaf Energy Station.

Soot Blowing

Slag from coal ash can build up on the walls of the boiler furnace. These deposits can negatively effect the efficiency of the boiler system, and negatively effect emissions. Soot-blowing refers to the method used to clean these deposits from the boiler, a common practice in pulverized coal fired boilers. Depending on the soot-blowing practices used, variable loadings of PM emissions can be added to the system that could be seen by a PM CEMS device, and not measured during a standard 3-hr stack testing event. A technical paper titled *PM2.5 and Mercury Emissions From a High Ratio Fabric Filter After a Pulverized Coal Fired Boiler* evaluated PM CEMS data during normal boiler operation and during soot-blowing in the boiler. A comparison of the PM CEMS data, as show in Figure 4 and Figure 5 of the technical paper, documented an almost 300% increase in particles smaller than 3 µm at the fabric filter baghouse outlet. It was noted that the total increase in PM emissions from soot-blowing was larger than that recorded since the PM CEMS device was only monitoring particles smaller than 3 µm and soot-blowing predominantly removes larger fly ash particles.

The source evaluated was a coal fired boiler utilizing emissions controls of Selective Catalytic Reduction (SCR), a fabric filter baghouse, and a wet scrubber. Therefore, there is documented evidence that soot-blowing activities can lead to an increase in PM emissions, and that increase in PM emissions would be captured by a PM CEMS device. This provides further evidence that by monitoring PM on a continuous basis with a CEMS device, routine operational practices that could cause increased in system PM emissions need to be taken into account.

Load Changes

Although Plant Washington will be a base load unit, depending on electricity demand the load demand on the main boiler will change over time. A sudden increase in boiler loading could cause a temporary increase in the loading to the system PM control device, leading to an increase in emissions. While a standard stack test could measure PM emissions at different load conditions (i.e. 40%, 100%, etc.), a PM CEMS device will continuously monitor and capture the entire system response to load changes. As stated above, when monitoring PM on a continuous basis with a CEMS device, routine operational practices that could cause increases in system PM emissions need to be taken into account when determining a proper emission limit.

Baghouse Cleaning Cycle

During a baghouse cleaning cycle, there is the potential for a sudden increase in PM emissions, due to a lack of filter cake on the filter bag decreasing the efficiency of the filter, and the potential for a sudden "puff" of PM. These effects were documented in an evaluation of PM CEMS devices by the USEPA, in a document titled *Evaluation of Particulate Matter (PM) Continuous Emission Monitoring Systems (CEMS) – September 2000.* Pages 5-99 through 5-104 of the document discuss peaks in evaluated PM CEMS devices that seem to correspond with the baghouse cleaning cycle, and that the peaks observed in the PM CEMS are "likely caused by the brief puff of particulates when a cleaned compartment is first opened". Therefore, an EPD evaluation of PM CEMS devices has documented that baghouse cleaning cycles can cause spikes in PM emissions and PM CEMS readings.

A response to WDEQ comments to the Basin Electric Power Cooperative, Dry Fork Unit 1 application indicated the following "because of the potential for increased particulate emissions immediately following a cleaning cycle (i.e. before the filter cake is reestablished) and because of the potential for particulate emissions associated with filter housing integrity, fabric filter vendors have not provided guarantees below 0.012 lb/MMBtu". This unit was proposing compliance with its PM emission limit through stack testing, not PM CEMS. Although these discussions were several years ago (2005), it demonstrates that the baghouse cleaning cycle is an important consideration in assessment of a filterable PM emission limit and emission guarantees.

Response and Variability of PM CEMS

PM CEMS devices are required to comply with Performance Specification 11 (PS-11), Specifications and Test Procedures for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources. Commenters to PS-11 noted that the reduction of the minimum correlation coefficient from 0.90 to 0.85 between the correlation test and the PM CEMS was allowing for PM CEMS to be less accurate, and was an admission that PM CEMS are inappropriate for compliance. Another commenter noted that use of the correlation coefficient of 0.85 was evidence that the response of PM CEMS is variable and unreliable.

The EPA responded to these comments by stating that they agreed with commenters that reduction in the required minimum correlation coefficient allowed for more variability in the data. However, the EPA did not agree that this was an indication that PM CEMS were unreliable. However, with a low allowable value for the minimum correlation coefficient, combined with the fact that stack testing is required for correlation with these devices and stack testing methods for the fine PM ($PM_{2.5}$), which will comprise a large portion of the PM emissions, are still in development, the response and variability of readings from a PM CEMS device could further make compliance with stringent PM emission limits difficult on a continuous basis.

PM Limit Evaluation Summary

Considering all of the above discussed variables, a PM CEMS device may best be used as an indicator of the performance of the pollution control devices in use, rather than an accurate long term measurement of emissions. When taking into account the five issues discussed above, the emissions control strategy of Plant Washington (wet scrubber) which could have unplanned increases in PM emissions, in combination with normal operational procedures that could cause increases in PM emissions that would be measured by a PM CEMS device, and the potential variability of a PM CEMS device, an emission limit of 0.012 lb/MMBtu for filterable PM is justified.

Based on the above information EPD agrees that the Non-Mercury Metal HAP floor can be set at 0.012 lb/MMBtu for $PM_{filterable}$.

(8) The MACT Emissions Limitation for Non-Mercury Metals

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's MACT Emissions Limitations for non-mercury metal HAPs.

(9) Conclusions

EPD sets as the MACT emission limitation for non-mercury metal HAPs the use of a fabric filter and wet scrubber and a $PM_{filterable}$ emission limit of 0.012 lb/MMBtu. PM CEMS will be utilized as a surrogate for the direct measurement of non-mercury metal HAPs because compliance with a $PM_{filterable}$ permit limit of 0.012 lb/MMBtu on a 3-hour average will ensure that these particulate HAPs are being captured effectively. Plant Washington will use a continuous emissions monitoring system (CEMS) for $PM_{filterable}$.

c. MACT Determination for Acid Gases

Applicant's Proposal

(1) Acid Gases MACT Floor

Two acid gas HAPs, Hydrochloric Acid (HCl) and Hydrogen Fluoride (HF), will be emitted from the coal-fired boilers due to trace concentrations of chlorine and fluorine compounds naturally found in the coal. Very little information is available from EPA on HCl and HF emissions from coal-fired power plants. Listed below in Table XII is available stack test results for similar facilities emitting HF and HCl.

Table XII - HF and HCl Stack Test Results

Facility	Pollutant	Emission Test Result (lb/MMBtu)	Emission Limit (lb/MMBtu)
Walter Scott Jr. Energy Center Unit 4	HF	2.9×10^{-5}	9.0×10^{-4}
	HCl	5.77×10^{-5}	2.9×10^{-3}
Santee Cooper Cross Generating Station Unit 3	HF	4.15×10^{-5}	3.0×10^{-4}
	HCl	2.77×10^{-4}	2.4×10^{-3}
Wisconsin Public Service corporation West Unit 4	HF	3.1×10^{-5}	2.17×10^{-4}
	HCl	0.34 lb/hr (7.03×10^{-5})	10.94 lb/hr (2.11×10^{-3})

Listed below in Table XIII are recent 112(g) determinations for acid gases for similar facilities.

Table XIII – Recent Acid Gas Limits in 112(g) Determinations

Facility	Acid Gas Control Strategy	HCl/HF Reduction	Emission Limit (lb/MMBtu)
Thoroughbred Generating Station	WFGD and WESP	98%	HF: 1.59×10^{-4} HCl: no limit
Consumers Energy Karn – Weadock	WFGD and sorbent injection	~98.3% Based on Estimated Fluorine and Chlorine Coal Concentrations	HF: 1.70×10^{-4} HCl: 2.4×10^{-3}
Roundup Power Project	Dry scrubber and fabric filter	90%	HF: 3.2×10^{-4}
Midamerican Energy Company – Walter Scott Jr. Energy Center CFEC4 Boiler	Dry scrubber and fabric filter	96%	HF: 9×10^{-4} HCl: 2.9×10^{-3}
Santee Cooper Cross Generating Station	WFGD	95%	HF: 3×10^{-4} HCl: 2.4×10^{-3}
LS Power Longleaf	Dry Scrubber and Fabric Filter	Not Indicated 98% to 99% Estimated based on uncontrolled and controlled rates	HF: 2.0×10^{-4} HCl: 6.0×10^{-3} (PRB coal) 2.4×10^{-3} (CAPP coal)
Tuscon Electric Power Company Springerville Generating Station	Dry Scrubber and Fabric Filter	Not Indicated	HF: 4.4×10^{-4} HCl: no limit

Facility	Acid Gas Control Strategy	HCl/HF Reduction	Emission Limit (lb/MMBtu)
Cliffside Station Unit 6	Dry Scrubber and Fabric Filter	Not Indicated	Surrogate Limit for HF and HCl SO_2 0.12 30-day rolling average.
Santee Cooper Pee Dee Generating Station	Wet Scrubber	Not Indicated	HF: 3.4×10^{-4} HCl: 2.72×10^{-3} Identified Limits for Initial compliance – continued compliance through surrogate monitoring SO_2 0.12 30-day rolling avg.
Consumers Energy Karn/Weadock Generating Station	Wet Scrubber	97%	HF: 3.0×10^{-4} HCl: 4.0×10^{-3}
John W. Turk Jr.	Dry Scrubber and Fabric Filter	Not Indicated	HF: 2.0×10^{-4} HCl: 6.0×10^{-4}

Based on a review of the data available, use of a wet scrubber for control of the acid gases HF and HCl with a removal efficiency of 98.5% is determined to be representative of the best controlled similar source, and the MACT floor for the control of the acid gases HF and HCl.

(2) Beyond the Floor

New information is available suggesting the addition of a wet electrostatic precipitator (WESP) would provide additional removal of HCl and HF. Plant Washington provided basic cost analysis on adding a WESP system to the facility. In addition to the higher costs, the use of a WESP will cause additional environmental impacts. Specifically would place greater demands on the limited water supply in the region. Plant Washington believes that these cost, environmental impacts and increased energy demands do not justify the use of a WESP at the facility.

(3) MACT Emission Limitation for Acid Gas HAPs

Plant Washington proposes as MACT for acid gas HAPs at the facility the use of a wet scrubber with a removal efficiency of at least 98.5%. The corresponding MACT emission limits would be 3.22×10^{-4} lb/MMBtu (sub-bituminous) and 2.89×10^{-3} lb/MMBtu (50/50 Coal Blend) for HCl, and 2.17×10^{-4} lb/MMBtu for HF. All three limits would be based on a 3-hour averaging time.

Plant Washington proposes using Methods 13A and/or 26A stack testing which will be conducted initially and thereafter as EPD may direct to demonstrate compliance with the proposed limits. Plant Washington also proposes using SO_2 CEMS and pH monitoring of the wet scrubber as a means of demonstrating that acid gas pollution control devices are operating effectively. Monitoring the major pollutant (SO_2) and other parameters like pH that is removed from the same pollution control devices i.e. wet scrubber will serve as a valid means of providing compliance assurance monitoring between the acid gas stack tests. Also, once the Title V Operating permit is issued, Compliance Assurance Monitoring (CAM) will provide an opportunity for reevaluating the proposed compliance methods to meet the actual performance data of the boilers.

EPD Review

(4) Acid Gases MACT Floor

EPD has additional stack test reports and emission results for other several other coal-fired power plants not listed in Plant Washington's 112(g) application. These test results are listed below in Table XIV.

Table XIV - HF and HCl Stack Test Results

Plant	Stack Test Date	Reported Emissions Lb/MMBtu	Permit Limit Lb/MMBtu
HF			
Newmont Nevada TS Power Plant	April 6 to 14, 2008	1×10^{-4}	1×10^{-3}
Wygen II	Jan 31, 2008	3.8×10^{-5}	3.7×10^{-4}
Santee Cooper - Cross Unit 3	Jan 16 & 19, 2007	$<4.15 \times 10^{-5}$	3.0×10^{-4}
Tucson Electric - Springerville Unit 3	Aug. 24 & 25, 2006	6.3×10^{-5}	4.4×10^{-4}
Hardin	May 31, 2006	5×10^{-5}	5.1×10^{-4}
HCl – Sub-bituminous			
Newmont Nevada TS Power Plant	April 6 to 14, 2008	4×10^{-4}	6×10^{-4}
Wygen II	Jan 31, 2008	3.8×10^{-4}	8.6×10^{-4}
Hardin	May 31, 2006	5×10^{-5}	1.18×10^{-3}

EPD has additional recent permits for other coal-fired power plants not listed in Plant Washington's 112(g) application. These permits are listed below in Table XV.

Table XV - Recent Acid Gas Limits in 112(g) Determinations

Facility	State	HF Permit Limit (lb/MMBtu)	HCl Permit Limit (lb/MMBtu)	(Draft) Permit Date	Notes
Coal Blends (including waste coal and bituminous coal)					
NRG Limestone	Texas	0.0005	0.0023	August 2008	Draft MACT Permit
Sub-bituminous					
Desert Rock	EPA Region 9 (New Mexico Tribal Lands)	0.00024 or 98% removal	--	July 2008	PSD Permit
Comanche	Colorado	0.00049	--	June 2005	PSD Permit

(5) Beyond the Floor

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's Beyond the Floor analysis for acid gas HAPs.

(6) MACT Emission Limitation for Acid Gas HAPs

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's selection of the MACT emission limitations for HF (while firing sub-bituminous and/or 50/50 coal blend) and HCl (while firing sub-bituminous).

For 50/50 coal blend, the applicant has proposed an emissions limit for HCl of 2.89×10^{-3} lb/MMBtu. However, EPD has decided to set a more stringent MACT emissions limit for HCl of 1.36×10^{-3} lb/MMBtu while firing 50/50 coal blend. The HCl emissions limit for 50/50 coal blend is based on a computed weighted average based on the proportion of MMBtu input contributed by each coal rank (sub-bituminous and bituminous) and its applicable HCl emissions limit while firing up to a 50/50 blend of sub-bituminous and bituminous coal. The Division has determined that the HCl emission limit of 2.40×10^{-3} lb/MMBtu is the MACT HCl limit for bituminous coal and must be used for bituminous coal to calculate the computed weighted average for the 50/50 coal blend.

The Division conducted an independent review of the RBLC database and looked at draft permits for similar sources. The recent draft permit determination for LS Power Longleaf 112(g) Notice of MACT Approval has a HCl limit of 2.40×10^{-3} lb/MMBtu while firing bituminous coal. Also, for the Santee Cooper Cross (Unit 3) facility, the permitted limit is 2.40×10^{-3} lb/MMBtu for HCl while firing bituminous coal. Based on the Division's review, EPD has decided to set the MACT HCl limit of 2.40×10^{-3} for bituminous coal at Plant Washington. Please note Plant Washington is not being permitted to fire bituminous coal exclusively in the boiler and only a 50/50 blend (by weight) of sub-bituminous and bituminous coal is allowed.

(7) Conclusions

EPD sets as MACT for acid gas HAPs at the Plant Washington facility the use of a wet scrubber. The corresponding MACT emission limits will be 3.22 x 10^{-4} lb/MMBtu (sub-bituminous), 1.36 x 10^{-3} lb/MMBtu (50/50 coal blend) and 2.40 x 10^{-3} (bituminous) for HCl, and 2.17 x 10^{-4} lb/MMBtu for HF.

Method 13A and/or 26A stack testing will be conducting initially and thereafter as EPD may direct to demonstrate compliance with the proposed limits.

SO_2 CEMS will be utilized as a means of demonstrating that Plant Washington's acid gas pollution controls are operating effectively. Continuous compliance can be determined using SO_2 as a surrogate monitoring compound for compliance with the applicable HF and HCl emissions limits, and pH monitoring of the facility wet scrubber.

d. MACT Determination for Organics

Applicant's Proposal

Unlike the previously discussed HAPs, organic emissions are not controlled through add-on pollution control technologies, but rather through good combustion practices. A complete listing of estimated emission from all organic HAPs is detailed in the Notice of MACT Approval application no. 17924.

(1) CO as a Surrogate for Organic HAP emissions

Plant Washington proposes the use of CO as a surrogate for organic HAPs. CO satisfies the factors discussed previously for non-mercury metal HAPs. CO and organics are both products of incomplete combustion. Thus, the good combustion practices that serve as effective pollution control to reduce CO emissions will also indiscriminately act to reduce the emissions of organic HAPs. CO will also be continuously monitored with a CEMS.

(2) Organic HAP MACT Floor

EPA has not provided any information pertaining to setting a MACT floor for organic HAPs. Good combustion practices refer to the optimization of the design, operation, and maintenance of the furnace and combustion system. Factors that affect combustion in a pulverized coal (PC) fired boiler include the continuous mixing of air and fuel in the proper proportions, extended residence time, and consistent high temperatures in the combustion chamber. Proper operation and maintenance of fuel feed systems, fans, system dampers, and other equipment will assist in reducing CO, VOC, and organic HAP emissions.

Unlike other HAPs discussed here, CO emissions have an effect on the corresponding NOx emissions. The lower the CO emissions are tuned in the boiler, the higher the NOx emissions (in a very simplistic relationship).

Table XVI below lists 112(g) determinations for similar facilities for organic HAPs

Table XVI – Recent CO 112(g) Determinations

Facility	Organic HAPs Control Strategy	Emission Limit (lb/MMBtu)
Cliffside Station Unit 6	Good Combustion Controls	Surrogate CO Monitoring 0.10 Compliance Determination per Stack Test
Consumers Energy Karn/Weadock Generating Station	Good Combustion Controls	Surrogate CO Monitoring 0.125, 30-day rolling avg
John W. Turk Jr.	Good Combustion Controls	Surrogate VOC Monitoring 0.0025, 3-hr avg
Santee Cooper Cross Generating Station	Good Combustion Controls	Surrogate CO and VOC Monitoring CO: 0.16 VOC: 0.0024 Compliance Determination Per Stack Test
Midamerican Energy Company – Walter Scott Jr. Energy Center CBEC4 Boiler	Good Combustion Controls	Surrogate CO Monitoring 0.154, 24-hr. block average (180 ppm)
Roundup Power Project	Good Combustion Controls	Surrogate CO Monitoring 0.15
Santee Cooper Pee Dee Generating Station	Good Combustion Controls	Surrogate CO Monitoring 0.15, 30-day rolling avg

Plant Washington proposes a MACT floor for organic HAP emissions from the facility is the use of combustion controls and good combustion practices with an emission limit of 0.10 lb/MMBtu on a 30-day rolling average.

(3) Beyond the Floor

No controls beyond use of good combustion practices were identified for control of organic HAP emissions. A review of recent permit limits in the RBLC database and in 112(g) permit limitations indicated that the proposed CO surrogate monitoring limit of 0.10 lb/MMBtu on a 30-day rolling average basis is the most stringent limit currently proposed. Therefore, any organic HAP emissions control beyond the MACT floor is determined to be infeasible.

(4) MACT Emissions Limitation for Organic HAPs

Plant Washington proposes as MACT for organic HAP emissions the use of good combustion practices and a CO emission limit of 0.10 lb/MMBtu on a 30-day average. Plant Washington will use a CEMS to continuously monitor and ensure compliance with the permitted limit. Compliance with the CO permit limit will satisfy MACT for the organic HAPs that the facility may emit.

EPD Review

(5) CO as a Surrogate for Organic HAP emissions

EPD reviewed all the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's surrogate analysis for organic HAPs.

(6) Organic HAP MACT Floor

Plant Washington did not list CO stack test results from similar facilities as a part of the 112(g) application. EPD has stack test reports and emission results for several other coal-fired power plants that are listed below in Table XVII.

Table XVII - CO Stack Test Results

Plant	Stack Test Date	Reported Emissions Lb/MMBtu	Permit Limit Lb/MMBtu
Newmont Nevada TS Power Plant	April 6 to 14, 2008	0.002	0.15
Wygen II	Jan 31, 2008	0.07	0.15
MidAmerican - Walter Scott, Jr.	Aug. 14-18, 2007	0.003	0.154
MidAmerican - Walter Scott, Jr.	May 8-12, 2007	0.039	0.154
Santee Cooper - Cross Unit 3	Jan 16 & 19, 2007	0.177	0.16
Tucson Electric -Springerville Unit 3	Aug. 24 & 25, 2006	0.062	0.15
Hardin	May 31, 2006	0.001	0.15

EPD has additional recent permits for other coal-fired power plants not listed in Plant Washington's 112(g) application. These permits are listed below in Table XVIII.

Table XVIII – Recent CO Limits in Recent Permits and Draft Permits

Facility	State	CO Permit Limit (lb/MMBtu)	(Draft) Permit Date	Notes
SWEPCO John Turk	Arkansas	0.15	Nov 2008	Final MACT Permit
NRG Limestone	Texas	0.15	August 2008	Draft MACT Permit
Desert Rock	EPA Region 9 (NM Tribal Lands)	0.10	July 2008	PSD Permit
Comanche	Colorado	0.13	June 2005	PSD Permit

(7) Beyond the Floor

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's beyond the MACT floor analysis for organic HAPs.

(8) MACT Emissions Limitation for Organic HAPs

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's selection of the MACT emission limitations for organic HAPs.

(9) Conclusions

EPD sets as MACT for organic HAP emissions at the Plant Washington facility the use of good combustion practices and a CO emission limit of 0.10 lb/MMBtu. CO CEMS will be used to continuously monitor and ensure compliance with the permitted CO emission limit. For the reasons set forth above regarding the use of CO as a surrogate for organic HAPs, compliance with the CO permit limit will satisfy MACT for the organic HAPs that the Plant Washington facility may emit.

4. Auxiliary Boiler Case-by-Case MACT

a. MACT Determination for Inorganic Metal HAPs

<u>Applicant's Proposal</u>

Plant Washington has placed mercury and non-mercury metal HAPs in a single category for the purposes of this application for several reasons. First, there is no mercury specific control technology that has been demonstrated to consistently achieve reductions in mercury emissions from new liquid fuel-fired industrial/commercial/institutional boilers like the boiler to be installed at the facility. Second, although mercury emissions may exist in different forms as compared to non-mercury metal HAPs, Plant Washington believes that if any mercury emission reductions are to be achieved from the auxiliary boiler, particulate-bound mercury can be effectively controlled through use of the same control technology used to reduce non-mercury metal HAPs.

(1) PM as a Surrogate for Inorganic Metal HAP Emissions

Plant Washington proposes the use of particulate matter (PM) as a surrogate for inorganic metal HAPs. In general, the use of a surrogate to set MACT standards has been widely accepted by EPA, state permitting agencies, and the courts. EPA federal register notices, and several court cases in the support this approach for verifying compliance with the MACT limits on inorganic metal HAP emissions. As one court noted, the reasonableness of the use of a surrogate depends on several factors, including (1) whether the HAPs to be regulated are "invariably present" in the emissions of the proposed surrogate; (2) whether the pollution control technology used for the surrogate "indiscriminately captures" the HAPs to be regulated along with emissions of the proposed surrogate; and (3) whether the pollution control technology used for the surrogate is the only means by which a facility could reduce the emissions of the HAPs to be regulated.[8]

Plant Washington states that for inorganic metal HAPs, the use of PM satisfies all of these factors and therefore is an appropriate surrogate for the associated permit limits. In addition, EPA has previously stated that PM would be an appropriate surrogate for inorganic metal HAPs for the following reasons:

> Most, if not all, non-mercury metallic HAP emitted from combustion sources will appear on the flue gas fly-ash. Therefore, the same control techniques that would be used to control the fly-ash PM will control non-mercury metallic HAP. Particulate matter was also chosen instead of specific metallic HAP because all fuels do not emit the same type and amount of metallic HAP but most generally emit PM. The use of PM as a surrogate will also eliminate the cost of performance testing to comply with numerous standards for individual metals.[9]

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[8] *See Sierra Club v. EPA*, 353 F.3d at 984 (citing *Nat'l Lime Ass'n*, 233 F.3d at 639).
[9] 69 Fed. Reg. at 55223 (Sept. 13, 2004).

(2) Inorganic metal HAP Floor

Unlike with the coal-fired boilers above, EPA has not identified control technologies for the removal of inorganic metal HAPs for the type of auxiliary boiler to be utilized at the facility (liquid fuel; limited use). Plant Washington details in Notice of MACT Approval Application No. 17924 a complete discussion of control technologies for inorganic metal HAPs. Plant Washington proposes the use of ultra low sulfur distillate fuel oil (15 ppm sulfur content, by weight) and good combustion practices (GCP) as the MACT floor for inorganic HAPs.

(3) Beyond the MACT Floor Analysis

No controls were identified to be effective for use on the auxiliary boiler other than fuel selection and good combustion practices. Therefore, use of additional controls for the limited use auxiliary boiler are not justified.

(4) The MACT Emission Limitation for Inorganic Metal HAPs

Based on the review of available information, fuel selection (low sulfur low ash fuel) and GCP is determined as MACT for inorganic metal HAPs from the auxiliary boiler.

<u>EPD Review</u>

(5) PM as a Surrogate for inorganic Metal HAP Emissions

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's surrogate analysis for inorganic metal HAPs.

(6) Inorganic HAP Floor

PM emissions control technology for new distillate oil-fired boilers indicates that no new distillate oil-fired boilers are designed with a PM control device. After reviewing the RACT/BACT/LEAR Clearinghouse (RBLC) database and recent draft and issued permits, EPD has determined that the use of a control device beyond fuel selection is not necessary to comply with MACT.

The use of natural gas instead of ultra low sulfur distillate fuel oil has the potential to slightly reduce PM emissions. EPA has stated previously that fuel switching was not considered a control technology to be considered in the beyond-the-floor analysis for new industrial/commercial/institutional boilers.[10]

[10] 68 Fed. Reg. at 1684-85 (Jan. 13, 2003). See also 69 Fed. Reg. at 55233 (Sept. 13, 2004).

EPD has reviewed recent draft and final permitting decisions throughout the United States. These facilities and their corresponding PM limits are listed below in Table XIX.

Table XIX – PM Limits in Recent Permits and Draft Permits

Facility	State	Permit Limit (lb/MMBtu)	(Draft) Permit Date	Notes
Desert Rock – 86.4 MMbtu/hr	EPA Region 9 (New Mexico Tribal Lands)	0.0236 (total) 0.0142 (filterable)	July 2008	PSD Permit
Wolverine – 72.4 MMBtu/hr	Michigan	0.03 (total) 0.015 (filterable)	September 2008	Draft PSD/MACT Permit
Plum Point Unit I	Arkansas	0.023	Jan 2008	PSD Permit
Virginia Commonwealth University East Plant	Virginia	0.02	March 2003	RBLC Database

After reviewing these permit limits from recently constructed facilities, EPD has determined that a PM_{total} limit – specifically, 0.024 lb/MMBtu – which is the BACT determination made previously for the auxiliary boiler by Plant Washington should be the MACT floor for Inorganic Metal HAPs. In conjunction with the PM limit, Plant Washington will be permitted to burn ultra low sulfur diesel fuel oil in the auxiliary boiler.

(7) Beyond the MACT Floor Analysis

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's Beyond the Floor analysis for inorganic metal HAPs.

(8) The MACT Emission Limitation for Inorganic HAPs

EPD reviewed all the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's selection of the MACT emission limitations for metal HAPs. In addition to the analysis performed by Plant Washington, EPD has set a PM_{total} limit for the boiler and designated the fuel to be ultra low sulfur diesel fuel oil.

(9) Conclusions

EPD sets as MACT for inorganic metal HAP emissions at the Plant Washington facility the use of ultra low sulfur distillate fuel oil (15 ppm sulfur content, by weight) and a PM_{total} emission limit of 0.024 lb/MMBtu. A PM stack test and fuel certifications for each fuel shipment will be utilized as a surrogate for direct measurement of inorganic metal HAPs.

b. MACT Determination for Inorganic (HCl and HF) HAPs

Applicant's Proposal

(1) SO_2 as a Surrogate for Inorganic HAP Emissions

Emissions of the acid gas HCl and HF will occur from the auxiliary boiler. HCl and HF emissions result from fuel oil combustion through the oxidation of chlorine present in the fuel source. Emissions of HCl and HF are controlled through SO_2 control technologies.

(2) Inorganic MACT Floor

SO_2 control technologies are not used for auxiliary boilers at coal utility plants due to their limited and intermittent use.

Plant Washington proposes the use of distillate oil as the MACT floor for the auxiliary boiler.

(3) Beyond the MACT Floor Analysis

No controls were identified to be effective for use on the auxiliary boiler other than good combustion practices and fuel selection. Therefore, use of additional controls for the limited use auxiliary boiler is not justified.

(4) The MACT Emissions Limitation for Inorganic HAPs

Plant Washington proposes the use of low sulfur distillate fuel oil as MACT for inorganic HAPs at the facility.

Plant Washington proposes to use fuel certifications for compliance assurance monitoring. Since low sulfur distillate fuel oil contains less impurities including fluorine and chlorine, fuel certifications will serve as a valid means of providing compliance assurance monitoring.

EPD Review

(5) SO_2 as a Surrogate for Inorganic HAP Emissions

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's surrogate analysis for inorganic HAPs.

(6) Inorganic MACT Floor

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and partially agrees with Plant Washington's MACT floor analysis for inorganic HAPs. EPD believes that the use of ultra low sulfur diesel fuel oil will significantly reduce emissions from inorganic HAPs.

(7) Beyond the MACT Floor Analysis

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's beyond the MACT floor analysis for inorganic HAPs.

(8) The MACT Emissions Limitation for Inorganic HAPs

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and partially agrees with Plant Washington's selection of the MACT emission limitations for inorganic HAPs. EPD believes that the use of ultra low sulfur diesel fuel oil will significantly reduce emissions from inorganic HAPs.

(9) Conclusions

EPD sets as MACT for inorganic HAP emissions at the Plant Washington facility the use of ultra low sulfur distillate fuel oil. Plant Washington will use fuel certifications for compliance monitoring. Since ultra low sulfur distillate fuel oil contains fewer impurities including fluorine and chlorine, fuel certifications will serve as a valid means of providing compliance assurance monitoring.

c. MACT Determination for Organic HAPs

Applicant's Proposal

(1) CO as a Surrogate for Organic HAP emissions

Plant Washington proposes to use CO as a surrogate for organic HAP. A review of recent case-by-case MACT determinations by other permitting authorities reveals that organic HAP emissions are through the use of either CO or volatile organic compounds (VOC) emissions as a surrogate.

(2) Organic MACT Floor

Plant Washington reviewed EPA's RBLC, 112(g) determinations conducted for other sources, and review of BACT determinations and confirmed that good combustion practices are the only demonstrated control for CO emissions and that no facility utilizes add-on control technology to reduce CO emissions.

Plant Washington concludes that the MACT floor for organic HAP emissions from the facility is the use of combustion controls and good combustion practices sufficient to comply with a CO emission limit of 0.04 lb/MMBtu on a 24-hour block average.

(3) Beyond the MACT Floor Analysis

No controls were identified to be effective for use on the auxiliary boiler other than good combustion practices and combustion controls. Therefore, use of additional controls for the limited use auxiliary boiler is not justified.

(4) The MACT Emissions Limitation for Organic HAP

Plant Washington proposes as MACT for organic HAP emissions at the facility the use of good combustion practices and a CO emission limit of 0.04 lb/MMBtu on a 24-hour block average. Plant Washington will use stack tests and documentation of good combustion practices to continuously monitor and ensure compliance with the permitted CO emission limit.

EPD Review

(5) CO as a Surrogate for Organic HAP emissions

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's surrogate analysis for organic HAPs.

(6) Organic MACT Floor

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's MACT floor analysis for organic HAPs.

(7) Beyond the MACT Floor Analysis

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's Beyond the MACT floor analysis for organic HAPs.

(8) The MACT Emissions Limitation for Organic HAP

EPD reviewed the provided information, verified footnotes and references throughout the application and additional information submittals and agrees with Plant Washington's selection of the MACT emission limitations for organic HAPs.

(9) Conclusions

EPD sets as MACT for organic HAP emissions at the Plant Washington facility the use of good combustion practices and a CO emission limit of 0.04 lb/MMBtu. Plant Washington will use stack tests and documentation of good combustion practices to continuously monitor and ensure compliance with the permitted CO emission limit.

5. Proposed MACT Limits and Requirements

The facility is subject to 40 CFR 63 Subpart A and Subpart B which contain the requirements for case-by-case MACT. The following sections detail the applicable requirements from these subparts. This information is not explicitly listed in the permit.

a. General Requirements

(1) The owner/operator shall comply with 40 CFR 63, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories, Subparts A (General Provisions) and B (Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections 112(g)) and Georgia Air Quality Rules and Regulations 391-3-1-.02(9)(b)16, as applicable.

(2) All provisions contained in this Notice of MACT Approval shall be federally enforceable upon the effective date of issuance as such notice, as provided by Georgia Air Quality Rules and Regulations 391-3-1-.02(9)(b)16.

(3) This Notice of MACT Approval applies to one nominal 8,300 MMBtu/hr (850 MW net output) pulverized coal fired boiler and an auxiliary boiler, 240 MMBtu/hr firing ultra low sulfur distillate fuel (15 ppm, % sulfur by weight) to be located at the proposed site described as Plant Washington at Mayview Road, Sandersville, Georgia (Washington County).

(4) The following pollution control devices shall be installed and operated on each of the two boilers.

i. Fabric Filters (FF) for the control of $PM_{filterable}$, Mercury, and Non-mercury Metal HAPs
ii. Wet Scrubber for control of SO_2, Mercury, and Acid Gas HAPs
iii. Activated Carbon Injection (ACI) in combination with FF for the control of Mercury

During operation of these boilers, all control devices shall be operated consistent with the technological limitations, manufacturer's specifications, and good engineering and maintenance practices for the control devices.

(5) These boilers are permitted to burn sub-bituminous coal (Powder River Basin, or PRB), or up to a 50/50 blend of sub-bituminous and bituminous coal (Illinois #6), as fuel. Ultra low sulfur diesel fuel can be used for startup in the coal-fired boilers. The use of any other substances as fuel is prohibited without prior written approval from the Division.

(6) All official correspondence, plans, application forms, and written statements are an integral part of this Notice of MACT Approval.

(7) The owner/operator shall submit written notification to the Division of the date construction is commenced, postmarked no later than 30 days after such date, and written notification of the actual date of initial startup of each no or altered source, postmarked within 15 days after such date.

(8) The owner/operator shall comply with all terms, conditions, and limitations of this Notice of MACT Approval

b. Emission Limits

(9) Pursuant to 40 CFR 63.43(g) and Georgia Air Quality Regulation 391-3-1-.02(9)(b)16, MACT determination, the Permittee shall comply with the following emission limitations for HAP emissions for the pulverized coal-fired boiler:

Table XXII – Emission Limitations

Pollutant	Emission limit (Per Unit)	Averaging Period
Mercury	13×10^{-6} lb/MWhr	12-month rolling average
Filterable PM (as a surrogate for Non-Mercury Metal HAPs)	0.012 lb/MMBtu	3-hour average
Acid Gases	HCl (sub-bituminous) 3.22×10^{-4} lb/MMBtu HCl (50/50 coal blend) 1.36×10^{-3} lb/MMBtu HCl (bituminous) 2.40×10^{-3} lb/MMBtu; HF – 2.17×10^{-4} lb/MMBtu	3-hour average
CO (as a surrogate for Organic HAPs)	0.10 lb/MMBtu	30-day average

c. General Compliance Requirements

(10) The owner/operator must be in compliance with the emissions limitations in Table XVII, including operating limits, at all times, except as provided by applicable laws and regulations.

d. Initial Compliance Requirements

(11) In order to demonstrate initial compliance with the emissions limitations in Table XXII, the owner/operator must conduct performance tests, set operating limits, and conduct monitoring equipment performance evaluations within 60 days after achieving the maximum production rate at which the facility will be operated, but not later than 180 days after initial startup.

Table XXIII – Initial Compliance Requirements

Pollutant	Emission Limit (Per Unit)	Compliance Monitoring
Mercury	13×10^{-6} lb/MWhr (sub-bituminous)	Direct via Mercury CEMS
Non-Mercury Metal HAPs	0.012 lb/MMBtu ($PM_{filterable}$ as a surrogate)	Indirect via PM CEMS
Acid Gases – HCl	3.22×10^{-4} lb/MMBtu (sub-bituminous) 1.36×10^{-3} lb/MMBtu (50/50 coal blend) 2.40×10^{-3} lb/MMBtu (bituminous)	Direct compliance tested via stack tests; indirect monitoring via SO_2 CEMS
Acid Gases – HF	2.17×10^{-4} lb/MMBtu	Direct compliance tested via stack tests; indirect monitoring via SO_2 CEMS
Organic HAPs	0.10 lb/MMBtu (CO as a surrogate)	Indirect via CO CEMS

(12) The owner/operator shall conduct each performance test listed in Table XXIII in accordance with paragraphs (a) through (d).

a. The owner/operator must conduct each performance test according to 40 CFR 63 Section 63.7 and the Division's **Procedures for Testing and Monitoring Sources of Air Pollutants**.

b. The owner/operator may not conduct performance tests during periods of startup, shutdown, or malfunction.

c. The owner/operator must conduct each performance test at representative performance (i.e., performance based on normal operating conditions) and must demonstrate initial compliance based on this test.

d. Notification of intent to source test, submittal of site-specific test plans, performance of source tests, and the reporting of source test results shall comply with 40 CFR 63 Section 63.7, 63.10 and with the Division's **Procedures for Testing and Monitoring Sources of Air Pollutants**. The owner/operator shall submit a site specific test plan at least 60 calendar days before the performance test is scheduled to take place. The Division must be notified at least two weeks prior to a source test so that a Division representative may be present.

e. Continuous Compliance Requirements

(13) Pursuant to 40 CFR 63.43 (g)(2)(ii) and Georgia Rules for Air Quality 391-3-1-.02(6)(b)1, the owner/operator shall conduct the following monitoring to assure continuous compliance with the applicable emission limitations in Table XXIII:

Table XXIV – Continuous Compliance Requirements

Pollutant	**Monitoring (Per Unit)**
Mercury	CEMS
Non-Mercury Metal HAPs ($PM_{filterable}$ as a surrogate)	CEMS
Acid Gases	Performance test for HCl and HF. SO_2 CEMS for continuous monitoring
Organics (CO as a surrogate)	CEMS

(14) All source tests shall be conducted in accordance with 40 CFR 63.7 and the Division's **Procedures for Testing and Monitoring Sources of Air Pollutants** and is required in the "Initial Compliance Requirements" section of this Notice of MACT Approval.

(15) The owner/operator shall install, operate, and maintain continuous emissions monitoring systems (CEMS) for monitoring and reporting of emissions of CO, Mercury, $PM_{filterable}$, and SO_2.

(16) The owner/operator must install, operate, and maintain CEMS according to the requirements in 40 CFR 63.8 and in paragraphs (a) through (f) of this section.

a. Install, operate, and maintain each CEMS according to 40 CFR 63.8(c) and the appropriate Performance Specification in 40 CFR 60, Appendix B.
b. Conduct a performance evaluation of each CEMS according to requirements of 40 CFR 63.8 and the appropriate Performance Specification in 40 CFR 60, appendix B.
c. As specified in 63.8(c)(4)(ii), each CEMS must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.
d. Reduce CEMS data as specified in 40 CFR 63.8(g)(2).
e. Record the results of each inspection, calibration, and validation check.
f. Except for monitor malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the owner/operator must monitor continuously (or collect data at all required intervals) at all times that the affected source is operating.

(17) To demonstrate continuous compliance with the $PM_{filterable}$ emission limitations in Table XXIII, the owner/operator shall utilize the CEMS data to calculate and record a 3-hour rolling average emission rate on a daily basis. A new 3-hour rolling average emission rate is calculated as the average of all of the hourly $PM_{filterable}$ emission data for the preceding 3 operating hours. For purposes of calculating data averages, data recorded during periods of monitoring malfunctions, associated repairs, out-of control periods (as defined in 40 CFR 63.8(c)(7)), required quality assurance or control activities shall not be used. All the data collected during all other periods in assessing compliance must be used. Any period for which the monitoring system is out of control and data are not available for required calculations constitute a deviation from the monitoring requirements.

(18) To demonstrate continuous compliance with the CO emission limitation in Table XXIII, the owner/operator shall utilize the CEMS data to calculate and record a 30-day rolling average emission rate on a daily basis. A new 30-day rolling average emission rate is calculated as the average of all of the hourly CO emission data for the preceding 30 operating days. For purposes of calculating data averages, data recorded during periods of monitoring malfunctions, associated repairs, out-of control periods (as defined in 40 CFR 63.8(c)(7)), required quality assurance or control activities shall not be used. All the data collected during all other periods in assessing compliance must be used. Any period for which the monitoring system is out of control and data are not available for required calculations constitute a deviation from the monitoring requirements.

(19) To demonstrate continuous compliance with the mercury emission limitations in Table XXIII, the owner/operator shall install, calibrate and maintain a continuous emission monitoring system. Compliance with the mercury emission limitations shall be based on the total mercury emissions from each boiler and total gross MWh from each boiler during the compliance period. The owner/operator shall calculate the mercury emission rate in lb/MWh for each calendar month of the year using hourly mercury concentrations measured by the CEMS and hourly gross electrical outputs. Compliance with the lb/MWh mercury emission limits shall be determined on a 12-month rolling average basis.

(20) A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions. Any period for which the monitoring system is out-of-control (as defined in 40 CFR 63.8(c)(7)) and data are not available for required calculations constitutes a deviation from the monitoring requirements.

(21) To demonstrate continuous compliance with the HCl and HF emission limitations in Table XXIII, the owner/operator shall conduct performance testing for the applicable acid gases.

f. Notification Requirements

(22) The owner/operator shall submit all of the notifications in 40 CFR 63.6(h)(4) and 63.6(h)(5), 63.7(c), 63.8(e), 63.8(f)(4) and 63.8(f)(6), 63.9(b) through (h) that apply to the owner/operator by the dates specified.

(23) The owner/operator shall submit a Notification of Compliance Status report according to 40 CFR 63.9(h)(2)(ii) and the requirements specified in paragraphs (a) through (c) of this section.

a. For each initial compliance demonstration, the owner/operator shall submit the Notification of Compliance Status report, including all performance test results, before the close of business on the 60th day following the completion of the performance test and/or other initial compliance demonstrations according to 40 CFR 63.10(d)(2).

b. The Notification of Compliance Status report shall contain all the information specified in paragraphs (i) through (iv) of this section, as applicable.

(i) A description of the affected source(s) including identification of which subcategory the source is in, the capacity of the source, a description of the add-on controls used on the source description of the fuel(s) burned, and justification for the worst-case fuel burned during the performance test.
(ii) Summary of the results of all performance tests, fuel analyses, and calculations conducted to demonstrate initial compliance including all established operating limits.
(iii) A signed certification that the owner/operator has met all emissions limitations.
(iv) If had a deviation from any emission limitation, the owner/operator shall also submit a description of the deviation, the duration of the deviation, and the corrective action taken in the Notification of Compliance Status report.

(24) The owner/operator shall submit notification for the CEMS as required by 40 CFR 63 Subpart A.

g. Recordkeeping Requirements

(25) The owner/operator shall keep records as required by 40 CFR 63 Subpart A.

(26) The owner/operator shall keep records according to paragraphs (a) through (c) of this section.

a. A copy of each notification and report that the owner/operator submitted to comply with this subpart, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report that the owner/operator submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv).
b. The records in 40 CFR 63.6(e)(3)(iii) through (v) related to startup, shutdown, and malfunction.

c. Records of performance tests or other compliance demonstrations and performance evaluations as required in 40 CFR 63.10(b)(2)(viii).

(27) For each monitoring system required by this subpart, the owner/operator shall keep records according to paragraphs (a) through (c) of this section.

a. Records described in 40 CFR 63.10(b)(2)(iv) through (xi).
b. Previous (i.e. superseded) versions of the performance evaluation plan as required in 40 CFR 63.8(d)(3).
c. Records of the date and time of each deviation started and stopped, and whether the deviation occurred during a period of startup, shutdown, or malfunction or during another period.

(28) The owner/operator records shall be in a form suitable and readily available for expeditious review, according to 40 CFR 63.10(b)(1).

(29) As specified in 40 CFR 63.10(b)(1), the owner/operator shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

(30) The owner/operator shall keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, according to 40 CFR 63.1(b)(1). The owner/operator can keep the records offsite for the remaining 3 years.

(31) The owner/operator shall maintain on file all measurements including continuous monitoring system or monitoring device performance measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required in a permanent form.

h. Reporting Requirements

(32) The owner/operator shall submit reports as required by 40 CFR 63 Subpart A.

(33) The Permittee shall submit a written compliance report for each quarterly period ending March 31, June 30, September 30, and December 31 of each year. All reports shall be postmarked by the 30th day following the end of each reporting period, April 30, July 30, October 30, and January 30, respectively. Reporting required by this condition shall begin at the end of the quarter in which initial startup is completed. In the event that there have not been any excess emissions, exceedances, excursions or malfunctions during a reporting period, the report should so state.

(34) The compliance report shall contain the information required in paragraphs (a) through (e) and, as applicable, paragraphs (f) through (h).

a. Company name and address.
b. Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.
c. Date of report and beginning and ending dates of the reporting period.
d. A summary of the results of the annual performance tests and documentations of any operating limits that were reestablished during this test, if applicable.
e. If the owner/operator had a startup, shutdown, or malfunction during the reporting period and the owner/operator took actions consistent with the SSMP, the compliance report shall include the information ins 40 CFR 63.10(d)(5)(i).
f. If there are no deviations from any of the emission limitations or operating limits, a statement that there were no deviations from the emissions limitations during the reporting period. A deviation occurs when monitoring data shows exceedance of 112(g) requirements.
g. If there are no periods during which a CEMS was out-of-control as specified in 63.8(c)(7), a statement that there were no periods during which the CEMS were out-of-control during the reporting period.
h. For each deviation from an emissions limitation, the owner/operator shall include the information in (i) through (xi). This includes periods of startup, shutdown, and malfunction.

    i. The date and time that each malfunction started and stopped and description of the nature of the deviation.
    ii. The date and time that each CEMS was inoperative, except for zero (low-level) and high-level checks.
    iii. The date, time, and duration that each CEMS was out-of-control, including the information in 40 CFR 63.8(c)(8).
    iv. The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period.
    v. A summary of the total duration of the deviation during the reporting period and the total duration as a percent of the total source operating time during that reporting period.
    vi. A breakdown of the total duration of the deviations during the reporting period into those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and other unknown causes
    vii. A summary of the total duration of CEMS downtime during the reporting period and the total duration of CEMS downtime as a percent of the total source operating time during that reporting period.
    viii. A brief description of the source for which there was a deviation.
    ix. A brief description of each CEMS for which there was a deviation
    x. The date of the latest CEMS certification or audit for the system for which there was a deviation.

xi. A description of any changes in CEMS, processes, or controls since the last reporting period for the source for which there was a deviation.

(35) If an action taken by the owner/operator during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with the procedures specified in boilers' startup, shutdown, and malfunction plan, and either boiler exceeds any emission limitation in Table XXIII, then the owner/operator shall record the actions taken for that event and shall report such actions within 2 working days after commencing actions inconsistent with the plan, followed by a letter within 7 working days after the end of the event, in accordance with 40 CFR 63.10(d)(5) (unless the owner/operator makes alternative reporting arrangements, in advance, with the Division).

i. Other Requirements

(36) In addition to complying with this MACT determination, the owner/operator shall comply with the electric utility MACT Standard upon promulgation, within the timeframes allowed by 40 CFR 63, Subpart B and Georgia Rules for Air Quality 391-3-1-.02(9)(b)16.

(37) The owner/operator shall install equipment associated with the boilers in a manner that should future specific controls for mercury be required, the installed equipment will accommodate the anticipated space necessary for the future mercury controls.