BEFORE THE OFFICE OF STATE ADMINISTRATIVE HEARINGS
STATE OF GEORGIA

FALL-LINE ALLIANCE FOR A CLEAN ENVIRONMENT; OGEECHEE RIVERKEEPER; SIERRA CLUB AND SOUTHERN ALLIANCE FOR CLEAN ENERGY,	:	**Docket No.: OSAH-BNR-AQ-1031707-98-WALKER**
Petitioners,	:	**(PSD Air Permit)**
v.	:	
F. ALLEN BARNES, Director of the Environmental Protection Division of the Department of Natural Resources of the State of Georgia,	:	
Respondent,	:	
POWER4GEORGIANS, LLC,	:	
Respondent-Intervenor.	:	

FINAL DECISION

I. INTRODUCTION

Respondent, Director of the Environmental Protection Division of the Department of Natural Resources of the State of Georgia ("EPD"), issued Prevention of Significant Deterioration Air Permit 4911-3-3-0051-P-01-0 to Respondent-Intervenor, Power4Georgians, LLC ("P4G") (collectively "Respondents") for operation of a coal-fired power plant ("Plant Washington") in Washington County, Georgia. Petitioners, Fall-Line Alliance for a Clean Environment, Ogeechee Riverkeeper, Sierra Club, and Southern Alliance for Clean Energy, filed a Petition alleging that Respondent issued the Permit in violation of the Georgia Air Quality Act, O.C.G.A. §§ 12-9-1 to -25, the Georgia Rules for Air Quality Control, Ga. Comp. R. & Regs.

391-3-1, the Georgia State Implementation Plan, 40 C.F.R. pt. 52 subpt. L, and the Clean Air Act, 42 U.S.C. ch. 85 subch. I.

II. LEGAL FRAMEWORK

The Clean Air Act mandates that the Environmental Protection Agency ("EPA") set National Ambient Air Quality Standards for pollutants found in ambient air. 42 U.S.C. § 7408 (a)(1)(A)–(B). Once EPA sets National Ambient Air Quality Standards, it requires each state to develop a state implementation plan specifying how air quality will be achieved and maintained. 42 U.S.C. § 7410(a). Georgia's State Implementation Plan comprises the Georgia Air Quality Act, O.C.G.A. §§ 12-9-1 to -25, and its implementing regulations. *See* Ga. Comp. R. & Regs. 391-3-1; *see also Longleaf Energy Assoc. v. Friends of the Chattahoochee, Inc.*, 298 Ga. App. 753, 754–55 (2009) (explaining the Clean Air Act's regulatory scheme in Georgia). EPD administers and enforces Georgia's State Implementation Plan. O.C.G.A. §§ 12-9-4 to -6, -11 to -14.

To prevent any deterioration of air quality in areas meeting National Ambient Air Quality Standards, a permitting authority must apply Prevention of Significant Deterioration ("PSD") standards to a potential source of pollution. *See* 42 U.S.C. ch. 85 subch. I pts. C & D. EPD issues PSD permits under Georgia's State Implementation Plan. *See* 40 C.F.R. §§ 52.570–.572; O.C.G.A. § 12-9-7(a); Ga. Comp. R. & Regs. 391-3-1-.02(9)(a), (b)16; *see also* O.C.G.A. § 12-9-2 ("It is declared to be the public policy of the State of Georgia to preserve, protect, and improve air quality and to control emissions to prevent the significant deterioration of air quality and to attain and maintain ambient air quality standards so as to safeguard the public health, safety, and welfare consistent with providing for maximum employment and full industrial development of the state."). A permitted source of pollutants that fails to comply with the restrictions contained in a PSD permit may be subject to penalties or enforcement action. *See, e.g.*, O.C.G.A. § 12-9-22 (noncompliance penalties); O.C.G.A. § 12-9-23 (civil penalties); O.C.G.A. § 12-9-24 (criminal penalties); O.C.G.A. § 12-9-12 (injunctive relief); and O.C.G.A. § 12-9-13 (enforcement).

III. PROCEDURAL HISTORY

Plant Washington will be located in an area meeting National Ambient Air Quality Standards, and will emit more than 100 tons per year of several hazardous pollutants. (Ex. J-5 at 40). Accordingly, P4G sought a PSD permit from EPD prior to Plant Washington's construction and operation. (Ex. J-3; J-5). On April 8, 2010, EPD granted P4G a PSD permit to build Plant Washington. (Ex. J-16).

Thirty days after the issuance of the PSD Permit ("Permit"), Petitioners filed a seven-count Petition seeking a declaration and order that the Permit is unlawful and invalid. Petitioners and Respondents both submitted motions for summary determination regarding Count I of the original Petition. Petitioners also moved for summary determination regarding Count VII of the Petition. On July 28, 2010, this Tribunal granted Respondents' Motion for Summary Determination as to Count I of the Petition, and denied Petitioners' Motions for Summary Determination as to Counts I and VII of the Petition. On August 2, 2010, Petitioners filed an Amended Petition for Hearing, deleting Count III of the original Petition.[1]

Petitioners' five remaining claims fall within three general categories: best available control technology, maximum achievable control technology, and prevention of significant

[1] The parties filed numerous pleadings regarding the timeline of this matter. (Consent Motion for Extension of Time for Motions for Summary Determination (May 25, 2010); Joint Motion for Adoption of Proposed Scheduling Order (June 4, 2010); Joint Motion for Extension of Scheduling Order (July 28, 2010); Joint Motion for Entry of Revised Scheduling Order for PreHearing Submissions and Written Direct Testimony (July 30, 2010); Respondent's Motion for Reconsideration of the Court's July 28, 2010 Order Denying the Parties' Joint Motion for Extension of Scheduling Order (Aug. 3, 2010); Joint Motion for an Extension of Time for Filing the Proposed Findings of Fact and Conclusions of Law and Closing Argument (Oct. 6, 2010)).

deterioration air dispersion modeling. Count II alleges that the Permit is invalid because the emission limitation[2] for sulfuric acid mist is not reflective of best available control technology. Count IV alleges that the Permit is invalid because the filterable Particulate Matter/Particulate $Matter_{10}$ ("PM" or "PM_{10}") surrogate emission limitation for non-mercury metal hazardous air pollutants is not reflective of maximum achievable control technology. Count V alleges that the Permit is invalid because it fails to include an emission limitation for dioxins and furans reflective of maximum achievable control technology. Count VI alleges that the Permit is invalid because the emission limitation for carbon monoxide as a surrogate emission limitation for non-dioxin or furans organic hazardous air pollutants is not reflective of maximum achievable control technology. Count VII alleges that the Permit is invalid because it is based on flawed air dispersion modeling that fails to adequately demonstrate that Plant Washington will not cause or contribute to violations of the 24-hour average PM_{10} air pollution increments or National Ambient Air Quality Standards.

A hearing regarding these claims took place during September 2010.[3] The parties filed Proposed Findings of Fact and Conclusions of Law on November 3, 2010, and presented closing arguments on November 18, 2010. The record closed on December 8, 2010.[4] The matter is now pending before the undersigned Administrative Law Judge of the Office of State Administrative Hearings.

This Tribunal reviews the evidence *de novo*, and the evidence is not restricted to that which was presented to EPD. Ga. Comp. R. & Regs. 616-1-2-.21(3). The burden of proof,

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[2] An emission limitation "limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis including any requirement relating to the equipment or operation or maintenance of a source to assure continuous emission reduction." Ga. Comp. R. & Regs. 391-3-1-.01(v).

[3] Over 200 exhibits were admitted during the ten-day hearing. Testimony included hundreds of pages of written direct examinations, and 1,918 pages of hearing transcript.

which must be satisfied by a preponderance of the evidence, rests with Petitioners. Ga. Comp. R. & Regs. 616-1-2-.07(1)(b) & -.21(4).

IV. FACTUAL BACKGROUND

P4G is a consortium of six electric membership cooperatives. (Tr. at 946 (Alford)).[5] These cooperatives seek to develop reliable electric capacity to meet future energy needs by constructing and operating Plant Washington in Washington County, Georgia. (Tr. at 946 (Alford); Ex. J-5 at 19–20). Plant Washington is designed as an electric utility steam generating unit, consisting of a supercritical pulverized coal-fired boiler and associated auxiliary and pollution control equipment. (Ex. J-16 at 1). The boiler will generate steam, which, in turn, will drive a turbine to create a net output of 850 megawatts of electricity. (Ex. J-5 at 15; Ex. Int.-St.-2 ¶¶ 7, 10 (Fickas)). P4G selected the proposed site of Plant Washington for four reasons: (1) the land is high and dry; (2) the land lies in close proximity to high voltage transmission lines; (3) there is access to a right of way from the property to the Oconee River to supply water to the facility; and (4) the land lies in close proximity to both the Norfolk Southern and CSX rail lines. (Tr. at 954–55 (Alford)).

P4G submitted its initial permit application for Plant Washington to EPD on January 17, 2008. (Ex. Pet.-St.-3 ¶ 7 (Prabhu); Ex. J-3). P4G hired MACTEC Engineering & Consulting, Inc. ("MACTEC") to prepare scientific analyses and assist in drafting the permit application. (Ex. Int.-St.-2 ¶ 4 (Fickas)). P4G submitted a revised application to EPD on December 3, 2008, and EPD held a public meeting in Washington County shortly after receiving the revised application. (Ex. Resp.-St.-5 ¶ 23 (Aponte); Ex. Resp.-St.-3 ¶¶ 7, 23 (Prabhu)). During the

[4] The undersigned received the final transcript on December 8, 2010. On the same date, P4G filed a Notice of Supplemental Authority. Petitioners assert that P4G's filing is untimely; the undersigned agrees and does not consider the Notice of Supplemental Authority in this decision.

following months, P4G provided supplemental information and analyses to EPD in response to questions from the agency. (Ex. J-6; Ex. J-7; Ex. J-8; Ex. J-9; Ex. J-10; Ex. J-14; Tr. at 1130 (Fickas)).

EPD issued a draft permit and accompanying Preliminary Determination for Plant Washington on August 24, 2009. (Ex. Resp.-St.-3 ¶ 22 (Prabhu); Ex. J-11; Ex. J-12). EPD then provided public notice of the draft permit and Preliminary Determination and opened a sixty-day public comment period. (Ex. J-15 at 3). After considering the public comments, including those from Petitioners, and requesting additional information from P4G in response to those comments, EPD issued the final Permit to P4G on April 8, 2010. (Ex. J-15; Ex. J-16).

Plant Washington will be a baseload generating facility, meaning that it may provide electricity 24 hours a day, seven days a week, regardless of daily or seasonal changes in electricity demand. (Ex. J-5 at 23). The total cost of Plant Washington will be approximately $2.1 billion; pollution controls will cost between $500 and $700 million. (Tr. at 973 (Alford)).

Pursuant to the Permit, the facility is allowed to burn either Powder River Basin ("PRB") coal, a subbituminous coal, or up to a 50/50 blend by weight of PRB coal and a bituminous coal from southern Illinois referred to as Illinois No. 6 coal. (Ex. J-16 at 9, Condition 2.11). Plant Washington is also permitted to burn subbituminous and bituminous coals with equivalent characteristics of PRB and Illinois No. 6 coals, respectively, in the same ratios. (Ex. J-16 at 9, Condition 2.11). This flexibility was requested by P4G and approved by EPD for several reasons, including logistical and supply constraint that will affect the delivery of PRB coal to Plant Washington. (Tr. at 971–72 (Alford); Tr. at 1323–24 (Blackburn)).

[5] References to exhibits include an alphanumeric designation in which the alphabetic prefix indicates the party or parties that listed the exhibits ("J" for Joint Exhibits, "P" for Petitioners' Exhibits, "R" for Respondent's Exhibits, and "RI" for Respondent-Intervenor's Exhibits).

Compliance with permitted emission limitations will be determined either by stack testing or continuous emissions monitoring. Stack tests must be conducted within 180 days of the initial start-up of the facility and thereafter on an annual basis. (Ex. J-15 at 242–43, Condition 6.3e & h; Ex. J-16 at 20–21, Condition 6.3e & h). A stack test typically consists of three runs for at least one hour each. (Tr. at 1565 (Prabhu)). Continuous emissions monitoring devices monitor emissions on a continuous basis, during all periods of operation and operating conditions. (Ex. Int.-St.-2 ¶¶ 109, 113 (Fickas)); Ex. Resp.-St.-4 ¶ 5 (Oser)).

V. ANALYSIS

A. CLAIMS RELATING TO BEST AVAILABLE CONTROL TECHNOLOGY

Georgia's State Implementation Plan mandates that new major sources of air pollution, such as Plant Washington, apply the best available control technology ("BACT") to each pollutant regulated under the EPA's New Source Review program. *See* Ga. Comp. R & Regs. 391-2-1-.02(7)(b)(7) (incorporating 40 C.F.R. § 52.21(j)(2) by reference). Sulfuric acid mist ("SAM") is a regulated pollutant requiring BACT when potential emissions are expected to exceed the significance threshold of seven tons per year. *See* Ga. Comp. R. & Regs. 391-3-1-.02(7)(a)2 (incorporating 40 C.F.R. § 52.21(b)(23)(i) by reference). Plant Washington is projected to have potential SAM emissions of 145 tons per year, triggering the need for BACT. (Ex. Resp.-St.-3 ¶ 28 (Prabhu); Tr. at 1534 (Prabhu)).

Georgia's State Implementation Plan defines BACT as follows:

> Best available control technology means an emission limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under [the Clean Air] Act which would be emitted from any proposed major stationary source or major modification which the [EPD Director], on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods,

> systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. . . .

Ga. Comp. R. & Regs. 391-3-1-.02(7)(a)2 (incorporating 40 C.F.R. § 52.21(b)(12) by reference).[6]

A BACT analysis utilizes project-specific information to derive an emission limitation for a pollutant based on the maximum degree of reduction achievable. *See* Ga. Comp. R. & Regs. 391-3-1-.02(7)(a)–(b) (incorporating 40 C.F.R. § 52.21(b)(12) by reference). In determining BACT for a pollutant, EPD generally instructs a PSD permit applicant to follow the five-step, top-down approach set forth in the Draft New Source Review Workshop Manual ("Draft NSR Manual").[7] (Ex. Resp.-St.-3 ¶ 15 (Prabhu); Ex. J-1). This process requires applicants to: (1) identify all available pollution control technologies; (2) eliminate technically infeasible options; (3) rank the effectiveness of the remaining technologies; (4) evaluate the most effective controls and document results; and (5) select BACT. (Ex. J-1 at 76–150).

As illustrated in its permit application, P4G reviewed available information on SAM control technologies and emission limitations set by other coal-fired power plant permits. (Ex. J-3 at 183–86). P4G then analyzed this information utilizing the five-step, top-down method set forth in the Draft NSR Manual for case-by-case BACT analyses to derive a proposed BACT emission limitation of 0.004 lb/MMBtu[8] on a 3-hour average. (Ex. Int.-St.-2 ¶¶ 41–91 (Fickas); Ex. J-5 at 171–86; Ex. Resp.-St.-3 ¶¶ 29–39 (Prabhu)).[9] Compliance with this limitation will be measured by stack testing (Ex. J-16 at 20–21, Condition 6.3e & h; Tr. at 1565 (Prabhu)); no

[6] EPD sent a draft PSD permit to EPA, and EPA commented on certain portions of the analysis. EPA did not comment on the SAM emission limitation in the draft permit. (Ex. RI-3).

[7] The EPA published the Draft NSR Manual in 1990 but has never finalized this document. Nonetheless, EPD recommends that applicants follow the approach outlined in the Draft NSR Manual. (Ex. Int.-St.-2 ¶ 40 (Fickas)).

[8] "The designation 'lb/MMBtu' is shorthand for pounds of emissions of the pollutant in question per million British thermal units of heat input." (Ex. Pet.-St.-2 ¶ 22 n.1).

[9] P4G's original application proposed a BACT emission limitation of 0.005 lb/MMBtu on a 3-hour average. (Ex. J-3 at 56). In its revised application, P4G reduced its proposed limitation to 0.004 lb/MMBtu. (Ex. J-5 at 57).

continuous emissions monitoring system ("CEMS") is available to measure SAM emissions. (Ex. Resp.-St.-4 ¶ 5 (Oser); Tr. at 1422 (Cornwell)). In Count II of their Amended Petition, Petitioners contend that the Permit's SAM emission limitation is not reflective of BACT. (Am. Pet. Hr'g, Count II).

1. SAM Formation

SAM forms when sulfur trioxide reacts with water vapor. (Ex. Int.-St.-3 ¶ 30 (Johnson)). Sulfur trioxide is created in the boiler during the combustion process, and in the SCR, the control device that Plant Washington will use to control nitrogen oxide ("NO_x") emissions across the SCR's catalyst bed. (Ex. Int.-St.-3 ¶¶ 28–29 (Johnson)). As the temperature of the flue gas drops, the sulfur trioxide will react with the water vapor in the flue gas to form SAM. (Ex. Int.-St.-3 ¶¶ 28–30 (Johnson); Ex. Int.-St.-2 ¶ 21 (Fickas)).

2. SAM Emissions

The level of SAM emissions is a function of several variables: the amount of sulfur in the parent coal; the amount of coal burned; the occurrence of conversion factors during combustion and throughout the processing; and the effectiveness of various removal mechanisms or pollution control technologies. (Tr. at 870 (Sahu); Tr. at 1061 (Fickas)). As the formation of SAM and its precursor sulfur trioxide is dependent, in part, on the sulfur content of the coal, SAM emissions at Plant Washington will be reduced through the use of low-sulfur PRB and washed Illinois No. 6 coal. (Ex. J-16 at 9, Condition 2.11; Ex. Int.-St.-2 ¶¶ 47–48 (Fickas)).

3. SAM Pollution Control Technology

The primary SAM pollution control technology that the Permit requires is duct sorbent injection, which injects highly reactive alkalis to remove sulfur trioxide from the exhaust gas stream. (Ex. J-16 at 8, Condition 2.7; Ex. Int.-St.-3 ¶¶ 36, 47 (Johnson); Ex. Int.-St.-2 ¶ 54

(Fickas)). The duct sorbent injection system at Plant Washington will be located between the SCR and the fabric filter baghouse, another pollution control device. (Ex. I-5; Ex. Int.-St.-3 ¶ 25 (Johnson)). Additional SAM removal may take place in the fabric filter baghouse. (Ex. Int.-St.-2 ¶ 66 (Fickas); Ex. Int.-St.-3 ¶ 47 (Johnson)). Good combustion practices, the use of a low sulfur-dioxide to sulfur-trioxide conversion catalyst in the SCR, and to some degree, the wet scrubber system will also be used to control the formation of SAM.[10] (Ex. Int.-St.-3 ¶ 47 (Johnson); Ex. Int.-St.-2 ¶¶ 50–51 (Fickas); Ex. RI-150; Ex. J-16 at 8, Condition 2.7).

4. Petitioners' Claim

Petitioners agree with Respondents that the SAM pollution technology required by Plant Washington's Permit is the best available control technology. However, they contend that the Permit's SAM emission limitation fails to reflect the maximum degree of reduction achievable using these pollution controls.

In support of their claim, Petitioners present the testimony of Dr. Ranajit Sahu. Dr. Sahu holds B.S., M.S., and Ph.D. degrees in Mechanical Engineering, the latter two from the California Institute of Technology. (Ex. Pet.-St.-2 ¶ 4 (Sahu)). His research specialty is coal combustion and air pollution, and he has provided consulting services to private sector, public sector and public interest group clients. (Ex. Pet.-St.-2 ¶¶ 4, 6 (Sahu)).

Dr. Sahu performed calculations to determine the estimated rate of SAM emissions using the same pollution control technology mandated by the Plant Washington Permit. Dr. Sahu concluded that Respondents failed to identify various inherent removal mechanisms in the pollution control technology. (Ex. Pet.-St.-2 ¶ 23 (Sahu); Tr. at 718–20, 1755–56, 1794–97 (Sahu)). In making his calculations, Dr. Sahu relied upon the same assumptions made by P4G

[10] While the wet scrubber may remove some SAM, it will also contribute to the formation of SAM. (Ex. Int.-St.-2 ¶ 51 (Fickas)).

and EPD regarding the average sulfur content of the coals, and the 1% rate of conversion of sulfur dioxide to sulfur trioxide across the process train. (Ex. Pet.-St.-2 ¶ 24 (Sahu)).

Taking into account the various inherent removal mechanisms across the pollution control process, Dr. Sahu determined that the actual SAM removal efficiency at Plant Washington is likely to be as high as 98%. (Ex. Pet.-St.-2 ¶ 24 (Sahu); Tr. at 1783, 1823–25 (Sahu)). Using this determination, Dr. Sahu calculated a controlled SAM emission rate of 0.00018 lb/MMBtu for the PRB coal and 0.00085 lb/MMBtu for the 50/50 blend—these rates are twenty-two times and five times lower, respectively, than the SAM emission limit in the Permit. (Ex. Pet.-St.-2 ¶¶ 24–25 (Sahu)). After applying a margin of compliance to the raw data, Petitioners proposed a SAM emission limit of 0.001 lb/MMBtu. (Ex. Pet.-St.-2 ¶ 26 (Sahu); Tr. at 1794 (Sahu)).

5. Analysis

Petitioners did not present reliable evidence demonstrating that the theoretical removal efficiencies underlying Dr. Sahu's calculations will be achievable at a coal-fired power plant that shares Plant Washington's design and fuel flexibility. Dr. Sahu based his calculations on research published by the Electric Power Research Institute ("EPRI"). (Tr. at 1983 (Sahu)). The research contained in the EPRI document is an extension of research originally performed and published by the Southern Company. (Tr. at 1789, 1812–13 (Sahu)).

As Dr. Sahu acknowledged in his testimony, the authors of the EPRI document explain that their calculations are subject to a plus/minus 50% margin of error due to measurement uncertainty associated with the controlled condensate method. (Tr. at 1815–16 (Sahu)). Dr. Sahu also recognized that the EPRI document noted particular uncertainty with regard to the SAM emission estimates from "high dust areas." (Tr. at 1815–16 (Sahu)). Finally, he testified that the data underlying the SAM emission calculation for PRB coal-fired facilities in the EPRI document consisted of stack tests from two facilities, and that given the limited data set, one would need to be careful about the application of emission estimates. (Tr. at 1818–19 (Sahu)).

P4G's attempts to corroborate Dr. Sahu's calculations with real-world data were unsuccessful. (Tr. at 1150–52 (Fickas)). Justin Fickas, a MACTEC engineer who reviewed and analyzed the EPRI data, did not consider Dr. Sahu's calculations reliable because the theoretical removal efficiencies discussed in the research did not comport with information concerning the SAM removal efficiencies achieved by operating units. As a result, P4G believed that the removal efficiencies reported in the research did not account for the specific combination of controls that would be utilized at Plant Washington. (Tr. at 1150–52 (Fickas)).

EPD also was unable to corroborate Dr. Sahu's calculations. During the permitting process, EPD personnel contacted other state permitting authorities to gather additional information, reviewed available data from other coal-fired power plants, requested additional information from the applicant, and considered and responded to public comments. (Ex. Resp.-St.-3 ¶¶ 19–21, 25 (Prabhu); Ex. RI-124; Ex. RI-125; Ex. RI-126). EPD employees noted that Dr. Sahu's proposed emission limitation fails to account adequately for the variability in stack test methods, the SAM emission control efficiency of facilities that have the combination of control technologies similar to Plant Washington, and the variability in the conversion rate of sulfur dioxide to sulfur trioxide in the SCR catalyst. (Ex. Resp.-St.-3 ¶ 47 (Prabhu); Ex. Resp.-St.-4 ¶¶ 14–15 (Oser)). For these reasons, EPD engineer Purva Prabhu, who performed the BACT analysis for Plant Washington, rejected Dr. Sahu's findings. (Tr. at 1541 (Prabhu)).

Additionally, in determining BACT source-specific characteristics must be considered, such as fuel type. (Tr. at 1390–91 (Cornwell)). While the evidence demonstrates that other coal-fired power plants have lower permitted SAM emission limitations, EPD determined that each of these facilities was distinguishable from Plant Washington based on the combination of controls and types of fuel that Plant Washington will use. (Ex. Int.-St.-2 ¶¶ 82–88 (Fickas); Ex. J-5 at 183–86; Ex. Resp.-St.-3 ¶¶ 43–44 (Prabhu)). After reviewing the evidence *de novo*, the undersigned agrees with EPD's conclusions.

In general, there is a very limited amount of test data for SAM emission rates at other coal-fired power plants. (Tr. at 1734–35 (Capp)). However, the data that is available is telling. Although the Santee-Cooper Cross facility has a lower SAM emission limitation than Plant Washington, the facility was unable to comply with its permitted SAM limitation. (Ex. Resp.-St.-3 ¶ 44(c) (Prabhu); Ex. Int.-St.-3 ¶ 87 (Fickas); Tr. at 1153–55 (Fickas)). Newmont and W.A. Parish also have lower SAM emission limitations; however, they are distinguishable in that they are permitted to burn exclusively PRB coal, as opposed to the higher sulfur 50/50 blend that Plant Washington may burn, and they have higher No_x limits. (Ex. Int.-St.-3 ¶¶ 83–84 (Fickas); Ex. Resp.-St.-3 ¶ 44(a) & (b) (Prabhu)). Moreover, EPD obtained information from the state permitting engineer for the W.A. Parish facility indicating that the facility's permit limit for SAM was based on data recorded prior to the installation of the SCR at the facility. (Tr. at 1595–96 (Prabhu); Ex. RI-214). The engineer indicated that he believed the SAM emission rate at the Parish facility after the installation of the SCR would be three to five times the permitted limit of 0.0015 lb/MMBtu. (Ex. RI-214).

Finally, EPD considers the effect of a BACT emission limitation for one pollutant on other pollutants. (Ex. Resp.-St.-3 ¶¶ 14(d), 41 (Prabhu)). Despite Dr. Sahu's testimony that lowering SAM emission limits would not impact either NO_x or carbon monoxide ("CO"), the evidence did not support his theory.

The Permit requires Plant Washington to comply with the most stringent NO_x limits that have ever been permitted for a coal-fired power plant. (Tr. at 1713–14 (Capp); Ex. Int.-St.-3 ¶ 29 (Johnson); Ex. Int.-St.-3 ¶ 29 (Fickas)). EPD concluded that lowering NO_x emissions for Plant Washington would result in higher emissions of SAM and CO. (Tr. at 1389–90 (Cornwell); Ex. Resp.-St.-3 ¶¶ 41–42 (Prabhu)). EPD's conclusion is supported by the stack test results available for the Newmont and Santee-Cooper Cross facilities, demonstrating that the tested NO_x emission rates were far in excess of the NO_x emission limitations in Plant Washington's Permit. (Ex. RI-58 at 11 (Newmont NO_x stack test result of 0.066 lb/MMBtu); Ex. J-38 at 3; Ex. J-43 at 3 (Santee-Cooper Cross Units 3 & 4 NO_x stack test results of 0.061 lb/MMBtu and 0.059 lb/MMBtu, respectively)).

A BACT emission limitation must reflect the maximum reduction achievable, taking into account energy, economic, and environmental impacts. Ga. Comp. R. & Regs. 391-3-1-.02(7)(a)(2) (incorporating 40 C.F.R. § 52.21(b)(12) by reference). Based upon the evidence in the record, the undersigned is not aware of any coal-fired power plant permitted with the combination of SAM, NO_x, and CO emission limitations contained in the Permit.[11]

Although the evidence demonstrated that there are coal-fired power plants with lower SAM emission limitations, each of these facilities is distinguishable from Plant Washington based on the combination of controls or types of fuel. Further, while studies have reported SAM removal at various locations in a coal-fired power plant, there is insufficient information regarding the performance of the combination of controls that would be installed at Plant Washington to rely on this data. (Tr. at 1557–58 (Prabhu)). As such, this Tribunal agrees that

[11] A review of the test results for facilities with SAM emission limitations below Plant Washington's permitted value shows how operating facilities have not been able to manage the trade-offs between these three pollutants in a fashion that would allow simultaneous compliance with the limits in the Permit. For example, in a 2008 stack test, Santee-Cooper Cross Unit 3 reported a SAM emission rate of 0.00021 lb/MMBtu, a NO_x emission rate of

the calculations Dr. Sahu derived from the Southern Company/EPRI research do not warrant a lower SAM emission limitation for Plant Washington. *See also Friends of Chattahoochee v. Couch*, No. OSAH-BNR-AQ-0732139-60-HOWELLS, at 93–94 (OSAH Apr. 2, 2010) (rejecting Petitioners' assertion that the SAM emission limitation should be 0.001 lb/MMBtu because "[l]imited data and unreliable test methods are insufficient to support a lower SAM emission limitation in the Permit").

B. CLAIMS RELATED TO MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY

Counts IV, V and VI of the Petition allege violations of maximum achievable control technology ("MACT") standards. Section 112(d) of the Clean Air Act, 42 U.S.C. § 7412, directs the EPA to establish MACT emission standards for hazardous air pollutants ("HAPs"). Plant Washington has the potential to emit over 10 tons per year of a single HAP, or 25 tons per year of a combination of HAPs, and therefore is classified as a "major source" of HAPs. *See* 42 U.S.C. § 7412(d); (Ex. Resp.-St.-5 ¶¶ 14–15 (Aponte); Ex. J-5 at 340–407; Ex. Int.-St.-2 ¶¶ 105–108 (Fickas)). As a major source of HAPs, Plant Washington must satisfy MACT for each HAP that it will emit.

Georgia regulations, with a few minor exceptions, incorporate the federal regulations regarding MACT. *See* Ga. Comp. R. & Regs. 391-3-1-.02(9)(a), (b)16 (incorporating 40 C.F.R. § 63.42(c)(2) by reference). As compared to BACT, MACT is far more rigorous. (Tr. at 1123 (Fickas)). MACT is defined as:

> the emission limitation which is not less stringent tha[n] the emission limitation achieved in practice by the best controlled similar source, and which reflects the maximum degree of [r]eduction 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.

0.061 lb/MMBtu, and a CO emission rate of 0.177 lb/MMBtu. (Ex. J-38 at 3). These NO_x and CO emissions would exceed Plant Washington's permitted limits.

Ga. Comp. R. & Regs. 391-3-1-.02(9)(a), (b)16 (incorporating 40 C.F.R. § 63.41 by reference). To meet this exacting standard, emission limitations for new sources, like Plant Washington, cannot exceed the emissions control performance of the best controlled similar source; existing sources must match the "average emission limitation achieved by the best performing 12 percent of the existing sources . . . ." 42 U.S.C. § 7412(d)(3)(A).

Although the EPA has promulgated National Emission Standards for HAPs ("NESHAPs") for certain types of sources, Plant Washington will be an electric utility steam generating unit, a listed source category for which there is no NESHAP.[12] If there is no promulgated NESHAP, construction for a major source of HAPs may not begin until EPD issues a case-by-case MACT emission limitation for each HAP that the major source will emit. *See* Ga. Comp. R. & Regs. 391-3-1-.02(9)(a), (b)16 (incorporating and adopting by reference, with minor exceptions, 40 C.F.R. §§ 63.42(c)(2)). The Permit divides these HAPs into four categories: mercury, non-mercury metal HAPs (for which filterable Particulate Matter/Particulate $Matter_{10}$ is used as a surrogate), acid gases, and organic HAPs (for which CO is used as a surrogate). (Ex. P-50 at 9–10).

<u>1. Case-by-Case MACT</u>

In Counts IV and VI, Petitioners raise claims regarding EPD's case-by-case MACT analysis. Case-by-case MACT analysis is a two-step process governed by 40 C.F.R. § 63.43(d), entitled "Principles of MACT Determinations." Ga. Comp. R. & Regs. 391-3-1-.02(9)(a) and (b)16 (incorporating 40 C.F.R. § 63.43(d) by reference). First, a permitting authority must make

[12] EPA is currently in the process of promulgating NESHAPs for Plant Washington's source category: electric utility steam generating units ("Utility MACT"). Pursuant to court order, the Utility MACT must be proposed by March 16, 2011 and finalized by November 16, 2011. *See Am. Nurses Ass'n v. Jackson*, No. 1:08-cv-02198 (RMC), 2010 U.S. Dist. LEXIS 37634, at *3 (D.D.C. Apr. 15, 2010). Once the Utility MACT is finalized, EPD believes Plant Washington will be required to comply with that standard. (Tr. at 1408–09 (Cornwell)).

a "MACT floor" determination, by identifying the level of control achieved in practice by the best-controlled similar source. 40 C.F.R. § 63.43(d)(1). (Ex. J-5 at 376–87; Ex. Int.-St.-2 ¶¶ 110–122 (Fickas)). The regulations define a "similar source" as "a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed major source such that the source could be controlled using the same control technology." 40 C.F.R. § 63.41. The MACT emission limitation for the proposed source cannot be less stringent than this MACT floor. 40 C.F.R. § 63.43(d)(1); 42 U.S.C. § 7412(d)(3). Once the MACT floor has been established, EPD then considers whether additional control technologies could be applied to the proposed facility to further reduce emissions "beyond the floor," taking into consideration the costs of achieving such reductions as well as any non-air quality health, environmental, and energy impacts associated with the reduction. (Ex. J-11 at 110; Ex. Resp.-St.-5 ¶ 20 (Aponte) (quoting 40 C.F.R. § 63.43(d)(2)).

Due to its complex regulatory history, the requirement for case-by-case MACT has only been in effect from 2002 to 2004 and since February 2008. (Ex. Int.-St.-2 ¶ 101 (Fickas)). Thus, there have been very few case-by-case MACT reviews for electric utility steam generating units, and the quality and depth of the reviews vary from state to state. (Ex. Resp.-St.-5 ¶ 27 (Aponte)).

2. PM Filterable

Count IV charges that the Permit is invalid because the filterable Particulate Matter/Particulate $Matter_{10}$ ("PM filterable")[13] surrogate emission limitation for non-mercury metal HAPs is not reflective of MACT. In P4G's proposed MACT emission limitations to EPD,

[13] Particulate matter or "PM" is defined as "any airborne, finely divided solid or liquid material with an aerodynamic diameter smaller than 100 micrometers." Ga. Comp. R. & Regs. 391-3-1-.01(*xx*). "PM_{10}" refers to particles that have an aerodynamic diameter of 10 micrometers or less. *Id.* at 391-3-1-.01(bbb). "Filterable PM and PM_{10} refer to the fraction of PM and PM_{10} that exist in solid particle form in the boiler and subsequent series of

it suggested the use of PM filterable as a surrogate for emissions of non-mercury metal HAPs.[14] Petitioners do not object to using PM filterable as a surrogate for non-mercury metal HAPs. (Pet. Hr'g ¶ 78).

The draft permit proposed a MACT emission limit for PM filterable of 0.012 lb/MMBtu on a 3-hour rolling average. (Ex. J-12 at 9, Condition 2.13d). After further review, EPD determined that a lower PM filterable emission limit of 0.010 lb/MMBtu on a 24-hour average was MACT for the non-mercury metal HAPs. (Ex. J-16 at 9, Condition 2.13d; Ex. Resp.-St.-5 ¶ 46 (Aponte)). EPD's MACT determinations are set forth in its Notice of MACT Approval for Plant Washington.[15] (Ex. J-11 at 105–55; Tr. at 1608 (Aponte)). The Permit's MACT emission limit of 0.010 lb/MMBtu on a 24-hour average is lower than the limits that other permitting authorities have selected as case-by-case MACT for non-mercury metal HAPs. (Tr. at 1427 (Cornwell); Ex. Resp.-St.-5 ¶¶ 52–53 (Aponte); Ex. J-5 at 381–82, tbl. 10-12; Ex. RI-27 at 9 (PM filterable limit of 0.011 lb/MMBtu); Ex. RI-74 at 2 (PM filterable limit of 0.015 lb/MMBtu); Ex. RI-92 at 160 (PM filterable limit of 0.012 lb/MMBtu)), and represents the lowest permitted value for PM filterable that P4G is aware of for any coal-fired plant in the United States. (Tr. at 1140–41 (Fickas)).

To comply with the PM filterable limit as set by the Permit, P4G will be required to construct one of the largest fabric filter baghouse systems ever built and use a CEMS device to

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pollution control devices that follow." (Ex. Pet.-St.-2 ¶ 32 (Sahu)). The Permit identifies the PM filterable limit as applicable to PM_{10} emissions. (Ex. J-16 at 9, Condition 2.13d).

[14] A regulatory agency may substitute the control of one pollutant, known as a "surrogate" pollutant, in lieu of setting such emission limits directly, if it is reasonable to do so and not contrary to law. *Nat'l Lime Ass'n v. EPA*, 233 F.3d 625, 637–40 (D.C. Cir. 2000); *Sierra Club v. EPA*, 353 F.3d 976, 982–85 (D.C. Cir. 2004). Non-mercury metal HAPs emitted from Plant Washington's boiler will be present in the exhaust gas as a portion of the fly ash. The fly ash is the primary component of PM filterable emissions and is effectively controlled by the fabric filter baghouse that will be installed at Plant Washington. (Ex. Resp.-St.-5 ¶ 39 (Aponte); Ex. J-15 at 103–05; Ex. Int.-St.-2 ¶¶ 109–111 (Fickas)). For these reasons, EPD concurred with P4G's proposed use of PM filterable as a surrogate for non-mercury metal HAPs emissions. (Ex. Resp.-St.-5 ¶ 38 (Aponte) (citations omitted); Ex. J-15 at 103–06).

[15] EPA submitted no comments to the Notice of MACT Approval. (Ex. Resp.-St.-5 ¶ 33 (Aponte)).

monitor the performance of that baghouse system continuously. (Ex. Int.-St.-3 ¶¶ 51, 56 (Johnson); Ex. J-16 at 16, 20, Conditions 5.2c & 6.2u). Fabric filter baghouses are widely recognized as the most effective pollution control technology for PM filterable and can achieve removal efficiencies greater than 99%. (Ex. Int.-St.-2 ¶¶ 110–11 (Fickas); Ex. Pet.-St.-2 ¶ 39 (Sahu); Ex. Int.-St.-3 ¶ 53 (Johnson); Tr. at 1708 (Capp)). CEMS devices monitor emissions on a continuous basis, during all periods of operation and operating conditions. (Ex. Int.-St.-2 ¶¶ 109, 113 (Fickas)); Ex. Resp.-St.-4 ¶ 5 (Oser)). Petitioners do not challenge the selection of a fabric filter baghouse as the appropriate technology for the control of PM filterable at Plant Washington.

P4G proposed Wygen II, a coal-fired power plant located in Wyoming, as the best controlled similar source for PM filterable. (Ex. J-14 at 9–10). EPD agreed with this selection. Wygen II's permit limit for PM filterable is 0.012 lb/MMBtu. (Ex. J-14 at 9). Permitting authorities tested Wygen II for compliance with this limit; the testing consisted of one stack test, with three two-hour test runs. The average of the three test runs was 0.00094 lb/MMBtu, over ten times less than Wygen II's permitted limit. (Ex. Pet.-St.-2 ¶ 42 (Sahu); Tr. at 1618–19 (Aponte)).

Petitioners also agree that Wygen II is the best controlled similar source. Nonetheless, they charge that instead of looking to the level of emission control Wygen II achieved in practice, EPD established the MACT floor based on Wygen II's continuous compliance with its permitted limit. Relying on the actual emissions recorded, Petitioners contend that Plant Washington's MACT emission limit for PM filterable should be 0.001 lb/MMBtu. (Pet. Hr'g ¶ 78; Ex. Pet.-St.-2 ¶¶ 52, 53, 56 (Sahu); Tr. at 747 (Sahu)). They posit that Plant Washington could meet the proposed 0.001 lb/MMBtu PM filterable emission limit using the same pollution controls mandated in the Permit: a well-operated baghouse with a bag leak detection system and a wet scrubber.[16] (Ex. Pet.-St.-2 ¶¶ 53–56 (Sahu)). Petitioners also propose a longer averaging time of thirty days to allow for the "smoothing out" of short-term fluctuations in PM filterable emissions. (Ex. Pet.-St.-2 ¶¶ 53, 56; Tr. at 908 (Sahu)).

3. Carbon Monoxide

In Count VI, Petitioners assert that the Permit's MACT emission limitation for CO as a surrogate for organic HAPs is "not reflective of MACT." (Pet. Hr'g, Count VI). Traditionally, CO is not viewed as a major pollutant, but in the instant case it serves as a surrogate for a range of organic chemicals that could be emitted in potentially harmful amounts. (Tr. at 1753–54 (Sahu)).

P4G reasoned that by implementing "good combustion practices" designed to achieve complete combustion, Plant Washington will achieve reductions in both CO and organic HAP emissions. (Ex. J-5 at 392; Ex. Resp.-St.-5 ¶ 64 (Aponte); Ex. Int.-St.-2 ¶ 138 (Fickas); Ex. Int.-St.-3 ¶ 70 (Johnson)). EPD agreed and selected a case-by-case MACT emission limitation for CO as a surrogate for organic HAPs of 0.10 lb/MMBtu on a 30-day rolling average.[17] (Ex. J-16 at 9, Condition 2.13b; Ex. J-11 at 136–39; Ex. Resp.-St.-5 ¶¶ 63, 76 (Aponte)). Plant Washington's CO emissions also will be monitored with a CEMS device on a continuous basis. (Ex. Resp.-St.-5 ¶ 66 (Aponte); Ex. J-5 at 15–16; Ex. J-16 at 16, 20, Conditions 5.2d, 5.2f, 6.2t).

The Permit's CO limit of 0.10 lb/MMBtu is as low as, if not lower than, the permitted value for CO of any coal-fired power plant in the United States. (Ex. Resp.-St.-5 ¶ 76 (Aponte); Ex. J-11 at 136–39). It is likewise as low as, if not lower than, the CO limits that other

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[16] In a supplemental submission to EPD during the permitting process, P4G stated that the wet scrubber may cause an increase in PM filterable emissions due to a condition referred to as "mist carryover." (Ex. J-9 at 2–4).

[17] The Permit also contains an emission limitation for CO of 0.30 lb/MMBtu on a 1-hour average, which was added as part of the BACT review. (Ex. J-16 at 9, Condition 2.13c; Ex. Resp.-St.-5 ¶ 66 (Aponte)).

permitting authorities have selected as case-by-case MACT emission limits for organic HAPs at other coal-fired power plants. (Ex. J-5 at 395; Tr. at 1419 (Cornwell); Ex. Resp.-St.-5 ¶ 76 (Aponte)).

For CO emissions, P4G identified the best controlled similar source as Newmont TS Power ("Newmont") a coal-fired power plant located in Nevada. (Ex. J-14 at 11). EPD agreed with P4G's proposal. Newmont's CO emission limitation is 0.15 lb/MMBtu on a 24-hour rolling average. (Ex. J-14 at 11). The lowest single CO stack test result for Newmont is 0.002 lb/MMBtu. Thus, the CO emission limit selected by EPD is fifty times higher than the 0.002 lb/MMBtu CO emissions rate recorded at Newmont. (Ex. Pet.-St.-2 ¶ 79 (Sahu); Ex. J-14 at 11).

Petitioners object to selecting Newmont as the best controlled similar source, arguing that Hardin Generating Station ("Hardin") has reported a lower CO emission level of 0.001 lb/MMBtu in a stack test result. The undersigned agrees that Respondents' selection of Newmont as the best controlled similar source is correct. While Hardin reported a lower CO emission level, the facility burns coal with a different heating value than the coal that will be burned at Plant Washington. Moreover, there was documentation indicating that the Hardin facility had exceeded its CO emission limitation soon after installing a CEMS device. (Tr. at 1115–17 (Fickas)).

Respondents found that good combustion controls would be the best pollution control technology for CO emissions at Plant Washington, and Petitioners concur. (Ex. Pet.-St.-2 ¶ 78 (Sahu)). Petitioners also assume that the use of CO as a surrogate for organic HAPs (with the exception of dioxins and furans, discussed *infra*) is appropriate. (Pet. Hr'g ¶ 89). However, Petitioners propose a suggested emission limitation for CO of 0.005 lb/MMBtu. Petitioners base this proposal on a variability factor of five times the 0.001 lb/MMBtu emission level recorded in a stack test at Hardin. (Ex. Pet.-St.-2 ¶ 83 (Sahu)).

4. Petitioners' Claim

Petitioners charge that EPD erred in establishing the MACT floor for both PM filterable and CO. They argue that EPD based the MACT floor on the best controlled sources' continuous compliance with their permitted limit, rather than on the level of actual emission control achieved by the facility. The ultimate MACT emission limitation for the proposed source cannot be less stringent than the MACT floor. 40 C.F.R. § 63.43(d)(1); *see also* 42 U.S.C. § 7412(d)(3).

Petitioners are correct. In setting the MACT floor, EPD relied upon the MACT definition articulated in 40 C.F.R. § 63.41, which references emission limitations. Instead, EPD should have complied with the strictures of 40 C.F.R. § 63.43(d)(1), which defines the MACT floor. Section 63.43(d)(1) provides that:

> The MACT emission limitation or MACT requirements recommended by the applicant and approved by the permitting authority *shall not be less stringent than the emission control which is achieved in practice* by the best controlled similar source, as determined by the permitting authority.

(emphasis added); *see also Cement Kiln Recycling v. Envtl. Prot. Agency*, 255 F.3d 855, 861 (D.C. Cir. 2001) ("[In determining a MACT floor,] EPA may not deviate from [the] requirement that floors reflect what the best performers actually achieve"). While MACT "[f]loors need not be perfect mirrors of the best performers' emissions[, the Clean Air Act] requires that floors reflect a reasonable estimate of the emissions 'achieved' in practice by the best-performing sources." *Cement Kiln*, 255 F.3d at 871–72 (citations omitted).[18] Nonetheless, EPD's Notice of

[18] Pursuant to the Clean Air Act, the District of Columbia Circuit Court of Appeals has exclusive jurisdiction to review challenges to the Act's regulations. *See* 42 U.S.C. § 7607(b)(1). Although *Cement Kiln* and its progeny involve EPA's promulgation of NESHAPs as opposed to case-by-case MACT determinations, these cases clarify the Principles of MACT Determination. 255 F.3d at 855. In the words of one commentator, *Cement Kiln* "begins a line of cases in which the EPA continued to strain to find discretion-conferring ambiguity in the face of court holdings that the statutory language did not confer such discretion." Susannah Landes Foster, *When Clarity Means*

MACT Approval cites to the language in 40 C.F.R. § 63.41, rather than § 63.43(d)(1), erroneously concluding that "[t]he 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 . . . .'"[19] (Ex. J-11 at 112) (emphasis added). EPD reiterated this error during the hearing.[20] (Tr. at 1400–03 (Cornwell); Tr. at 1613–14 (Aponte)).

5. Respondents' Claims

Respondents make several arguments as to why, notwithstanding EPD's error, the Permit's emission limitations satisfy MACT. First, relying on *U.S. v. Cinergy Corp.*, 623 F.3d 455 (7th Cir. 2010), Respondents suggest that because EPD issued the Permit pursuant to state law, federal MACT standards are inapplicable. *Cinergy* holds that when there is a conflict between the terms of an EPA-approved state implementation plan and the Clean Air Act, the terms of the last approved state implementation plan control. *Id.* at 5, 7–8.

Respondents' reliance on *Cinergy* is misplaced. In the instant case, there is no conflict between the terms of Georgia's State Implementation Plan and the Clean Air Act; to the contrary, Georgia's State Implementation Plan explicitly incorporates and adopts the MACT floor definition provided by 40 C.F.R. § 63.43(d)(1). Ga. Comp. R. & Regs. 391-3-1-.02(9)(a), (b)16. Further, as EPD acknowledged during the hearing, it looks to the principles set forth in federal cases as guidance. (Tr. at 1637–38 (Aponte)). EPD relied extensively on federal law in formulating its *Notice of MACT Approval*, stating at the outset that "Plant Washington submitted an application to obtain preconstruction review and approval required by Section 112(g)(2)(B) of the [Clean Air Act] and its accompanying regulations, 40 [C.F.R. §§ 63.40–.44]," and citing to

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Ambiguity: An Examination of Statutory Interpretation at the Environmental Protection Agency, 96 Geo. L.J. 1347, 1357 (2008).

[19] P4G made this same error, stating in its *Best Controlled Similar Source Evaluation*, "The lowest CO emission limit achieved in practice from review of source testing data was 0.15 lb/MMBtu." (Ex. J-14 at 11).

federal law and/or federal cases multiple times. (Ex. J-11 at 110–12, 115, 117, 122, 140, 147–48, 150–55).

Respondents next argue that, regardless of whether EPD erred in defining the MACT floor, EPD correctly rejected the best-controlled similar source stack testing as unreliable. Respondents maintain that in setting a MACT floor, a single stack test is not sufficient to give it confidence that the best controlled similar source would be able to achieve that emissions level under all reasonably foreseeable operating conditions. (Tr. at 1523 (Cornwell)). For Wygen II, Respondents note that the three test runs that comprised the stack testing varied approximately 63% from run to run, with the high run reporting 0.00166 lb/MMBtu and the low run reporting 0.00056 lb/MMBtu. (Ex. J-45 at 53; Ex. Resp.-St.-5 ¶ 47 (Aponte)). As a result, Respondents' witnesses testified that they had little confidence in a single stack test as a valid means for demonstrating the variability in PM filterable emissions expected from a facility under all reasonably foreseeable circumstances. (Tr. at 1423, 1425–26 (Cornwell); Tr. at 1641–42 (Aponte); Tr. at 1100–03 (Fickas)). Respondents note that the variability demonstrated in Wygen II's stack testing is similar to that for other coal-fired power plants. (Tr. at 1706 (Capp)).

Respondents also point to Plant Washington's use of a CEMS device to monitor PM filterable and CO emissions as further reason why EPD did not err in failing to rely upon the emission rates reflected in the stack testing at the best-controlled similar sources. (Ex. Int.-St.-2 ¶ 113 (Fickas)). Plant Washington's CEMS device will allow monitoring of PM filterable and CO emissions during transient conditions (i.e., load changes) that may not be accounted for in stack testing. (Ex. Resp.-St.-5 ¶ 45 (Aponte)). Variability might also be caused by changes in the ash content of the coal, tears in the baghouse bags, soot blowing, and bag cleaning. (Ex. Int.-

[20] The written direct testimony referenced the correct definition, but also referred to the lowest emission limits achieved in practice. (Ex. Resp.-St.-5 ¶¶ 19, 52, 67 (Aponte)).

St.-2 ¶¶ 118–120 (Fickas); Ex. Resp.-St.-5 ¶¶ 45, 51 (Aponte); Tr. at 1393–95 (Cornwell); (Ex. Int.-St.-3 ¶ 53 (Johnson)). Although Plant Washington will employ a leak detection system, Respondents urge that even the slightest change in the baghouse's removal efficiency can lead to a significant change in PM filterable emissions.[21] (Tr. at 1109 (Fickas); Tr. at 1708–09 (Capp); Tr. at 1426–27 (Cornwell); Tr. at 1281–82 (Johnson)).

6. Analysis

Respondents' reliance on the permitted emission levels at Wygen II and Newmont is not error in and of itself. A permitting authority may rely on a permit limit as an indicator of what level of control a similar source would achieve under all reasonably foreseeable circumstances. *See Sierra Club v. EPA*, 167 F.3d 658, 662–63 (D.C. Cir. 1999) (rejecting the contention that the Clean Air Act forbids EPA's reliance on regulatory data, including permit limits, when setting a MACT floor). However, in order to rely upon a permitted limit, the permitting authority must have evidence that the limit is a reasonable reflection of the level of control achieved at the facility. *See id.* at 663 (remanding EPA's decision to combine regulatory data and uncontrolled values to approximate performance because the EPA "ha[d] not "pointed to evidence supporting the reasonableness of the approximation"); *see also Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 953–54 (D.C. Cir. 2004) (rejecting the EPA's efforts to use state permit limits as the MACT floor because "[a]s in *Sierra Club*, EPA . . . stated only that it

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[21] Respondents contend that it is unclear whether there is pollution control technology available that could guarantee Petitioners' suggested PM filterable emissions limitations. (Ex. Int.-St.-3 ¶¶ 54, 60 (Johnson)). Despite Respondents' claim that there is no guarantee pollution control technology can meet Petitioners' suggested limits, Petitioners urge that their suggested limits are attainable using the pollution control technology already in place. As compared to Wygen II, Plant Washington's baghouse is likely to be better because it is subject to limits for fine particulates, which necessitate the use of better fabric filter material. (Ex. J-6 at 17). The Permit requires Plant Washington to keep its equipment in good working order and operate all pollution control device consistent with good air pollution control practices. (Ex. J-15 at 228, Condition 1.1; Ex. J-16 at 6, Condition 1.1; Tr. at 744–45 (Sahu)). Further, the effectiveness of Plant Washington's baghouse at removing PM filterable is likely to improve rather than degrade over the life of the facility, as replacement bags are likely to reflect technological improvement. (Tr. at 1108–10 (Alford)).

'believes' state permit limits reasonably reflect the actual performance of the best performing units without explaining why this is so").[22]

The record does not contain sufficient evidence that Wygen II and Newmont's permitted emission limitations reflect the actual level of control achieved by these facilities. In preparing its permit application, P4G completed a *Best Controlled Similar Source Evaluation*, in which it collected stack testing data for PM filterable as a surrogate for non-mercury metal HAPs from ten facilities. (Ex. J-14 at 9). While the facilities' permitted emission limits are all higher than the limit proposed for Plant Washington, nine out of the ten facilities report actual emissions below the limit articulated in the instant Permit. (Ex. J-14 at 9).

P4G's *Best Controlled Similar Source Evaluation* provided comparable information for CO emissions, as did EPD's *Notice of MACT Approval*. (Ex. J-14 at 11; Ex. J-11 at 138, tbl. XVII). The data demonstrate that the facilities' permits contain CO emission limits equivalent to or greater than Plant Washington's. However, of the seven facilities listed in EPD's Notice of MACT Approval, six demonstrate stack test results for CO below that of Plant Washington's permit limit.

These data sets provide persuasive evidence that the stack testing results at Wygen II and Newmont were not atypical.[23] At the hearing, EPD acknowledged that it had no reason to deem

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[22] Both new and existing sources "require the maximum degree of reduction in emissions of [relevant HAPs] that the Administrator . . . determines is achievable for new or existing sources . . . ." 42 U.S.C. § 7412(d)(2). However, the methods to determine the proper MACT standards differ. For new sources, "[t]he maximum degree of reduction in emissions that is deemed achievable . . . [can]not be less stringent than the emission control that is achieved in practice by the best controlled similar source . . . ." *Id.* § 7412(d)(3). For existing sources, in contrast, the emission standard "may be less stringent than standards for new sources," but may "not be less stringent, and may be more stringent than the average emission limitation achieved by either the best performing" 12 percent of existing sources or the best performing 5 sources for which the agency has information. *Id. Compare Sierra Club*, 167 F.3d at 660–66 (reviewing and analyzing the statutory requirements for proposed MACT floors for existing and new sources); *and Northeast Maryland*, 358 F.3d at 953–56 (evaluating information the agency relied upon in order to issue MACT floors for existing and new sources).

[23] Dr. Sahu also relied upon the EPA's recently proposed NESHAPs for industrial, commercial, and institutional boilers and process heaters ("proposed Industrial Boiler MACT"), 75 Fed. Reg. 32,006, 32,066 tbl. 1 (June 4, 2010), which proposes a MACT standard for coal-fired industrial boilers of 0.001 lb/MMBtu PM filterable as a surrogate

Wygen II's stack testing data unreliable. (Tr. at 1621 (Aponte)). As a result, EPD should have considered the stack testing data in determining whether the permitted limits reasonably reflected actual levels of emission control at the best controlled similar sources. *See Sierra Club*, 167 F.3d at 663 (if sources "substantially overachieving the permit limits…the permit limits would be of little value in estimating the [best sources'] performance").

As noted "floors need not be perfect mirrors of the best performers' emissions." *Cement Kiln*, 255 F.3d at 871–72. A permitting authority typically adjusts an emission rate to account for variability. *Cf. id.* at 865 (explaining in the context of setting NESHAPs for existing sources that "the relevant question here is not whether control technologies experience variability[,] but whether the variability experienced by the best-performing sources can be estimated by relying on emissions data from the worst-performing sources using the MACT control"). As both Petitioners and Respondents acknowledge, EPD is obligated to set a margin of compliance to account for the variability in emissions due to operational changes. (Ex. Resp.-St.-5 ¶¶ 50–51 (Aponte); Ex. Pet.-St.-2 ¶ 83 (Sahu); Tr. at 1426–27 (Cornwell)); *Nat'l Lime Assoc. v. Envtl. Prot. Agency*, 627 F.2d 416, 424–25, 436, 439–41 (D.C. Cir. 1980) (recognizing variability in the performance of emission controls such as baghouses, scrubbers, feed materials, and types of fuel)).

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for non-mercury metal HAPs. (Ex. Pet.-St.-2 ¶¶ 47–50 (Sahu)). Respondents moved to exclude consideration of the proposed Industrial Boiler MACT, and the undersigned denied their Motion, concluding that the objections went to the weight, and not the admissibility, of the evidence. After due consideration, the undersigned does not accord any weight to the proposed Industrial Boiler MACT, as it has neither been adopted by the EPA nor does it apply to coal-fired utility boilers such as Plant Washington's. Moreover, the EPA Administrator recently stated that as a result of public comments and new data, "the final standards will most assuredly differ from the proposed ones." Letter from Lisa P. Jackson, Adm'r, Envtl. Prot. Agency, to Mary L. Landrieu, Senator, U.S. Senate (Sept. 28, 2010) (Int'r's Notice of Suppl. Evid. Ex. A (Oct. 5, 2010)).

"[EPD] would be justified in setting the floors at a level that is a reasonable estimate of the performance of the 'best controlled similar unit' under the worst reasonably foreseeable circumstances . . . ." *Sierra Club*, 167 F.3d at 665. However, the record does not contain reliable evidence that Respondents considered the best-controlled unit's performance under the worst foreseeable circumstances; instead, Respondents looked only to Plant Washington's performance under the worst foreseeable circumstances stating: "MACT limits must be achievable [for Plant Washington]. That is, they must be able to be met under all reasonably foreseeable operating conditions for the life of the facility." (Ex. Resp.-St.-5 ¶ 51 (Aponte)).

Respondents also argue that EPD's error in determining the MACT floor is mitigated by the fact that the Permit's emission limitations fall below those of the best-controlled similar sources, maintaining that any mistake made by EPD was harmless in the final MACT analysis. In support, Respondents look to the limited guidance EPA has issued for case-by-case MACT determinations, which applies to existing sources of pollution rather than to new sources such as Plant Washington. (Ex. RI-130). That guidance provides, in relevant part, as follows:

> [C]ase-by-case MACT emission limitation will be highly dependent upon the amount and type of information available . . . . In some instances, a permitting authority's control technology determination procedures may yield the appropriate level of control without specifically following this guidance or making a MACT floor finding. The EPA is less concerned with the actual methodologies used, and more concerned that the outcome requires sources to comply with an emission limitation based on MACT.

(Ex. RI-130 at 10). As the EPA's guidance for case-by-case MACT determinations for existing sources indicates, there are a number of possible approaches a permitting authority might adopt in determining MACT. However, the dilemma in this case is that EPD's initial error drove its analysis. By concluding that the MACT floor was the lowest permitted emission limit, rather than the lowest emission control achieved in practice, EPD failed to explore whether the permitted emission limitation reasonably reflected the level of control achieved at the facility. *See Sierra Club*, 167 F.3d at 663.

Respondents maintain that a stack test is merely a snapshot in time and thus unreliable evidence of a facility's actual emissions.[24] Despite Respondents' challenge to the reliability of the stack testing data, the undersigned finds that stack tests generally are reliable because they record emission levels under representative operating conditions. (Tr. at 1621, 1744–45 (Capp); Ex. J-16 at 18, Condition 6.1d (requiring all monitoring systems and devices be installed, calibrated, and operational prior to conducting stack tests and that they be used to acquire data during each stack test)). While Wygen II only underwent one stack test, there is no regulatory requirement for a certain number of tests. (Tr. at 905 (Sahu)). EPD found no indication that the test at Wygen II was not performed according to the accepted protocols and procedures or that the results were otherwise unreliable. (Tr. at 1621 (Aponte)). Additionally, both permitting authorities and industry vendors rely on stack tests: EPA uses stack test data to set limits for nationwide MACT standards, and pollution control equipment dealers typically rely upon a single stack test to demonstrate that a guaranteed control performance has been met. *See, e.g.*, 62 Fed. Reg. 960, 961 (Jan. 7, 1997); (Tr. at 1360–62 (Brown); Tr. at 1515 (Cornwell); Tr. at 1801–02 (Sahu)).

Respondents also suggest that there is not enough data to conduct a meaningful variability analysis; however, the evidence does not support their assertions. Further, if EPD felt

[24] Respondents suggest that if they had relied upon Santee Cross's stack testing of 0.0099 lb/MMBtu, the "application of a margin of compliance to account for operational variability would result in a limit of greater than 0.010 lb/MMBtu." (Ex. Resp.-St.-5 ¶ 48 (Aponte)). However, the Santee Cross stack test is by far the highest of the similar sources—not the best controlled similar source.

that the data was insufficient for variability testing, the record does not reflect that they made earnest attempts to gather additional information from the best controlled similar sources.[25]

Respondents' argument that Plant Washington's use of a CEMS device to measure PM filterable and CO emissions precludes any reliance on stack test data is unavailing. Stack tests are the reference method for testing to certify CEMS and are the standard by which CEMS are certified, operated, and relied upon. (Tr. at 910 (Sahu); Tr. at 1678 (Capp)). To this end, Plant Washington's Permit requires the use of stack tests to certify the accuracy of the CEMS that will be used to continuously monitor and track the emissions levels of various pollutants emitted by Plant Washington. (Tr. at 1516 (Cornwell); Ex. J-16 at 18, Condition 6.1 a-d). Contrary to Respondents' arguments, the CEMS allows for early detection and diagnosis of any problems in the baghouse. (Ex. Pet.-St.-2 ¶ 55; Ex. Int.-St.-1 ¶ 113 (Fickas)). Further, not all transient conditions will be evaluated by the CEMS data, as Respondents' acknowledge that Georgia regulations allow for excess emissions during startup and shutdown so long as the source complies with good operational practices. (Tr. at 1403–04, 1476–78 (Cornwell)). Justin Fickas testified that he had identified sources comparable to Plant Washington that used a CEMS device to measure PM filterable emissions, but that as an applicant—as opposed to a regulatory authority—he was unable to obtain the CEMS data. (Tr. at 1134–35 (Fickas)). While a CEMS device will continually monitor emissions and reflect variability to a greater degree than a stack test, to compensate for any spikes in emissions measured by the CEMS, EPD might determine that a longer averaging time is warranted. (Tr. at 1480, 1515 (Cornwell); Tr. at 1624 (Aponte)).

[25] While Respondents suggest that insufficient data might lead to an inability to conduct a meaningful variability analysis, the undersigned finds the evidence submitted on this point was not persuasive. In EPA's proposed Industrial Boiler MACT, EPA's proposed emission limitation is "based on the 99% Upper Prediction Limit (UPL) of test runs at the best controlled similar source (meaning that there is a 99% confidence level that the average of three test runs would fall below this emission rate) . . . ." (Ex. Pet.-St.-2 ¶ 47; Ex. P84, 75 Fed. Reg. 32,028 tbl. 5). In 2004, when EPA last developed a NESHAP for utility boilers, the agency based its proposal on single stack test

7. The Relationship Between CO and NO_x

In addition to the aforementioned arguments, Respondents offer that the interplay between CO and NO_x also supports the Permit's CO MACT emission limitation. Plant Washington has three NO_x BACT emission limitations—0.05 lb/MMBtu on a 30-day average, 0.03 lb/MMBtu on a 12-month average while firing PRB coal, and 0.044 lb/MMBtu on a 12-month average while firing the 50/50 blend coal. (Ex. Resp.-St.-5 ¶ 69 (Aponte)). These are the most stringent NO_x emission limitations ever permitted for a coal-fired power plant. (Tr. at 1713 (Capp); Ex. Resp.-St.-5 ¶ 65 (Aponte)). EPD devised these limitations because NO_x is a precursor to ozone. (Tr. at 1695 (Capp); Tr. at 1635–36 (Aponte)). Although Plant Washington is in an attainment area for National Ambient Air Quality Standards, Georgia has struggled to comply with these standards for ozone.

In formulating the NO_x BACT limits, Respondents considered the relationship between NO_x and CO. The evidence presented demonstrated that efforts to control the formation of CO in the boiler will necessarily impact the formation of NO_x, and vice-versa. (Ex. Resp.-St.-5 ¶ 65 (Aponte); Ex. Int.-St.-2 ¶¶ 146–48 (Fickas); Ex. Int.-St.-3 ¶ 72 (Johnson)). Specifically, the good combustion controls utilized by a boiler operator to minimize CO formation, such as maintaining a longer residence time, high temperature, good mixing and excess oxygenation, increase the formation of NO_x in the boiler. (Ex. Int.-St.-3 ¶ 72 (Johnson); Ex. Resp.-St.-5 ¶ 65 (Aponte)).

Petitioners contend that it is possible to overcome the trade-off between NO_x and CO emissions by using state-of-the-art technology. (Ex. Pet.-St.-2 ¶ 59 (Sahu)). They suggest that staged combustion that will take place in Plant Washington's boiler will decouple NO_x and CO in

results from multiple sources. (Tr. at 1103–04 (Fickas)). EPA is currently relying on single stack tests from best-controlled similar sources for the development of a Utility MACT. (Tr. at 1100–01 (Fickas)).

the boiler, allowing the facility to achieve low NO_x and CO values simultaneously. (Tr. at 831–32, 1752 (Sahu)).

Witnesses for EPD and P4G recognized a definitive trade-off between CO and NO_x, noting that their formation is inversely related. (Tr. at 1120 (Fickas); Tr. at 1307–08 (Johnson); Ex. Resp.-St.-5 ¶ 65 (Aponte)). Further, the trade-off between NO_x and CO emissions is evident from a review of the stack testing data for both the Newmont and Hardin facilities. For example, the stack testing for Newmont reported a CO emission level of 0.002 lb/MMBu and a corresponding NO_x emission level of 0.066 lb/MMBtu. (Ex. RI-58 at 11; Ex. Resp.-St.-5 ¶ 69 (Aponte)). This NO_x emission level would exceed the NO_x emission limitations in the Permit. (Ex. J-16, Condition 2.13a & r; Ex. Resp.-St.-5 ¶ 69 (Aponte)).

EPD demonstrated that the CO MACT emission limitation tends to have an impact on corresponding NO_x emissions. (Ex. Resp.-St.-5 ¶¶ 65, 69–71 (Aponte); Tr. at 1120 (Fickas)). Similarly, the stack test for Hardin reported a CO emission level of 0.001 lb/MMBtu and a NO_x emission level of 0.072 lb/MMBtu. (Ex. RI-70 at 13). Again, while Hardin was able to achieve a low CO emission level during that particular stack test, it did not simultaneously achieve a NO_x emission level that would comply with the limits in the Permit. (Ex. Resp.-St.-5 ¶ 70 (Aponte)). Petitioners did not present stack testing data to support their position.

The undersigned agrees that when evaluating emissions controls, consideration must be given to the impact of selection of a control technology on all pollutants being considered. (Ex. Int.-St.-2 ¶ 22 (Fickas)). Nonetheless, in this case, the CO limit is a MACT limit, while the NO_x limit is a BACT limit. Respondents acknowledge that in the event of a conflict between MACT and BACT limits, MACT must govern. (Tr. at 1123 (Fickas); Tr. at 1635 (Aponte)). Moreover, NO_x is not the only precursor to ozone formation. Volatile organic compounds ("VOCs") are also ozone precursors and are among the organic HAPs for which CO is serving as a surrogate. (Tr. at 1635 (Aponte)).

Notwithstanding any inverse relationship between CO and NO_x, in the event of a conflict between a MACT and BACT standard, the MACT standard must govern; indeed, as EPD conceded at the hearing "the MACT determinations subsume the BACT." (Tr. at 1123 (Fickas); Tr. at 1635 (Aponte)). Only after establishing the MACT floor for CO may EPD consider impacts on other pollutants. *See* 40 C.F.R. § 63.43(d)(2). For the aforementioned reasons, the undersigned finds that Petitioners have proven by a preponderance of the evidence that the Permit's emissions limitations for PM filterable as a surrogate for non-mercury metal HAPs and for CO as surrogate for organic HAPs are not reflective of MACT.

8. Dioxins and Furans

Petitioners also allege that the Permit is invalid because it fails to include a direct emission limitation for dioxins and furans reflective of MACT. (Pet. Hr'g, Count V). Petitioners object to emission limitations for two categories of HAPs that Plant Washington will emit: non-mercury metal HAPs and organic HAPs, including dioxins and furans. (Ex. J-11 at 113; Ex. Pet.-St.-2 ¶ 30 (Sahu)). "Dioxins and furans refer to a group of chlorinated organic compounds that all share a similar chemical structure" and fall within the general category of organic HAPs. (Ex. Int.-St.-2 ¶ 127 (Fickas); Ex. Pet.-St.-2 ¶ 60 (Sahu)). Based on the limited data available, P4G estimated that Plant Washington's total annual emissions of dioxins and furans would be a relatively small quantity if the boiler operated at its maximum capacity throughout the entire year. (Ex. Int.-St.-2 ¶ 129 (Fickas); Tr. at 773 (Sahu)).[26] In its permit

[26] As discussed *supra* note 13, EPA is currently in the process of obtaining additional data as part of its Information Collection Request for the forthcoming Utility MACT. In supporting documentation for its Information Collection Request, EPA recognized the likelihood that tested emissions of dioxins and furans would be below the detection

application, P4G proposed the use of CO as a surrogate emission for organic HAPs, including dioxins and furans. As noted, Petitioners did not object to CO as a surrogate emission for organic HAPs, other than dioxins and furans.

Generally, permitting authorities may use surrogates to regulate hazardous pollutants, providing such use is reasonable. *Nat'l Lime v. Envtl. Prot. Agency*, 233 F.3d 625, 637 (D.C. Cir. 2000). In *National Lime*, the court found the surrogacy was reasonable because (1) the hazardous pollutants were invariably present in the surrogate; (2) the surrogate's control technology indiscriminately captured the hazardous pollutants; and (3) the surrogate's control technology was the only means by which the source could reduce the hazardous pollutants' emissions. 233 F.3d at 639; *see also Sierra Club v. EPA*, 353 F.3d 976, 984–85 (D.C. Cir. 2004) (relying on the same three factors to uphold EPA's use of PM filterable as a surrogate for HAP metal emissions). In this case, Petitioners object to the Permit's use of CO as a surrogate for dioxins and furans, arguing CO combustion bears no relationship to the formation or destruction of these pollutants.

<u>a. Formation of Dioxins and Furans</u>

As Petitioners acknowledge, dioxin and furan formation in coal-fired boilers is complex. (Ex. Pet.-St.-2 ¶ 60 (Sahu)). The EPA proposes three theories regarding how and where dioxins and furans may be formed in a coal-fired power plant: (1) dioxins and furans are found in the coal that survives combustion in the boiler; (2) precursors to dioxins and furans form in the boiler and then condense and absorb onto fly ash particles in the exhaust gas; and (3) dioxins and furans form "downstream" of the boiler through the interaction of chlorine and another molecule

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limit, concluding "[h]owever, EPA believes that some additional data are necessary upon which either to base a surrogate standard or to establish an emission limit for dioxin/furan." (Ex. RI-168 at 4–5).

that together serve as a precursor in their formation (the "de novo theory"). (Ex. RI-159 at 393–94; Ex. P-94 at 98–99; Ex. Int.-St.-3 ¶ 64 (Johnson)).

b. Petitioners' Claims

Petitioners adopt the *de novo* theory of dioxin and furan formation. Under the *de novo* theory, Petitioners argue that the surrogacy test articulated in *National Lime* is not satisfied in the instant case because (1) dioxins and furans are not invariably present in CO; (2) good combustion practices for CO do not indiscriminately capture dioxins and furans; and (3) control of CO is not the only means by which facilities achieve reductions in dioxins and furans—carbon injection in combination with the baghouse also control dioxins and furans—but neither of these technologies control for CO. (Tr. at 1113–15 (Alford); Tr. at 1638 (Aponte)). Petitioners further reason that CO is not an appropriate surrogate for dioxins and furans because CO, unlike dioxins and furans, is not related to the chlorine content in coal. (Ex. Pet.-St.-2- ¶¶ 60–62 (Sahu)).

Relying on the *de novo* thesis, Petitioners assert that a separate limit must be established for dioxins and furans. They propose a direct dioxin and furan emission limitation of 0.002 nanograms per dry standard cubic meter ("ng/dscm"), toxicity equivalent correct to 7% oxygen.[27] (Pet. Hr'g ¶ 85). Again, Petitioners do not challenge the control technology permitted by EPD. Petitioners allow that Plant Washington could achieve the proposed limit through the use of activated carbon injection, which Plant Washington is already required to install for the control of mercury emissions. (Ex. Pet.-St.-2 ¶ 70 (Sahu); Ex. J-16 at 9, Condition 2.9).

[27] In its proposed Industrial Boiler MACT, EPA proposed a dioxins and furans MACT emission limit for new pulverized coal-fired industrial boilers of 0.002 ng/dscm, toxicity equivalent corrected to 7% oxygen. 75 Fed. Reg. 32,006 (June 4, 2010). This is equivalent to what Dr. Sahu proposed. Petitioners do not put forth any evidence of

c. Pollution Controls for Dioxins and Furans

The technology required by the Permit for the control of CO emissions is referred to as "good combustion controls." (Ex. J-16 at 8, Condition 2.5). Good combustion controls are the best and most widely accepted means of controlling emissions of CO and organic HAPs. (Ex. Int.-St.-3 ¶¶ 66, 70, 73 (Johnson); Ex. J-5 at 111–13, 393; Ex. Pet.-St.-2 ¶ 78 (Sahu)). The goal of good combustion controls is "complete combustion," which occurs when all combustible portions of the coal are converted into stable oxidized forms. (Ex. Int.-St.-3 ¶ 68 (Johnson)). To achieve this goal, the boiler must be designed and operated in a manner to maximize the "three T's" of combustion: time, temperature, and turbulence. (Ex. Int.-St.-2 ¶ 131 (Fickas); Ex. Int.-St.-3 ¶¶ 68–69, 73 (Johnson); Ex. J-5 at 393, 396–98).

d. Analysis

As to this issue, Petitioners do not meet their burden of proof. *See* Ga. Comp. R. & Regs. 616-1-2-.07(1)(b) & -.21(4). They have not presented sufficient evidence proving that a direct MACT emission limitation for dioxins and furans would ensure a greater reduction in emissions above that which the CO emission limitation will already provide.[28]

Contrary to Petitioners' claims, the evidence suggests that complete combustion will destroy dioxins and furans that may form within the boiler, as well as the organic precursors that are necessary for dioxins and furans formation outside of the boiler. (Ex. Resp.-St.-5 ¶¶ 58, 66 (Aponte); Ex. Int.-St.-3 ¶¶ 64–66 (Johnson); Ex. Int.-St.-2 ¶¶ 131–132 (Fickas)). To the extent dioxins and furans may form outside of the boiler, any such *de novo* formation still depends on the presence of precursors, which, like CO, is a byproduct of incomplete combustion. (Ex.

stack testing data from coal-fired power plants to support their proposed emissions limitation for dioxins and furans. (Tr. at 751–52 (Sahu)).

Resp.-St.-5 ¶ 58 (Aponte); Ex. Int.-St.-3 ¶¶ 64–66 (Johnson); Ex. Int.-St.-2 ¶¶ 131, 134 (Fickas); Ex. Pet.-St.-2 ¶ 60 (Sahu); Tr. at 775–77 (Sahu)). Although Dr. Sahu believes that good combustion practices that control CO will not prevent the formation of dioxins and furans, he acknowledges that some hydrocarbons, which are a necessary precursor for the formation of dioxins and furans outside the boiler, would be combusted in the boiler. (Ex. Pet.-St.-2 ¶ 62 (Sahu)). In turn, even adopting the *de novo* theory of formation, such combustion would leave fewer hydrocarbons in the exhaust gas available to form dioxins and furans. (Tr. at 774–77 (Sahu)). As a result, the same good combustion controls that Plant Washington will employ to control CO emissions will necessarily reduce dioxins and furans or the precursors of dioxins and furans. (Ex. Resp.-St.-5 ¶ 58 (Aponte); Ex. Int.-St.-3 ¶¶ 62–66 (Johnson); Ex. Int.-St.-3 ¶ 131 (Fickas)).

EPA and other state permitting authorities have endorsed the use of CO or VOCs, another indicator of complete combustion, as a surrogate for all organic HAPs, including dioxins and furans.[29] (Ex. J-5 at 395, tbl. 10-18; Ex. Resp.-St.-5 ¶ 55 (Aponte); Ex. RI-27 (VOC as surrogate for all organic HAPs); Ex. RI-81 at 23–24 (same); RI-74 at 3, ¶ 21 (CO and VOCs surrogate for all organic HAPs); Ex. RI-78 (same); Ex. RI-92 (VOC as surrogate for all organic HAPs)). P4G considered the use of either CO or VOC emissions as a surrogate. (Ex. Resp.-St.-5 ¶ 63 (Aponte)). However, no VOC CEMS device exists to monitor emissions continuously. (Ex. J-5 at 392).

Witnesses testified that they are not aware of any permit that has been issued for a coal-fired power plant that contains a separate emission limitation for dioxins and furans. (Ex. Resp.-

[28] The evidence suggests that in the event downstream formation of dioxins and furans takes place, activated carbon injection and a fabric filter baghouse could assist in their removal. Plant Washington is already required to install these two controls. (Ex. J-15 at 9, Conditions 2.8 & 2.9).

[29] EPA did not object to EPD's use of CO as a surrogate for dioxins and furans. (Ex. RI-3).

St.-5 ¶ 57 (Aponte); Tr. at 1429 (Cornwell)). Not only do other facilities use CO as a surrogate for dioxins and furans, EPA's NESHAPs for new hazardous waste combustors that burn solid fuel (i.e., coal), approve the use of CO as a surrogate for dioxins and furans. 40 C.F.R. § 63.1216(b)(1) & (5). Of the many subcategories within the hazardous waste combustor NESHAP, the solid fuel hazardous waste combustors are more similar to Plant Washington, as both types of sources burn coal. (Tr. at 1125 (Fickas); Tr. at 1665–66 (Aponte)).

Petitioners did not present any data from coal-fired power plants that attributed emissions of dioxins and furans to a particular formation mechanism.[30] (Tr. at 800–04 (Sahu)). Irrespective of where or how dioxins and furans are formed, the evidence in the record establishes a correlation between the removal of CO and the limitation of dioxins and furans. (Tr. at 1643 (Aponte); Tr. at 1297–98 (Johnson)). Given the scientific uncertainty surrounding the formation and control of dioxins and furans at coal-fired power plants, and the known correlation between CO and dioxins and furans, the undersigned concludes that Petitioners did not meet their burden to show that CO is an inappropriate surrogate.

C. CLAIMS RELATED TO AIR DISPERSION MODELING

In Count VII, Petitioners allege that P4G failed to demonstrate that Plant Washington will not cause or contribute to violations of the National Ambient Air Quality Standards or PSD increment for PM_{10} over a 24-hour averaging period.[31] (Pet. Hr'g ¶¶ 91–104; Am. Pet. Hr'g ¶¶

[30] An EPA report cited by Dr. Sahu in support of his claim that CO is not an appropriate surrogate because CO emissions are not related to the chlorine content in coal concluded that "the chlorine content of fuel and feeds to a combustion source is not a good indicator of levels of [dioxins and furans] emitted from the stack of that source." (Ex. P-94 at 99).

[31] An area violates the 24-hour average PM_{10} National Ambient Air Quality Standards if the 24-hour average PM_{10} concentrations in the area exceed 150 micrograms per cubic meter ("$\mu g/m^3$") for more than one 24-hour period in one calendar year. 40 C.F.R. § 50.6(a); Ga. Comp. R. & Regs. 391-3-1-.02(4)(c)(1)(i). EPA also has promulgated standards for the maximum allowable increase, or increment, of 24-hour PM_{10} air pollution levels associated with a major new source of air pollution located in an attainment area. The 24-hour average PM_{10} increment is 30 $\mu g/m^3$, which may be exceeded only during one 24-hour period per year at any one location. 40 C.F.R. § 52.21(c); Ga. Comp. R. & Regs. 391-3-1-.02(7)(b)1.

2–4). National Ambient Air Quality Standards are established by pollutant and are applicable nationwide. *See generally* 40 C.F.R. §§ 50.1–.17. PSD ambient air increments are also established by pollutant but are applicable pursuant to an area's general level of air quality. Plant Washington is in a Class II area for PSD increments. (Ex. Resp.-St.-2 at 5 n.2 (Courtney)).[32]

Before EPD can issue a PSD permit for a new major source of air pollution:

> [t]he owner or operator of the proposed source or modification shall demonstrate that allowable emission increases from the proposed source or modification, in conjunction with all other applicable emissions increases or reductions (including secondary emissions), would not cause or contribute to air pollution in violation of: (i) Any national ambient air quality standard in any air quality control region; or (ii) Any applicable maximum allowable increase over the baseline concentration in any area.

Ga. Comp. R. & Regs. 391-3-1-.02(7)(a)1, (b)8; 40 C.F.R. § 52.21(k)(1). Coarse particle pollution, also known as "PM_{10}" because it has an aerodynamic diameter between 2.5 microns and 10 microns, is one of the criteria pollutants subject to regulation. *See* 40 C.F.R. Pt. 50.

Pursuant to Ga. Comp. R. & Regs. 391-3-1-.02, EPD requires PSD permit applicants to establish, via air dispersion modeling, that predicted emissions from a proposed facility will not cause or contribute to a violation of a National Ambient Air Quality Standards or PSD increment. If air dispersion modeling submitted by an applicant suggests that the highest predicted concentration of 24-hour PM_{10} exceeds the significant impact level of 5 micrograms per cubic meter ("$\mu g/m^3$"), then a full impact analysis, or "refined modeling," is required.[33] (Tr. at 398 (Keeley)). Refined modeling predicts the combined impacts of the proposed facility and

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[32] PSD increments are by pollutant within a class, with the class designation based on the area in question's level of air quality. Class I refers to excellent air quality (parks and wilderness areas), Class II refers to average air quality, and Class III denotes areas of poor air quality. *See* Ga. Comp. R. & Regs. 391-3-1-.02(7)(b)1, 3 (incorporating 40 C.F.R. § 52.21(c) & (e) by reference).

[33] While this significant impact level is not part of EPA's or Georgia's PSD regulations, EPA has issued guidance to state permitting authorities that the significant impact level nevertheless provides an appropriate threshold for determining the sufficiency of an air dispersion modeling demonstration. (Ex. Resp.-St.-2 ¶¶ 9–10 (Courtney)).

other nearby emissions sources. (Tr. at 397–98 (Keeley)). The results of the refined modeling are then compared to the National Ambient Air Quality Standards and PSD increment standards. (Ex. Int.-St.-1 ¶¶ 14–15 (Keeley)).

In this case, the modeling P4G submitted as support for the PSD permit reported a maximum 24-hour average PM_{10} concentration of 4.951 $\mu g/m^3$, or 99% of the regulatory threshold. (Ex. Resp.-St.-2 ¶ 15 (Courtney); Ex. Pet.-St.-1 ¶ 20 (Gebhart)). Nonetheless, because the highest 24-hour PM_{10} concentration reported by P4G's air dispersion modeling was less than the significant impact level of 5 μ/m^3, Respondents concluded that the PM_{10} emissions from Plant Washington would not cause or contribute to a violation of the 24-hour PM_{10} National Ambient Air Quality Standards or PSD increment. (Ex. Int.-St.-1 ¶ 97 (Keeley); Ex. Resp.-St.-2 ¶ 14 (Courtney)); Ex. J-11 at 33). Petitioners charge that P4G's air dispersion modeling analysis contains numerous errors, and that accurate modeling would have demonstrated concentrations above the threshold level of 5 $\mu g/m^3$, requiring refined modeling.

1. Air Dispersion Models

Air dispersion models are computer-based programs that utilize mathematical equations to predict atmospheric concentrations of a pollutant from a particular emission source or sources. (Ex. Int.-St.-1 ¶¶ 8–9 (Keeley); Ex. Pet.-St.-1 ¶ 24 (Gebhart); *see* 40 C.F.R. § 52.21(*l*) (describing requirements of air quality models). The EPA establishes approved modeling parameters and methodologies. *See* 40 C.F.R. § 52.21(*l*) (directing PSD permit applicants to follow the modeling guidelines set forth in 40 C.F.R. pt. 51, app. W [hereinafter "Appendix W"]). Georgia has incorporated these guidelines by reference. Ga. Comp. R. & Regs. 391-3-1-.02 (7)(b)9.

P4G utilized the EPA-approved model for stationary sources, AERMOD, to conduct its air dispersion modeling for 24-hour PM_{10}. (Ex. Int.-St.-1 ¶ 11 (Keeley); Ex. Resp.-St.-2 ¶ 11 (Courtney)). The air dispersion modeling predicted daily 24-hour PM_{10} concentrations using five years of meteorological data at 6,726 modeling receptor sites spaced throughout a 24-kilometer by 22-kilometer grid centered on the Plant Washington site. (Ex. Resp.-St.-2 ¶ 14–15 (Courtney); Ex. J-5 at 254, fig. 5-2). In total, the model calculated over twelve million separate 24-hour PM_{10} concentrations. (Ex. Int.-St.-1 ¶ 97 (Keeley); Ex. Resp.-St.-2 ¶ 15 (Courtney)). Of these, thirty-three were above 4 $\mu g/m^3$. (Ex. Int.-St.-1 ¶ 97 (Keeley)).

The key inputs for air dispersion models include (1) estimates of emissions for sources within a proposed facility; (2) the stack and release parameters (e.g., stack height and diameter, velocity at which emissions exit the stack, and stack exhaust temperature); (3) the physical layout of the facility; (4) meteorological data; and (5) the location and elevation of modeling receptors. (Ex. Pet.-St.-1 ¶ 32 (Gebhart); Ex. Resp.-St.-2 ¶ 11 (Courtney); Ex. Int.-St.-1 ¶ 10 (Keeley); Tr. at 1180 (Hoffnagle)). Inputs are derived from conditions specified in a permit, representations made in the permit application materials, or reasonable estimates based on the applicant's engineering judgment. (Ex. Int.-St.-1 ¶¶ 33–35 (Keeley); Tr. at 206–07 (Gebhart); Tr. at 407 (Keeley)).

Petitioners contend P4G's modeling inputs were invalid. (Tr. at 399 (Keeley)). First, Petitioners claim P4G made multiple errors in calculating Plant Washington's fugitive dust emissions. Second, Petitioners allege that P4G erred in failing to place modeling receptors along portions of roadways that currently lie within the proposed boundary of the facility. Third, Petitioners maintain that the meteorological data EPD prescribed for use in P4G's 24-hour PM_{10}

air dispersion modeling does not represent meteorological conditions at the Plant Washington site. (Pet. Hr'g ¶¶ 92–104; Am. Pet. Hr'g ¶¶ 2–4).

2. Source Emissions

To model 24-hour PM_{10} impacts from Plant Washington, P4G estimated the PM_{10} emissions from thirty-four sources at the facility. (Ex. Int.-St.-1 ¶¶ 33–34 (Keeley); Ex. J-5 at 41, Table 3-1; Ex. I-2). Emission sources are categorized as either "point source" emissions or "fugitive" emissions. A point source refers to a source that emits PM_{10} through a vent or stack. (Ex. Int.-St.-1 ¶ 35 (Keeley)). Fugitive emissions or "fugitive dust" refers to those emissions sources, like roadways or coal piles, where PM_{10} emissions do not originate from a vent or stack. (Ex. Int.-St.-1 ¶ 35 (Keeley)). *See also* Ga. Comp. R. & Regs. 391-3-1-.01(dd) (defining "fugitive dust" as "solid airborne particulate matter emitted from any source other than through a stack, vent, or chimney"). Fugitive dust can be generated by (1) vehicle traffic traveling across a paved or unpaved road surface, (2) wind erosion from material stockpiles and other open areas where materials are stored, such as ash or gypsum disposal sites, and (3) the handling and transfer of materials such as coal and other minerals, aggregate, sand, and gravel. (Ex. Pet.-St.-1 ¶ 36 (Gebhart)).

a. Point Source Emissions

To estimate the PM_{10} emissions of point sources at Plant Washington, P4G assumed that the facility would be operating at its maximum permitted capacity at all times under the highest emitting conditions (e.g., utilizing the higher sulfur 50/50 blend of fuel to model impact of sulfur dioxide). For example, P4G estimated the PM_{10} emissions from the facility's main coal-fired boiler by assuming that the boiler would operate at its maximum heat input capacity (8,300 MMBtu/hr) at all times. P4G then multiplied this maximum heat input capacity by the maximum PM_{10} emission level allowed by the Permit (0.018 lb/MMBtu) to derive a maximum PM_{10} emission rate of 149.4 lb/hr. (Ex. Int.-St.-1 ¶ 37 (Keeley)). P4G also followed this same approach for the other point sources at the facility, including the auxiliary boiler, cooling towers, and other vents and baghouses. (Ex. Int.-St.-1 ¶¶ 39–44 (Keeley)). The PM_{10} emissions from the three primary point sources—the coal-fired boiler, the auxiliary boiler, and the cooling towers—represent approximately 98% of the total PM_{10} emissions from Plant Washington. (Ex. Int.-St.-1 ¶ 42 (Keeley)). Petitioners do not challenge P4G's assumptions regarding point source emissions.

P4G maintains that it made multiple "worst-case assumptions" regarding point source operations, leading to emissions overestimations. For example, P4G assumed that the auxiliary boiler and the coal-fired boiler would both be operating at all times, which is not likely to occur. The auxiliary boiler will only run when the main coal-fired boiler is not operating or during the start-up process for the coal-fired boiler. (Ex. Int.-St.-1 ¶ 13 (Fickas)); Tr. at 224–25 (Gebhart)). Further, the Permit restricts operation of the auxiliary boiler to 876 hours per year. (Ex. J-16 at 12, Condition 2.17). Thus, P4G's assumption that both the auxiliary boiler and main coal-fired boiler will be operating simultaneously for an entire year is an unlikely—if not impossible—occurrence. (Tr. at 304, 352 (Gebhart) (acknowledging that it would be "inefficient" to operate both the auxiliary boiler and main boiler simultaneously for 24 hours).

b. Fugitive Emissions

Petitioners challenge P4G's modeling for six fugitive emissions sources: (1) paved haul roads; (2) unpaved haul roads; and (3) four transfer points and storage areas for PRB coal, Illinois No. 6 coal, limestone, and bottom ash. They argue that finding even a small error in modeling any of these sources would cause predicted emission concentrations to increase over the significant impact level of 5 μ/m^3. (Pet. Hr'g ¶¶ 97–103; Ex. Pet.-St.-1 ¶¶ 20–21 (Gebhart)).

Fugitive dust is generally released at or near ground level. (Ex. Pet.-St.-1 ¶ 39 (Gebhart)). The height at which an emission point releases PM_{10} pollution is significant, as emissions released close to ground-level have less opportunity for dispersion and dilution. (Ex. Pet.-St.-1 ¶¶ 47–48 (Gebhart); Tr. at 401–02 (Keeley)). As a result, fugitive dust emissions have a greater relative impact on ambient PM_{10} concentrations as compared to the same quantity of PM_{10} emissions released from an elevated stack. (Ex. Pet.-St.-1 ¶¶ 46–48 (Gebhart)).

While fugitive dust sources are predicted to generate less than 1% of all PM_{10} emissions from Plant Washington, because there is less opportunity for dispersion, "fugitive dust sources, primarily traffic on paved and unpaved roads, account[] for almost 50% of the predicted $PM_{[10]}$ concentration on the worst-case day in MACTEC's modeling analysis." (Ex. Pet.-St.-1 ¶ 51 (Gebhart)). In contrast, "the main boiler stack accounts for only 5% of the maximum $PM_{[10]}$ impact, despite the fact that the main stack emissions account for the majority of the Plant Washington's PM_{10} emissions." (Ex. Pet.-St.-1 ¶ 51 (Gebhart)).

Fugitive source emissions are difficult to estimate.[34] (Tr. at 439–41 (Keeley); Tr. at 1185–87 (Hoffnagle)); *see also* Appendix W § 5.2.2.2e (noting the "difficult nature of characterizing and modeling fugitive dust and fugitive emissions"). Neither Georgia nor federal law prescribe particular modeling parameters or methodologies for calculating emissions from fugitive dust sources; instead, the permitting authority retains discretion to approve emission estimates that it deems most appropriate. *See* Appendix W § 8.1.1.b ("The appropriate reviewing authority should be consulted to determine appropriate source definitions and for guidance

[34] It is for this reason that some states do not require fugitive sources of emissions to be included in modeling for short-term averaging times. (Ex. Int.-St.-1 ¶ 67 (Keeley); Ex. Resp.-St.-2 ¶ 40 (Courtney)).

concerning the determination of emissions from and techniques for modeling the various source types."). The Draft NSR Manual notes that fugitive emissions should be included in air dispersion modeling only "to the extent they are quantifiable . . . ." (Ex. J-1 at 29). Such discretion is warranted as fugitive dust emissions cannot be estimated with the same precision as point source emissions. (Tr. at 1185 (Hoffnagle); Tr. at 437, 441 (Keeley)).

At EPD's behest, P4G relied on two guidance documents to estimate Plant Washington's 24-hour PM_{10} fugitive emissions: EPD's *Guideline for Assuring Acceptable Concentration of PM_{10} in Areas Impacted by Quarry Operating Producing Crushed Stone* ("Quarry Modeling Guideline") and EPA's *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources* ("AP-42"). (Tr. at 396–97 (Keeley)). EPD developed the Quarry Modeling Guidelines in 1988 to estimate PM_{10} fugitive dust emissions at quarries. (Ex. Resp.-St.-2 ¶ 42 (Courtney)). EPA's AP-42 is a compilation of "emission factors," which are defined as "representative value[s] that attempt[] to relate the quantity of a pollutant released . . . with an activity associated with the release of that pollutant."[35] (Ex. J-25 at 1 (emphasis omitted)).

1) Paved Roads

Plant Washington's design includes a short haul road of less than 0.5 miles from the boiler facility to the solid materials handling facility to transport bottom ash, gypsum, and fly ash. (Ex. Int.-St.-1 ¶ 66 (Keeley)). To minimize fugitive dust emissions, this haul road will be paved, and P4G will utilize water sprays and/or apply chemical dust suppressants. (Ex. J-5 at 245; Ex. J-16 at 3).

[35] Although the AP-42 is considered the best source of information that exists for estimating certain fugitive dust emissions, it is likely that the AP-42 fugitive dust emissions are overestimations. (Tr. at 1181–84; 1192, 1218 (Hoffnagle)). Because these emission factors are based on the observed average of a range of emission rates, EPA discourages the use of AP-42 emission factors as emission limits or standards. (Ex. J-25 at 1–2 (noting that AP-42 "emission factors are frequently the best or only method available for estimating emissions, in spite of their limitations").

Pursuant to the Quarry Modeling Guidelines, an applicant is directed to first calculate PM_{10} emissions from paved and unpaved roads by multiplying the maximum number of vehicle miles traveled in a 24-hour period by the uncontrolled PM_{10} emission rate. (Tr. at 405–06 (Keeley)). After calculating the maximum uncontrolled PM_{10} emissions from paved and unpaved roads, the permit applicant is directed to apply a control efficiency figure based on the dust control measures that are required as enforceable conditions in the permit. (Tr. at 406 (Keeley)). P4G's calculations included the following variables: (1) a "silt loading factor" which refers to the mass of dust-generating material that may be found in a unit area of road surface; (2) the control efficiency achieved by fugitive dust controls; (3) the average weight of vehicles traveling on the road; (4) the number of vehicle miles traveled; and (5) precipitation. (Ex. Int.-St.-1 ¶ 68 (Keeley); Ex. J-24 at 9; Ex. J-27 at 6).

In its permit application, P4G represented that fugitive emissions from the haul road "will be reduced by 90 percent by paving the haul road in conjunction with water sprays and surfactants." (Ex. J-5 at 245, 552). Consequently, when conducting its air dispersion modeling, P4G also assumed a control efficiency of 90% on the paved road.

The Permit requires that the specific fugitive dust control measures P4G ultimately proposes, and EPD approves, be set forth in a separate dust suppression plan.[36] (Ex. J-16 at 27, Condition 7.17). The dust suppression plan will be submitted after construction, but prior to the commencement of any operations at Plant Washington that generate fugitive dust. (Tr. at 1438–39 (Cornwell); Ex. Int.-St.-1 ¶ 84 (Keeley); Tr. at 486–87 (Keeley)). The dust suppression plan

[36] Although the Permit does not contain a dust suppression plan, it does reference fugitive dust control. (Ex. J-16 at 3–4). For example, pursuant to the Permit P4G must "take all reasonable precautions to prevent fugitive dust from becoming airborne . . . ." (Ex. J-16 at 12–13, Conditions 2.22 & 3.1). The Permit requires the use of "Water sprays and/or Dust suppressant" to control fugitive emissions from the paved roads. (Ex. J-16 at 4). If water sprays are installed and operated correctly, there should not be any observable dust emissions. (Tr. at 1436 (Cornwell)). Other provisions in the Permit allow P4G the flexibility to implement additional measures to control fugitive dust from the paved roads as well as other fugitive dust sources at Plant Washington. (Ex. J-16 at 12–13, Conditions 2.22 & 3.1).

must specify the measures P4G will employ to control fugitive dust, and establish monitoring and recordkeeping provisions. (Tr. at 1435–36 (Cornwell)). EPD will ensure compliance with the plan through inspections, requiring changes to the plan if necessary. (Tr. at 1440–41 (Cornwell)).

Petitioners contend that P4G should not be permitted to rely on this 90% control efficiency. (Pet. Hr'g ¶ 99). Petitioners maintain that because the details of the dust suppression plan were not set forth in the Permit, nor subject to public notice and comment, any dust suppression plan submitted after approval of the Permit is not enforceable. They complain that the Permit does not indicate the quantity of water or suppressants that will be applied, the intensity or frequency of application, the number of vehicle passes between applications, or the monitoring and recordkeeping required to insure that these techniques are effective. (Ex. J-16; Ex. Pet.-St.-1 ¶¶ 77, 87 (Gebhart); Tr. at 436–37 (Keeley)).

Arguing that without a dust suppression plan P4G should not be permitted to rely on the 90% control measure, Petitioners' expert conducted a revised modeling analysis eliminating the control. (Ex. Pet.-St.-1 ¶¶ 87–88 (Gebhart)). This revised modeling results in an impact of 9.475 μ/m^3, and twenty six days where the 24-hour PM_{10} concentrations exceeded the 5 μ/m^3 significant impact level. (Ex. Pet.-St.-1 ¶ 89 (Gebhart)).

Petitioners' arguments that P4G should not be allowed to rely on a 90% control efficiency are not persuasive. Under Georgia law, P4G's representation regarding the 90% control efficiency is an enforceable condition of the proposed project. *See* Ga. Comp. R. & Regs. 391-3-1-.03(3)(a)3; 391-3-1-.02(7)(b)15 (incorporating 40 C.F.R. § 52.21(r)(l), which provides that "[a]ny owner or operator who constructs or operates a source or modification not in accordance with the application submitted...shall be subject to appropriate enforcement action").

EPD routinely exercises its authority to enforce representations in permit applications. (Tr. at 1692–93 (Capp)). Indeed, the Permit states on its face that it may be revoked, suspended, or modified for any misrepresentation in the application or supporting data. (Ex. J-16 at 1).

EPD customarily does not require the submission of a dust suppression plan as part of a permit application, (Tr. at 1438 (Cornwell)), nor do applicants routinely submit these plans prior to the building of the plant. (Tr. at 1173, 1199 (Hoffnagle); Tr. at 482 (Keeley)). Nonetheless, Respondents presented evidence at the hearing demonstrating that P4G can achieve the 90% control efficiency for fugitive dust. For example, measures could be taken to wash down tires and wheels of haul trucks. (Tr. at 1369 (Brown)). Street sweepings could be conducted on a regular basis, and spilled material promptly cleaned off the road surface. (Tr. at 436–37 (Keeley)). The speed of the vehicles also could be regulated. (Tr. at 1216 (Hoffnagle)).

Petitioner's expert agrees that a 90% control efficiency on the paved roads could be achieved. (Tr. at 243, 245 (Gebhart)). He has used this control efficiency value in preparing permit applications for his clients. (Tr. at 246 (Gebhart)). If the Permit explicitly required P4G to develop a dust suppression plan capable of achieving 90% control, Mr. Gebhart acknowledged that his criticism of P4G's use of a 90% control efficiency could be resolved. (Tr. at 302–03 (Gebhart)).

When a plan in question does not concern a fundamental statutory requirement of a permit, but rather addresses a supplemental requirement added at the permitting authority's discretion, the terms of the plan can be determined at a later date without requiring notice and comment. *See In re Power Holdings of Illinois, LLC*, PSD Appeal No. 09-04, at *9–16 (E.A.B. Aug. 13, 2010) (flare minimization plan was not required to be included in a PSD permit, as the plan did not impact BACT emission limitations in the permit); *In re: Indeck-Niles Energy*

Center, PSD Appeal No. 04-01, at *14–15 (E.A.B. Sept. 30, 2004) (startup and shutdown emission plan need not be part of the PSD permit because it would not affect the BACT emission limitations in the permit).

Moreover, to impose a requirement that a dust suppression plan be submitted as part of a permit application would be illogical. During the permitting process, neither an applicant nor EPD would be able to formulate an effective fugitive dust suppression plan, as final details of the plant design are not known. (Tr. at 1199 (Hoffnagle); Tr. at 1438 (Cornwell); Tr. at 482 (Keeley)). In a similar vein, the Permit specifies an emission limitation for NO_x and specifies the use of an SCR as a control. (Ex. J-16 at Conditions 2.13a & 2.4). The Permit does not specify the type of SCR to be used. As with the dust suppression plan, this detail will be resolved as the facility is constructed. (Tr. at 1255–56 (Johnson)).

The undersigned rejects Petitioners' argument that the Permit must contain a dust suppression plan, and finds that P4G's assumption of a 90% control efficiency in its emission estimates for fugitive dust emissions from the paved road at Plant Washington is permissible.

2) Unpaved Roads

The front-end loaders used to transport coal between the active and inactive piles will not follow a set path or defined road. (Ex. J-5 at 257; Tr. at 1190–92 (Hoffnagle); Tr. at 403 (Keeley)). P4G utilized AP-42's emission factor for unpaved roads to estimate fugitive dust emissions that will be generated from the moving equipment. (Ex. Int.-St.-1 ¶ 90 (Keeley); Ex. J-5 at 444). Emission calculations for unpaved roads are based on a control efficiency of 50%. (Ex. J-5 at 444).

3) Precipitation Correction Factor

P4G included a precipitation mitigation factor in its calculations of the 24-hour PM_{10} emissions from the paved and unpaved roads at Plant Washington. The factor accounts for the effect that natural precipitation will have on the control of fugitive dust emissions from the paved and unpaved roads. Specifically, the factor accounts for the number of days upon which rainfall will equal or exceed 0.01 inches in a given year. (Ex. Int.-St.-1 ¶ 85 (Keeley)).

Petitioners charge that P4G erred in applying an annual precipitation correction factor to quantify the 24-hour average PM_{10} emissions for paved and unpaved roads. (Ex. Pet.-St.-1 ¶ 66 (Gebhart)). Petitioners are correct. Under either AP-42 or the Quarry Modeling Guideline, P4G should not have used a precipitation correction factor for calculating maximum uncontrolled PM_{10} emissions in a 24-hour period. (Tr. at 416–17, 421–24 (Keeley)). "By using a precipitation factor, the [] PSD permit modeling significantly underestimated the peak 24-hour average $PM_{[10]}$ emissions and associated ambient air quality impacts from paved and unpaved roads." (Ex. Pet.-St.-1 ¶ 73 (Gebhart)).

Petitioner's expert ran the AERMOD model using P4G's model inputs but eliminating the precipitation correction factor. (Ex. Pet.-St.-1 ¶ 74 (Gebhart)). When the 24-hour average PM_{10} modeling is conducted without using the precipitation correction factor, the model produces a total of five separate days where the 24-hour PM_{10} concentration exceeds the 5 μ/m^3 significant impact level, triggering the need for a refined analysis. (Ex. Pet.-St.-1 ¶ 75 (Gebhart)).

4) Average Vehicle Weight

"The Plant Washington facility will require trucks to transport fly ash, bottom ash and gypsum from the main plant . . . to the on-site solid waste management facility." (Ex. Pet.-St.-1

¶ 57 (Gebhart)). For traffic on paved roads, the AP-42 finds "the magnitude of emissions from trucks and other vehicles traveling across a paved road surface for a given size fraction of particulate matter [is] principally a function of two variables: 1) the road surface silt loading[,] and [] 2) the average weight of vehicles traveling the road segment[]." (Ex. Pet.-St.-1 ¶ 57 (Gebhart)). If the vehicle weight is not properly accounted for, the resulting PM_{10} emissions may be in error. (Ex. Pet.-St.-1 ¶ 65 (Gebhart)).[37]

P4G assumed an average truck weight of 12.5 tons and a vehicle miles traveled value based on 126 truck trips on the paved road each day. (Ex. J-5 at 443). The vehicle weight assumed by P4G is unrealistic (Ex. Pet.-St.-1 ¶ 107 (Gebhart)), as it is less that than the weight of vehicles typically used for hauling at coal-fired power plants. (Tr. at 1215–16 (Hoffnagle)).

"By underestimating the average weight of vehicles traversing Plant Washington's haul roads, the air dispersion modeling understates the $PM[_{10}]$ emissions . . . and overall 24-hour average $PM[_{10}]$ impacts . . . ." (Ex. Pet.-St.-1 ¶ 107 (Gebhart)). Petitioners suggest that the average vehicle weight should be increased to at least 27.5 tons.[38] (Ex. Pet.-St.-1 ¶ 109 (Gebhart)). When this error is corrected, the PM_{10} modeling results exceeds the 5 μ/m^3 significant impact level, thus triggering the need for a refined analysis. (Ex. Pet.-St.-1 ¶ 107 (Gebhart)).

5) Analysis of Paved and Unpaved Road Emissions

As P4G acknowledges, it made errors in some of its modeling inputs regarding roadway fugitive emissions. However, the evidence presented at the hearing supports P4G's assertion that it also made a number of overestimations in its modeling inputs. When the underestimations

[37] "[T]he change in $PM[_{10}]$ emissions for any change in average vehicle weight would be more than linear because the weight variable is raised to the 1.5 power. . . ." (Ex. Pet.-St.-1 ¶ 60 (Gebhart)).

identified by Petitioners are balanced against P4G's emission overestimations, the undersigned concludes that no refined modeling is warranted.

First, P4G's overestimation regarding the silt loading value offsets any error in including the precipitation correction factor in its calculations. P4G's modeling assumed a silt loading value of 8.2 grams of silt per square meter (g/m^2). This value was taken from the Quarry Modeling Guideline, and corresponds with an expected silt loading value for quarries, not coal-fired power plants. (Ex. Int.-St.-1 ¶ 75 (Keeley); Ex. Resp.-St.-2 ¶ 47 (Courtney); Ex. J-24 at 9). Material from Plant Washington, unlike the stone transported at quarries, will be moistened such that if it falls it will not be as dusty as material transported at a quarry, and less likely to be deposited on the roads due to wind erosion. (Tr. at 1366–68 (Brown); Ex. Resp.-St.-2 ¶ 47 (Courtney); Ex. Int.-St.-1 ¶ 76 (Keeley)).

The Quarry Modeling Guideline's 8.2 g/m^2 is a much higher silt loading value than would be expected at Plant Washington. (Tr. at 488–89 (Keeley); Ex. Resp.-St.-2 ¶ 47 (Courtney); Ex. Int.-St.-1 ¶¶ 75–77 (Keeley)). For public paved roads with average daily traffic of less than 500 vehicle trips, AP-42 recommends a default silt loading value of 0.6 g/m^2. (Ex. J-27 at 9). P4G also introduced evidence of silt loading values utilized in permit applications for other coal-fired power plants that range from 0.015 to 0.6 g/m^2. (Ex. J-40 at 28; Ex. RI-37 at 164; Ex. RI-223 at 5; Ex. RI-224 at 283–85; Ex. RI-225 at 21; Ex. P-29 at 2). The most common number used in permit applications for the silt loading factor is .015 g/m^2, the amount referenced in AP-42 for a limited access road. (Tr. at 491 (Keeley)).

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[38] Petitioners acknowledge that EPA has proposed a revision to the AP-42 emission factor equation for paved roads that would reduce the PM_{10} emission factors for vehicle miles traveled over paved roads, assuming the silt content and vehicle weights used at Plant Washington. (Ex. Pet.-St.-1 ¶ 58 n.2 (Gebhart)).

Respondents' evidence demonstrates that P4G overestimated the silt loading factor in its calculations.[39] If the silt loading factor is reduced from 8.2 g/m^2 to 0.6 g/m^2, this would more than offset the removal of the precipitation mitigation factor from the paved road emission estimate. Moreover, this same result would occur if the silt loading value were lowered to 0.6 g/m^2, the precipitation factor removed, and the average vehicle truck weight increased to 27.5 tons.[40] (Tr. at 493 (Keeley)).

Further, the number of truck trips per day on the paved road was derived by assuming that the maximum amount of fly ash, bottom ash, and gypsum that the facility could generate (with the boiler operating continuously at its maximum heat input) would be transported during every 24-hour period in trucks with a 20-ton carrying capacity. (Ex. Int.-St.-1 ¶ 74 (Keeley)). This equates to an average daily volume of ash and gypsum transported on the paved road of 2,520 tons per day. The amount of gypsum was based on the worst-case assumption that the main boiler would fire a 50/50 blend of coal, and that the blend's sulfur content would be at the maximum end of the range. (Ex. Int.-St.-1 ¶115 (Keeley)).

P4G argues that it also overestimated fugitive dust emissions for the unpaved roads. Unlike a typical unpaved road, the coal pile area will be carefully controlled in that mobile equipment will travel at slow speeds, generating less dust. (Tr. at 1191--92 (Hoffnagle)). The Permit requires the use of "Water sprays and/or Dust suppressant" to control fugitive emissions

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[39] P4G used 8.2 g/m^2 because "at every step our goal was to be ultraconservative, to exaggerate emissions." (Tr. at 490 (Keeley)).

[40] Respondents presented several additional ways by which they could compensate for any underestimations. For example, P4G assumed a control efficiency of 90% from the fugitive dust controls that will be implemented on the paved road. (Ex. J-5 at 443). However, the Quarry Modeling Guidance allows the use of 95% control efficiency for fixed water spray systems on paved roads. (Ex. J-24 at 9; Ex. Resp.-St.-2 ¶ 45 (Courtney)). If P4G had used a 95% control efficiency, rather than 90%, the estimated PM_{10} emissions from the paved road at Plant Washington would have been half of what P4G assumed in its air dispersion modeling. (Tr. at 1191–92, 1198, 1202 (Hoffnagle)). Further, if the silt loading factor remained at 8.2 g/m^2, but the precipitation factor was removed and the control efficiency increased from 90% to 95% (as assumed in the Quarry Modeling Guideline), the resulting emission rate for fugitive emissions from the paved road would have decreased from 0.55 tons per year to 0.3 tons per year. (Ex. Resp.-St.-2 ¶ 46 (Courtney)).

from the unpaved area between the coal piles. (Ex. J-16 at 4; 12–13). P4G assumed a control efficiency of 50% from the water spray and dust suppressants required in the Permit. (Ex. Int.-St.-1 ¶ 90 (Keeley); Ex. J-5 at 444).

Relying on the Quarry Modeling Guideline and the AP-42, P4G maintains the 50% assumed control efficiency for this area is too low. The Quarry Modeling Guideline provides for a control efficiency of 90% for unpaved roads through the use of water trucks or fixed water spray systems. (Ex. J-24 at 7). EPA's AP-42 indicates that the use of dust suppressants on unpaved roads can achieve a PM_{10} control efficiency of about 80%. At the hearing, experts stated that P4G can achieve a 90% control efficiency. (Tr. at 1203 (Hoffnagle)).

If the precipitation mitigation factor was removed from the equation for fugitive emissions from unpaved roads, but the control efficiency was increased from 50% to 80%, the resulting PM_{10} emission estimate would be less than the emission used for unpaved roads in P4G's air dispersion modeling. (Ex. Int.-St.-1 ¶¶ 111–112 (Keeley)). If the precipitation mitigation factor was removed from the equation and the control efficiency was increased from 50% to 90% (the value assumed in the Quarry Modeling Guideline), the emission rate for unpaved roads would be as much as three times less than the emission rate used by P4G in its air dispersion modeling. (Ex. Resp.-St.-2 ¶ 44 (Courtney); Tr. at 1203 (Hoffnagle)).

As noted *supra*, this Tribunal reviews the evidence *de novo*, and the record is not restricted to that which was presented to EPD. Ga. Comp. R. & Regs. 616-1-2-.21(3). In considering the evidence, the undersigned agrees that an assumption that underestimates emissions from one source can be offset by a separate assumption that overestimates emissions from that same source. (Tr. at 1197, 1227 (Hoffnagle); Ex. Int.-St.-1 ¶¶ 111–113 (Keeley); Tr. at 489–90 (Keeley); Ex. Resp.-St.-2 ¶¶ 44, 46 (Courtney)). Respondents demonstrated that the removal of the precipitation mitigation factor and increase in truck weight estimation could be offset by valid adjustments to other assumptions that overstated emissions. Accordingly, the undersigned concludes that Respondents provided sufficient evidence to rebut Petitioners' claims that the omission of a precipitation mitigation factor and the underestimation of vehicle weight at the facility would trigger the need for refined modeling.[41]

6) Coal, Limestone, and Bottom Ash Handling

a) Coal

Both the PRB and Illinois No. 6 coal burned at Plant Washington will arrive via rail. Transporting the coal from railcar to boiler will cause fugitive dust emissions. The coal will be unloaded at a railcar unloading facility into one of four underground receiving hoppers, which will feed the coal into underground unloading belt feeders for transport to the coal piles. Although the rail unloading facility will be partially enclosed and will apply dust suppressant or water to the coal, fugitive PM_{10} emissions may occur during the unloading process. (Ex. Int.-St.-1 ¶¶ 48, 62 (Keeley); Ex. J-16 at 3).

To estimate fugitive emissions from the coal unloading facility, P4G utilized a "drop point" emission calculation from EPA's AP-42. (Ex. Int.-St.-1 ¶ 62 (Keeley)). P4G assumed a material throughput rate of 1,500 tons of coal per hour, which is equal to the maximum capacity of the unloading equipment. P4G likewise assumed that this rate of coal throughput would occur every hour of every day, over the entire year. (Ex. Int.-St.-1 ¶ 62 (Keeley); Tr. at 241 (Gebhart)). P4G maintains that this is a worst-case assumption because rail shipments of coal are not expected to occur every hour of every day. (Ex. Int.-St.-1 ¶ 62 (Keeley); Tr. at 241 (Gebhart)).

[41] Petitioners urge that it was incumbent upon Respondents to rerun the AERMOD modeling once it identified these errors; however, the undersigned concludes that the experts' testimony in this regard is sufficient rebuttal evidence.

The more likely scenario is that Plant Washington will receive one train, carrying up to 14,000 tons of coal, per day. (Tr. at 1326–30 (Blackburn)).

Coal will travel via conveyors from the unloading facility to four coal piles: two PRB piles (one active and one inactive) and two Illinois No. 6 coal piles (one active and one inactive). Coal will be unloaded from the conveyor system to the two active piles via stacking tubes. Two insertable dust collectors will be operated to collect any fugitive dust generated as the coal drops from the conveyor into the lowering wells. (Ex. Int.-St.-1 ¶¶ 48–50 (Keeley)). The two inactive piles will consist of back-up fuel supplies in the event there is a delivery interruption, and are designed to hold, collectively, up to a ninety-day supply of coal. (Ex. Int.-St.-1 ¶¶ 45, 50 (Keeley)). The buildup of the inactive coal piles is expected to occur either prior to facility startup or over the course of two years of normal operations. (Ex. Int.-St.-1 ¶ 50 (Keeley); Tr. at 1345 (Blackburn)).

Coal will be drawn from the active coal piles via underground grizzly hoppers and feeders to two conveyor belts for underground transport to the crusher and then to the coal-fired boiler. (Ex. Int.-St.-1 ¶¶ 48–49 (Keeley); Ex. I-4; Ex. J-5 at 27–30). Mobile equipment may be used to shift coal to the grizzly hoppers or to move the coal between the active and inactive coal piles. (Ex. Int.-St.-1 ¶ 49 (Keeley); Ex. I-4; Ex. J-5 at 27–28; Tr. at 445 (Keeley)).

P4G will use various methods to control fugitive dust generated during the coal handling in and around the coal piles. (Ex. J-16 at 12–13, Condition 2.22). Where possible, coal handling facilities will be enclosed. (Ex. Int.-St.-1 ¶ 48 (Keeley); Ex. I-4; Ex. J-16 at 3). Likewise, coal will be unloaded from the conveyor system via lowering wells, which are designed to control fugitive dust by creating a confined space in which to transfer coal from the end of the conveyor systems to the active coal piles. (Tr. at 1339–40 (Blackburn); Tr. at 1368 (Brown)). The Permit also specifies the use of chemical dust suppressants and/or water sprays to control fugitive dust. (Ex. J-16 at 3). Despite these control measures, some fugitive dust may be generated by the handling of coal in and around the coal piles. P4G assumed that the maximum amount of the 50/50 coal blend that Plant Washington is permitted to burn in a single hour would be handled every hour of every day by the mobile equipment, at both the inactive and active piles. (Ex. Int.-St.-1 ¶¶ 52–53 (Keeley)).

b) Limestone

Plant Washington will utilize approximately 300,000 tons of limestone in its air pollution control equipment to remove sulfur dioxide from the flue gas per year. The facility expects two and a half trainloads of limestone to arrive each month. (Ex. Int.-St.-1 ¶ 57 (Keeley); Tr. at 1334 (Blackburn)). To estimate emissions of fugitive dust that may be generated during the limestone unloading process, P4G utilized AP-42's drop point emission factor and assumed a limestone throughput rate of 1,000 tons per hour, which is equal to the maximum capacity of the limestone unloading equipment. P4G assumed this throughput rate would be sustained every hour of every day, over the entire year. (Ex. Int.-St.-1 ¶ 62 (Keeley)). P4G also assumed maximum wind speeds, and that the boiler would be producing the maximum level of uncontrolled sulfur dioxide emissions. (Ex. Int.-St.-1 ¶¶ 58–60 (Keeley)). P4G's assumptions regarding fugitive emissions generated from the limestone handling at Plant Washington predict a worst-case scenario for use in the model. (Ex. Int.-St.-1 ¶ 59 (Keeley)).

c) Bottom Ash

Bottom ash and pyrites will be generated as waste byproducts of the coal-fired boiler and pulverizer. P4G utilized AP-42's drop point emission factor to estimate fugitive emissions from the bottom ash transfer point. The amount of material throughput used by P4G is much higher than the facility would expect to generate and handle for any sustained period of time. (Ex. Int.-St.-1 ¶ 64 (Keeley)).

d) Petitioner's Claims Regarding Coal, Limestone, and Bottom Ash

Petitioners challenge the emission estimates for 24-hour PM_{10} fugitive dust emissions from the coal, limestone, and bottom ash transfer points at Plant Washington. Petitioners first assert that P4G utilized annual average emission rates for these transfer points to derive 24-hour averages and thus failed to capture the maximum daily peak volume of materials processed at each of the transfer points at issue. (Pet. Hr'g ¶ 101; Am. Pet. Hr'g ¶ 4; Ex. Pet.-St.-1 ¶¶ 5(c), 116–124 (Gebhart)). Second, Petitioners note that the Permit does not limit the amount of coal or limestone that can be delivered by railcar and transferred to emission points during any 24-hour period. Petitioners maintain P4G erred in calculating materials handling emissions based on the maximum rate that coal could be consumed in the boiler, contending that the throughput at the coal and limestone piles should be based on the maximum rate at which coal and limestone might be unloaded from the railcars. (Ex. Pet.-St.-1 ¶ 122 (Gebhart); Tr. 392–93; 443–44 (Keeley); Ex. J-1 at 195).

The evidence presented does not support Petitioners' claims regarding the four transfer points and storage areas for coal, limestone, and bottom ash. Although the emission calculations provided in the permit application express the emissions at each of these sources as tons per year, the evidence demonstrates that the annual tonnage was derived by assuming the maximum hourly volume of material would be handled at each of these sources every hour of the year. (Ex. Int.-St.-1 ¶¶ 52–54, 56, 58, 60, 64 (Keeley)). As Petitioners acknowledge, P4G assumed that the maximum hourly "peak" PM_{10} fugitive dust emissions would occur at all times. (Tr. at 232–34, 241 (Gebhart)).

The Draft NSR Manual specifies:

> For both NAAQS and PSD increment compliance demonstrations, the emissions rate for the proposed new source or modification must reflect the maximum allowable operating conditions as expressed by the federally enforceable emissions limit, operating level, and operating factor for each applicable pollutant and averaging time. . . .

(Ex. J-1 at 195). Petitioners are correct in their assertion that P4G based material throughput on the maximum hourly coal usage by the boiler. (Ex. Int.-St.-1 ¶¶ 52–53 (Keeley); Tr. at 453–56 (Keeley)). P4G estimated maximum 24-hour emissions from each of these sources by assuming that the boiler would be operating at its maximum permitted hourly capacity every hour of every day for the entire year. Over a 24-hour period, the maximum physical capacity of the coal and limestone unloading and handling facility would be greater than the maximum amount of coal that the boiler is physically capable of burning. (Tr. at 445, 453–56 (Keeley)). However, P4G's multiple overestimations regarding the amount of fugitive dust that would be generated at the transfer points where materials will be handled more than offsets error—if any—in calculating the rate of material throughput.

P4G's overestimations regarding the material handling points are as follows: P4G assumed simultaneous operation of insertable dust collectors, for both the PRB and Illinois No. 6 coal throughout each 24-hour period. As both types of coal cannot arrive and be unloaded at the same time, this assumption exaggerates the estimated level of 24 hour PM_{10} emissions from those points. (Tr. at 476–77 (Keeley)). P4G assumed that coal would be taken to both coal piles simultaneously, but this cannot occur. (Tr. at 1331–32 (Blackburn); Tr. at 475–77 (Keeley)). P4G also utilized AP-42's Industrial Wind Erosion emission factor to estimate fugitive emissions caused by wind erosion at the two active coal piles, assuming that the maximum two-minute wind speed recorded over a one-year period (41 miles per hour) would blow continuously for an entire year. (Ex. Int.-St.-1 ¶ 54 (Keeley); Tr. at 457–58 (Keeley)). This assumption regarding the erosive force of a 41 mph wind blowing continuously twenty four hours a day is an excessive estimate that exaggerates the expected conditions.

P4G's model contemplated that trains would unload coal and limestone every hour of the day at the maximum unloading rate. This overestimates unloading emissions, as witnesses testified that only two or three limestone trains would be unloaded in a month and that coal would not arrive every day. (Tr. at 1326–30; 1334 (Blackburn)). P4G also assumed that mobile equipment would be handling coal at the two active and inactive piles at the same time. This is an unrealistically conservative assumption, as the equipment will be either moving coal from an active coal pile to an inactive pile, or vice-versa, but not conducting both activities at the same time. (Tr. at 452–53 (Keeley)). P4G also overestimated the amount of work a bulldozer would perform in moving coal, because grizzly hoppers will allow 30% of the coal pile to be fed to the boiler without the need for mobile equipment. (Tr. at 1339–40 (Blackburn)).

Petitioners fail to prove that P4G's estimates of emissions from the material handling points invalidate the adequacy of its air dispersion modeling. Petitioners did not submit any modeling indicating that the alleged errors made in modeling the material handling points would trigger the need for refined modeling. As such, even if Petitioners are correct that P4G erred in relying on maximum boiler consumption rather than maximum offloading in calculating fugitive dust emissions from materials handling points, the undersigned finds the conservative assumptions underlying P4G's 24-hour PM_{10} emission estimates from these sources collectively overestimate the maximum 24-hour PM_{10} emissions. (Tr. at 1207–08 (Hoffnagle); Ex. Int.-St.-1

¶ 120 (Keeley)). Accordingly, the submitted modeling captures the maximum 24-hour PM_{10} fugitive dust emissions at material handling points that could reasonably be expected to occur at Plant Washington.

3. Mayview and Mathis Roads

Portions of two public roads, Mayview and Mathis Roads, currently traverse the proposed Plant Washington site. (Ex. P-46 at 2; Ex. Int.-St.-2 ¶¶ 151–153 (Fickas)). Petitioners claim that P4G's 24-hour PM_{10} modeling is flawed because P4G did not include modeling receptors along those portions of Mayview and Mathis Roads crossing the proposed site. (Am. Pet. Hr'g ¶ 3).

Throughout the permitting process, P4G represented to EPD that those portions of Mayview and Mathis Roads that traverse the proposed Plant Washington site would be relocated prior to the construction of the facility. P4G provided EPD with a map outlining the proposed rerouting. (Ex. Int.-St.-2 ¶ 101 (Keeley); Ex. Int.-St.-2 ¶¶ 151–153 (Fickas); Ex. P-46(a); Tr. at 1688–89 (Capp)). Although the Permit does not prohibit commencement of construction until the two roads are closed or relocated, without relocating these two public roads around the facility's boundaries, P4G will not be able to construct Plant Washington as presently permitted. (Tr. at 965 (Alford); Ex. Int.-St.-1 ¶ 101 (Keeley); Ex. Int.-St.-2 ¶ 153 (Fickas)). Neither P4G nor EPD have authority to relocate the roads; the relocation must be approved by Washington County pursuant to a separate legal process that had not yet commenced at the time of the hearing. (Tr. at 964–65 (Alford); Tr. at 1722 (Capp)).

Given P4G's representations regarding the rerouting, P4G did not locate and EPD did not require modeling receptors on Mayview or Mathis Roads. (Tr. at 464–65 (Keeley)). Petitioners contend that either the Permit must be revised to include a permit condition that prohibits the construction and operation of Plant Washington unless and until the roads are relocated around the plant boundary, or in the alternative, that the air dispersion model must be rerun with receptors placed along those portions of the roads that are currently open to the public. Based on Petitioners' position that the model should be rerun, Mr. Gebhart conducted additional modeling for receptors along Mayview Road and Mathis Road. Mr. Gebhart found that the PM_{10} concentrations along Mayview and Mathis Roads exceeded the significant impact level, requiring refined modeling. (Ex. Pet.-St.-1 ¶ 128 (Gebhart)).

National Ambient Air Quality Standards and PSD increments only concern "ambient air" or "that portion of the atmosphere, external to buildings, to which the general public has access." 40 C.F.R. § 50.1(e). Modeling receptors need not be placed on the applicant's property, provided such property is "inaccessible to the general public." (Ex. J-1 at 192).

In its permit application, P4G represented to EPD that the relocation of Mayview and Mathis Roads is a prerequisite to the construction of Plant Washington. A representation in a permit application becomes an enforceable condition of the proposed project. *See* Ga. Comp. R. & Regs. 391-3-1-.03(3)(a)3; 391-3-1-.02(7)(b)15. EPD routinely enforces representations made in a permit application, notwithstanding that those same representations are not stated explicitly in the permit. (Tr. at 1692-93 (Capp)). Further, the Permit provides that it "may be subject to revocation, suspension, modification or amendment by the Director ... for any misrepresentation made in the [Permit application materials]." (Ex. J-16 at 1; Tr. at 1720 (Capp)).

As witnesses for EPD testified, the relocation of portions of both Mayview and Mathis Roads, as depicted in a map P4G provided to EPD, constitutes a "necessary part" of P4G's permit application. (Tr. at 1689 (Capp)). In the event P4G begins construction without obtaining approval for the road relocations, EPD could either commence enforcement action or direct P4G to revise their application. (Tr. at 1690–92 (Capp)). For the stated reasons, the undersigned finds no merit in Petitioners' claims regarding Mayview and Mathis Roads.

4. Meteorological Data

Air dispersion modeling requires meteorological data that accurately represents the range of meteorological conditions that would be expected at the project site. (Ex. Pet.-St.-1 ¶ 134 (Gebhart); Tr. at 466–68, 513–14 (Keeley)). In addition to an inventory of the potential emissions of air pollutants, two types of meteorological information must be inputed in order to predict potential concentrations of ambient air pollution under a range of reasonably expected weather conditions: (1) representative surface meteorological data and (2) a representative profile of the upper air, or "vertical" meteorology above the project site. (Tr. at 466–67, 514 (Keeley)).

The modeling guidelines set forth in Appendix W provide that a PSD permit applicant's air dispersion model should use five years of National Weather Service ("NWS") meteorological data or at least one year of site-specific data, and that the decision between the two rests with the permitting authority. Appendix W § 8.3.1.2b. In either case, Appendix W requires that the meteorological data set should be "adequately representative" of the meteorological conditions at the project site. *Id.* § 8.3.1.2a.

EPD supplied P4G with the meteorological data that was used in P4G's 24-hour PM_{10} air dispersion modeling. This data consisted of surface air data collected at a NWS station at the Middle Georgia Regional Airport in Macon, Georgia, and upper air data collected by the NWS at a station in Centreville, Alabama. (Ex. J-2 at 6; Ex. Resp.-St.-2 ¶ 17 (Courtney); Ex. Int.-St.-1 ¶ 25 (Keeley); Ex. Pet.-St.-1 ¶ 5(f) (Gebhart)). Petitioners argue that P4G should have used on-site meteorological data, noting that Appendix W § 8.3.3.1 expresses a preference for on-site meteorological data as model input. Petitioners also contend that the off-site meteorological data used is not sufficiently representative of the conditions at the proposed site.

The undersigned rejects Petitioners' objections to the meteorological data. The meteorological data used in the modeling were collected at both the Macon airport and Centreville weather stations over a five year period from 1987 to 1991. (Ex. Resp.-St.-2 ¶ 17 (Courtney)). The data from this time period represents the most recent, complete five-year data set available to the agency for the Macon airport weather station. The agency then acquired the upper air data from the Centreville weather station for this same time period to ensure temporal representativeness between the surface and upper air data sets. (Ex. Resp.-St.-2 ¶ 19 (Courtney)). Although the 1987–1991 surface data set was complete, the upper air data was missing thirty-nine observations; an EPD meteorologist filled in the missing data with observations deemed most similar to the missing observation. (Ex. Resp.-St.-2 ¶ 17 (Courtney)). EPD used AERMOD's Meteorological Data Processor ("AERMET") to convert the 1987–1991 surface and upper air meteorological data sets into AERMOD ready meteorological data files. (Ex. Resp.-St.-2 ¶ 18 (Courtney)). EPD has used surface data from the Macon airport weather station and upper air data from the Centreville weather station for air dispersion modeling of proposed sources in Washington County and several other counties in Central Georgia. (Ex. Resp.-St.-1 ¶ 21 (Courtney); Ex. Int.-St.-1 ¶ 25 (Keeley); Tr. at 599–600 (Courtney)).

The Macon airport weather station is located approximately fifty six miles from the proposed site for Plant Washington. (Ex. Pet.-St.-1 ¶ 147 (Gebhart); Ex. Resp.-St.-1 ¶ 23 (Courtney); Ex. Int.-St.-1 ¶ 123 (Keeley)). It was the closest available NWS site to the proposed facility with a complete set of surface meteorological data. (Ex. J-15 at 66; Ex. Pet.-St.-1 ¶ 147 (Gebhart)). The surface meteorological data collected at the Macon airport weather station includes temperature, dew point, wind direction, wind speed, and cloud cover, all of which are measured via instrumentation located close to the ground. (Ex. Int.-St.-1 ¶ 24 (Keeley)). The instrumentation at the Macon airport weather station is affixed to a twenty three foot tower. (Tr. at 600 (Courtney); Ex. Pet.-St.-1 ¶ 157 (Gebhart)).

The Centreville weather station is located approximately 212 miles from the Macon airport weather station. (Ex. Pet.-St.-1 ¶ 148 (Gebhart); Ex. Resp.-St.-2 ¶ 23 (Courtney)). The upper air meteorological data collected at the Centreville weather station includes temperature, relative humidity, barometric pressure, wind speed, and wind direction. (Ex. Int.-St.-1 ¶ 25 (Keeley); Ex. Resp.-St.-1 ¶ 5 (Murphey); Tr. at 515 (Murphey)). This data is collected from a radiosonde tethered to a weather balloon. (Ex. Resp.-St.-1 ¶ 5 (Murphey)). The weather balloon is released daily. (Ex. Resp.-St.-2 ¶ 17 (Courtney); Tr. at 514–15 (Murphey); Tr. at 601 (Courtney)). The radiosonde typically does not begin collecting meteorological data until the balloon has reached an altitude of 200 to 300 feet above ground surface. (Ex. Resp.-St.-1 ¶ 12 (Murphey)). The elevation of the proposed Plant Washington site is 457 feet above mean sea level ("amsl"). The elevations of the Centreville and Macon airport weather stations are 459 feet and 354 feet amsl, respectively. (Ex. Resp.-St.-2 ¶ 23 (Courtney)).

Although Petitioners' maintain that the off-site meteorological data should not have been used, off-site NWS data is routinely used for air dispersion modeling applications for coal-fired power plants as long as it is sufficiently representative of the proposed site. (Tr. at 275–77 (Gebhart)). In this case, on-site meteorological data would actually be less representative of surface meteorological conditions because characteristics of the proposed facility site, as they exist today, will be extensively modified prior to the commencement of operations. (Ex. Resp.-St.-2 ¶ 37 (Courtney); J-15 at 8–9).

Petitioners next argue that the data used in the modeling is not representative of the proposed site for Plant Washington. To the contrary, witnesses for both EPD and P4G testified that the Macon/Centreville data used in the air dispersion modeling are representative of meteorological conditions at the proposed Plant Washington site. (Ex. Resp.-St.-1 ¶¶ 5, 7, 11 (Murphey); Ex. Resp.-St.-2 ¶ 36 (Courtney); Ex. Int.-St.-1 ¶¶ 123, 126 (Keeley)).

The undersigned agrees with Respondents that the data used was sufficient. The Macon airport weather station meteorological data is representative of conditions at the Plant Washington site because of (1) the proximity of the Macon airport weather station to the project site; (2) the lack of significant terrain differences between Macon and the project site; (3) the similar high degree of exposure of the monitoring instruments at the Macon airport weather station and the project site, once the Plant Washington site is cleared and graded; and (4) the fact that the 1987–1991 Macon airport weather station data represents the most recent, complete data set, and therefore as the most conservative data set practicable to use for P4G's air dispersion modeling analysis.[42] (Ex. J-15 at 66–67). Additionally, the site characteristics immediately surrounding the Macon airport weather station are similar to those that will exist in the immediate vicinity of Plant Washington once the facility is constructed. (Ex. Resp.-St.-2 ¶¶ 36–37 (Courtney)).

The permit application included an evaluation of the surface characteristics at the Plant Washington site and the Macon airport weather station, and there are no significant terrain features between the two. (Ex. J-15 at 66; Ex. Resp.-St.-2 ¶¶ 34, 37 (Courtney)). P4G relied on topographical maps, aerial photographs, and EPA guidance to examine several characteristics of the two sites, including albedo (indicator of the reflectivity of the earth's surface), bowen ratio (indicator of surface moisture), and surface roughness. (Ex. J-5 at 258–62; Ex. Int.-St.-1 ¶¶ 27–32 (Keeley)). As a result of this analysis, P4G concluded that the Macon airport weather station's meteorological data was representative of conditions at the project site, once the site is graded and the facility constructed. EPD concurred with P4G's analysis.[43] (Ex. J-15 at 70–71; Ex. Resp.-St.-2 ¶ 18 (Courtney)).

Petitioner's expert testified that the large distance between Centreville and the project site introduced the potential for substantial errors in accurately defining the vertical temperature profile. (Ex. Pet.-St.-1 ¶¶ 148–149 (Gebhart)). Significant errors also may be introduced when fronts or convective storms propagate from west to east. (Ex. Pet.-St.-1 ¶¶ 149–150 (Gebhart)). Nonetheless, Petitioners did not conduct any modeling or perform any calculations to determine whether use of the upper air data from the Centreville weather station misrepresents the vertical temperature profile used by AERMOD, and if so, how the use of the Centreville data might affect the results of P4G's air dispersion modeling for 24-hour PM_{10}. (Tr. at 277–78 (Gebhart)).

Despite Petitioners' objections, the evidence demonstrated that the upper air meteorological data collected at the Centreville weather station is representative of upper air meteorological conditions at the proposed Plant Washington. Further, all three sites are located at about the same elevation and the same latitude, and are affected by similar climates. (Ex. J-15 at 68; Ex. Resp.-St.-2 ¶ 24 (Courtney); Ex. Resp.-St.-1 ¶¶ 5–11 (Murphey)). Fall and spring frontal systems and summertime high pressure systems that affect the upper air meteorology

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[42] In its comments, EPA criticized P4G's use of the Macon surface data suggesting that the Macon site was not representative of the surface conditions at the Plant Washington site. (Tr. at 468–71 (Keeley)). Petitioners did not raise any objections to the time period of the NSW data.

[43] The height of the weather station tower at the Macon airport is twenty three feet, while the height of the main stack at Plant Washington will be approximately 450 feet. (Ex. Pet.-St.-1 ¶¶ 157, 162 (Gebhart)). AERMOD compensates for this disparity in elevation by calculating faster wind speeds appropriate for emission points, such as the main stack and the cooling tower emission points, that are taller than the 23-foot weather station tower at the Macon airport. (Ex. Resp.-St.-2 ¶ 35 (Courtney); Ex. J-15 at 72). Petitioners did not tender any evidence

would be similar in Centreville, Macon, and at the proposed Plant Washington site, although not necessarily concurrent in time. (Ex. Resp.-St.-1 ¶¶ 7–9 (Murphey)). While in some cases the weather events at the Plant Washington site and Centreville may not occur simultaneously, these events do not have to be conjoined temporally in the model. (Tr. at 601–02 (Courtney)).

Petitioners did not prove that the surface air conditions that exist at the Macon airport weather station are not representative of the expected as-built conditions at Plant Washington, nor did they demonstrate that Centreville upper air meteorological data is not adequately representative of meteorological conditions at the project site. The undersigned finds that the meteorological data used by P4G was appropriate input for the AERMOD model.

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demonstrating that the difference in height between the Macon weather airport station and Plant Washington's main stack would affect P4G's modeling results.

VI. CONCLUSION

In reviewing EPD's action, it is "the ALJ's duty to conduct a *de novo* hearing and render an independent determination without deference to a technically complex agency decision." *Longleaf*, 298 Ga. App. at 768. Accordingly, the undersigned must "render an independent decision on whether the Challengers carried their burden to prove by the preponderance of evidence that the permit should not have been issued." *Id.* (citation omitted). The undersigned concludes that Petitioners did not carry their burden as to Counts II, V and VII of the Petition. However, for the reasons discussed, the undersigned finds that Petitioners have proven by a preponderance of the evidence their claims articulated in Counts IV and VI, which concern maximum achievable control technology, and the Permit's emission limitations for PM filterable and CO. Accordingly, the Petition is **GRANTED** and the issuance of the Permit is **REVERSED**.[44]

SO ORDERED, this 11 day of December 2010.

RONIT Z. WALKER
Administrative Law Judge

[44] The undersigned expressly declines to adopt the emission limitations proposed by Petitioners for these pollutants.