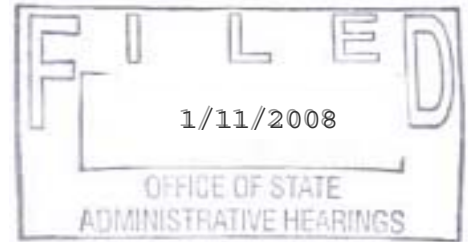


**BEFORE THE OFFICE OF STATE ADMINISTRATIVE HEARINGS  
STATE OF GEORGIA**

**FRIENDS OF THE** )  
**CHATTAHOOCHEE, INC. and** )  
**SIERRA CLUB** )  
 )  
**Petitioners,** )  
 )  
**v.** )  
 )  
**DR. CAROL COUCH, DIRECTOR** )  
**ENVIRONMENTAL PROTECTION** )  
**DIVISION, GEORGIA** )  
**DEPARTMENT OF NATURAL** )  
**RESOURCES** )  
 )  
**Respondent,** )  
 )  
**and** )  
 )  
**LONGLEAF ENERGY** )  
**ASSOCIATES, LLC** )  
 )  
**Intervenor** )  
\_\_\_\_\_ )

**DOCKET NO:**  
**OSAH-BNR-AQ-0732139-60-**  
**HOWELLS**



**FINAL DECISION**

Petitioners, Friends of the Chattahoochee, Inc. and Sierra Club, appeal the issuance of a Prevention of Significant Deterioration (“PSD”) air quality permit (“Permit”) to Intervenor, Longleaf Energy Associates, LLC (“Longleaf” or “Intervenor”). The Permit was issued on May 14, 2007, by Dr. Carol Couch, Director of the Environmental Protection Division (“EPD” or “Respondent”) of the Georgia Department of Natural Resources. It authorizes Intervenor to construct and operate a 1,200 megawatt (MW) coal fired steam electric generating station.

Petitioners oppose the issuance of the Permit because they assert that it violates provisions of the Georgia Air Quality Act, the Georgia Rules for Air Quality Control, and the federal Clean Air Act. *See* O.C.G.A. §§ 12-9-1, *et seq.*; GA. COMP. R. & REGS. r. 391-3-1-.01, *et*

*seq.*; 42 U.S.C. §§ 7401, *et seq.* Specifically, Petitioners assert that some of the emission limits contained in the Permit are not stringent enough and therefore do not comply with the requirements of 40 C.F.R. § 52.21(b)(12). Petitioners also assert that the additional impacts analysis performed by Intervenor and Respondent was inadequate and did not comply with 40 C.F.R. § 52.21(o). For the reasons stated below, Respondent's decision to issue the Permit is **AFFIRMED**.

## **I. PROCEDURAL BACKGROUND**

On May 14, 2007, the Director of EPD issued Prevention of Significant Deterioration ("PSD") Air Quality Permit No. 4911-099-0030-P-01-0 ("Permit") to Longleaf for the construction and operation of a nominal 1,200 MW pulverized coal-fired steam electric generating facility in Early County, Georgia. On June 13, 2007, Petitioners filed a seventeen-count Petition alleging that the Permit was unlawful and invalid. After briefing and oral argument, this Tribunal granted summary determination in favor of Longleaf and EPD as to Counts I, X, XI, XV; and partial summary determination on Counts II, V, and VII. *See Friends of the Chattahoochee v. Couch*, OSAH-BNR-AQ-0732139-60-Howells, 2007 Ga. ENV LEXIS 60 (OSAH December 18, 2007).

On August 24, 2007, Petitioners filed their First Amended Petition, in which they abandoned two of the original claims, Counts VIII and XII. (*See* First Amended Petition; *see also* Tr. at 49-51). On September 5, 2007, this Tribunal granted EPD's motion to dismiss Counts XIII and XIV of the First Amended Petition. (Tr. at 109). Subsequently, Petitioners abandoned Count XVII of the First Amended Petition. (Tr. at 3396-97).

Therefore, nine of Petitioners' original seventeen counts have been dismissed, abandoned, or denied as a matter of law. The following eight Counts remain:

- Count II: alleging that the Permit’s sulfur dioxide (“SO<sub>2</sub>”) emission limitation is not reflective of best available control technology (“BACT”) due to EPD’s alleged failure to consider all available control options;
- Count III: alleging that the Permit’s SO<sub>2</sub> emission limitation is not reflective of BACT due to EPD’s alleged errors in the collateral impacts analysis;
- Count IV: alleging that the Permit’s SO<sub>2</sub> emission limitation is not reflective of BACT due to EPD’s alleged failure to require the use of clean fuels;
- Count V: alleging that the Permit’s nitrogen oxides (“NO<sub>x</sub>”) emission limitation is not reflective of BACT due to EPD’s alleged failure to consider all available control options;
- Count VI: alleging that the Permit’s NO<sub>x</sub> emission limitation is not reflective of BACT based on EPD’s selected control technology;
- Count VII: alleging that the Permit’s particulate matter (“PM”) emission limitation is not reflective of BACT based on EPD’s selected control technology;
- Count IX: alleging that the Permit’s sulfuric acid mist (“SAM”) emission limitation is not reflective of BACT; and
- Count XVI: alleging that the additional impacts analysis was inadequate.

These remaining eight counts challenge the Permit’s emission limitations for four pollutants — sulfur dioxide (“SO<sub>2</sub>”), nitrogen oxides (“NO<sub>x</sub>”), particulate matter (“PM”),<sup>1</sup> and sulfuric acid mist (“SAM”) — as well as EPD’s additional impacts analysis. For each of these four pollutants, Petitioners claim that EPD failed to establish an emission limitation in the Permit that represents “best available control technology” (“BACT”), as defined by 40 C.F.R. § 52.21(b)(12). *See* GA. COMP. R. & REGS. r. 391-3-1-.02(7)(a)2 (incorporating 40 C.F.R. 52.21(b)

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<sup>1</sup> As used throughout this Decision and in the Permit, PM includes particulate matter that has a diameter of ten microns or less (“PM<sub>10</sub>”).

by reference). Petitioners further claim that the additional impacts analysis was inadequate and that it did not appropriately assess the risk to sensitive local vegetation.

This Tribunal conducted a 21-day evidentiary hearing on intermittent days, between September 5, 2007, and October 30, 2007. The hearing included testimony from nine different witnesses and resulted in 3,826 pages of transcript.

## **II. FINDINGS OF FACT**

Over five years ago, the developer of the Longleaf facility, LS Power Development, LLC (“LS Power”), proposed a new coal-fired steam electric generating facility in the southeast United States to meet a growing demand for baseload power generating facilities. (Tr. at 1439). LS Power considered building a nuclear, coal, or natural gas facility. However, it ultimately decided on a coal-fired facility due to the abundant coal reserves that exist in the United States. (Tr. at 1440-41).

In 2001, LS Power selected a site for the new Longleaf facility in Early County, Georgia. This site was selected for several reasons. First, high voltage transmission lines cross the property. Second, two main-line railroads, Norfolk Southern and CSX, are in close proximity to the site, and a short-line railroad connecting the Norfolk Southern and CSX lines runs along the property. Third, the site has two nearby water sources, the Chattahoochee River and the Georgia-Pacific paper mill. Finally, the land is suitable for the construction of the facility. (Tr. at 1442, 1457-58).

In mid-2001, soon after the Early County site had been selected and option contracts had been obtained for the property, Longleaf met with the then-Director of EPD, Harold Reheis, and several EPD branch chiefs to discuss which permits would be necessary to construct the facility. (Tr. at 1442-43). EPD issued two directives at this meeting. First, the agency instructed Longleaf that any new coal-fired power plant permitted by EPD would have to be “one of the

cleanest facilities in the country.” Second, EPD stated that it would not issue a water withdrawal permit for any new facility in Early County unless that facility used recycled water.<sup>2</sup> In response to the second directive, Longleaf approached Georgia-Pacific about re-using some of the wastewater from its nearby paper mill. (Tr. at 1447). Once Longleaf and Georgia-Pacific reached an initial agreement, Longleaf submitted a proposal to EPD whereby Longleaf would use only non-contact cooling water. (Tr. at 1448). EPD rejected this proposal. (Tr. at 1449). After some analysis on the technical feasibility of treating and recycling Georgia-Pacific’s pulp and paper wastewater, Longleaf filed a revised water permit application. (Tr. at 1450). Ultimately, Longleaf obtained a water withdrawal permit that requires it to use 42% pulp and paper wastewater, and 58% non-contact cooling water. (Tr. at 1453; Ex. I-60).

On February 16, 2002, Longleaf submitted an air permit application to EPD’s Air Protection Branch. EPD returned the application to Longleaf, however, with a letter setting out various omissions in the application that had to be corrected before the agency would review the application. (EPD File Ex. 860).

Longleaf spent the next two years gathering information and revising its application to respond to the matters addressed in EPD’s letter. (Tr. at 1455-56). Longleaf re-initiated the PSD permit application process in February 2004, when the company submitted its Class II modeling protocol to EPD for approval. (EPD File Ex. 1). The Class II modeling results were one of many components that were eventually submitted as part of Longleaf’s PSD permit application.

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<sup>2</sup> (Tr. at 1447). Petitioners objected on hearsay grounds to Mr. Vogt’s testimony concerning EPD’s instructions to Longleaf. However, Mr. Vogt’s testimony of what EPD said at this meeting was not offered for the truth of EPD’s statements. Rather, this testimony was offered to explain the subsequent conduct of Longleaf and EPD in developing a water withdrawal permit that requires the use of recycled water. (Tr. at 1444-46). Accordingly, this is not hearsay. *See* O.C.G.A. § 24-3-2; *DI Uniform Services, Inc. v. United Water Unlimited Atlanta LLC*, 254 Ga. App. 317, 323, 562 S.E.2d 260, 266 (Ga. Ct. App. 2002).

Longleaf submitted its second PSD permit application to EPD on November 22, 2004. (EPD File Ex. 8).

Over the course of the next year and a half, Longleaf modified, updated, and revised its application in response to requests and suggestions from EPD and the United States Environmental Protection Agency (“EPA”). (See EPD File Exs. 38, 43-50, 60, 61, 63, 64, 66, and 67). On September 15, 2006, EPD issued the Draft Permit and Preliminary Determination. (EPD File Ex. 83; EPD File Ex. 84).

Upon release of the Draft Permit and Preliminary Determination, public notice was placed in local newspapers in Early County and Dothan, Alabama, notifying the community of the proposed Longleaf facility and providing the public with an opportunity to submit written comments to EPD. (EPD File Ex. 103 at 1). EPD organized two public forums following the issuance of the Preliminary Determination and Draft Permit in order to solicit comments and address concerns regarding the Longleaf facility: a Question & Answer session on October 17, 2006; and a public hearing on November 9, 2006. (EPD File Ex. 103 at 1). By the close of the public comment period, EPD had received hundreds of comments on the Draft Permit, including comments from Petitioners, EPA, United States Fish and Wildlife Service, and citizens of Georgia, Alabama, and Florida. (EPD File Ex. 103; Tr. at 2054-55, 2595).

On May 14, 2007, EPD issued the Permit to Longleaf for the construction and operation of a nominal 1,200 MW pulverized coal-fired steam electric generating facility in Early County, Georgia (the “Longleaf facility”). (EPD File Ex. 104). On that same date, EPD issued its Final Determination. In the Final Determination, EPD responded to the public comments that it had received concerning the Longleaf facility. (EPD File Ex. 103; EPD File Ex. 104). In response to public and agency comments, and as a result of the correspondence and discussions between

EPD and Longleaf, the final emission limitations for each of the four regulated pollutants at issue were more stringent than the limits originally proposed by Longleaf in its November 22, 2004 application. (*Compare* EPD File Ex. 8, *with* EPD File Ex. 104).

The following chart depicts the emission limitations for SO<sub>2</sub>, PM, NO<sub>x</sub>, and SAM in Longleaf’s November 22, 2004 application as compared to the Permit. The Permit limits are all expressed in terms of mass of pollutant emitted per unit of heat burned in the boilers, or pounds of pollutant per million British thermal unit (“MMBtu”) of heat.

Pollutant	Original Application 2004		Final Permit 2007	
	Emission Limit (lb/MMBtu)	Avg. Period	Emission Limit (lb/MMBtu)	Avg. Period
SO <sub>2</sub>	0.12	30-day rolling	0.065-0.105 0.12	30-day rolling 24-hr Average
NO <sub>x</sub>	0.07	30-day rolling	0.07 0.05	30-day rolling Annual Average
PM	0.033	30-day rolling	0.012 (filterable) 0.030 (total)	3-hr Average 3-hr Average
SAM	0.005	30-day rolling	0.005	3-hr Average

(*Id.*).

The Longleaf facility will consist of two 6,139 lb/MMBtu pulverized coal-fired boilers and associated auxiliary and pollution control equipment. (EPD File Ex. 104 at 3-5, Condition 2.18). The two boilers will each have a nominal electrical output of 600 MW. (*Id.*). The boilers will generate steam which will drive a turbine to create electricity. (Tr. at 140). The total cost for the Longleaf facility will be approximately two billion dollars, with 400 million devoted to pollution control equipment. (Tr. at 1462).

The Longleaf facility will be a baseload generating facility. This means that it may provide electricity 24 hours a day, seven days a week, regardless of daily or seasonal changes in

electricity demand.<sup>3</sup> The facility will primarily burn either Powder River Basin (“PRB”) coal (also known as “subbituminous” coal) or low-sulfur Central Appalachian (“CAPP”) coal (also known as “bituminous” coal). (EPD File Ex. 104 at Condition 2.10). It may also burn small quantities of clarifier sludge, as well as other sources of bituminous coal and/or pet coke, subject to certain operating conditions. (EPD File Ex. 104 at 1 & Conditions 2.10, 2.14). The facility will be located on the banks of the Chattahoochee River in Early County, approximately 12 to 14 miles southwest of Blakely, Georgia, and is expected to serve customers in Georgia. (Tr. at 1442, 1457-59).

## **A. POLLUTION CONTROL**

### **1. The Regulated Pollutants At Issue**

The hot gases, or “flue gas,” generated during the combustion process in each of the Longleaf facility’s boilers will contain four regulated pollutants that are relevant to this dispute: sulfur dioxide (“SO<sub>2</sub>”), nitrogen oxides (“NO<sub>x</sub>”), particulate matter (“PM”), and sulfuric acid mist (“SAM” or “H<sub>2</sub>SO<sub>4</sub>”).

NO<sub>x</sub> includes nitrogen oxide and nitrogen dioxide. NO<sub>x</sub> forms in the boiler: (1) when nitrogen in the coal is oxidized; and (2) when elemental nitrogen and oxygen in the boiler air are exposed to high temperatures. (EPD File Ex. 12 at 5).

SO<sub>2</sub> is generated during the combustion of coal. It is formed as a result of thermal oxidation of the sulfur contained in the coal. (EPD File Ex. 12 at 15; EPD File Ex. 84 at 42; Tr. at 144).

PM refers to the mixture of solid particles and liquid droplets that are present in the flue gas. PM is classified as “filterable” or “condensable.” Filterable PM, or fly ash, consists of the

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<sup>3</sup> (Tr. at 1515-16). A load-following or peaking facility, in contrast, provides an amount of electricity that directly responds to the current demand. (*Id.*).

inorganic material in the coal that does not combust. It can be captured by passing the flue gas through a filter. (EPD File Ex. 12 at 25; EPD File Ex. 84 at 64; Tr. at 163). Condensable PM refers to those gases that exit the stack in a vapor state and later condense to form homogeneous or heterogeneous aerosol particles. (EPD File Ex. 84 at 64; EPD File Ex. 12 at 25; Tr. at 164).

SAM results from the chemical reaction of sulfur trioxide (“SO<sub>3</sub>”) and water vapor, both present in the flue gas. SO<sub>3</sub> forms in two places: (1) in the boiler, during the combustion of sulfur in the coal; and (2) in the selective catalytic reduction (“SCR”) located “downstream” of the boiler, as SO<sub>2</sub> in the flue gas converts to SO<sub>3</sub> across the SCR’s catalyst bed. When the temperature drops and moisture is introduced to the flue gas, SO<sub>3</sub> reacts with water vapor to form SAM. (EPD File Ex. 84 at 107; Tr. at 687, 1696-97).

## **2. The Relevant Pollution Control Equipment**

The Longleaf facility will contain several air pollution control devices to reduce the emissions of each of the four regulated pollutants. (*See* EPD File Ex. 104 at Conditions 2.3, 2.5, 2.6).

NO<sub>x</sub> emissions will be controlled through the use of Low-NO<sub>x</sub> burners, Over-Fire Air, and SCR. (EPD File Ex. 104 at Condition 2.3). The Low-NO<sub>x</sub> burners and Over-Fire Air are combustion devices located within the boiler that are designed to reduce NO<sub>x</sub> formation. (*See* EPD File Ex. 12 at 5-6). The SCR is a post-combustion, or “add-on,” control that will be located downstream of the boilers. In the SCR, ammonia is added to the flue gas upstream of a catalyst bed. When the ammonia-laden flue gas comes into contact with the catalyst, the ammonia and NO<sub>x</sub> react to form nitrogen (“N<sub>2</sub>”) and water, thus eliminating NO<sub>x</sub> from the flue gas. (EPD File Ex. 12 at 7; *see also* Tr. at 145-46).

SO<sub>2</sub> and SAM emissions will be reduced through the use of low sulfur PRB and CAPP coal. (EPD File Ex. 104 at Conditions 2.10, 2.11). The Longleaf facility will also employ a dry

scrubber as an add-on control to reduce SO<sub>2</sub> and SAM emissions. (EPD File Ex. 104 at Condition 2.5). A dry scrubber consists of a large absorber vessel in which a slurry of lime and water is sprayed into the flue gas through an atomizer located at the top of the vessel. SO<sub>2</sub> is removed from the flue gas by sorption and reaction with the slurry. (EPD File Ex. 84 at 45; Tr. at 305-06). Although not specified in the Permit as part of the pollution control equipment for SO<sub>2</sub> and SAM emissions, the fabric filter baghouse, which is required for PM, will contribute to the control of SO<sub>2</sub> and SAM. (Tr. at 3698; Ex. R-5A at 12; Ex. P-33 at 17).

PM emissions from the Longleaf facility will primarily be controlled through the use of a fabric filter baghouse. (EPD File Ex. 104 at Condition 2.6). A fabric filter removes PM by drawing the flue gas through a bank of filter tubes suspended in a housing. (EPD File Ex. 84 at 65; Tr. at 144). The post-combustion pollution control devices for each of the pollutants are arranged downstream of the boiler in the following order: SCR, dry scrubber, and fabric filter baghouse. (EPD File Ex. 93 at 8 (schematic depicting the pollution control train at the Longleaf facility)).

## **B. WITNESSES**

### **1. EPD's Witnesses**

EPD called two witnesses to testify at the hearing concerning their roles in the review of Longleaf's permit application: James "Jac" Capp, the Manager of the EPD Air Protection Branch's Stationary Source Permitting Program; and Anna Aponte, a permit engineer in the NO<sub>x</sub> Permitting Unit of the Stationary Source Permitting Program. (Tr. at 2021, 2527).

#### **a. James "Jac" Capp**

Mr. Capp is the Program Manager of the Stationary Source Permitting Program of the Georgia Environmental Protection Division. He holds a Bachelor of Science in mechanical engineering from the University of Illinois and a Master of Science in mechanical engineering

from Georgia Institute of Technology. Mr. Capp has been employed by EPD since 1992. Prior to his current position, he held positions as an environmental engineer, Unit Manager of the NO<sub>x</sub> Permitting Unit, and Program Manager of the Industrial Source Monitoring Program. As a result of his fifteen years of experience as a regulator with EPD, Mr. Capp is intimately familiar with the air quality permits for all ten of the existing permitted coal-fired power plants in Georgia. Mr. Capp has extensive experience in drafting and supervising the drafting of air quality permits, including PSD permits. Mr. Capp testified as an expert regarding the regulatory requirements for permitting, monitoring, and testing of stationary sources in Georgia. (Ex. R-42A; Tr. at 2526-2561, 2579).

Through several years of work as the Program Manager of the Industrial Source Monitoring Program, Mr. Capp acquired expertise in stack testing, having reviewed about 1,000 stack tests per year. He also acquired expertise in continuous emissions monitoring systems (“CEMS”) and continuous opacity monitoring systems (“COMS”).<sup>4</sup>

The Stationary Source Permitting Program (“SSPP”) implements all air quality related stationary source permitting requirements in Georgia. This includes New Source Review and all Operating Permit (Title V) Programs. As SSPP Program Manager, Mr. Capp supervises 5 managers and 35 environmental engineers. He reviews and approves the stationary source permits drafted by SSPP engineers. The SSPP engineers review between 700 and 750 permit applications per year including 10 to 12 PSD permit applications. In the year and a half he has served as Program Manager, Mr. Capp has reviewed approximately one thousand permit applications including approximately 18 PSD permit applications. (Ex. R-42A; Tr. at 2649-2703). Mr. Capp worked in close concert with Ms. Aponte in reviewing and responding to comments and drafting the Permit. (Tr. at 2595-96).

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<sup>4</sup> (Tr. at 2649-2703). Opacity is the measurement of visible emissions. (*Id.*).

**b. Anna Aponte**

Ms. Aponte is an Environmental Engineer in the Stationary Source Permitting Program. She was the primary author of the PSD permit at issue in this case. Ms. Aponte worked closely with her supervisors to prepare the Draft Permit, respond to comments, and prepare the Permit. (Tr. at 2252-53).

Ms. Aponte holds a Bachelor of Science in Chemical Engineering from the Georgia Institute of Technology. She has been employed at EPD for seven years. (Ex. R-38A; Tr. at 2021-2041). Ms. Aponte has taken several air pollution control courses through EPA and has attended numerous professional conferences and symposiums. The EPA courses included control of particulate emissions, control of gaseous emissions, control of NO<sub>x</sub> emissions, combustion evaluation, CEMS, and a New Source Review intermediate class. (Tr. at 2021-2041).

Ms. Aponte has reviewed approximately 109 air quality permit applications at EPD. She drafted permits for a majority of those applications. Ms. Aponte has drafted permits for a variety of stationary sources including power plants, textile facilities, cotton gins, peanut processing facilities, and miscellaneous metal parts facilities. She has drafted PSD permits for four Greenfield (i.e., new construction) power plants including the Longleaf facility and three natural gas-fired facilities. Ms. Aponte testified as an expert concerning the regulatory requirements for permitting stationary sources in Georgia. (Tr. at 2021-2041).

**2. Longleaf's Witnesses**

Longleaf called four witnesses to testify. Michael Vogt, the Project Manager for the Longleaf facility, and Kathy French, the Environmental Manager for LS Power, both testified regarding the Longleaf PSD permit application process. Kennard Kosky, an engineer who is an expert in BACT analyses with more than thirty years of experience, testified regarding the

BACT analyses completed by Longleaf and EPD. Robert McCann, an air modeling expert, testified regarding the modeling and additional impacts analysis components of Longleaf's PSD permit application.

**a. Michael Vogt**

Mr. Vogt is an employee of LS Power Development, LLC ("LS Power"). (Tr. at 1433). Mr. Vogt holds a Bachelor of Science in Mechanical Engineering from the University of Missouri and is a registered professional engineer in Missouri. (Tr. at 1434). Prior to working for LS Power, Mr. Vogt worked in the mechanical engineering department of an architectural engineering firm. (*Id.*). Mr. Vogt's works for LS Power's development unit, which develops, owns, and operates power generation facilities. (Tr. at 1437).

Mr. Vogt is the Project Manager for the development of the Longleaf facility. Mr. Vogt has been involved with the Longleaf facility since the initial meetings with EPD and Early County in 2001. (Tr. at 1443).

**b. Kathy French**

Ms. French is the environmental manager for LS Power. She oversees the environmental permitting phase of the company's development projects and manages the environmental compliance and auditing functions for LS Power. Ms. French also assists LS Power's engineering department in preparing requests for proposals, and obtaining bids and contracts used to construct power generation projects. (Tr. at 1520). Ms. French is a registered professional engineer in Missouri. She holds a master's degree in environmental engineering.

Ms. French has worked for LS Power for six years. (Ex. I-78). She has worked on the permitting of six coal-fired power plants that required PSD permits, which included performing BACT determinations and additional impacts analyses. Ms. French has also worked on PSD permit projects for other types of LS Power generating facilities (e.g., combustion turbines). Ms.

French prepared portions of the PSD Permit Application for the Longleaf facility, and oversaw the preparation of other portions. Ms. French provided fact and expert testimony concerning the preparation of Longleaf's PSD Permit Application, including the BACT analyses, the additional impacts analysis, and Longleaf's response to public comments.

**c. Robert C. McCann, Jr.**

Mr. McCann is employed by Golder Associates in Gainesville, Florida. He has more than thirty years experience performing computerized air dispersion models for PSD permit applicants. (*See* Ex. I-85). Mr. McCann provided expert testimony regarding ambient air impact analyses and computerized air dispersion models. (Tr. at 1928).

**d. Kennard F. Kosky**

Mr. Kosky is employed by Golder Associates in Gainesville, Florida. Mr. Kosky has more than thirty years experience preparing and reviewing PSD permit applications. (*See* Ex. I-92). His experience includes work on more than 50 air permits for various types of power plants. Mr. Kosky has worked on more than 18 PSD permit applications for coal-fired power plants, and nine of those projects involved new facilities with complete PSD reviews. Mr. Kosky's prior work experience also includes a brief period reviewing air permit applications in Florida for EPA.

Mr. Kosky has published "papers in air pollution impacts and control and made many presentations." (Tr. at 3168). For the past 15 years, he has presented an annual air pollution course for engineers and attorneys. (*Id.*). Mr. Kosky has "prepared, managed, and directed all portions of the PSD permit application [process]." (Tr. at 3169). His work experience also includes the preparation of permit applications for federal Title V Operating Permits. He has prepared PSD permit applications for projects in Georgia and submitted those applications to EPD. (Tr. at 3179). Mr. Kosky provided expert testimony concerning all aspects of PSD

permitting for coal-fired power plants and offered expert opinions regarding the SO<sub>2</sub>, NO<sub>x</sub>, PM, and SAM BACT emission limits at issue. (Tr. at 3169).

### **3. Petitioners' Witnesses**

Petitioners called three witnesses to testify: Michelle Keith, the NO<sub>x</sub> Permitting Unit Coordinator at EPD; Dr. Phyllis Fox, an environmental engineer; and Khan Tran, a modeling consultant. Dr. Fox was Petitioners' primary witness. Petitioners also relied on their cross-examinations of Jac Capp and Anna Aponte as part of their case-in-chief.

#### **a. Michele Keith**

Ms. Michele Keith is the NO<sub>x</sub> Permitting Unit Manager for EPD. She was subpoenaed by Petitioners to testify. Ms. Keith holds a Bachelor of Science in Chemical Engineering and a Master of Science in Environmental Engineering from the University of South Carolina. Ms. Keith has worked at EPD for six years and previously worked for the South Carolina Department of Health and Environmental Control. Ms. Keith testified as a fact witness about her participation in the drafting of the PSD permit for the Longleaf facility and about how the EPD Stationary Source Permitting Program and the NO<sub>x</sub> Unit operate. (Tr. at 60-102).

#### **b. Phyllis Fox, PhD.**

Dr. Phyllis Fox holds a Bachelor of Science in Physics from the University of Florida and a Master of Science and PhD in Environmental Engineering from the University of California. She is a licensed Professional Engineer in five states, including Georgia. Dr. Fox testified as an expert regarding PSD permitting, BACT analysis, additional impacts analysis, BACT emission limits for SO<sub>2</sub>, PM, and SAM, and the enforceability of PM emission limits. (Ex. P-195; Tr. at 117, 137, 645, 705).

Dr. Fox is not a regulator, a design engineer, or an expert in the design of pollution control devices. She has never worked for a permitting agency reviewing permit applications.

Nor has Dr. Fox ever drafted an air quality permit, made a BACT determination for a permitting agency, or assisted an applicant in submitting an air quality permit application for a pulverized coal-fired power plant. She admits that she is not an expert in Georgia’s air permitting statutes and regulations. (Tr. at 119-23, 831-838).

**c. Khan Tran**

Mr. Tran holds a Bachelor of Science in Mechanical Engineering and a Master of Science in Mechanical Engineering from the University of California. (Ex. P-194). Mr. Tran’s resume and his testimony show that he has many years of experience with computerized dispersion models. Mr. Tran’s qualifications appear at Exhibit PR-49. Mr. Tran provided expert testimony about performing ISC modeling and interpreting the results. (Tr. at 3719).

**C. SULFUR DIOXIDE (SO<sub>2</sub>) EMISSION LIMITATION**

**1. The Permit’s SO<sub>2</sub> BACT Emission Limitation**

The Permit contains a three-tiered BACT emission limitation for SO<sub>2</sub> that is determined by the uncontrolled SO<sub>2</sub> emission rate on a 30-day rolling average. The Permit also contains a 24-hour BACT emission limitation for SO<sub>2</sub> of 0.12 lb/MMBtu. (EPD File Ex. 104 at Conditions 2.15(e)-(h)).

The Permit’s SO<sub>2</sub> emission limitations are as follows:

<b>Sulfur Content of Coal (lbs SO<sub>2</sub>/MMBtu)</b>	<b>SO<sub>2</sub> BACT Emission Limitation (lb/MMBtu)</b>	<b>Averaging Time</b>
≤ 1.0	0.065	30-day rolling average
> 1.0 but ≤ 1.25	0.08	30-day rolling average
> 1.25 but < 1.6	0.105	30-day rolling average
	0.12	24-hour average

(EPD File Ex. 104 at Conditions 2.15(e)-(h)).

The three-tiered 30-day rolling average limits correspond to a maximum SO<sub>2</sub> removal efficiency of 93.5%. The 24-hour emission limit corresponds to a SO<sub>2</sub> removal efficiency of 92.5%. (Tr. at 3112).

The Permit's SO<sub>2</sub> BACT emission limitations represent a significant reduction from the original emission limitation that Longleaf proposed in its November 22, 2004 application. In that application, Longleaf proposed a SO<sub>2</sub> BACT emission limitation of 0.12 lb/MMBtu on a 30-day rolling average. (EPD File Ex. 8 at 4-6). EPD subsequently instructed Longleaf to propose a lower tiered limit. (EPD File Ex. 57). Longleaf responded to this request by proposing the three-tiered limit that the Permit now contains. (EPD File Ex. 60).

The uncontrolled SO<sub>2</sub> emission rate refers to the SO<sub>2</sub> concentration in the flue gas at the time it enters the dry scrubber. (Tr. at 285). To implement the three-tiered SO<sub>2</sub> limit, the Permit requires the use of a continuous emissions monitoring system ("CEMS") at the inlet to the dry scrubber as well as the outlet. (EPD File Ex. 104 at Condition 5.2(c) (requiring the installation of a SO<sub>2</sub> CEMS "at both the inlet and outlet of the SO<sub>2</sub> control device"); *see also* EPD File Ex. 103 at 25 (quoting Longleaf comment to EPD in which Longleaf informs the agency that it will monitor uncontrolled SO<sub>2</sub> emissions at the "scrubber inlet"); Tr. at 899-900, 2631-32). A CEMS provides continuous, real-time emissions data regarding the facility's compliance with Permit limits. (Tr. at 1739, 2530-31).

To date, a three-tiered SO<sub>2</sub> limit has been required in only one other PSD Permit in the country. (Tr. at 1017, 3218). Many agencies and experts, including EPA, Mr. Kosky, and Dr. Fox, have concluded that EPD's three-tiered SO<sub>2</sub> limit is a stringent requirement that should serve as a model for other permitting authorities. Mr. Kosky testified that the Permit's SO<sub>2</sub> limit "from an operational standpoint . . . is very stringent." (Tr. at 3217-18). Dr. Fox testified that

Longleaf’s three-tiered SO<sub>2</sub> limit is “one of the great parts of the [P]ermit.” (Tr. at 1017-18). In a comment letter on the Sunflower Holcomb Station Expansion Project, EPA Region 7 cited Longleaf’s three-tiered SO<sub>2</sub> limit approvingly as an example of EPA’s preferred approach. (Ex. P-42, Attachment A at 5). EPA has recognized that a tiered SO<sub>2</sub> limit is an effective alternative to including a control efficiency requirement in a Permit. (Ex. P-42 at 1 (“An alternative to a percent reduction requirement would be to create BACT limits for various ranges of SO<sub>2</sub> inlet concentrations.”); Ex. P-43, Attachment A at 4 (same)).

Longleaf’s three-tiered limits are as stringent or more stringent than other permits and draft permits that have been issued for similar facilities. (EPD File Ex. 108; Tr. at 3119). The following chart provides a comparison of permit limits:

<b>Facility Name</b>	<b>Fuel Type</b>	<b>Emission Limit<sup>5</sup> (Averaging Period)</b>	<b>Control Technology</b>	<b>Cite</b>
Longleaf Energy Associates, LLC (LS Power Development, LLC), Georgia	Primarily PRB	0.065 - (30-day) [if coal sulfur content ≤ 1.0 SO <sub>2</sub> /MMBtu]; 0.08 - (30-day) [if coal sulfur content >1.0 but ≤ 1.25 lbs SO <sub>2</sub> /MMBtu]; 0.105 (30-day) [if coal sulfur content >1.25 but < 1.6 lbs SO <sub>2</sub> /MMBtu]; 0.12 (24-hour)	Dry Scrubber	EPD File Ex. 48; EPD File Ex. 104
Xcel Energy, Comanche Station, Colorado	PRB	0.10 (30-day) <sup>6</sup>	Lime Spray Dryer	Ex. R-4A at 3 EPD File Ex. 108
City Utilities of Springfield, Missouri	Low-Sulfur Western Subbituminous	0.095 (30-day) <sup>7</sup> 490.5 lbs/hr (24 hour) <sup>9</sup>	Dry FGD	Ex. R-6A at 20; Ex. R-6A at 4-5; Ex. R-6A at 5

<sup>5</sup> The emission limits are expressed in lb/MMBtu.

<sup>6</sup> Comanche Unit 3 was not subject to BACT review for SO<sub>2</sub> for this project. (R-4A at 2).

<sup>7</sup> This limit does not include periods of startup, shutdown or malfunction (“SSM”). (R-6A at 4). This is the limit indicated in the permit. It has now been changed to 0.08-30-day rolling average. (EPD File Ex. 46 at 1).

<sup>8</sup> This is the limit indicated in the permit. It has now been changed to 0.08-30-day rolling average. (EPD File Ex. 46 at 1).

<sup>9</sup> May have a maximum of a discrete 3 hour period within the 24-hours that exceeds 490.5 lbs/hr, but emissions may not exceed 6785 lbs. during that time period. (Ex. R-6A at 4-5).

Kansas City Power & Light, Hawthorne Station, Missouri	PRB Subbituminous	0.12 (30-day) <sup>10</sup>	Dry FGD	Ex. P-99 at 1 Ex. P-99 at 2
Sunflower Electric Power Cooperative, Holcomb Power Plant, Kansas	PRB Subbituminous or other western coal (maximum S content to be 0.50% on an average annual basis)	0.095 (30-day) <sup>11</sup>	Dry FGD	EPD File Ex. 507 at 4; EPD File Ex. 507 at 7
Kansas City Power and Light Company, Iatan Generating Station, Missouri	Low Sulfur Subbituminous Coal (< 1.4 lb/MMBtu)	Unit 1: 0.10 – (30-day rolling average) 4212 lbs/hr – (24 hour rolling average) 6630 lbs/hr – (3-hour block average) Unit 2: 0.09 – (30-day rolling average) 4372 lbs/hr – (24-hour rolling average) 6885 lbs/hr – (3-hour block average) <sup>12 13</sup>	Wet Scrubber (Unit 1 and Unit 2)	Ex. P-104 at 4 Ex. P-104 at 5, 7, 9 Ex. P-104 at 23-24
Longview Power, Massachusettes	Not in permit	0.15 - (3-hour rolling average) 0.12 – (24-hour rolling average) <sup>14</sup>	Wet FGD	Ex. I-69 at 2-3
MidAmerican Energy Company, Council Bluffs, Iowa	S content not to exceed 0.625 lbs of S/MMBtu	0.10 – (30-day rolling average) <sup>15</sup>	Dry FGD	EPD File Ex. 563 at 8; EPD File Ex. 563 at 5; EPD File Ex. 108
Nevada Newmont	PRB	0.09 – (24-hour rolling average period) S content ≥ 0.45% over 30-day rolling average 0.065 – (24 hour rolling average) S content < 0.45% over 30-day rolling average	Dry FGD	Ex. R-8A at 1; Ex. I-70 at V-2
Plum Point Energy Associates, Plum	Primarily PRB	0.16 – (3-hour average)	Dry FGD	EPD File Ex. 505 at 3;

<sup>10</sup> This limit does not include periods of SSM. (Ex. P-99 at 2).

<sup>11</sup> This limit does not include SSM. (EPD File Ex. 507 at 7).

<sup>12</sup> Unit 2 was the installation of a pulverized coal boiler and associated pollution control equipment. Unit 1 was the modification of an existing electrical utility stream generating unit to upgrade the pollution control equipment and increase heat input range. (Ex. P-104 at 1).

<sup>13</sup> These limitations include SSM. (Ex. P-104 at 5, 7).

<sup>14</sup> Requires emissions be measured at inlet and outlet of the wet FGD. (Ex. I-69 at 3).

<sup>15</sup> This limitation does not include SSM. (EPD File Ex. 563 at 5).

Point Energy Station, Arkansas				EPD File Ex. 505 at 10
Spruce, Texas	Low Sulfur Bituminous (S content $\leq$ 0.625 lb S/MMBtu on annual avg.)	0.10 – (30-day rolling average)	Wet FGD	Ex. P-3B at 1; Ex. P-3B at 2; Ex. P-3B at 11
Thoroughbred Generating Co., Thoroughbred Generating Station, Kentucky	Not in permit.	0.167 – (30-day rolling average) 0.41 – (24-hour block average)	Wet FGD	Ex. P-102 at 3; Ex. P-102 at 2
Wisconsin Public Service Corporation, Weston 4, Wisconsin	PRB	Minimum control efficiency of 90% - (30-day rolling average)	Dry FGD	EPD File Ex. 581 at 9-10; EPD File Ex. 581 at 13; EPD File Ex. 581 at 8-9
White Pine Energy Associates, Nevada	Not in permit.	0.09 – (24-hour rolling average) S content $\geq$ 0.45% over 30-day rolling average 0.065 – (24-hour rolling average) S content $<$ 45% over 30-day rolling average <sup>16</sup>	Dry FGD	Ex. I-75 at V-2; Ex. I-75 at V-1
Sandy Creek Energy Associates, Sandy Creek Energy Station, Texas	PRB	0.12 – (30-day average) 0.30 – (1-hour) 0.10 – (12-month average)	Dry FGD	EPD File Ex. 509 at 1; EPD File Ex. 509 at 3
Seminole Electric Cooperative, Inc. Palatka Generating Station, Florida		0.165 – (24-hour average) netted out of PSD	Wet Scrubber	EPD File Ex. 108
Peabody Prairie State Generating Station, Illinois		0.182 – (30-day rolling average) with 98% control	Wet Scrubber	EPD File Ex. 108
Sunflower Electric Power Cooperative, Holcomb Power Plant, Kansas	PRB (with maximum S content to be 0.50% on an average annual basis)	0.095 – (30-day average)	Dry Scrubber	EPD File Ex. 507 at 4; EPD File Ex. 108
Louisville Gas & Electric Company (LG&E), Trimble County Generating	S content not to exceed 0.80%	0.11 – (24-hour average) netted out of PSD 0.80 – (3-hour average)	Wet FGD	Ex. P-118 at 7 EPD File Ex. 108 (emissions and control)

<sup>16</sup> This limitation does not include startup and shutdown. (Ex. I-75 at V-6).

Station, Kentucky				technology)
Omaha Public Power District, Nebraska		0.095 – (30-day average) 0.163 – (24-hour average) 0.480 – (3-hour average)		EPD File Ex. 108 (emissions)
Sithe Global-Desert Rock Energy Facility, New Mexico (Navajo)	Low sulfur, blended coal from Navajo Nation mine.	0.060 – (24-hour average) 612 lb/hr – (3-hour average) 378.5 lb/hr – (365 day rolling average) <sup>17</sup>	Wet FGD, Hydrated Lime Injection	Ex. P-33 at 3 EPD File Ex. 108 Ex. P-128 at 3
LS Power, Texas		0.12 – (30-day average) 0.10 – (annual average)	Dry scrubber	EPD File Ex. 108

## 2. The SO<sub>2</sub> Control Technology

The Permit’s three-tiered SO<sub>2</sub> BACT emission limitation is based on the use of low sulfur PRB and CAPP coal in conjunction with a dry scrubber (and associated fabric filter baghouse) to achieve maximum SO<sub>2</sub> control efficiency of 93.5%. (EPD File Ex. 48, Appendices Da, Db; Tr. at 3089-90). Longleaf and EPD employed a “top-down” BACT analysis to select these controls as BACT for the Longleaf facility. (EPD File Ex. 48, Appendices Da, Db; EPD File Ex. 84 at 42-63). Separate BACT analyses were conducted for PRB and CAPP coal. (EPD File Ex. 48, Appendices Da, Db; EPD File Ex. 84 at 42-63). Longleaf considered a range of lower emitting processes and add-on control technologies in its BACT analysis for SO<sub>2</sub>. (EPD File Ex. 48, Appendix Da at 1-4, Appendix Db at 1-4).

As part of its BACT analysis, Longleaf evaluated coal selection and coal cleaning as lower emitting processes and practices. (EPD File Ex. 48, Appendix Da at 1, Appendix Db at 1). Longleaf considered low-sulfur, clean fuels (i.e., PRB and CAPP coal) as potential SO<sub>2</sub> emission controls for the Longleaf facility. (EPD File Ex. 48, Appendix Da at 4, Appendix Db at 4). Based on current prices and availability, the Longleaf facility will likely burn PRB coal. However, due to the great distance between the PRB coal mines of Wyoming and Early County, Georgia (1,800 to 2,100 miles), coal delivery interruptions could occur. Accordingly, Longleaf

<sup>17</sup> This limitation does not include startup and shutdown. (Ex. P-128 at 7).

requested an air permit that provides for the flexibility necessary to burn low sulfur CAPP coal — whose mines are roughly 750 to 900 miles from Early County — in the event that PRB coal delivery interruptions occur. (EPD File Ex. 48 at 1; Tr. at 2085).

Longleaf also examined the use of coal cleaning for both PRB and CAPP coal. (EPD File Ex. 48, Appendix Da at 2 & 4, Appendix Db at 2 & 4). Coal cleaning is a process that removes mineral ash matter from the coal after it is removed from the ground. (EPD File Ex. 48, Appendix Da at 2, Appendix Db at 2).

PRB coal contains very little rock and non-combustible material that can be removed during coal cleaning. Thus, PRB coal cleaning is not considered a technically feasible control technology. (EPD File Ex. 48, Appendix Da at 4; Tr. at 184). CAPP coal contains varying amounts of material that may be successfully removed during coal cleaning. Therefore, CAPP coal cleaning is considered to be a technically feasible control technology. (EPD File Ex. 48, Appendix Da at 4; Tr. at 2203).

Ultimately, EPD did not require coal cleaning in the Permit due to the increased economic costs, additional water consumption, and decreased boiler efficiency associated with washing the coal. (Tr. at 2203). EPD relied upon a recent regulatory decision in support of its rejection of a CAPP coal cleaning requirement. (Tr. at 2204).

Neither Longleaf nor EPD considered the type of boiler (i.e., subcritical, supercritical, or ultra-supercritical) as an SO<sub>2</sub> control technology for the Longleaf facility. (See EPD File Ex. 48; EPD File Ex. 84). The main difference between these boiler types is the level of thermal efficiency at which they produce steam. For example, when the heat input remains constant, a supercritical boiler will produce more steam than a subcritical boiler. (Tr. at 1673-74). When

heat input remains constant, however, both boilers will produce the same amount of emissions. (Tr. at 1673, 3192-93).

A boiler does not inherently control emissions, but rather creates emissions, and therefore EPD does not view the boiler as a control technology. (Tr. at 2092-93, 2734). EPD's approach is consistent with PSD permits that have been issued across the country. (Tr. at 2734; Ex. P-33 at 16 (not including boiler type among the listed SO<sub>2</sub> control technologies for the Desert Rock facility)).

The Permit limits each of the two main boilers to a maximum design heat input of 6,139 lb/MMBtu. (EPD File Ex. 104 at Condition 2.17). Consistent with permitting agencies' practices, the Permit does not contain emission limitations based on power output (pounds per Megawatt hour) for any of the four pollutants at issue. (Tr. at 3243). Regardless of whether the Longleaf facility is built with a subcritical or supercritical boiler, as long as the facility operates with a maximum design heat input of 6,139 lb/MMBtu, the emission level of the four regulated pollutants at issue will remain the same. (Tr. at 1673-74, 3192-93, 3219).

Longleaf considered a variety of post-combustion SO<sub>2</sub> control technologies, including a wet scrubber, regenerable wet scrubber, spray dryer absorber ("dry scrubber"), circulating dry scrubber, duct sorbent injection, furnace sorbent injection, limestone injection dry scrubbing, activated carbon bed, electro-catalytic oxidation, and the Pahlman Process. (EPD File Ex. 48, Appendix Da at 2-4, Appendix Db at 2-4). Longleaf specifically considered a variety of wet scrubbers in its analysis, including wet scrubbers that use limestone, lime, magnesium-enhanced lime, forced oxidation, and inhibited oxidation. (EPD File Ex. 48, Appendix Da at 4, Appendix Db at 4). Longleaf concluded that coal selection, wet scrubber, regenerable wet scrubber, dry

scrubber, duct sorbent injection, and furnace sorbent injection were all technically feasible control options. (EPD File Ex. 48, Appendices Da at 2-4, Appendix Db at 2-4).

**a. Ranking of Remaining Control Technologies by Effectiveness**

Longleaf consulted technical publications, vendor information, permits, permit applications, and EPA's RACT/BACT/LAER Clearinghouse to determine the range of control efficiencies of the technologies that Longleaf deemed technically feasible. (EPD File Ex. 48, Appendix Da at 6, Appendix Db at 6). Longleaf selected the wet scrubber, regenerable wet scrubber, and dry scrubber as the three top control technologies, in decreasing order of effectiveness. All the parties agreed that wet scrubbers are the top performers. (Tr. at 428-29, 3056, 3251).

**i. Wet Scrubber Control Efficiency**

For purposes of its BACT analysis, Longleaf identified a wet scrubber's SO<sub>2</sub> control efficiency to range from 90% to greater than 95%. Longleaf's cost comparison calculations for a wet scrubber assumed a 95% SO<sub>2</sub> control efficiency. (EPD File Ex. 48, Appendices Da, Db).

Longleaf derived this range of control efficiencies from lists of the most stringent permit limits available at the time of its application and post-application submittals for coal-fired facilities burning both PRB and CAPP coal. (See EPD File Ex. 12, Tables D.23, D.24; EPD File Ex. 48, Tables Da.23, Db.24). Of the fifteen wet scrubber facilities that Longleaf reviewed, none of the listed permit limits were based on SO<sub>2</sub> control efficiencies in excess of 95%. (EPD File Ex. 48, Tables Da.23, Db.24).

Longleaf's use of a 95% SO<sub>2</sub> control efficiency for wet scrubbers was consistent with EPD's knowledge of other permitted projects where dry scrubbers were selected as BACT over wet scrubbers. (Tr. at 3035-36). The 95% SO<sub>2</sub> control efficiency was also consistent with EPD's knowledge of the Chiyoda jet bubbling wet scrubber operated at Georgia Power's Plant

Yates in Georgia. (Tr. at 2975; *see also* Ex. P-218 at 34 (U.S. Dept. of Energy Assessment of the Plant Yates wet scrubber that concludes that the Chiyoda wet scrubber was capable of achieving a SO<sub>2</sub> control efficiency of over 90%). Longleaf's use of the 95% SO<sub>2</sub> control efficiency for wet scrubbers is consistent with other recent PSD permits and permit applications. (*See* Ex. P-123 at 4-1 (using 95% SO<sub>2</sub> control efficiency for a wet scrubber in an application for installation of a wet scrubber at the Weston 3 unit in Wisconsin); Ex. P-3B at 1-2 (using a 95.2% removal efficiency, as derived from the maximum coal sulfur content of 0.625 lb S/MMBtu and the annual SO<sub>2</sub> emission limit of 0.06 lb/MMBtu)).

Based on his knowledge and experience, Mr. Kosky opined that the use of a 95% SO<sub>2</sub> control efficiency for a wet scrubber was appropriate for the design basis used in Longleaf's BACT analysis (i.e., assuming a worst case sulfur content with uncontrolled emissions of 1.6 lb/MMBtu). (Tr. at 3269). In its application, Longleaf acknowledged that certain vendors have claimed an ability to achieve SO<sub>2</sub> control efficiencies greater than 95%. (*See, e.g.*, Ex. P-57 (claiming a stable SO<sub>2</sub> control efficiency of 99% with a wet scrubber at the Shinko-Kobe power plant in Japan); Ex. P-80 (press release from Chiyoda, a wet scrubber manufacturer, claiming that its wet scrubber "makes it possible to remove sulfur dioxide with [a] high efficiency rate such as 99 percent"). Additionally, the draft permit for the Desert Rock facility in New Mexico contains a SO<sub>2</sub> control efficiency of 96.7%, assuming a worst-case sulfur content of the coal. (Tr. at 3027; *see also* Ex. P-21 at 2 (comments from EPA suggesting that 96-98% SO<sub>2</sub> control efficiency should be required for the Newmont facility in Nevada)).

Despite these high reported control efficiencies for wet scrubbers, it is generally accepted and demonstrated in the industry that the control efficiencies of wet scrubbers decrease as the sulfur content of the coal decreases. (Tr. at 3051-52, 3266-67; Ex. P-33). Because of this trend,

wet scrubbers are generally used with high sulfur coals, while dry scrubbers are generally used with low sulfur coals. (Tr. at 3210-12, 3704 (Dr. Fox testifying that dry scrubbers “are almost universally used on low-sulfur coals,” while wet scrubbers “are most commonly used on high sulfur coals”)).

EPD relied on its knowledge of recent regulatory decisions and its own experience to conclude that the 95% SO<sub>2</sub> control efficiency for wet scrubbers proposed by Longleaf was a reasonable basis for setting the BACT emission limitation. (Tr. at 3030). For example, Ms. Aponte explained that the expected actual SO<sub>2</sub> control efficiency for a new Chiyoda wet scrubber at Georgia Power’s Plant Bowen is 95%. (Tr. at 2487).

## **ii. Dry Scrubber Control Efficiency**

Longleaf used a SO<sub>2</sub> control efficiency range of 90 to 92.7% to assess the effectiveness of a dry scrubber. (EPD File Ex. 48, Appendices Da, Db). Longleaf’s proposed BACT limit of 0.12 lb/MMBtu on a 30-day rolling average was based on a 92.5% SO<sub>2</sub> control efficiency. (EPD File Ex. 48, Appendices Da, Db). Longleaf relied on the most stringent SO<sub>2</sub> emission limits for coal-fired boilers firing both PRB and CAPP coal in support of its selected SO<sub>2</sub> control efficiency values. (EPD File Ex. 48, Appendix Da at 6, Appendix Db at 6).

Longleaf’s use of a 90 to 92.7% SO<sub>2</sub> control efficiency range for dry scrubbers is consistent with available information, EPA comments, and expert opinion. In comments regarding the Newmont Nevada Energy Investments, LLC’s coal-fired power plant PSD permit application, EPA concluded that a dry scrubber SO<sub>2</sub> control efficiency of 92.3% “is at the top end of the range of what can be achieved with dry scrubbing.” (Ex. P-21 at 2). In comments on the emission limits for the coal-fired Comanche power plant in Colorado, EPA agreed with the applicant that a SO<sub>2</sub> control efficiency of 91.1% was BACT for the PRB coal-fired facility. (*See* Ex. P-46 at 2). As recently as March 2007, a leading scrubber vendor stated that SO<sub>2</sub> control

efficiencies for dry scrubbers on low sulfur coal were in the range of 90 to 95%. (Ex. P-27 at 6). Mr. Kosky testified that 93% SO<sub>2</sub> control efficiency is a good design basis for conducting a BACT analysis of a dry scrubber. (Tr. at 3276).

Dr. Fox claimed that 95% SO<sub>2</sub> control efficiency is achievable for dry scrubbers, yet nevertheless conceded that Longleaf would be “hard pressed to achieve 95%.” (Tr. at 306, 429-30). On the final day of the hearing, Dr. Fox acknowledged that the most recent permits for facilities with dry scrubbers use SO<sub>2</sub> control efficiencies between 90 and 93%. (Tr. at 3704).

**b. Rejection of the Wet Scrubber in Favor of the Dry Scrubber Because of Environmental, Energy, and Economic Impacts**

Longleaf examined the potential energy, environmental, and economic impacts of the top three technologies: wet scrubber, regenerable wet scrubber, and dry scrubber. (EPD File Ex. 48, Appendices Da, Db). After considering these factors, Longleaf rejected the top control technology, a wet scrubber, in favor of a dry scrubber because of the increased water consumption, excessive economic impacts, and lower ability to control hazardous air pollutants (“HAP”) and SAM emissions associated with a wet scrubber. (*Id.*).

EPD reviewed Longleaf’s analysis and agreed with the applicant’s technology selection. (EPD File Ex. 84 at 47-63). EPD did not find one factor dispositive, but instead relied on all three to approve Longleaf’s selection of a dry scrubber as the appropriate SO<sub>2</sub> control technology. (Tr. at 3098-99).

**i. Water Consumption: Wet v. Dry Scrubber**

A wet scrubber consumes more water than a dry scrubber. (First Amended Petition at ¶ 58; Tr. at 469, 488, 2114, 3068-69; Ex. PR-17 at 35-12). A wet scrubber uses 50% more water than a dry scrubber. (Tr. at 469, 488).

The primary water source for the Longleaf facility is the Chattahoochee River. (Ex. I-60 at 3). More specifically, as discussed *infra*, Longleaf’s primary water source will be effluent wastewater from a Georgia-Pacific paper mill. The paper mill obtains its water directly from the Chattahoochee River.

During the public comment period, the United States Department of the Interior – Fish and Wildlife Service submitted the following comment:

The permit documents indicate that Longleaf will withdraw approximately 27 million gallons per day (MGD) and discharge 5.54 MGD. It is not clear where the consumption of approximately 18 MGD will occur nor do the documents explain how the amount of consumption could be minimized. As you are well aware, *water use in the Apalachicola-Chattahoochee-Flint River basin continues to be a critical natural resource issue, and a legally-sensitive one. We have serious concerns about the long-term impacts of numerous projects that remove water from the ACF system.* Downstream impacts of the proposed withdrawal need to be considered in light of the needs of the entire ACF system, including listed species.

(EPD File Ex. 107, March 12, 2007 letter at 3 (emphasis added); EPD File Ex. 103 at 20).

In response to this comment, Longleaf stated,

LEA coordinated closely with Georgia EPD Watershed Protection Branch in the permitting of the [water usage] . . . . First, LEA implemented an innovative water recycling program through its use of treated effluent from the Georgia Pacific paper mill located just south of the Project. Under expected normal operating scenarios, no water will be withdrawn from the Chattahoochee River for use at the Facility . . . . LEA also thoroughly investigated other possible measures to reduce emissions and water consumption. Dry cooling, for example, was considered by LEA but ultimately rejected because it increases air emissions and would increase the overall size of the facility compared with alternative technologies . . . . LEA did, however, select a dry scrubber instead of a wet scrubber to control SO<sub>2</sub> emissions, in part, on the fact that a dry scrubber consumes approximately half of the water required by a wet scrubber.

(EPD File Ex. 107, March 12, 2007 letter at 3).

Petitioners themselves have recognized that water constraints exist at the Longleaf site. In their comments opposing Longleaf’s water withdrawal permit, Petitioners asserted that Longleaf’s water use would impact the “highly stressed” and “overly allocated” Chattahoochee

River. (Ex. I-63 at 4; Ex. I-64 at 5). In these same comments, Petitioners acknowledged that the River's water supply is the subject of "protracted litigation regarding the amount of water available for various needs in Georgia, Alabama and Florida." (Ex. I-64 at 5). Petitioners further asserted that even modest river flow reductions could have "significant impacts" on endangered species located downstream. (Ex. I-63 at 4; Ex. I-64 at 5).

Early in the permitting process EPD gave Longleaf certain directives. (Tr. at 1447). In response to one of those directives Longleaf designed a water treatment and recycling system whereby the Longleaf facility will obtain 100% of its process water from wastewater generated by Georgia-Pacific's neighboring paper mill. (Ex. I-60). Much of the water is once-through cooling water, but at least 42% must be process effluent that Longleaf must treat in order to use. (*Id.* at 4). It is estimated that Longleaf will incur capital costs for treatment of Georgia-Pacific's effluent of 10 to 20 million dollars, with an annual operating cost of 2 to 3 million dollars. (Tr. at 1455). As long as Georgia-Pacific's paper mill remains in normal operation, Longleaf will not withdraw any water from the Chattahoochee River. (EPD File Ex. 43 at 24; Ex. I-60).

Longleaf relied on the water supply constraints at the site as a ground for rejecting a wet scrubber in favor of a dry scrubber. (EPD File Ex. 48, Appendix Da at 11, Appendix Db at 11). Specifically, in response to a comment from EPA regarding the rejection of a wet scrubber, Longleaf stated as follows:

In addition to the cost aspect of the BACT analysis, the permitting authority can determine that environmental impacts "justify a conclusion that the most stringent technology is not 'achievable' in that case." As part of the Project's overall permitting process, EPD has required the applicant to reuse treated effluent from a neighboring G-P paper mill in an effort to conserve the state's water resources. Thus, while southwestern Georgia is not part of the arid southwest discussed by EPA in the recent mercury NSPS, in reality, water is a limited resource in the area. As a result, the Facility does face the same type of efforts to conserve water which led EPA to determine best demonstrated technology (BDT) to be a dry scrubber and fabric filter for the mercury control of subbituminous fired units.

(EPD File Ex. 43 at 24 (citations omitted)). In the Preliminary Determination, EPD's reasons for rejecting a wet scrubber include increased water consumption. EPD did not, however, specifically address the issue of "water constraints" or "water supply." See EPD File Ex. 84 at 52.

**ii. Control of HAPs: Wet v. Dry Scrubber**

Hydrogen fluoride ("HF"), hydrochloric acid ("HCl"), and mercury are the major hazardous air pollutants that the Longleaf facility will emit. (Tr. at 2378). As compared to a wet scrubber, a dry scrubber provides better control of emissions of non-soluble hazardous air pollutants, HF, HCl and mercury. (EPD File Ex. 48, Appendix Da at 9, Appendix Db at 9; EPD File Ex. 84 at 50-51, 61; Tr. at 2113-14; Ex. P-33 at 17 (EPA concludes in the Desert Rock PSD permit that a dry scrubber removes more HCl and mercury than a wet scrubber)).

The increased HAP removal efficiency by a dry scrubber compared to a wet scrubber is due to the location of the fabric filter baghouse in relation to the scrubber. In a dry scrubber system, the fabric filter baghouse is downstream of the scrubber and collects a lime filter cake that allows for further reaction of the lime with acid gases such as HCl. (Ex. P-33 at 17). In contrast, in a wet scrubber system, the fabric filter baghouse must be installed upstream of the wet scrubber. (Tr. at 595-96).

**iii. Control of SAM: Wet v. Dry Scrubber**

A dry scrubber used in conjunction with a downstream fabric filter baghouse is more efficient at removing SAM as compared to a wet scrubber system. (EPD File Ex. 84 at 50-51; Ex. P-27 at 11-12; Ex. R-4A at 4; Ex. R-8A at 2; EPD File Ex. 581 at 5; Ex. P-33 at 17; Tr. at 2787). The increased SAM removal efficiency of the dry scrubber compared to a wet scrubber is a result of the fabric filter baghouse being located downstream of the scrubbing device. (Tr. at 1701-02, 3698).

The placement of the fabric filter baghouse downstream of the dry scrubber increases SAM removal efficiencies in two ways. First, the bags within the fabric filter baghouse collect and become coated with lime dust. The lime dust caked to the bags enhances the removal of SAM from the flue gas. (Tr. at 3698). Because the fabric filter baghouse is located upstream of the scrubber in a wet scrubbing system, it does not accumulate lime dust to enhance the removal of SAM. (*Id.*).

Second, the dry scrubber lowers the temperature of the flue gas and introduces moisture to the flue gas, both of which convert gaseous  $\text{SO}_3$  into liquid SAM droplets before the gases enter the fabric filter baghouse. These SAM droplets are then removed from the flue gas when they come into contact with the lime dust and alkaline fly ash in the fabric filter baghouse. (Tr. at 1967-69, 2109-10). In a wet scrubbing system, the flue gas passes through the upstream baghouse at a much higher temperature. As a result, a greater percentage of the  $\text{SO}_3$  can pass through the baghouse in a vapor state. Once the  $\text{SO}_3$  condensates into SAM in the wet scrubber, the only remaining control is the mist eliminator in the wet scrubber, which is not as effective at removing SAM droplets as the fabric filter baghouse. (Tr. at 1967-68).

#### **iv. Waste: Wet v. Dry Scrubber**

A dry scrubber produces less solid waste compared to a wet scrubber. (EPD File Ex. 85 at 50; Tr. at 2438). A dry scrubber generally does not produce any liquid waste, while a wet scrubber produces a liquid waste stream. (Tr. at 527, 2113). As a result of these differences, the solid waste produced by a dry scrubber is easier to handle and dispose of compared to the by-product produced by a wet scrubber. Specifically, the by-product of a dry scrubber can be handled with conventional pneumatic fly ash handling equipment and disposed directly into a landfill. In contrast, the by-product of a wet scrubber requires dewatering and potentially wastewater treatment. (PR-17 at 35-12; P-27 at 11; Tr. at 992; *see also* Ex. R-4A at 4 (rejecting

a wet scrubber in favor of a dry scrubber, in part, because the difficulties associated with disposal of the sludge generated by a wet scrubber); Ex. R-8A at 2 (same)).

A facility using a wet scrubber may have to install a wastewater treatment plant to treat the liquid waste prior to discharge. A wastewater treatment plant will produce a small volume of solid waste laden with heavy metals that must be disposed of in a special landfill at a higher cost. In contrast, the by-product produced by a dry scrubber can trap heavy metals at concentrations that are low enough to dispose of in a standard landfill. (P-27 at 12; Tr. at 992).

The by-product of a wet scrubber contains gypsum that may be sold to wallboard manufacturers. (Tr. at 293, 2113; EPD File Ex. 48, Appendix Da at 7, Appendix Db at 7). However, no evidence was presented to suggest that a market for gypsum exists within the vicinity of the Longleaf facility. Without a market for gypsum, one it would require disposal.

#### **v. Visible Plume: Wet v. Dry Scrubbers**

A facility equipped with a wet scrubber will emit a visible moisture plume due to the fact that the flue gas is saturated with water. The flue gas emitted by a dry scrubber facility is not saturated with water, and thus the potential for a visible moisture plume is reduced or entirely eliminated through the use of a dry scrubber. (Ex. P-27 at 12; Tr. at 994-95, 2122).

The moisture-laden plume produced by a wet scrubber is cooler and less buoyant than the plume produced by a dry scrubber, and as a result, ground level concentrations for all pollutants generally tend to be higher near the stack of a wet scrubber facility compared to a dry scrubber facility. (EPD File Ex. 84 at 49, 60; Tr. at 2122). To eliminate the visibility impairment caused by a wet scrubber, a facility may install a reheater or a gas-gas heat exchanger to increase the flue gas temperature and create a dry stack. However, as a result of the high costs associated with re-heating the flue gas, all recent wet scrubber systems in the United States have wet stacks. (Ex. P-27 at 12; Tr. at 994-95).

**vi. Short-Term SO<sub>2</sub> Emissions: Wet v. Dry Scrubber**

Each of the four dry scrubber vessels at the Longleaf facility will contain atomizers, which spray the lime slurry into the flue gas stream. (EPD File Ex. 8, Appendix A; Tr. at 305-60, 1620). As part of the routine maintenance associated with a dry scrubber system, these atomizers will be removed, replaced with a spare, clean atomizer, and then cleaned in a process referred to as “atomizer change-out.” (Tr. at 1616). The expected amount of time that it will take to remove an atomizer and replace it with a spare atomizer will be between 5 and 30 minutes, with an average time of 10 minutes. (Tr. at 1616, 1620, 1924). Although the time it takes to perform maintenance or clean an atomizer is longer than 10 minutes, the insertion of a spare atomizer ensures that the scrubber vessel will be without any atomizer for a very short time.<sup>18</sup>

Because Longleaf has proposed to install two separate dry scrubber vessels on each of the two main boilers, any impact related to an atomizer change-out in one of these scrubber vessels would only affect 25% of the facility’s overall SO<sub>2</sub> emissions. (Tr. at 1620). Any excess SO<sub>2</sub> emissions that occur during atomizer change-out must be included in the averaging times for the Permit’s 24-hour and 30-day SO<sub>2</sub> BACT emission limitations. Thus, Longleaf will have an incentive to minimize the duration of any periods of excess emissions that atomizer change-outs might cause. (Tr. at 1619). Modeling results using an SO<sub>2</sub> emission rate of 0.26 lb/MMBtu — which is 217% above the highest allowable emission rate — confirm that higher short-term emissions will not have a significant impact. (EPD File Ex. 48 at 5; Tr. at 1615-16).

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<sup>18</sup> (Tr. at 1619-20). These values are based on conversations that Longleaf had with vendors. (Tr. at 1616, 1925; *see also* Ex. P-32-2 at 1 (noting that atomizer change-out should take 30 minutes)).

### **vii. Costs: Wet v. Dry Scrubber**

The installation and operation of a dry scrubber system costs less than the installation and operation of a wet scrubber system. (EPD File Ex. 48, Appendix Da at 9, Appendix Db at 9; Tr. at 991-92, 2114; Ex. PR-17 at 35-12). The difference in cost is due, in part, to the fact that a dry scrubber can be constructed of unlined carbon steel, as opposed to the stainless steel or special alloy construction required for wet scrubbers. (Ex. P-27 at 11; PR-17 at 35-12; Tr. at 991). Additionally, dry scrubber capital costs are lower than the capital costs for a wet scrubber because the dry scrubber system is less complicated, requires less equipment, and thus results in lower labor and maintenance material costs compared to a wet scrubber. (P-27 at 11; PR-17 at 35-12; Tr. at 991-92). Finally, because a dry scrubber uses less energy than a wet scrubber, its operating costs will be lower.

Assuming an 85% capacity factor, the incremental cost effectiveness of a wet scrubber is \$12,674 per ton of SO<sub>2</sub> for PRB coal; the incremental cost effectiveness of a wet scrubber is \$8,964 per ton of SO<sub>2</sub> for CAPP coal. (EPD File Ex. 48, Appendix Da at 10, Appendix Db at 9). Longleaf failed to include the cost of treating Georgia-Pacific's wastewater in its cost analysis. Therefore, these costs may be understated. (Tr. at 1761-62).

Longleaf concluded that the economic impacts of using a wet scrubber rather than a dry scrubber would be "excessive," and therefore relied on this economic basis as one of the grounds for rejecting a wet scrubber. (EPD File Ex. 48, Appendix Da at 11, Appendix Db at 11). To support its conclusion that the economic impact of using a wet scrubber would be excessive, Longleaf provided a table in which it compared the wet scrubber incremental costs for other facilities where a wet scrubber was rejected to the incremental cost for Longleaf. (EPD File Ex. 107, January 5, 2007 letter at 10 (Table 1)). The costs listed in the table span 12 years (i.e. 1993 – 2005). Longleaf did not adjust the costs to a common year basis.

EPD approved Longleaf's cost analysis, in part based on the fact that the costs reported by Longleaf were within the range of costs reported by other permit applicants. (EPD File Ex. 84 at 52, 62; Tr. at 2114, 2895, 3073; *see also* EPD File Ex. 107 at 10 (Table 1)).

In the Final Determination, EPD stated that it relied on both average and incremental cost impacts of a wet scrubber versus a dry scrubber to conclude that the economic impact of a wet scrubber would be excessive. (EPD File Ex. 103 at 4). However, at the hearing Mr. Capp testified that EPD did reject wet scrubbing on the basis of average costs. EPD found the average cost for the wet scrubber to be reasonable. (Tr. at 3074-75). In making its cost determination, EPD did not apply a specific cost threshold to determine whether Longleaf's cost calculations were significant. (Tr. at 3097). Mr. Capp testified that the adoption of a bright-line significance threshold for costs would be disadvantageous to the agency, because applicants could manipulate their cost effectiveness analyses to obtain favorable agency determinations. (*Id.*). Nevertheless, EPD did not state on what basis it found the economic impacts of a wet scrubber to be "excessive."

#### **viii. Energy Use: Wet v. Dry Scrubber**

A wet scrubber consumes more energy than a dry scrubber. (Ex. P-27 at 11; Ex. PR-17 at 35-12; Tr. at 2111, 2438, 3214). A wet scrubber would consume approximately 2% of the gross power generation at a facility, whereas a dry scrubber would consume roughly 0.7% of the gross generation. At the Longleaf facility, these percentages translate to an energy requirement of approximately 26.2 MW for a wet scrubber and 9.2 MW for a dry scrubber. (EPD File Ex. 84 at 48). EPD found the difference in energy use between a wet and dry scrubber to be significant based on comparisons with other permit decisions where dry scrubbers had been selected as the SO<sub>2</sub> control technology. (Tr. at 3057-61).

#### **D. NITROGEN OXIDES (NO<sub>x</sub>) EMISSION LIMITATION**

The Permit contains two BACT emission limitations for NO<sub>x</sub> – 0.07 lb/MMBtu on a 30-day rolling average and 0.05 lb/MMBtu on a 12-month rolling average. (EPD File Ex. 104 at Conditions 2.15(a) & (b)). The 30-day NO<sub>x</sub> limit of 0.07 lb/MMBtu is higher than the annual NO<sub>x</sub> limit of 0.05 lb/MMBtu, which allows some short term variability in NO<sub>x</sub> emissions. However, should Longleaf’s NO<sub>x</sub> emissions exceed the annual NO<sub>x</sub> limit in the short term; Longleaf will have to reduce emissions to below the annual limit in order to comply with the annual limit. (Tr. at 2448-51). Compliance with the NO<sub>x</sub> limits in the Permit will be determined by use of a CEMS in the stack. (EPD File Ex. 104 at Conditions 4.1(r), 5.2(a)). Longleaf must comply with the NO<sub>x</sub> limits during all periods of operation, including startup, shutdown and malfunction, unless certain conditions are met. (EPD File Ex. 104, Conditions 2.15(a) & (b), 8.23).

Longleaf’s 30-day NO<sub>x</sub> limit is comparable to and in some cases lower than the 30-day limits proposed or permitted for other facilities. (Tr. at 2181, 3195-96). Importantly, the chart below identifies many NO<sub>x</sub> permit limits that exclude periods of startup, shutdown, and malfunction. The Longleaf Permit does not exclude these periods. Accordingly, the higher emissions that occur during these periods “count” against the NO<sub>x</sub> allowable averages in Longleaf’s Permit.

In setting the NO<sub>x</sub> BACT emission limits in the Permit, EPD reviewed NO<sub>x</sub> limits in final permits, draft permits, permit applications, and EPA’s National Coal Fired Spreadsheet for a number of other facilities. (Tr. at 2465-2472, 2474-2476; *see also* EPD File Ex. 108). EPD specifically considered the NO<sub>x</sub> limits in the permits cited by EPA and Petitioners in their comments on the Draft Permit and Preliminary Determination. (*See* EPD File Ex. 347 at 3-4; EPD File Ex. 356 at 32; Tr. at 2169, 2875; *see also* EPD File Ex. 108).

EPD also considered the CEMS data cited by EPA and Petitioners in their comments, most of which was for coal-fired boilers that utilize SCRs only during the five-month ozone season from May 1st through September 30th (“ozone season CEMS data”) versus year-round (“annual CEMS data”). (Tr. at 2460, 3342-3344). Specifically, EPA cited to ozone season CEMS data for Georgia Power’s Plant Bowen and referred EPD to its Clean Air Markets website. (EPD File Ex. 347 at 4; Tr. at 2170). Petitioners cited 2004-05 ozone season CEMS data for a number of coal-fired boilers and 2003-06 annual CEMS data for four Parish units purportedly obtained from EPA’s Clean Air Markets website. (EPD File Ex. 356 at 31). This CEMS data showed that none of the coal-fired boilers had annual emissions rates less than 0.05 lb/MMBtu, and that only two had ozone season emissions rates of less than 0.05 lb/MMBtu. (Tr. at 3342-44).

While a good source of information, CEMS data has limited usefulness and should not be translated into an emission limit without including a safety factor. CEMS data for sources that use an SCR only during the ozone season has even less value than CEMS data for sources that must run their SCRs all year long, because the latter sources can run their SCRs harder during the ozone season to achieve lower permitted emission limits. (Tr. at 2461, 2505, 2514 (“[E]ssentially, [they] would use and abuse their SCR to meet their limits and then would clean [the SCR] up afterwards.”), 3199, 3200, 3344, 3347).

In addition to the CEMS data cited by EPA and Petitioners, EPD reviewed 2006 ozone season CEMS data for coal-fired boilers. Based on this review, EPD found only about a dozen coal-fired boilers in the country with emission rates less than 0.05 lb/MMBtu during the ozone season. (Tr. at 3344-45). As a result of EPD’s consideration of the comments submitted by EPA and Petitioners, the annual NO<sub>x</sub> limit of 0.05 lb/MMBtu was added to the Permit. This limit is

equal to the lowest limit cited by Petitioners and is as stringent as the limits cited by EPA. (Tr. at 2168, 2875).

The following chart depicts a comparison of Longleaf’s NO<sub>x</sub> limit to other permitting decisions on NO<sub>x</sub>:

<b>Facility Name</b>	<b>Emission Limit in lbs/MMBtu With (Averaging Period)</b>	<b>Control Technology</b>	<b>Cite</b>
Longleaf Energy Associates, LLC (LS Power Development, LLC)	0.07 – (30-day average) 0.05 – (annual average)	Low-NO <sub>x</sub> Burner (“LNB”), Over-fire Air (“OFA”), Selective Catalytic Reduction (“SCR”)	EPD File Ex. 104; EPD File Ex. 108
Xcel Energy, Comanche Station, Colorado	0.08 – (30-day average) 0.07 – (annual average)	LNB, SCR	EPD File Ex. 108
Seminole Electric Cooperative, Inc.- Palatka Generating Station	0.07 [netted out of BACT]	LNB, SCR	EPD File Ex. 108
Peabody - Prairie State Generating Station, Illinois	0.07 – (30-day average)	LNB, SCR	EPD File Ex. 108
MidAmerican, Council Bluffs, Iowa	0.07 – (30-day rolling average) <sup>19</sup>	SCR	EPD File Ex. 108
Sunflower Electric Power Cooperative, Holcomb Power Plant, Kansas	0.07 – (30-day average) <sup>20</sup>	LNB, Separated OFA, SCR	EPD File Ex. 108
Louisville Gas & Electric Company (LG&E), Trimble County Generating Station, Kentucky	0.05 – (24 hour average) [netted out of PSD] <sup>21</sup>	SCR	EPD File Ex. 108
Omaha Public Power District, Nebraska	0.07 – (30-day average) following 18 month optimization, interim was 0.12	LNB, SCR	EPD File Ex. 108
LS Power, White Pine, Nevada	0.07 – (24 hour average) <sup>22</sup>	LNB, OFA, SCR	EPD File Ex. 108
Sithe Global - Desert Rock Energy Facility, New Mexico (Navajo)	0.06 – (24 hour average) <sup>23</sup>	LNB, SCR	EPD File Ex. 108
Duke Power, North Carolina	0.08 – (30-day average)	LNB, Separated	EPD File Ex. 108

<sup>19</sup> Limit does not apply during startup, shutdown or malfunction (“SSM”). (EPD File Ex. 563 at 5; Tr. at 2181-82).

<sup>20</sup> Limit does not apply during SSM. (EPD File Ex. 509 at 6; Tr. at 2173-74).

<sup>21</sup> Permit has two limits: per calendar day AND per 12 consecutive months. Plant must exceed both limits to constitute a permit violation. (Ex. P-118 at 28, Condition 2.g; Tr. at 2331).

<sup>22</sup> Separate limit of 0.45 lb/MMBtu during startup and shutdown. (Ex. I-75 at V-2, V-6; Tr. at 2176).

<sup>23</sup> Limit does not apply during startup and shutdown. (Ex. P-128 at 7 (¶ N. 1-3)).

		OFA, SCR	
City Utilities of Springfield-Southwest Power Station, Missouri	0.08 – (30-day rolling average) <sup>24</sup>	SCR	Ex. R-6A at 3; Tr. at 2171-72
LS Power, Sandy Creek, Texas	0.07 – (30-day average) 0.05 – (annual average)	LNB, SCR	EPD File Ex. 108

### 1. Selection of Best Available Control Technology

The Permit’s NO<sub>x</sub> emission limitations are based on the use of Low-NO<sub>x</sub> burners, Over-Fire Air and SCR. The Permit requires Longleaf to install and operate these air pollution control technologies. (EPD File Ex. 104 at Condition 2.3). Petitioners agree that the pollution control technologies selected by EPD are appropriate. (Tr. at 773-74, 966).

Longleaf and EPD employed a “top down” BACT analysis to select these controls as BACT for the Longleaf facility. (EPD File Ex. 12 at 15; EPD File Ex. 84 at 22, 37). Longleaf’s “top-down” BACT analysis for control of NO<sub>x</sub> emissions from the boilers followed the five-step process outlined in the Draft NSR Manual: (1) consideration of all available control technologies, both pre-combustion and post combustion; (2) elimination of technically infeasible technologies; (3) ranking of remaining control technologies by effectiveness; (4) evaluation of the energy, environmental, and economic impacts of the top control technologies; and (5) selection of BACT. (EPD File Ex. 12 at 5, 15, 48, 63-64; *see also* Draft NSR Manual at B.6).

Longleaf’s BACT analysis proposed the use of Low-NO<sub>x</sub> burners, Over fire Air and SCR control technologies, and a NO<sub>x</sub> emission limit of 0.07 lb/MMBtu on a 30-day rolling average. (EPD File Ex. 12 at 15). EPD summarized Longleaf’s BACT analysis and documented its review and concurrence with Longleaf’s proposal in the Preliminary Determination. (EPD File Ex. 84 at 22, 37). As noted *supra*, however, EPD lowered the NO<sub>x</sub> limit by adding the 0.05 lb/MMBtu annual average on the basis of comments received from EPA and Petitioners.

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<sup>24</sup> Limit does not apply during SSM. (Ex. R-6A at 3; Tr. at 2171-72).

**a. PRB and CAPP Coals**

Longleaf's BACT analysis was not performed separately for each coal. While the amount of nitrogen varies with the type of coal, separate analyses are not necessary, because the nitrogen content of coal is generally small (less than 2% on a dry mass basis). Further, the variation in the nitrogen content between PRB and CAPP coals is much smaller than the variation in the sulfur content between the two coals, and sulfur content of coal is a more significant parameter in terms of coal selection. (EPD File Ex. 12 at 5; EPD File Ex. 48 at 2; EPD File Ex. 63 at BATES 10569; EPD File Ex. 84 at 22; Tr. at 2165).

**b. Boiler Type**

Longleaf's BACT analysis did not include consideration of boiler type – specifically, subcritical, supercritical or ultra supercritical – as a NO<sub>x</sub> control technology, because a boiler is not a control technology. (Tr. at 966, 2092-93, 2734; *see also* Ex. P-33 at 12-14 (EPA did not consider boiler type as a NO<sub>x</sub> control technology)). Furthermore, because the permit contains a maximum heat input, use of a subcritical or supercritical boiler will not affect emission levels. (Tr. at 3192-93, 3208).

**c. Low SO<sub>2</sub> to SO<sub>3</sub> Catalyst**

Longleaf's BACT analysis considered a low SO<sub>2</sub> to SO<sub>3</sub> catalyst to minimize the conversion of SO<sub>2</sub> to SO<sub>3</sub>. However, Longleaf did not propose the use of a low SO<sub>2</sub> to SO<sub>3</sub> catalyst in the SCR as BACT, because such catalyst could lower the removal of NO<sub>x</sub> from the boiler flue gases. (EPD File Ex. 12 at 14; EPD File Ex. 84 at 26, 35; Tr. at 2242-44).

**d. Baseline Emissions Rate**

Longleaf's BACT analysis reported that the available performance related data indicated that a coal-fired boiler equipped with Low-NO<sub>x</sub> burners and Over-fire Air would be expected to operate with NO<sub>x</sub> emission levels in the range of 0.15 to 0.47 lb/MMBtu. (EPD File Ex. 84 at

31). Longleaf chose a number which is approximately the arithmetic mean of that range, 0.3 lb/MMBtu, as its NO<sub>x</sub> baseline emissions rate. (*Id.*).

Longleaf's BACT analysis used a NO<sub>x</sub> baseline emissions rate of 0.3 lb/MMBtu from the boilers with Low-NO<sub>x</sub> burners and Over fire Air in its ranking of control technologies by effectiveness and its economic analysis of the top control technologies. (EPD File Ex. 12 at 12 (Table D.2); EPD File Ex. 64 at 12-13 (Table 2); EPD File Ex. 84 at 32 (Table VIII), 36 (Table IX)). A NO<sub>x</sub> baseline emissions rate is a reasonable upper bound of emissions from the source before controls. (Tr. at 3122-24, 3126; *see also* NSR Manual at B.37-38 (A baseline emissions rate represents uncontrolled emissions from a source calculated using realistic upper boundary operating conditions.)). EPD determined that Longleaf's NO<sub>x</sub> baseline emissions rate of 0.3 lb/MMBtu was consistent and reasonable based upon its experience with NO<sub>x</sub> emissions from coal-fired boilers with Low NO<sub>x</sub> burners and Over-Fire Air. (EPD File Ex. 84 at 31; Tr. at 3132-35, 3146).

## **2. Petitioners' Proposed NO<sub>x</sub> Emission Limits**

Petitioners contend that the annual NO<sub>x</sub> BACT emission limit in the Permit should be 0.01 lb/MMBtu. Petitioners calculated this limit using a theoretical 90% control efficiency for the SCR and a NO<sub>x</sub> baseline emissions rate of 0.10 lb/MMBtu. (Tr. at 775-76).

Petitioners contend that the 30-day NO<sub>x</sub> BACT emission limit in the permit should be 0.02 lb/MMBtu. Petitioners calculated this limit using a theoretical 90% control efficiency for the SCR and a NO<sub>x</sub> baseline emissions rate of 0.20 lb/MMBtu. (Tr. at 775-76).

Both Ms. Aponte and Mr. Capp opined that these limits are not achievable by the Longleaf facility on a long-term basis. (Tr. at 2184-85, 2860-64, 3198). Neither the baseline emissions rate utilized by Petitioners nor the theoretical 90% removal efficiency is achievable by Longleaf. (Tr. at 2864).

Ms. French testified that there are no permits for coal-fired power plants in the United States with limits that low. (Tr. at 1689, 1694). Petitioners have not identified any permit for a pulverized coal-fired power plant with an emissions limit for NO<sub>x</sub> of 0.01 lb/MMBtu on an annual basis or 0.02 lb/MMBtu on a 30-day average. Ms. French testified that to her knowledge no pulverized coal-fired power plant has ever achieved those limits over a sustained period, such as 30 days or a year. (Tr. at 1695). Petitioners have not produced any evidence demonstrating that any such plant has achieved such limits over a sustained period.

The calculated control efficiency for the SCR using the annual NO<sub>x</sub> emission limit is 84% and using the 30-day NO<sub>x</sub> limit is 77%. (Tr. at 2322-2323, 2431). Facilities with SCRs that have achieved 90% or close to 90% control efficiency have higher inlet NO<sub>x</sub> emission rates than Longleaf. Because Longleaf's NO<sub>x</sub> inlet concentrations to the SCR will be less, this will result in a decrease in the ability of the SCR to remove the remaining NO<sub>x</sub>. This decreased ability will make it harder for Longleaf's SCR to achieve 90%.<sup>25</sup> Thus, a 90% control efficiency is not achievable by the SCR all of the time. (Tr. at 2859-2861, 2864, 2873).

A baseline emissions rate is appropriately used in the ranking and economic analysis of control technologies, not in the setting of BACT limits in a permit. (Tr. at 3122, 3127, 3342; *see also* NSR Manual at B.25-27 (Baseline shown in Table B-2, Sample BACT Control Hierarchy), B.36-37 (Baseline emissions rate is to determine cost effectiveness in dollars per ton of pollutant emissions removed by the top control technologies.)). Specifically, Dr. Fox acknowledged that she is aware of no permit that sets a BACT emissions limit for NO<sub>x</sub> emissions at the boiler outlet. (Tr. at 3678).

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<sup>25</sup> Petitioners' expert admitted that when the boiler outlet [i.e., SCR inlet] NO<sub>x</sub> level is lower, the SCR's control efficiency will decrease; however, she still maintained that the SCR could achieve 90%. (Tr. at 728-29).

Petitioners submitted a spreadsheet (Petitioners' Exhibit 18A) in support of the baseline emissions rates used in their calculations. This spreadsheet contains 2003 annual CEMS data for NO<sub>x</sub> emissions from coal-fired boilers equipped with Low-NO<sub>x</sub> burners and Over fire Air (but not SCRs) that was downloaded from EPA's Clean Air Markets website.<sup>26</sup> Petitioners' own exhibit shows that none of the coal-fired boilers was operating at a baseline emissions rate of 0.10 lb/MMBtu and that very few boilers, except for those boilers which burn PRB coal exclusively, or at least predominantly, (e.g., Rush Island, Baldwin and Labadie), were operating at a baseline emissions rate of 0.20 lb/MMBtu. (Ex. P-18A; Tr. at 1035-36).

Section two of Petitioners' Exhibit 18A (tendered as Respondent's Exhibit 43A) purportedly contains 2003 annual CEMS data for NO<sub>x</sub> emissions from approximately 1100 coal-fired boilers equipped with Low NO<sub>x</sub> burners and Over fire Air and/or SCRs. (Tr. at 3672-73). Again, Petitioners' own exhibit shows that no pulverized coal-fired boilers, and only two circulating fluidized bed boilers, were operating at an annual emissions rate of 0.05 lb/MMBtu or less. (Tr. at 2863; Ex. R-43A).

#### **E. PARTICULATE MATTER (PM) EMISSION LIMITATION**

The Permit contains two BACT emission limitations for PM emitted by the boilers – 0.012 lb/MMBtu on a 3-hour average for filterable PM and 0.03 lb/MMBtu on a 3-hour average for total PM. (EPD File Ex. 104 at Condition 2.15(d)). Compliance with the filterable PM limit in the Permit will be determined by use of a CEMS in the stack. (EPD File Ex. 104 at Conditions 4.1(t), 5.2(f)). This PM CEMS will be one of a few in the country, and will be the first in Georgia. (Tr. at 2632). Compliance with the total PM limit in the Permit will be determined by a stack test, using Method 5 or 17 to determine the filterable PM concentration

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<sup>26</sup> (Tr. at 709-713; Ex. P-18A). Exhibit P-18A was admitted as data that Dr. Fox relied on, however due to concerns about the reliability of the document, it was not admitted for the truth of the numbers contained therein.

and Method 202 to determine the condensable portion. (Tr. at 2635; EPD File Ex. 104 at Conditions 4.1(f) & (p), 4.2(b)). Longleaf must comply with the PM limits during all periods of operation, including startup, shutdown and malfunction, unless certain conditions are met. (EPD File Ex. 104 at Conditions 2.15(d), 8.23).

### **1. Setting the PM BACT Limits in the Permit**

In setting the PM BACT emission limits in the Permit, EPD reviewed PM limits in final permits, draft permits, permit applications and EPA's National Coal-fired Spreadsheet for a number of other facilities. (Tr. at 2211, 2222, 2233-34; EPD File Ex. 108). EPD specifically considered the PM limits in the permits cited by EPA in their comments on the Draft Permit and Preliminary Determination. (Tr. at 2231, 2738-2739; EPD File Ex. 347 at 4; *see also* EPD File Ex. 108 (including permits cited by EPA)). Petitioners did not comment on the PM limits in the Draft Permit. (*See* EPD File Ex. 356).

As a result of EPD's consideration of the comments submitted by EPA, EPD lowered the filterable PM limit in the Draft Permit from 0.015 to 0.012 lb/MMBtu, with a corresponding decrease in the total PM limit from 0.033 to 0.030 lb/MMBtu. However, EPD lowered the total PM limit cautiously, due to the limited information on condensable PM. (Tr. at 2231, 2408).

Of the three filterable PM limits cited by EPA in its comments, Longleaf's filterable PM limit is equal to or lower than two limits (Seminole at 0.013 and Holcomb at 0.015) and slightly higher than a third limit (Desert Rock at 0.010). Of the two total PM limits cited by EPA, Longleaf's total PM limit is lower than one limit (Comanche at 0.035) and higher than the other limit (Desert Rock at 0.020). (Tr. at 2257; EPD File Ex. 347 at 4).

#### **a. The Filterable PM Limit**

Petitioners' expert Dr. Fox agrees that the 3-hour filterable PM limit of 0.012 lb/MMBtu is BACT and that the use of a PM CEMS to determine compliance with the limit is proper. (Tr.

at 186, 277). The filterable PM limit of 0.012 lb/MMBtu on a 3-hour average is one of the lowest limits in the country. Moreover, this limit is more stringent than similar limits in other PSD permits, because compliance will be determined by a CEMS versus a stack test. (Tr. at 2632-34).

**b. The Total PM Limit**

Total PM is made up of filterable PM and condensable PM. (Tr. at 163-64). EPD included a safety factor or margin of compliance in the total PM limit in the Permit, because there is limited data available on condensable PM. (Tr. at 2729-30). EPD relied upon a recent regulatory decision concerning Newmont's TS Power Plant in Nevada in support of its inclusion of a safety factor based on the lack of data. (Tr. at 2717). Little data exists on condensable PM, because SAM and other condensables have not been regulated until recently. (Tr. at 2210-11). Consequently, there is a lack of long term data, because, historically, permits have not contained condensable limits. (Tr. at 2717; *see also* Ex. P-29 at 70 ("Some recent BACT determinations include both filterable and condensable PM, although federal regulatory limits and most BACT determinations have addressed only filterable PM.")).

The data on condensable PM that does exist shows it can be a significant portion of total PM. (Tr. at 2795-2808). A technical paper, entitled "In Stack Condensible Particulate Matter Measurements and Issues," showed that condensable PM was 0.0208 lb/MMBtu or 82% of total PM. The paper was based on a stack test at Logan Generating Company in New Jersey of a pulverized coal-fired boiler with controls identical to Longleaf (i.e., SCR + dry scrubber + fabric filter baghouse). (Tr. at 2797, 2803; Ex. P-146 at 211 (Table 2), 217 (Table 1)). A test report for a stack test conducted on a pulverized coal-fired boiler with controls identical to Longleaf (SCR + dry scrubber + fabric filter baghouse) at the Hardin Generating Station in Montana showed that

condensable PM was 0.0219 lb/MMBtu, which was a significant portion (over 50%) of total PM. (Tr. at 2800, 2803; Ex. I-43 at 2, 7).

Recent permitting decisions by EPA and other state agencies echo the lack of data and uncertainty regarding condensable PM. The permit issued to Deseret Power Electric Cooperative in Utah states: “In the event the Permittee cannot meet [the total PM] limit because of condensable particulate matter, EPA may adjust the emission limit to a level not to exceed 0.045 lb/MMBtu, pending EPA’s review of stack test results at the CFB boiler.” (Ex. R-34A at 7 (D.1.a)). The permit for Holcomb Station in Kansas states: “If the initial performance test demonstrates that an emissions limitation of 0.018 lb/MMBtu is consistently achievable, this limitation shall supersede the PM<sub>10</sub> [total PM] emission limitation of 0.035 lb/MMBtu.” (EPD File Ex. 507 at 7). The preliminary determination for the proposed Sandy Creek Energy Station in Texas states: “[T]here is some uncertainty as to the expected values. The applicant agrees to lower the allowable emission rates of these compounds, and the total PM/ PM<sub>10</sub>, if the stack testing indicates better removal efficiencies of these compounds than the application representations.” (EPD File Ex. 509 at 4). In the proposed permit conditions for Desert Rock, EPA states: “If EPA determines from the performance testing data that the PC boilers and associated control devices have not achieved PM<sub>10</sub> [total PM] emissions lower than the limits prescribed in X.I., EPA may revise these conditions to reflect the equipment and control devices’ performance.” (EPD File Ex. 493 at BATES 3276 (¶ T.1)).

EPD included a safety factor or margin of compliance in the total PM limit in the Permit due to the inaccuracy of Method 202 in measuring condensable PM. (Tr. at 2711). Method 202 is the only EPA approved stack test method for measuring condensable PM. Method 202 was

included in the Permit as the compliance method for condensable PM, because it is generally accepted across the country. (Tr. at 3372-73).

Method 202 is widely known to be inaccurate. The margin of error in Method 202 is significant, but given the limited amount of data, the level of inaccuracy has not been established. Mr. Capp testified that he has seen reports that Method 202 measured four times the amount of condensable PM that was actually present. (Tr. at 3372-73, 3390-91; Ex. P-146 at 6 (“Positive bias (indicating more condensable PM than is actually emitted) is a significant issue [with Method 202] that could result in unrepresentative, elevated condensable PM measurements.”)). Petitioners’ expert Dr. Fox admitted that Method 202 is inaccurate in that it measures higher amounts of condensable PM than is present and, for this reason, the BACT emission limit should be set consistent with the method specified for measuring condensable PM. (Tr. at 1027-29).

To account for the lack of data and uncertainty regarding condensable PM as well as the known inaccuracy of Method 202, EPD included a reasonable safety factor in the total PM limit. Using the little data that is available, which indicates that condensables may be a significant portion of total PM, EPD set the total limit so that the condensable portion (0.018 lb/MMBtu) is greater than the filterable portion (0.012 lb/MMBtu). (Tr. at 2794-95, 2801).

Ms. Aponte, Mr. Capp, and Mr. Kosky all opined that the PM emission limitations in the Permit met the requirements of BACT. (Tr. at 2234, 2808, 3205). The following chart depicts a comparison of Longleaf’s PM limits to other permitting decisions on PM:

<b>Facility Name</b>	<b>Emission Limit (lbs/MMBtu) With Averaging Period</b>	<b>Control Technology</b>	<b>Cite</b>
Longleaf Energy Associates, LLC (LS Power Development, LLC), GA	0.012-filterable 0.030-total	Baghouse	EPD File Ex. 104
Xcel Energy, Comanche Station, Colorado	0.013-filterable 0.022-total	Baghouse	EPD File Ex. 108
Seminole Electric Cooperative, Inc. – Palatka Generating Station, Florida	0.013-filterable	Wet Electrostatic Precipitator (“ESP”), ESP	EPD File Ex. 108
Peabody - Prairie State Generating Station, Illinois	0.015- 3-hour block avg 0.035- PM <sub>10</sub> -3 hour block avg	Wet ESP, ESP	EPD File Ex. 108
MidAmerican, Iowa	0.027	Baghouse	EPD File Ex. 108
Sunflower Electric Power Cooperative, Holcomb Power Plant, Kansas <sup>27</sup>	0.012-filterable 0.035-total	Baghouse	EPD File Ex. 108; EPD File Ex. 507 at 7; Tr. at 2212-13
Louisville Gas & Electric Company Trimble County Generating Station, Ky	0.018-total	Baghouse	EPD File Ex. 108
Omaha Public Power District, Nebraska	0.018-total	Baghouse	EPD File Ex. 108
LS Power, Nevada	0.015-3 hour average, filterable	Baghouse	EPD File Ex. 108
Sithe Global - Desert Rock Energy Facility, NM	0.010-24 hour average 0.020- PM <sub>10</sub>	Baghouse	EPD File Ex. 108
Duke Power, North Carolina	0.015-3 hour average, filterable	Dry ESP, Wet ESP	EPD File Ex. 108
LS Power, Texas	0.015-filterable, annually 0.040-total, annually (subject to performance test and lower limit)	Baghouse	EPD File Ex. 108; EPD File Ex. 509 at 3

## **2. Selection of Best Available Control Technology**

The Permit’s PM emission limitations are based on the use of a fabric filter baghouse. The Permit requires Longleaf to install and operate this air pollution control technology. (EPD File Ex. 104 at Condition 2.6). Longleaf and EPD employed a “top-down” BACT analysis to select this control as BACT for the Longleaf facility. (EPD File Ex. 12 at 25-30; EPD File Ex. 84 at 64-71). Longleaf’s “top-down” BACT analysis for control of PM emissions from the

<sup>27</sup> Limits do not apply during startup, shutdown or malfunction (“SSM”). (EPD File Ex. 507 at 7; Tr. at 2212-23).

boilers followed the five-step process outlined in the NSR Manual: (1) consideration of all available control technologies, both pre-combustion and post combustion; (2) elimination of technically infeasible technologies; (3) ranking of remaining control technologies by effectiveness; (4) evaluation of the energy, environmental, and economic impacts of the top control technologies; and (5) selection of BACT. (EPD File Ex. 12 at 25-30, 48, 64; *see also* NSR Manual at B.6).

As explained in more detail *supra* in the SO<sub>2</sub> BACT analysis, EPD fully considered low coal selection and coal cleaning as part of its BACT analysis for PM. Longleaf and EPD did not consider boiler types during their BACT analyses for the reasons set forth *supra*.

Longleaf's BACT analysis proposed the use of a fabric filter baghouse and a total PM emissions limit of 0.033 lb/MMBtu on a 30-day rolling average. (EPD File Ex. 12 at 30). EPD summarized Longleaf's BACT analysis and documented its review thereof in the Preliminary Determination. EPD concurred with Longleaf's proposed control technology and total PM limit; however, EPD added a filterable PM limit of 0.015 lb/MMBtu in the Draft Permit. (EPD File Ex. 84 at 64, 71; EPD File Ex. 83 at Condition 2.14(c)). EPD reduced Longleaf's proposed total PM limit based upon comments received from EPA, after the issuance of the Preliminary Determination and Draft Permit. (*Compare* EPD File Ex. 83 at Condition 2.14(c) (Draft Permit), *with* EPD File Ex. 104 at Condition 2.14(c) (Final Permit)).

Petitioners' expert, Dr. Fox, agreed that use of a fabric filter bag to control PM emitted by the boilers is BACT, because it removes not only filterable PM, but also a significant amount of condensable PM in the form of SAM. (Tr. at 192-93).

### **3. Petitioners' Proposed Emission Limits**

Petitioners contend that the total PM limit in the Permit should be 0.018 lb/MMBtu on a 3-hour basis. (Tr. at 228, 233, 238, 835). Mr. Capp and Mr. Kosky opined that Petitioners'

proposed total PM limit is not BACT for the boilers, because it does not contain an adequate safety factor or margin of compliance. (Tr. at 2794, 3206). Petitioners' limit is based on only four three-hour stack tests for Hawthorne Unit 5 at Kansas City Power and Light in Missouri and a handful of permit limits of which Hawthorne Unit 5 is the only facility currently in operation. (Tr. at 879, 1036, 1038).

A question was raised during the hearing regarding the validity of the Hawthorne 5 stack test data relied upon by Dr. Fox as a basis for the total PM emission limit she advocated as BACT. Ms. French's unrebutted testimony was that the EPA summary of the Hawthorne 5 stack test data provided to the parties by the Petitioners indicates that the fuel burned during the Hawthorne 5 stack tests was not identified. The fuel could have been coal, natural gas, or a combination of the two; it is simply an unknown. If natural gas was being fired, it contains very little particulate. (Tr. at 1730-1736; *see also* Ex. P-99 at 8 (noting that Hawthorn Unit 5 is fueled by PRB coal and natural gas)).

Ms. French also pointed out that the Iatan project has a much higher total PM limit of 0.024 lb/MMBtu compared to Hawthorne 5's PM limit of 0.018 lb/MMBtu, even though both permits were issued by Missouri, and the Iatan permit was issued after the Hawthorne 5 permit. (Tr. at 1730-1736; *see also* Ex. P-104 at Condition 3.A (demonstrating that the Iatan unit is fueled by low sulfur subbituminous coal as its primary fuel)).

#### **4. Petitioners' Proposed Opacity Limit**

Petitioners contend that an opacity limit is needed in the Permit to show continuous compliance (through use of a continuous opacity monitoring system ("COMS")) with the total PM limit, because the Permit requires only one stack test for condensable PM over the life of the facility. (Tr. at 271-72). Petitioners contend that the opacity limit in the Permit should be 5%, based on limits in other permits and some data from operating facilities that Dr. Fox reviewed.

(Tr. at 274-75). Petitioners assert that such limit can be established by developing a relationship between opacity and condensable PM. (Tr. at 273).

Opacity is the measurement of how much a background is obscured by visible emissions. Zero opacity means the background is not obscured by the emissions at all. One hundred percent opacity means the background is completely obscured. (Tr. at 2739).

The Permit requires a COMS to determine compliance with the Permit's 20% opacity limit. (Tr. at 2739; EPD File Ex. 104 at Conditions 2.15(p), 4.1(u)). The 20% opacity limit is not a BACT requirement, but is a requirement of the Georgia Rules for Air Quality Control. *See* GA. COMP. R. & REGS. r. 391-3-1-.02(2)(d)(3). (Tr. at 2746).

The level of opacity at the Longleaf facility is expected to be zero or near zero when the dry scrubber and fabric filter baghouse are operating properly. (Tr. at 2740). In order to establish a relationship between opacity and condensable PM, Longleaf would have to perform a study. This study would involve making the air pollution control devices operate less efficiently to produce visible emissions and then measuring the opacity and condensable PM. During this study, pollutants would be emitted to the atmosphere that normally would not as a result of the control devices being operated less efficiently. For example, by operating the fabric filter baghouse less efficiently, lead, mercury and filterable PM would be emitted. (Tr. at 893 (Dr. Fox agrees that Longleaf would have to pollute to do this study), 2740-2742).

An opacity limit based on a relationship between opacity and condensable PM is not necessary, because proper operation of the dry scrubber and the fabric filter baghouse will assure compliance with the total PM limit in the Permit. (Tr. at 2745). Proper operation of the dry scrubber and fabric filter baghouse will be indicated by the SO<sub>2</sub> CEMS and the filterable PM CEMS. Should there be a significant decline in the performance of the control devices,

emissions of SO<sub>2</sub> and filterable PM will go up and the CEMS will record violations of the SO<sub>2</sub> and filterable PM BACT limits in the Permit. (Tr. at 2747-48).

The dry scrubber and fabric filter baghouse combination are also the control devices for condensable PM. (Tr. at 2745). One benefit of having the dry scrubber first and then a fabric filter baghouse (like Longleaf) versus a fabric filter baghouse first and then a wet scrubber (advocated by Petitioners) is the control of condensable PM. In essence, the dry scrubber “assists” the fabric filter baghouse by condensing some of the SAM and other condensables out of the flue gas, which are then collected by the baghouse. (Tr. at 2208-10).

EPD is unaware of any other coal-fired power plants with low PM limits that have established a relationship between opacity and condensable PM. (Tr. at 2745). Mr. Capp stated that requiring a study to establish a relationship between opacity and condensable PM would not be something EPD would do in this situation. Such a study would not produce meaningful results, because, among other things, the Method 202 used to measure condensable PM is not very accurate. (Tr. at 2740, 2744, 3372-74, 3387-91).

EPA recently expressed the same sentiment in response to a comment received on the Deseret Power PSD permit in Utah:

While it is true that PM CEMS only measures filterable particulate matter, EPA believes that opacity monitoring . . . would be ineffective for assuring compliance with the emission limits for either filterable PM or total PM. Opacity monitoring can be useful as a surrogate for direct measurement of particulate emissions. However, EPA does not consider it useful for assuring compliance with PM emission limits where those limits are extremely low. The proposed emission limit for Deseret Power’s WCFU for total PM/ PM<sub>10</sub> is 0.03 lb/MMBtu. This limit is based on a filterable PM/ PM<sub>10</sub> emission limit of 0.012 lb/MMBtu, added to projected emissions of no more than 0.018 lb/MMBtu for condensable PM. These emission limits are so low that EPA believes it highly improbable, if not impossible, that any form of existing opacity monitor could reliably detect opacity at levels that would correspond to these limits. Moreover, given the sensitivity of the PM CEMS, elevated emissions would be detected by PM CEMS well in advance of detection via a Continuous Opacity Monitoring System (COMS), or

via a Method 9 or Method 22 visible emissions observation. Further, opacity only provides data from a subset of all particles, namely those particles whose size is roughly the same wavelength as visible light.

(Ex. R-35A at 66 (Response 4(e)(2))).

### **5. Compliance with Total PM Limit Determined by Stack Test**

The Permit requires compliance with the total PM limit in the Permit to be determined by a stack test conducted within 60 days after achieving the maximum production rate, but not later than 180 days after the initial startup of each boiler for each coal type. (Tr. at 2748-49; EPD File Ex. 104 at Conditions 4.1(f) & (p), 4.2(b)). However, EPD has the authority to require additional stack tests. (Tr. at 3361-62). *See also* GA. COMP. R. & REGS. r. 391-3-1-.02(6)(b)(1)(i).

The Permit requires only one stack test for two reasons: (1) the SO<sub>2</sub> and PM CEMS will provide a reasonable assurance of compliance with the total PM limit in the Permit; and (2) the Permit will remain in effect for only a short period of time before being replaced by a Title V Operating Permit that will require monitoring that provides a reasonable assurance of compliance with the emission limits. (Tr. at 2749, 2752).

Longleaf is required to submit an application for a Title V Operating Permit within one year after commencing operation. (Tr. at 2750; EPD File Ex. 104 at Condition 10.2). EPD is required by law to issue the Title V Operating Permit or deny Longleaf's application within 18 months of receipt of a complete application. (Tr. at 2750). *See also* O.C.G.A. § 12-9-7(i). Issuance of the Title V permit to Longleaf will revoke its PSD Permit. (Tr. at 3362, 3368-69). As part of its Title V application, Longleaf will be required to submit a compliance assurance monitoring ("CAM") plan. In its CAM plan, Longleaf must propose a continuous monitoring method that provides a reasonable assurance of compliance with the emission limits for total PM and SAM. (Tr. at 2750, 2758); Ex. R-1A).

## **F. SULFURIC ACID MIST (SAM) EMISSION LIMITATION**

The Permit contains a SAM BACT emission limitation of 0.005 lb/MMBTU based upon a 3-hour average. (EPD File Ex. 103 at Condition 2.15(l)). Compliance with the SAM limit in the Permit will be determined by the EPA Method 8 stack test specified in Condition 4.1(h) of the Permit. This stack test will be conducted within 180 days of the initial start-up of the Longleaf facility. Unlike other pollutants emitted by the Longleaf facility (e.g., NO<sub>x</sub> or SO<sub>2</sub>), there is no CEMS available to measure SAM on a continuous basis. (Tr. at 2753-54).

Within twelve months following the commencement of operations of the facility, Longleaf will be required to file an application for a Title V Operating Permit. (Tr. at 2749). That permit application will have to include a plan to assure compliance (“CAM Plan”) with the SAM emission limit on a continuous basis using another pollutant’s CEMS as a surrogate for determining SAM emissions. (Tr. at 2754-58). Longleaf must comply with the SAM limits during all periods of operation, including startup, shutdown and malfunction, unless certain conditions are met. (EPD File Ex. 103 at Conditions 2.15(l), 8.23).

### **1. The SAM Control Technology**

The Permit’s SAM BACT emission limitation is based on the use of low sulfur PRB and CAPP coal in conjunction with a dry scrubber and fabric filter baghouse. (EPD File Ex. 103 at Condition 2.5). Based on an uncontrolled SO<sub>2</sub> production rate of 1.6 lb/MMBtu and a combined furnace and SCR catalyst SO<sub>2</sub> to SO<sub>3</sub> conversion rate of 2.5%, the Permit limit corresponds to a SAM removal efficiency of 92%. (EPD File Ex. 84 at 111-12). Longleaf and EPD employed a “top-down” BACT analysis to select these controls as BACT for the Longleaf facility. (EPD File Ex. 48, Appendix Da, Appendix Db).

**a. EPD's Rejection of Top SAM Control Technologies**

EPD considered a range of lower emitting processes and add-on control technologies in its BACT analysis for SO<sub>2</sub>. (EPD File Ex. 48, Appendix Da at 17-18, Appendix Db at 17-18). Many of the controls analyzed in Longleaf's BACT analyses for SO<sub>2</sub> and PM also tend to control SAM, including wet and dry scrubbers, a fabric filter baghouse, and a wet electro-static precipitator ("WESP"). (EPD File Ex. 48, Appendix Da at 18, Appendix Db at 18).

Consistent with its approach to other pollutants, EPD did not consider boiler type as a SAM control technology. As explained *supra*, regardless of Longleaf's selected boiler type, the facility's SAM emissions will remain constant at the boiler heat input limit contained in the Permit. (Tr. at 3222; *see* EPD File Ex. 104 at Condition 2.17). While EPD considered the use of a low SO<sub>2</sub> to SO<sub>3</sub> conversion catalyst in the SCR, it did not discuss the use of a low SO<sub>2</sub> to SO<sub>3</sub> conversion catalyst in its BACT analysis on SAM. (EPD File Ex. 84 at 35; Tr. at 2242-44).

EPD rejected the use of the top SAM control technology combinations — dry scrubber + WESP; wet scrubber + WESP; regenerable wet scrubber + WESP — due to the increased water consumption required by a WESP as well as the severe economic impacts of a WESP. (EPD File Ex. 119). The cost of removing a ton of SAM with a WESP is near \$80,000. (Tr. at 3220-21).

EPD also rejected the use of sorbent injection in conjunction with a dry scrubber due to the excessive economic impacts associated with sorbent injection, as well as the lack of demonstrated performance by the combination of technologies. (EPD File Ex. 84 at 119). Specifically, the average cost effectiveness of sorbent injection was estimated to be \$24,972. (*Id.*). Petitioners did not present any evidence to challenge EPD's economic and environmental justification for the rejection of these top SAM control technologies.

**b. EPD's Rejection of a Wet Scrubber**

A dry scrubber used in conjunction with a downstream fabric filter baghouse removes a greater percentage of SAM as compared to a wet scrubber system. (EPD File Ex. 84 at 50-51; Ex. P-27 at 11-12; Ex. R-4A at 4; Ex. R-8A at 2; EPD File Ex. 581 at 5; Ex. P-33 at 17; Tr. at 2787).

As previously explained *supra*, the increased SAM removal efficiency in the dry scrubber and fabric filter baghouse combination is a result of the location of the fabric filter baghouse in relation to the dry scrubber. The downstream placement of the baghouse allows lime cake to accumulate in the fabric filter bags, which in turn enhances SAM removal. The temperature of the downstream fabric filter baghouse in a dry scrubber system is also lower than the upstream baghouse in a wet scrubber system. This lower temperature results in the condensation and reaction with water vapor of gaseous  $\text{SO}_3$  to form liquid SAM droplets. Once in liquid form, SAM can more easily react with the lime dust and alkaline fly ash in the fabric filter baghouse and thus be eliminated from the flue gas stream. (Tr. at 1967-98, 2109-10).

In a wet scrubber system, the upstream baghouse's ability to remove SAM is dependent upon the alkalinity of the fly ash. With PRB coal, the high alkalinity in the fly ash helps to remove the SAM from the flue gas. (Tr. at 691-92). According to Dr. Fox, the SAM emission levels at plants burning PRB coal are virtually undetectable. (Tr. at 691-92).

CAPP coal generally has a higher sulfur content than PRB coal. The increased sulfur content yields greater levels of  $\text{SO}_2$ ,  $\text{SO}_3$ , and in turn, SAM. CAPP coal also has a lower alkalinity in its fly ash which can lower SAM removal efficiencies in a baghouse, especially in the wet scrubber system where the baghouse is located upstream of the scrubber. (Tr. at 1701-02).

## **2. EPD's BACT Determination**

In setting the SAM BACT emission limitation in the Permit, EPD reviewed SAM emission limits in final permits, draft permits, and permit applications for a number of other facilities. (Tr. at 2242; *see also* EPD File Ex. 108). While EPD identified permit limits and proposed permit limits for SAM that were below 0.005 lb/MMBtu, EPD was not comfortable setting a lower limit due to the lack of actual test data on SAM emissions and inaccuracies in the test method. (Tr. at 2249, 2846).

### **a. Comparison of the Permit's SAM Emission Limitation to Other Permits**

Longleaf identified PSD permits for coal-fired power plants that have SAM emission limits similar to or higher than the SAM BACT emission limitation in the Permit. (Tr. at 1708-1712). Petitioners introduced testimony that some PSD permits for coal-fired power plants have lower SAM emission limits than the SAM BACT emission limitation in the Permit. (Tr. at 692-93).

The Sandy Creek facility in Texas, which is also being developed by LS Power, has a SAM emission limit of 0.0034 lb/MMBTU, but that facility will only burn PRB coal. (EPD File Ex. 509 at 1; Tr. at 1712). The Parish Unit 8 facility in Texas, which Petitioners cited approvingly for its low SAM emission limit of 0.0015 lb/MMBtu, has a permit that fails to explicitly identify a compliance test method for SAM emissions. (Tr. at 1234). EPA has proposed a draft SAM emission limit for the Desert Rock facility, which is proposed to be built in New Mexico and in close proximity to the Grand Canyon, a Class I PSD area, of 0.004 lb/MMBTU on a 3-hour average. (EPD File Ex. 492 at 6). In the case of Desert Rock, however, the facility's proximity to a large number of Class I areas and regional haze requirements required the facility to have lower emission limits. (*See* Tr. at 3213).

The Newmont facility, also referenced by Petitioners, has a SAM emission limitation of 0.001 lb/MMBtu. (Tr. at 693). Newmont, however, relied upon a SO<sub>2</sub> to SO<sub>3</sub> conversion rate of 0.7 that came from AP-42, a document that was never intended to be utilized to formulate BACT emission limitations. (Tr. at 1708-09). Newmont has encountered problems meeting this limit. (*Id.*).

**b. SAM Emissions Data and Test Methods**

At the time EPD made its BACT determination for the Longleaf facility, there was little, if any, available data concerning SAM emissions from coal-fired power plants that the agency could review to confirm that permit limits could be achieved. (Tr. at 1046-47 (Dr. Fox testifying that there is limited accurate test data on SAM emissions, and what information is available is confidential), 2249, 2615).

Problems with accuracy are known to exist with the available test methods for SAM emissions from coal-fired power plants. (*See* Tr. at 1048, 3372-73). The most widely accepted, EPA-approved test method for SAM is Method 8. (Tr. at 692, 1704, 3373). Method 8, however, is known to produce inaccurate results. (Tr. at 1048, 3373). In particular, Method 8 is known to produce erroneously high readings, because some of the SO<sub>3</sub> that was not converted to SAM in the boiler or the scrubber vessel can condense into SAM in the testing equipment. (Tr. at 703, 1706). Despite its inaccuracies, Method 8 remains generally accepted across the country, and continues to be approved by EPA. (Tr. at 1704, 3373). EPD continues to utilize Method 8 because it allows for comparison with other permits that use also Method 8. (Tr. at 1704, 3373).

Dr. Fox testified regarding two other test methods for SAM: CCS, or controlled condensation; and “E.on.” Neither of these methods have been approved by EPA. (Tr. at 1048-49). Dr. Fox and others agree that the accuracy of CCS is “notoriously uncertain.” It can

produce results that are only accurate to plus or minus 50%. (See Tr. at 1049, 2845; Ex. P-116-2 at 3).

### **3. Petitioners' Proposed SAM Emission Limitation**

In their Amended Petition, Petitioners contend that the SAM BACT emission limitation in the Permit should be 0.0015 lb/MMBtu on a 3-hour average. (First Amended Petition at ¶ 160). Petitioners' expert, Dr. Fox, testified that she believed the SAM BACT emission limitation for the Longleaf facility should be 0.001 lb/MMBtu. (Tr. at 702). Dr. Fox did not rely on any test data to reach this conclusions. (Tr. at 907). Instead, she relied exclusively on other permit limits and her own computer spreadsheet to compute what she believed to be the appropriate BACT emission limitation for SAM. (Tr. at 953).

Dr. Fox relied on a Southern Company paper entitled "Estimating Total Sulfuric Acid Emissions from Stationary Power Plants: Revision 3," for the removal efficiencies that she used in her emission limitation calculations. (Tr. at 196). The paper states that the uncertainty in its data could be as high as plus or minus 50%. (Tr. at 1047-48; Ex. P. 116-2 at 3). The test data recorded in this paper was measured using an inaccurate test method that underpredicts SAM emissions. (Tr. at 2846). Finally, Dr. Fox's calculations did not include a margin of compliance. (*Id.*).

## **G. ADDITIONAL IMPACTS ANALYSIS**

### **1. EPD's Additional Impact Analysis**

As part of its additional impacts analysis, EPD relied on the results of Longleaf's computerized air dispersion modeling report to conclude that "there should not be any discernible effects on vegetation and soils" due to emissions from the Longleaf facility. (EPD File Ex. 84 at 192). Specifically, the agency relied on the fact that the operation of the Longleaf

facility will not threaten or exceed any applicable ambient air standards. EPD reasoned as follows:

One indicator of potential vegetation and soils effects is a comparison of predicted ambient concentrations with ambient air quality standards. Of most significance here is the fact that secondary NAAQS were established to prevent adverse “welfare” effects such as direct damage to vegetation and harmful contamination of soils. In light of the fact that it has been shown that the operation of the Longleaf Energy Facility will not threaten or exceed any ambient standard at any location, there should not be any discernible effects on vegetation and soils.

(EPD File Ex. 84 at 192).

In determining that the Longleaf facility would not have an adverse impact to vegetation and soils, EPD also relied on the fact that the highest predicted impacts from the Longleaf facility were below the screening threshold for sensitive vegetation set forth in EPA’s “A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals.” (EPD File Ex. 84 at 192). In addition to its soils and vegetation impacts analysis, EPD reviewed Longleaf’s Class I and Class II visibility impacts analyses and concluded that the facility would not have adverse impacts on visibility. (EPD File Ex. 84 at 181-87; Tr. at 1623-24, 3235).

## **2. Longleaf’s Air Dispersion Modeling**

Longleaf utilized the EPA-approved<sup>28</sup> model for stationary sources, the Industrial Source Complex Short-Term model (“ISCST3”), to conduct its computerized air dispersion modeling. (EPD File Ex. 1 at 6). The parameters for this model were submitted to EPD in Longleaf’s Class II modeling protocol. (EPD File Ex. 1). Subject to several minor changes, EPD approved Longleaf’s modeling protocol. (EPD File Ex. 2).

Longleaf used five years of meteorological data, consisting of more than 40,000 weather records, to predict pollutant concentrations at over 10,000 receptor sites surrounding the

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<sup>28</sup> At the time Longleaf submitted its modeling protocol and PSD permit application, the recommended EPA model was ISC3. *See* 40 C.F.R. § 51, Appendix W, Appendix A (July 1, 2005). Since that time, EPA has developed and issued a new model, AERMOD, to take the place of the ISC3 model. *See* 70 Fed. Reg. 68218 (Nov. 9, 2005).

Longleaf facility. (Tr. at 1934). The receptor sites covered an area of 2,500 square miles. (*Id.*). At each receptor site, the five years of meteorological data produced over 14,000 predicted 3-hour emission concentrations, or “events.” (Tr. at 3806). In sum, Longleaf’s model generated over 140,000,000 3-hour concentrations from which ambient air impacts could be evaluated. (Tr. at 3806-07).

**a. Model Inputs**

Longleaf ran its model at two different SO<sub>2</sub> emission rates: (1) 0.12 lb/MMBtu, which corresponds to the highest allowable SO<sub>2</sub> emission rate under the Permit; and (2) 0.26 lb/MMBtu. (EPD File Ex. 49 at 2; Tr. at 1933-34). Longleaf’s model included allowable emissions from roughly 100 other sources in the vicinity of the Longleaf facility. (Tr. at 1939). These other sources included Georgia-Pacific’s paper mill, which is located approximately five miles from the Longleaf site. (Tr. at 1939).

To account for non-modeled sources of SO<sub>2</sub> emissions, Longleaf’s model also included a background 3-hour SO<sub>2</sub> concentration of 68 µg/m<sup>3</sup>. (Tr. at 1943). The background SO<sub>2</sub> concentration represents the ambient 3-hour SO<sub>2</sub> concentration recorded at the EPD’s Columbus, Georgia ambient air monitor. (Tr. at 2880). The highest ambient 3-hour SO<sub>2</sub> concentration recorded at any of EPD’s ambient air monitors across Georgia is less than 200 µg/m<sup>3</sup>. (Tr. at 2880-81).

Under Georgia law, pre-construction monitoring may be required in certain circumstances prior to the issuance of a permit. GA. COMP. R. & REGS. r. 391-3-1-.02(7)(b)10 (adopting 40 C.F.R. 52.21(m) by reference). Rather than require Longleaf to conduct pre-construction monitoring, EPD instructed Longleaf to rely on ambient 3-hour SO<sub>2</sub> concentrations recorded at the nearest monitor in Georgia’s ambient air monitoring network. (Tr. at 2878). In response to comments made during a public meeting on the Longleaf project in January 2006,

however, Longleaf agreed to voluntarily conduct a year of ambient monitoring for several pollutants in Early County beginning at least one year before the Longleaf facility commences operation and continuing for at least two years after the facility begins operations. (Tr. at 1506-07).

**b. Analysis of Model Results**

**i. Compliance with Ambient Air Standards**

Longleaf's modeling results demonstrated that the Longleaf facility will comply with all applicable ambient air standards, including the secondary 3-hour NAAQS for SO<sub>2</sub>. (EPD File Ex. 84 at 192). To demonstrate compliance with the secondary 3-hour NAAQS for SO<sub>2</sub>, Longleaf compared the second-highest cumulative three-hour SO<sub>2</sub> concentration predicted by the model with the secondary NAAQS. (EPD File Ex. 8 at 6-3; EPD File Ex. 49 at 5). *See* 40 C.F.R. § 50.5(c) (requiring the applicant to report the second-highest value to determine compliance with the NAAQS due to the fact that one exceedance per year is allowed before the impacts are in non-compliance with the NAAQS). The second-highest 3-hour SO<sub>2</sub> concentration predicted at any receptor site at any time with the five years of meteorological data was 1,094 µg/m<sup>3</sup>. This 1,094 µg/m<sup>3</sup> value consists of a modeled result of 1,026 µg/m<sup>3</sup> plus the non-modeled background value of 68 µg/m<sup>3</sup>. (*See* EPD File Ex. 49 at 5).

The model results indicate that the Longleaf facility will not have a predicted impact at the receptor site that recorded the 1,026 µg/m<sup>3</sup> value. Instead, this value was the product of SO<sub>2</sub> emissions from other modeled sources, such as the Georgia-Pacific's paper mill. This conclusion is confirmed by the fact that the 1,026 µg/m<sup>3</sup> value remained constant as Longleaf's SO<sub>2</sub> emission rates and capacity factors changed. (Tr. at 1946-47). The 1,094 µg/m<sup>3</sup> value is less than the applicable 3-hour SO<sub>2</sub> secondary NAAQS of 1300 µg/m<sup>3</sup> as well as the equivalent

Georgia ambient air standard. *See* 40 C.F.R. § 50.5(a); GA. COMP. R. & REGS. r. 391-3-1-.02(4)(b)1.

**ii. Compliance with EPA’s Screening Threshold**

In a guidance document entitled “A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals,” EPA established a 3-hour SO<sub>2</sub> screening threshold for sensitive vegetation of 786 µg/m<sup>3</sup>. (EPD File Ex. 655 at 14). This threshold was explicitly established “to aid in determining whether emission are significant or whether there are significant air quality impacts under [40 C.F.R. § 52.21(o)].” (*Id.* at 2).

The highest 3-hour SO<sub>2</sub> concentration for the Longleaf facility at an emission rate of 0.12 lb/MMBtu per hour was 97.4 µg/m<sup>3</sup>. (EPD File Ex. 84 at 192). At that particular receptor site and period, there were no other impacts predicted from other sources. When added to the non-modeled background value of 68 µg/m<sup>3</sup>, the total source impact is 165.4 µg/m<sup>3</sup>, which is considerably lower than EPA’s screening threshold. (*See* EPD File Ex. 655 at 14).

The highest 3-hour SO<sub>2</sub> concentration predicted for the Longleaf facility at an SO<sub>2</sub> emission rate of 0.26 lb/MMBtu was 210 µg/m<sup>3</sup>. At that particular receptor site and period, there were no other impacts predicted from other sources. When added to the non-modeled background value of 68 µg/m<sup>3</sup>, the total source impact is 278 µg/m<sup>3</sup>, which is considerably less than EPA’s screening threshold. (Tr. at 1950-51). Even if the highest non-modeled background concentration at any ambient air monitoring station in Georgia is added to the 210 µg/m<sup>3</sup>, the resulting value of approximately 410 µg/m<sup>3</sup> is still less than EPA’s screening threshold. (*See* Tr. at 2886).

Petitioners’ modeling expert, Mr. Tran, searched all 140,000,000 3-hour SO<sub>2</sub> cumulative concentrations predicted by Longleaf’s model (i.e., impacts from Longleaf plus other modeled sources plus non-modeled background) that were greater than 568 µg/m<sup>3</sup>, and Longleaf’s

contribution was greater than or equal to  $1 \mu\text{g}/\text{m}^3$ . Mr. Tran's search produced a total of 7 events where the cumulative 3-hour  $\text{SO}_2$  concentration was predicted to exceed EPA's  $786 \mu\text{g}/\text{m}^3$  screening threshold. (Ex. PR-50). For 5 of these 7 events, Longleaf's predicted contribution was less than  $25 \mu\text{g}/\text{m}^3 \text{SO}_2$ . (Ex. PR-50). Longleaf's modeled emission rate during all 5 of these events was 0.26 lb/MMBtu  $\text{SO}_2$ . (Tr. at 3805).

### **iii. Emissions from Georgia-Pacific's Paper Mill**

At the time Longleaf ran its computerized air dispersion model, the Georgia-Pacific facility's allowable annual  $\text{SO}_2$  emissions totaled approximately 38,000 tons of  $\text{SO}_2$ . This allowable annual  $\text{SO}_2$  emission level was used in all of the Longleaf modeling results that were discussed during the hearing. (Tr. at 3810-11). In the Spring of 2007, EPD issued Georgia-Pacific a new Title V Operating permit which reduced the facility's allowable annual  $\text{SO}_2$  emissions by approximately 15,000 tons of  $\text{SO}_2$ . (Ex. I-96; Ex. I-97; Tr. at 3793-94).

As Mr. McCann testified, these reductions in Georgia-Pacific's allowable emissions would reduce the 3-hour  $\text{SO}_2$  concentrations reported for those receptors impacted by that source by 20 to 30 percent or more. (Tr. at 3812-13). Petitioners did not refute or contradict Mr. McCann's testimony.

## **III. CONCLUSIONS OF LAW**

The hearing in this matter was de novo in nature. The evidence was not limited to the evidence presented to or considered by the referring agency. GA. COMP. R. & REGS. r. 616-1-2-.21(3).

Petitioners bear the burden of proof in this challenge to EPD's issuance of the permit to Longleaf. GA. COMP. R. & REGS. r. 616-1-2-.07(1)(b) (noting that "[a]ny party challenging the issuance ... of a license who is not the licensee shall bear the burden [of proof]"). Petitioners' burden must be carried by the preponderance of the evidence. GA. COMP. R. & REGS. r. 616-1-2-

.21(4) (“[T]he standard of proof on all issues in a hearing shall be a preponderance of the evidence.”).

Petitioners must show by a preponderance of the evidence that the Director’s exercise of her authority in issuing the Longleaf permit pursuant to O.C.G.A. § 12-9-7(a) was unlawful or unreasonable, as the statute provides that an applicant that meets the statutory and regulatory standards is entitled to a permit. *See* O.C.G.A. § 12-9-7(a) (providing that “[a] permit shall be issued to an applicant on evidence satisfactory to the director of compliance with this article and any standards, limitations, requirements or rules and regulations pursuant to this article”).

The BACT determinations that are the basis of the Permit limits necessarily require an exercise of discretion and judgment, which calls upon the agency’s technical knowledge. Thus, even if this Tribunal concluded that reasonable persons could disagree as to what constitutes BACT for the Longleaf facility, the Director’s determinations should be affirmed if they are within the scope of her authority, constitute a reasonable exercise of her discretion, and satisfy the requirements of the law. This Tribunal should not substitute its equally reasonable determination for the Director’s reasonable determination. Nor should it substitute another expert’s reasonable determination for the Director’s reasonable determination. *See In Re City of Cornelia*, Case No. OSAH-DNR-EPD-WQ-AH 11-95, 1996 Ga. ENV LEXIS 18, at \*16-17 (OSAH June 26, 1996) (“An ALJ is required to make an independent determination as to what the facts are, but so long as the Director exercises his authority in a lawful and reasonable manner, an ALJ has no authority to substitute the ALJ’s judgment for the Director’s judgment . . .”). *See also In re: Indeck-Elwood, LLC*, 2006 EPA App. LEXIS 44, at \*91 (Sept. 27, 2006) (finding that where the permit issuer’s decision was reasonable and there is a bona fide

difference of expert opinion or judgment on technical issues the EAB will defer to the permit issuer).

#### **A. PSD PERMITTING IN GEORGIA**

Georgia law requires all air pollution sources to obtain permits from EPD before commencing construction and operation. *See* O.C.G.A. § 12-9-7(a). EPD administers its permitting program through rules and regulations adopted by the Georgia Board of Natural Resources. The rules governing air quality control are located in Chapter 391-3-1. *See generally* GA. COMP. R & REGS. r. 391-3-1-.01, *et seq.* These rules list specific requirements for various types of air permits depending on the air quality in the area of the source (i.e., whether the source is located in an area that is in “attainment” or “nonattainment” of applicable National Ambient Air Quality Standards (“NAAQS”)), and on the potential air pollution emission rates from the source. *See generally* GA. COMP. R. & REGS. r. 391-3-1-.02 (providing specific emission limitations and standards). Early County, the site of Longleaf’s proposed coal-fired facility, lies in an “attainment area” for all regulated pollutants. This means that the air quality in the area is in compliance with state and federal air quality standards. *See* 40 C.F.R. § 81.311.

The federal Clean Air Act (“CAA”), 42 U.S.C. § 7401, *et seq.*, requires states to adopt regulatory programs for issuing a certain type of construction permit to major air pollution sources located in attainment areas. This permit is known as a “Prevention of Significant Deterioration” or “PSD” permit, because it is designed to prevent significant deterioration of air quality in areas that are currently meeting NAAQS. *See* 42 U.S.C. § 7470(1). Georgia has adopted a regulatory program for PSD permits, which the United States Environmental Protection Agency (“EPA”) has approved as part of Georgia’s State Implementation Plan (“SIP”). *See* 40 C.F.R. § 52.572. Therefore, in Georgia, the Director of EPD issues PSD permits

to qualifying sources pursuant to Georgia's rules. *See* GA. COMP. R. & REGS. r. 391-3-1-.02(7) (providing rules for the prevention of significant deterioration of air quality).

PSD permits require a number of demonstrations and conditions to ensure protection of national ambient air quality standards, or NAAQS, and to restrict future air quality degradation. *See* 42 U.S.C. § 7475(a)(3) (listing requirements for PSD permit applicants). All new major air pollution sources must use best available control technology (“BACT”) for each pollutant regulated under EPA’s New Source Review (“NSR”) program. *See* 42 U.S.C. § 7475(a)(4); 40 C.F.R. § 52.21(j)(2) (“A new major stationary source shall apply best available control technology for each regulated NSR pollutant that it would have the potential to emit in significant amounts.”) (incorporated by reference in GA. COMP. R. & REGS r. 391-3-1-.02(7)(b)7). BACT is defined as follows:

[A]n emissions 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 Administrator, 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.

40 C.F.R. § 52.21(b)(12); GA. COMP. R. & REGS. r. 391-3-1-.02(7)(a)2 (incorporating 40 C.F.R. § 52.21(b) by reference).

As the regulation notes, BACT is a case-by-case analysis. The applicant is proposing a particular project, with particular equipment, at a particular site. The BACT analysis must take all of the project-specific information into account. Permit decisions for other facilities may be helpful in conducting a BACT analysis, but the specific information pertaining to those facilities

must be scrutinized in order to determine whether and to what extent the emissions limitations in those permit decisions are comparable to the project under consideration. (Tr. at 2605-07).

The case-by-case analysis requires weighing the project-specific information and factors required by the regulations, and making a regulatory decision. This is a much different process than when EPA sets a national standard for emissions, which is not case-by-case, but universally applied. (Tr. at 3184).

As Petitioners' own expert, Dr. Fox, testified, because the application of BACT requires a case-by-case analysis of project-specific information and factors, it is unusual to find two facilities with exactly the same emissions limitations. (Tr. at 866-868). Some of the project-specific facts and considerations that may make a permit decision at another facility more or less comparable to the project under consideration include: equipment, fuels, the site, and proximity to Class I areas, available PSD increment, and availability of resources such as water. (Tr. at 2605-2613).

A BACT analysis also requires the applicant and permitting agency to consider how the various technologies work together, given the project-specific fuels, geographic site, air pollution control, et cetera. In the context of BACT, a limit is achievable if the facility is able to meet that limit all the time, over the life of the facility, over every compliance averaging period, taking into account any reasonable operating scenario. (Tr. at 2604-06, 2613-14).

While BACT is defined as a "maximum degree of reduction," the definition qualifies that phrase by providing that such reduction must be "achievable." 40 C.F.R. § 52.21(b)(12). Thus, a fundamental component of any BACT analysis is determining whether a proposed emission limitation is "achievable." (Tr. at 2604).

A BACT analysis is not a process of finding the lowest limit ever imposed in any permit anywhere on each pollutant of concern and plugging those limits into the permit. As EPA's Environmental Appeals Board ("EAB") has explained:

When the [EPA] Region prescribes an emissions limit representing BACT, the limitation does not necessarily reflect the highest possible control efficiency achievable by the technology on which the emissions limitation is based. Rather, the Region has discretion to base the emissions limitation on a control efficiency that is somewhat lower than the optimal level. There are several different reasons why a permitting authority might choose to do this. One reason is that the control efficiency achievable through the use of the technology may fluctuate, so that it would not always achieve its optimal control efficiency. In that case, setting the emissions limitation to reflect the highest control efficiency would make violations of the permit unavoidable. Another possible reason is that the technology itself, or its application to the type of facility in question, may be relatively unproven. To account for these possibilities, a permitting authority must be allowed a certain degree of discretion to set the emissions limitation at a level that does not necessarily reflect the highest possible control efficiency, but will allow the permittee to achieve compliance consistently.

*In re Masonite Corporation*, 5 E.A.D. 551, 560-561, 1994 EPA App. LEXIS 36, at \*24-26 (Nov. 1, 1994) (internal citations omitted); *see also In re Prairie State Generating Co.*, 13 E.A.D. \_\_\_, slip op. at 30, 2006 EPA App. LEXIS 38, at \*138-42 (Aug. 24, 2006). Given the very severe consequences that can ensue from a failure to comply with the emissions limitations, it is important that the permit include emissions limitations that the permittee is able to meet at all times, without violation. *See, e.g.*, O.C.G.A. § 12-9-23 (civil penalties); O.C.G.A. § 12-9-12 (injunctive relief); O.C.G.A. § 12-9-13 (enforcement); O.C.G.A. § 12-9-22 (noncompliance penalties); O.C.G.A. § 12-9-24 (criminal penalties).

### **1. Margin of Compliance/Safety Factor**

In setting emissions limitations under a BACT analysis, it is appropriate for the agency to include a "margin of compliance" or "safety factor." (Tr. at 874, 2616-19, 3184-85). There are three primary reasons why a margin of compliance must be taken into account when setting a BACT emissions limitation: (1) the uncertainty as to how the facility and its complex pollution

control equipment will function in practice once constructed; (2) the inaccuracy of the equipment and methods employed for measuring emissions; and (3) the variability that is inevitable in the operation of the facility. (Tr. at 2617-19). EPA and other state agencies routinely include a margin of compliance or safety factor in setting BACT emissions limits. (Tr. at 2621-22).

EAB decisions have recognized that use of a safety factor is appropriate in setting emissions limitations under BACT. The EAB has made clear that a proper interpretation of the phrase “maximum degree of reduction” that is “achievable” includes a safety factor:

In particular, we have approved the use of a so-called “safety factor” in the calculation of the permit limit to take into account variability and fluctuation in expected performance of the pollution control methods. As we noted in *Masonite*, where the technology’s efficiency at controlling pollutant emissions is known to fluctuate, “setting the emissions limitation to reflect the highest control efficiency would make violations of the permit unavoidable.”

*In re Newmont Nevada Energy Inv., LLC*, 12 E.A.D. \_\_\_, slip op. at 18, 2005 EPA App. LEXIS 29, at \*35-36 (Dec. 21, 2005) (internal citations omitted).

Thus, the “maximum degree of reduction” must be considered in light of the level of reduction that can be sustained at all times, rather than a consideration of the absolute maximum. Additionally, as the EAB has held, the discretion to make this determination must reside with the permit writer — in this case EPD.

In applying the margin of compliance or safety factor, there is no formulaic calculation. In this case, EPD used its judgment and experience to set the limits to include a safety factor. (Tr. at 2623).

Because the emissions limitations must be established at a level that can be met at all times throughout the life of the project, and therefore should include an adequate margin of compliance or safety factor, it necessarily follows that the actual emissions from a facility will be less than the permit limits. (Tr. at 3185).

## **2. Consideration of Energy, Environmental, and Economic Impacts**

BACT is distinguishable from other legal standards governing emission limitations due to its explicit requirement that applicants and permitting authorities take into account energy, environmental, economic impacts and other costs when determining what emission reductions are achievable at a particular facility. In contrast, the Lowest Achievable Emission Rate (“LAER”) is a legal standard that governs permit limits for new or modified sources constructed in nonattainment areas. 42 U.S.C. § 7503(a)(2). LAER is defined as the “most stringent emissions limitation which is contained in the [SIP] of any state .... or ... which is achieved in practice by such class or category of stationary sources.” 40 C.F.R. § 51.165(a)(1)(xiii)(A) & (B). Importantly, LAER, unlike BACT, does not allow applicants or permitting authorities to take economic, environmental or energy factors into account when setting emission rates. *Compare* 42 U.S.C. § 7503 (a)(2), *with* 42 U.S.C. §§ 7475(a)(4) & 7479(3).

### **B. THE SCOPE OF A BACT ANALYSIS**

#### **1. The “Top-Down” Approach**

EPD generally follows a “top-down” approach in performing a BACT analysis. (Tr. at 2591). Early in the permitting process for this facility, EPD directed Longleaf to perform a top-down BACT analysis and resubmit the permit application. (EPD File Ex. 860). As directed, Longleaf’s application included a top-down analysis for each pollutant at issue here. (EPD File Ex. 12, Appendix D; EPD File Ex. 48, Appendices Da & Db). EPD has described the five-step top-down process as follows: determining the available control technologies; determining what technologies are feasible; ranking those technologies; evaluating the energy, economic and environmental impacts of those technologies; and then selecting the best available control technology. (Tr. at 2698).

Nothing in the Clean Air Act or the regulations mandates the top-down analysis. *Alaska Dep't of Environmental Conservation v. Environmental Protection Agency*, 540 U.S. 461, 476 n.7 (2004). However, permitting agencies frequently use the top-down approach. *Id.*

## **2. The Process**

In performing a BACT analysis, EPD starts with the application and the applicant's top-down BACT analysis. The agency does not depend entirely on the information contained in the application, but reviews other sources of information that are relevant to the project in question. (Tr. at 2583-84, 2708-09). EPD's role in the BACT process is to review the application, request additional information if needed, and then to set the BACT emission limits. (Tr. at 2061).

EPD reasonably assumes that the information submitted by an applicant is true and correct. The PSD application includes a statement that the application contains accurate and complete information. (EPD File Ex. 10 ("This application is...complete and correct.")). There are legal sanctions, including revocation, suspension or modification, that may be imposed upon a permittee for obtaining a permit by misrepresentation or for failing to disclose fully all relevant facts. GA. COMP. R. & REGS. r. 391-3-1-.03(3)(a)3. The Longleaf Permit notes on its face that it may be revoked, suspended or modified for any misrepresentation in the application or supporting data. (EPD File Ex. 104).

## **3. Use of the Draft NSR Manual**

EPD referred to the Draft New Source Review Workshop Manual ("Draft NSR Manual") in performing the BACT analysis for the Permit. (EPD File Ex. 84 at 8-9). The Draft NSR Manual is a compilation of then-existing EPA guidance documents that was put together in 1990 in draft form – but never finalized. (Tr. at 2597-98). EPD uses the Draft NSR Manual as guidance, but it is not binding on EPD. (Tr. at 2598).

As the Preface to the Draft NSR Manual states, the document “is not intended to be an official statement of policies and standards and does not establish binding regulatory requirements; such requirements are contained in the regulations and approved state implementation plans.” Moreover, the document notes that it “does not necessarily describe the specific requirements in those areas where the PSD program is conducted under a state implementation process which has been developed and approved in accordance with 40 CFR [§] 51.166.” Draft NSR Manual at 1.

As the EAB has repeatedly held, because the Draft NSR Manual is guidance, PSD permitting decisions will not be overturned because of a permitting authority’s failure to strictly apply the contents of the Draft NSR Manual. *In re Indeck-Elwood, LLC*, 13 EAD \_\_\_, 2006 EPA App. LEXIS 44, at \*89 (Sept. 27, 2006) (“As we have explained in other cases, given that the [Draft] NSR Manual is guidance, we will not find a PSD permit deficient “simply because the permitting authority deviated from the [Draft] NSR Manual.”) (citing *In re Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, at n.14, 1999 EPA App. LEXIS 2, at \*22 n.14 (Feb. 4, 1999)); *In re Prairie State Generating Co.*, 13 EAD \_\_\_, slip op. at 16, 2006 EPA App. LEXIS 38, at \*31 (stating that “the [Draft] NSR Manual is not a binding Agency regulation and, as such, strict application of the methodology described in the [Draft] NSR Manual is not mandatory”).

Even if the Draft NSR Manual were binding on EPA, it would not be legally binding on EPD, because it has not been adopted as a rule by the Georgia Board of Natural Resources. *See In re Olin Corp.*, No. DNR-EPD-HW-AH 4-92, 1993 Ga. ENV LEXIS 27, at \*3-4 (Ga. Bd. Nat. Res. July 28, 1993). Accordingly, EPD is not bound by the Draft NSR Manual.

#### **4. Sources of Information for Determining BACT**

The Draft NSR Manual suggests that applicants and permitting authorities may consult various sources of information in order to identify all “demonstrated and potentially applicable”

control technology alternatives. Those recommended sources include EPA's BACT/LAER Clearinghouse;<sup>29</sup> BACT Guideline from the South Coast Air Quality Management District; control technology vendors; federal/state/local new source review permits and associated inspection/performance test reports; environmental consultants; technical journals, reports and newsletters, air pollution control seminars; and EPA's NSR bulletin board. Draft NSR Manual at B. 11.

**a. Other Permits**

In making BACT determinations, EPD uses the Draft NSR Manual but also looks to other sources of guidance, such as permit decisions, EAB decisions, EPA guidance documents, and EPA comment letters on draft permits. (Tr. at 2598-2600).

In the view of EPD permitting officials, EPA permits and memos are more helpful as guidance than the Draft NSR Manual because, unlike the Draft NSR Manual, the permit decisions address specific projects and real situations, rather than hypotheticals. (Tr. at 2599-2600). In addition, the permit decisions are contemporary or recent, unlike the Draft NSR Manual, which is now 17 years old. (*Id.*).

When establishing BACT limits, the critical question is what emissions limitations the proposed source can achieve on a consistent basis. (Tr. at 874). In addition to the sources mentioned in the Draft NSR Manual, information about other similar sources can provide information that is relevant to the inquiry of what is achievable. (Tr. at 2709).

Recent EPA permit decisions setting emissions limitations for similar projects are very helpful to EPD in setting BACT limits, because those permitting decisions explain EPA's

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<sup>29</sup> The BACT/LAER Clearinghouse is currently referred to as the RACT/BACT/LAER Clearinghouse. "RACT/BACT/LAER" is translated as "Reasonably Available Control Technology/Best Available Control Technology/Lowest Achievable Emission Rate." Each of these acronyms refers to technological standards established under different sections of the Clean Air Act. The Clearinghouse contains information on recently permitted facilities.

reasoning in conducting the BACT analysis and setting permit limits. (Tr. at 2599-2600). In performing BACT analyses, EPD also reviews decisions rendered by the EAB in analogous permit appeals. (Tr. at 2598-2600). Additionally, EPD uses permit decisions of other state agencies on similar projects as guidance in making its PSD permit decisions. (EPD File Ex. 108). EPD also considers pending applications for permits for other similar facilities, including those reported in the EPA National Coal-Fired Power Plant Spreadsheet, as a good source of information as to what other applicants believe would be achievable permit limits. (Tr. at 2759-60).

In this case, EPD compared the Longleaf emissions limitations to those in other PSD permits for coal-fired power plants. (Tr. at 2736-37). When comparing to other permits, it was important to understand the details concerning the other permits to be sure that the agency was comparing “apples to apples.” Various project-specific facts — such as fuel type, equipment, monitoring requirements, proximity to Class I areas — all have an impact on the permit limit and influence whether that limit is comparable to a proposed emissions limitation at the Longleaf facility, given its specific parameters. (Tr. at 2736-37). EPD considered a number of analogous permits in setting the BACT limits for Longleaf. (Tr. at 2738).

**b. Vendor Literature and Guarantees**

The Draft NSR Manual suggests that applicants and permitting authorities may also consult information published by control technology vendors as evidence of what a given set of pollution control technologies may achieve. *See* Draft NSR Manual at B.11. Vendor brochures, articles and other descriptions that are not tied to an enforceable contractual commitment are of limited value. Such vendor information may provide helpful information concerning available technology, but it must be regarded with caution, as it is generated for the purpose of promoting

a product or a service, and the vendor has an interest in extolling the virtues of the product or process.

In contrast, a vendor guarantee is a contract between the manufacturer and the permit holder to guarantee a specific emission rate. Any such contract comes with specifications concerning operating conditions and other conditions, as negotiated between the manufacturer and the permittee. (Tr. at 2734-35). Vendor guarantees are of limited use in setting emission limits. Vendor guarantees are typically available and reliable when an applicant plans to use an “off-the-shelf” or manufactured piece of equipment, such as a natural gas-fired combustion turbine. (Tr. at 3202).

In the case of a coal-fired power plant, the pollution control equipment may cost \$50-100 million, and there may be several different vendors of the different elements of the pollution control equipment. In Longleaf’s case, the total cost of the pollution control equipment is estimated at \$400 million. With such a considerable investment at stake, the vendor guarantee takes a long time to get, and generally it cannot be obtained until after the permit is issued. (Tr. at 1461-62, 3200-3202). With an “engineer, procure, and construct” (“EPC”) contract for a large complex facility like a coal-fired power plant, the vendor guarantee is typically for the entire unit, rather than individual guarantees for specific pieces of equipment that make up the unit. (Tr. at 1459-60, 1461-62).

Where a vendor guarantee can be obtained, it is a performance guarantee, not a warranty. The guarantee is valid until the facility is up and running and performance to the guaranteed limits has been demonstrated. Typically, the guarantee lasts only 30 days after the performance demonstration. Thus, a vendor guarantee does not guarantee that the equipment will meet a specified emissions limitation over the life of the project. (Tr. at 3200-02). Vendor guarantees

are sometimes used by applicants in their efforts to convince a permitting agency that a particular emissions limit is *not* achievable, because the vendor guarantee is for a higher limit. (Tr. at 2736, 3200-02).

Based on past permitting experience, EPD understands the limited value that vendor guarantees have in setting permit limits. One of EPD's witnesses described an example of a facility where the applicant relied on a vendor guarantee to determine its BACT limits. After the facility was built, it was tested and failed to comply with one of the permit limits. (Tr. at 2690).

**c. CEMS Data and Stack Test Data**

CEMS data has limited value to an applicant or permitting agency seeking to set a BACT emission limitation. (Tr. at 3203). CEMS data is merely a snapshot in time of how that source is operating in terms of its emissions at that particular time. (Tr. at 3308-3310). While CEMS data can provide some information about what is achievable, it is limited information. CEMS data should not be used as the sole basis to set an emission limit in another facility.

The EAB has recognized that CEMS data is not necessarily a proper determinant of BACT emission limitations:

Thus, we have long recognized that permit writers must retain discretion to set BACT levels that “do not necessarily reflect the highest possible control efficiencies but, rather, will allow permittees to achieve compliance on a consistent basis.” . . . More generally, we have recognized a “distinction between, on the one hand, measured ‘emission rates,’ which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the ‘emissions limitation’ determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility’s life.”

*In re: Prairie State Generating Co.*, 13 E.A.D. \_\_\_, slip op. at 71, 2006 EPA App. LEXIS 38, at \*138-39 (internal citations omitted).

CEMS data at a facility should always be below the applicable permit limit because an operating facility must emit less than its permit limits. Accordingly, CEMS data showing actual

emissions, at a given facility, should not be used as a permit limit for another facility. (Tr. at 2718). In addition, CEMS data can suffer from inaccuracies, thus limiting its reliability. (Tr. at 2636).

Stack test data is another source of information. However, stack tests provide only a small sample of data. For example, an annual stack test generally will provide three hours of emissions data out of 8760 hours in a year – and often reflects only steady state operating conditions. (Tr. at 2619). Accordingly, stack test data does provide *some* evidence of what is achievable. However, care should be taken before extrapolating that data into an emission limit.

### **C. SULFUR DIOXIDE (SO<sub>2</sub>) EMISSION LIMITATION**

In Count II, Petitioners contend that the SO<sub>2</sub> emission limitations in the Permit do not represent BACT because EPD failed to consider all available control options for SO<sub>2</sub>. Specifically, Petitioners contend that EPD should have considered:

[S]upercritical boiler technology, sorbent injection plus a scrubber, a wet scrubber, different designs for wet scrubbers including Advatches's [sic] single contract absorber and double contract absorber, Almstom's Flowpac bulbing [sic] bed reactor, Chiyoda's CT-121 bubbling jet reactor, Cameruses's magnesium-enhanced limestone, Hitachi's advanced spray towers, methods to enhance performance such as organic acid additives, a wet scrubber followed by a dry scrubber, lower sulfur coals combined with a wet scrubber, clean fuels, and dry cooling, a comparison of subcritical, supercritical and ultra-supercritical pulverized coal technologies.

(First Amended Petition at ¶ 44).

In Count III, Petitioners maintain that the SO<sub>2</sub> emission limitations in the Permit do not represent BACT because EPD failed to properly analyze the economic, environmental and energy factors that EPD relied upon to justify the selection of a dry scrubber instead of a wet scrubber. (First Amended Petition at Count III).

In Count IV, Petitioners allege that the SO<sub>2</sub> emission limitations in the Permit do not represent BACT due to EPD's alleged failure to require the use of clean fuels. Specifically,

Petitioners maintain that the Permit should have only allowed the Longleaf facility to burn PRB coal. (First Amended Petition at Count IV).

Petitioners have failed to demonstrate by a preponderance of the evidence that the Permit's SO<sub>2</sub> emission limitations do not meet the requirements of BACT. As the evidence demonstrates, EPD established SO<sub>2</sub> emission limitations which it believes represent the maximum degree of reduction for SO<sub>2</sub>, taking into account energy, environmental, and economic impacts. Petitioners have failed to present sufficient evidence to prove that EPD's determination is not reasonable.

The Permit's three-tiered SO<sub>2</sub> emission limitation is as low as or lower than other permits that have been issued to similar facilities. The Permit's use of tiers, along with a scrubber inlet CEMS, is a stringent control that has been recognized by EPA and others as an appropriate way to ratchet down emission limits with changes in the sulfur content of the coal. (*See* Tr. at 1017-18, 3217-18; Ex. P-42, Attachment A at 5).

#### **1. EPD's Selected SO<sub>2</sub> Control Technology**

EPD selected a combination of pollution controls — low sulfur PRB and CAPP coal, dry scrubber in combination with a fabric filter baghouse — that will allow the maximum degree of reduction of SO<sub>2</sub> that is achievable for the Longleaf facility, taking into account energy, environment, and economic impacts.

EPD's SO<sub>2</sub> BACT determination was the product of a top-down analysis that included a review of the top SO<sub>2</sub> control techniques that were available for the Longleaf facility. (*See* EPD File Ex. 48, Appendices Da & Db; EPD File Ex. 84 at 42-63). The top SO<sub>2</sub> control technology, the wet scrubber, was rejected as BACT for the Longleaf facility based upon consideration of energy, economic and environmental impacts, including the excessive economic costs, increased

water consumption, and decreased ability to control HAPs and SAM as compared to a dry scrubber. (EPD File Ex. 48, Appendices Da & Db; EPD File Ex. 84 at 42-63).

## **2. EPD's SO<sub>2</sub> BACT Determination**

Petitioners contend that the Permit's SO<sub>2</sub> emission limitation does not represent BACT because EPD failed to consider certain control techniques, including various vendor-specific variations of a wet scrubber such as the Chiyoda CT-121 bubbling jet reactor and Cameruses' magnesium-enhanced limestone wet scrubber, as well as clean fuels. (First Amended Petition at ¶ 44). Petitioners have failed to present any legal or factual support for their contention that an applicant or reviewing agency *must* consider vendor-specific control technologies and performance claims when conducting a BACT analysis.

The evidence demonstrated that Longleaf identified and considered 10 different types of SO<sub>2</sub> control technologies, including variations of wet scrubbers that use limestone, lime, magnesium-enhanced lime, forced oxidation, and inhibited oxidation. (EPD File Ex. 48, Appendices Da at 1-4, Appendix Db at 1-4). More importantly, all parties agree that Longleaf accurately identified and ranked the best available control technologies, a wet and dry scrubber. (*See* Tr. at 428-29, 3056, 3251). Thus, EPD considered all available SO<sub>2</sub> control technologies, including various types of wet scrubbers.

EPD selected control efficiencies for the top two control efficiencies — wet and dry scrubbers — based on the agency's own review of regulatory decisions and performance data, as well as the agency's experience with wet scrubbers in Georgia. The reasonableness of EPD's selected control efficiencies — 92.7% for a dry scrubber and 95% for a wet scrubber — is supported by the evidence as well as applicable guidance.

The Draft NSR Manual does not advise applicants and permitting authorities to consider every possible level of control efficiency for a particular control technology. Specifically, the Draft NSR Manual provides as follows:

Many control techniques, including both add-on controls and inherently lower polluting processes can perform at a wide range of levels. Scrubbers, high and low efficiency electrostatic precipitators (ESPs), and low-VOC coatings are examples of just a few. *It is not the EPA's intention to require analysis of each possible level of efficiency for a control technique, as such an analysis would result in a large number of options.* Rather, the applicant should use the most recent regulatory decisions and performance data for identifying the emissions performance level(s) to be evaluated in all cases.

Draft NSR Manual at B.23 (emphasis added). Petitioners' expert, Dr. Fox, agreed that this passage stands for the proposition that when an applicant or permitting authority is confronted with a range of control efficiencies for a particular technology, it should not pick the highest number in that range. (Tr. at 901).

Petitioners have failed to demonstrate by a preponderance of the evidence that EPD's selected control efficiencies were unreasonable. Longleaf and EPD examined a wide range of control efficiencies for both wet and dry scrubbers. In accordance with the definition of BACT, EPD relied upon source-specific factors — in this case, fuel type — to conclude that the highest control efficiencies reported for a wet scrubbers would not be achievable for a facility, like Longleaf, that planned to burn low-sulfur PRB coal. EPD relied upon its own experience with wet scrubber performance in Georgia as well as its knowledge of the reported control efficiencies of other similar facilities to conclude that an achievable SO<sub>2</sub> control efficiency for a wet scrubber at the Longleaf facility would be 95%. (See EPD File Ex. 84 at 42-63; EPD File Ex. 48, Appendices Da & Db; Tr. at 3030, 3051-52, 3266-67).

Petitioners have similarly failed to demonstrate by a preponderance of the evidence that EPD's chosen SO<sub>2</sub> control efficiency for dry scrubbers was unreasonable. EPD's selected

control efficiency for purposes of the BACT analysis, 92.7%, is consistent with available data and regulatory decisions. (*See* Ex. P-21 at 2; Ex. P-46 at 2; Ex. P-27 at 6; Tr. at 3276). The maximum SO<sub>2</sub> control efficiency required by the Permit's three-tiered limit, 93.5%, lies at the top end of the range of control efficiencies that have been demonstrated for dry scrubbers. (*See id.*). Further, control efficiency required by the Permit is the same control efficiency that Petitioners themselves request in Count IV of their First Amended Petition. (*See* First Amended Petition at ¶ 131). In sum, the evidence demonstrates that EPD fully considered available regulatory decisions and performance data to select the SO<sub>2</sub> control efficiencies for wet and dry scrubbers.

Petitioners contend that EPD's review of top SO<sub>2</sub> control technologies was inadequate because the agency did not consider different types of boilers (i.e., subcritical, supercritical, and ultra-supercritical). (First Amended Petition at ¶ 44). EPD was not required to consider boiler type as a control technology in its BACT analysis. First, as Mr. Capp, Ms. Aponte, and Dr. Fox all testified, a boiler is not a pollution control technology. Rather, a boiler creates emissions. Accordingly, it was not improper for EPD to exclude the type of boiler from its BACT analysis.

Second, even if a boiler could be considered a control technology, differences between boiler types are immaterial where, as here, the permit limits each boiler by heat input, not power output. (EPD File Ex. 104 at Condition 2.17). As Mr. Kosky and Ms. French testified, if different boiler types operate at the permitted maximum design heat input of 6,139 lb/MMBtu, the boilers will all produce the same quantity of emissions. (Tr. at 1673-74, 3192-93, 3219). Accordingly, under the terms of the Permit, boiler type will not affect the overall quantity of emissions and therefore was properly excluded from consideration as a control technology.

### 3. EPD Considered and Required the Use of Clean Fuels

In Count IV of the First Amended Petition, Petitioners claim that the Permit's SO<sub>2</sub> emission limitation does not represent BACT because of the failure to *require* the use of clean fuels. Petitioners contend that the Permit should have required Longleaf to burn exclusively PRB coal. Petitioners have failed to demonstrate by a preponderance of the evidence that EPD's consideration of clean fuels, as well as the agency's required use of clean fuels in the Permit, was unreasonable.

The statutory definition of BACT in the Clean Air Act was amended in 1990, in part, to add the term "clean fuels" to the list of applicable methods, systems and techniques for achieving emission reductions that must be considered. *In re: Prairie State Generating Co.*, 13 E.A.D. \_\_\_, 2006 EPA App. LEXIS 38, at \*40 (citing Pub. L. No. 101-549, § 403(d), 104 Stat. 2399, 2631-32 (1990)). As amended, the definition provides that a BACT emission limitation must be based on the maximum emissions reduction achievable "through application of production processes and available methods, systems and techniques, including ... clean fuels" 42 U.S.C. § 7479(3). True to the plain language of the amendment, the EAB has held that an agency must consider the cleanliness of the fuels — i.e., sulfur and ash content — when making a BACT determination. *In re: Prairie State Generating Co.*, 13 E.A.D. \_\_\_, 2006 EPA App. LEXIS 38, at \*41.

Petitioners failed to demonstrate by a preponderance of the evidence that EPD failed to adequately consider clean fuels in accordance with the law. Petitioners have failed to present any evidence — other than two general statements by Dr. Fox that the Permit should only allow Longleaf to burn PRB coal — that EPD's consideration of clean fuels was inadequate. (Tr. at 686, 968).

EPD did consider and require the use of clean fuels for the Longleaf facility. (EPD File Ex. 84 at 42, 53). Both of the facility's primary fuel sources are low-sulfur coals: PRB and CAPP. (EPD File Ex. 104 at Condition 2.10). While the Permit does allow Longleaf the flexibility to use both PRB and CAPP coal, this fuel flexibility is based on reasonable economic and logistical factors that Longleaf clearly presented to EPD during the application process. (EPD File Ex. 48 at 1).

Further, to the extent the fuel sulfur content is permitted to fluctuate, the three-tiered SO<sub>2</sub> BACT emission limitation will ensure that a high level of removal efficiency must be achieved at all times. Thus, the fuel flexibility built into the Permit will not allow Longleaf to circumvent the maximum degree of SO<sub>2</sub> reduction that EPD determined was achievable for the facility. For these reasons, EPD's selection of low-sulfur PRB and CAPP coal was a reasonable application of the requirement to consider clean fuels as part of the agency's BACT determination.

#### **4. Collateral Impacts Analysis**

Petitioners contend that energy, environmental and economic considerations do not justify EPD's rejection of a wet scrubber as BACT for the Longleaf facility. Petitioners assert that in order to reject a top performing technology on the basis of collateral impacts, EPD must demonstrate that the impacts are unique to the facility. Petitioners further assert that the economic, environmental, and energy factors that EPD relied upon to reject a wet scrubber are neither adverse nor unique.

The evidence demonstrates that there are sufficient environmental and energy factors that support EPD's selection of a dry scrubber over a wet scrubber for the Longleaf facility. The evidence shows that wet scrubbers use more water, consume greater amounts of energy, emit a more visible steam plume, produce a less buoyant steam plume thus causing a great chance of

elevated near-field emission concentrations, produce more solid waste, generate more liquid waste, and capture SAM and HF at lower rates compared to a dry scrubber. All of these factors constitute real, adverse environmental or energy impacts that confirm the reasonableness of EPD's SO<sub>2</sub> control technology selection. EPD reasonably relied on recent permitting decisions, performance data, and its own technical expertise to conclude that the environmental and energy impacts of a wet scrubber compared to a dry scrubber were significant. (*See, e.g.*, EPD File Ex. 84 at 42-63).

As noted *supra*, Petitioners allege that EPD's analysis of the economic, environmental and energy impacts associated with a wet scrubber was flawed because EPD did not limit its analysis to unique, site-specific impacts. Petitioners cite no binding authority in support of this proposition. Rather, Petitioners rely on a statement contained in the Draft NSR Manual and EAB decisions which rely on that same statement. *See* Draft NSR Manual at B.29; *see also In re Kawaihae Cogeneration Project*, 7 E.A.D. 107, 117 (1997); *In re Columbia Gulf Transmission Co.*, 2 E.A.D. 824, 827 (1989); *In re World Color Press, Inc.*, 3 E.A.D. 474, 478 (Adm'r 1990). The Draft NSR Manual does not carry the force of law in Georgia. Deviations from the procedures outlined in the Draft NSR Manual cannot justify setting aside EPD's analysis of the economic, environmental and energy impacts of wet versus dry scrubbers. *See In re Indeck-Elwood*, 13 EAD \_\_\_, 2006 EPA App. LEXIS, at \*89 ("As we have explained in other cases, given that the [Draft] NSR Manual is guidance, we will not find a PSD permit deficient "simply because the permitting authority deviated from the [Draft] NSR Manual.").

**a. Environmental Impacts**

Even assuming, as Petitioners contend, that the Draft NSR Manual is binding upon EPD, the agency's SO<sub>2</sub> technology determination must still be upheld. Petitioners have failed to demonstrate by a preponderance of the evidence that there are no unique, site-specific

environmental or energy factors that would justify the selection of a wet scrubber over a dry scrubber.

The evidence demonstrated that unique, site-specific water supply constraints at the Longleaf site were raised during the comment period by the U.S. Department of the Interior – Fish and Wildlife Service, and relied upon by Longleaf to reject wet scrubbing. (EPD File Ex. 107 (March 12, 2007 letter at 3); EPD File Ex. 103 at 20). In particular, the Fish and Wildlife Service stated, “As you are well aware, water use in the Apalachicola-Chattahoochee-Flint River basin continues to be a critical natural resource issue, and a legally-sensitive one.” *Id.* While EPD itself did not specifically describe the water constraints at the Longleaf site, this issue was clearly raised during the comment period and relied upon by the applicant. As Petitioners’ own expert, Dr. Fox, testified, “true water shortages and water scarcity” could constitute a “site-specific impact” that would justify the elimination of a wet scrubber as BACT in favor of a dry scrubber. (Tr. at 461-62). *See also* Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28606, 28615 (May 18, 2005) (In the context of EPA’s Clean Air Mercury Rule, EPA concludes that best adequately demonstrated system of emission reduction for PRB coal-fired facilities where water availability is a concern is a dry scrubber followed by a fabric filter) (May 18, 2005).

Petitioners’ allegation that “[w]ater scarcity is simply not a constraint at this site” is not credible. (First Amended Petition at ¶ 63)). As an initial matter, Petitioners’ allegation is belied by Petitioners’ own comments during the water withdrawal permitting process, wherein Petitioners asserted that even modest reductions in river flow could have significant impacts on certain endangered and threatened species.. (Ex. I-64 at 5).

Further, contrary to Petitioners' assertion, water availability is a constraint at the Longleaf site. The water use at the Longleaf site was an issue at the outset of the Longleaf application process. (Tr. at 1447). This is evidenced by the requirement in Longleaf's water withdrawal permit that Longleaf recycle wastewater from the nearby Georgia-Pacific papermill. The fact that the water withdrawal permit contains this requirement supports an inference that water constraints at the Longleaf site exist. Petitioners failed to rebut this inference.

The facts concerning water use of a dry scrubber versus a wet scrubber cannot credibly be disputed. A dry scrubber uses less water than a wet scrubber. Petitioners themselves concede that a dry scrubber uses 50% less water than a wet scrubber. (First Amended Petition at ¶ 58)).

In sum, assuming that no other energy, economic or environmental impacts justified the use of a dry scrubber over a wet scrubber, the water constraints that exists at Longleaf's site alone constitutes a unique, site-specific impact that supports EPD's elimination of a wet scrubber as BACT in favor of a dry scrubber.

#### **b. Energy Impacts**

EPD rejected wet scrubbing, in part, based on energy impacts. Specifically, EPD relied on the fact that wet scrubbers consume more energy than wet scrubbers. A wet scrubber would consume approximately 2% of the gross power generation at the Longleaf facility. Whereas, a dry scrubber would consume approximately 0.7% of the gross power generation. Petitioners do not dispute these figures. Rather, Petitioners assert that this is a generic difference, not a unique site-specific difference, and therefore it is an inappropriate basis to reject wet scrubbing. However, as discussed *supra*, there is no legal requirement that EPD consider only unique site-specific impacts in its collateral impacts analysis. Accordingly, this Tribunal finds that EPD's reliance, in part, on disparate energy impacts was reasonable.

**c. Economic Impacts**

EPD rejected wet scrubbing, in part, because it found the economic impacts to be excessive. This finding begs the question: Excessive compared to what? To find something excessive one must necessarily compare it to something else. There must be a measuring stick. EPD asserts that it did not use a bright line measuring stick, because such a practice would encourage applicants to manipulate cost figures to reach a specific outcome. Nevertheless, EPD did not provide any basis upon which it found the costs associated with wet scrubbing to be excessive.

In its application materials, Longleaf provided a table of the incremental wet scrubbing costs of other facilities where wet scrubbing was rejected, at least in part, because the economic impacts were excessive. Longleaf asserted that its incremental costs for wet scrubbing were in the same range of the incremental costs of other facilities where wet scrubbing was rejected. The costs listed in Longleaf's table spanned 12 years. Longleaf did not adjust the costs to a common year basis. Basic economic principles require that in order to get a reasonable comparison, the costs borne by the other facilities should have been adjusted to a common year basis. It would be inappropriate to compare costs borne by a facility in 1993 to Longleaf's costs in 2007. To the extent EPD relied on Longleaf's table comparing the wet scrubbing incremental costs of other facilities, such reliance would be unreasonable.

While it is undisputed that the installation and operation of a wet scrubber costs more than a dry scrubber, EPD has failed to adequately explain its conclusion that the costs are "excessive." Accordingly, this Tribunal finds EPD's conclusion regarding economic impacts unreasonable.

Notwithstanding, because EPD relied on economic, environmental, and energy impacts to reject wet scrubbing, this Tribunal cannot say that EPD's rejection of wet scrubbing was

improper. As discussed *supra*, the environmental impacts alone would be sufficient to reject wet scrubbing.

#### **D. NITROGEN OXIDES (NO<sub>x</sub>) EMISSION LIMITATION**

Petitioners assert that the NO<sub>x</sub> emission limitations do not meet the requirements of BACT, because EPD failed to consider or improperly considered “all production processes or available methods, systems, and techniques” for control of NO<sub>x</sub>. Specifically, Petitioners contend that EPD should have considered ultra supercritical boiler technology, supercritical boiler technology, SCR, Low-NO<sub>x</sub> burners, ultra Low-NO<sub>x</sub> burners and Over fire Air. Petitioners further contend that if all available control options are properly considered, the 30-day NO<sub>x</sub> BACT limits in the Permit should be: 0.02 lb/MMBtu (or lower) and 0.16 lb NO<sub>x</sub>/NetMWhr (or lower). (First Amended Petition at Count V). Petitioners claim that the 30-day NO<sub>x</sub> limit of 0.07 lb/MMBtu does not represent BACT based on the control technologies selected by EPD.

At the hearing, Petitioners admitted that the technologies selected by EPD for the control of NO<sub>x</sub> emitted by the boilers (i.e., Low-NO<sub>x</sub> burners, Over-fire Air and SCR) are BACT. (Tr. at 707, 773-74, 966). However, Petitioners claim that EPD should have included a supercritical boiler as one of the components of the top technologies. (*Id.*). In addition, Petitioners claim that the NO<sub>x</sub> emission limits set by EPD based on the technologies selected do not represent BACT, because EPD used the wrong baseline NO<sub>x</sub> emissions rate from the boilers and an incorrect control efficiency percentage for the SCR. (Tr. at 707, 713, 774, 776). Specifically, using 90% control efficiency for the SCR, Petitioners contend that the annual NO<sub>x</sub> limit should be 0.01 lb/MMBtu (using a baseline NO<sub>x</sub> emission rate of 0.10 lb/MMBtu) and the 30-day limit should be 0.02 lb/MMBtu (using a baseline NO<sub>x</sub> emission rate of 0.20 lb/MMBtu). (Tr. at 719-20, 775-76).

Petitioners have failed to demonstrate by a preponderance of the evidence that the Permit's NO<sub>x</sub> emission limitations do not meet the requirements of BACT. EPD, after reviewing Longleaf's application materials and hundreds of public and agency comments, exercised its technical judgment and expertise to select emission limitations for NO<sub>x</sub> that meet the definition of BACT. Petitioners have failed to show by a preponderance of the evidence to demonstrate that EPD's NO<sub>x</sub> determination is unreasonable.

The technology that the Permit requires for the control of NO<sub>x</sub> emissions — Low-NO<sub>x</sub> burners, Over-Fire Air, and Selective Catalytic Reduction — are the best available control technologies. Petitioners' expert agrees. (Tr. at 707, 773-74, 966).

The fact that the Permit does not require installation of a super-critical boiler does not render EPD's selection of pollution control technology improper. A boiler is not a pollution control technology. Furthermore, if different types of boilers are operated at the same maximum heat input, the boilers will produce the same quantity of emissions. The Longleaf Permit contains a maximum heat input limit. Thus, the type of boiler would not impact the amount or rate of pollutants emitted. (Tr. at 966, 2092-2093, 2734).

The Permit includes a 30-day NO<sub>x</sub> limit of 0.07 lb/MMBtu. (EPD File Ex. 104 at Condition 2.15(b)). This limit is consistent with permits recently issued. (Tr. at 2181, 2254, 2865, 3195-3196; *see also* EPD File Ex. 108 (spreadsheet of representative sample of permit limits considered by EPD)).

The Permit also includes an annual NO<sub>x</sub> limit of 0.05 lb/MMBtu, similar to annual NO<sub>x</sub> limits that have been included in just a few recently-issued permits. (EPD File Ex. 104 at Condition 2.15(a); EPD File Ex. 108 (spreadsheet of representative sample of permit limits

considered by EPD)). The annual limit of 0.05 lb/MMBtu is as low as any permit in the country. (Tr. at 2181, 2254, 2865, 3195-3196).

In developing the NO<sub>x</sub> emission limits, EPD took into account its considerable experience with NO<sub>x</sub>, at facilities with and without SCRs, to determine what is achievable at Longleaf. (See Tr. at 2021-41, 2649-2703). EPD also relied upon permit decisions of other states, EPA, and the EAB in making the BACT determination concerning NO<sub>x</sub>. (Tr. at 2048-49). After consideration of the comments from EPA and the Petitioners, EPD reduced the permit limits by imposing an annual NO<sub>x</sub> limitation of 0.05 lb/MMBtu, making the Longleaf permit one of the most stringent in the country. (Tr. at 2168, 2875).

Petitioners argue that EPD's reliance on the emission limitations in recent permits and the experience of other facilities was an improper backwards-looking approach to determine what is achievable. Petitioners appear to assert that relying on emission limitations in recently issued permits and the experience of existing facilities is improper because it focuses on what has been *achieved*, not what is *achievable*. This Tribunal disagrees. First, emission limitations in recent permits are some evidence of what another permitting authority believes is achievable. Second, in many instances the recently permitted facilities have not been built, or are not yet operating, and thus have not *achieved* anything. Third, what other facilities have achieved is also some evidence of what is achievable. In other words, if another facility has achieved a certain emission level, then that is some evidence that the level may be achievable by the applicant, provided that the two facilities are similar in size, burn the same type of fuel, and have the same pollution control equipment. In fact, Petitioners rely, to some extent, on recently issued permits, stack test results and CEMS data from some existing facilities to support their proposed emission limitations. Finally, the EPA and the Draft NSR Manual direct permitting authorities to look at

recently issued permits and the experience of existing facilities as sources of information to determine what is achievable. (See EPD File Ex. 103 at 5-6; see also Draft NSR Manual at B.24).

Petitioners' assert that the emissions limits for NO<sub>x</sub> should be calculated based on their estimate of the annual baseline emissions rate (i.e., the rate of emissions from the boiler without the control of an SCR) of 0.10 lb/MMBtu and a 30-day baseline emissions rate of 0.20 lb/MMBtu. Petitioners' assertion is not supported by the facts or the law.

The baseline emissions rate is not subject to an emissions limitation or a BACT analysis; its value is in assessing the efficiency and cost of various control technologies. (Tr. at 3122-27, 3342). See also Draft NSR Manual at B.25-27, B.36-37. Furthermore, Petitioners' reliance upon CEMS data to establish the baseline emissions rate is misplaced because the CEMS data presents only a snapshot in time of emissions and may not be reflective of the emissions under all circumstances over the entire life of the facility. (Tr. at 3308-3310). Additionally, the CEMS data cited by Petitioners demonstrates that no coal-fired boilers operate with a baseline emissions rate of 0.10 lb/MMBtu and very few operate with a baseline emissions rate of 0.20 lb/MMBtu. Thus, the baseline emissions rates used by Petitioners as the basis for their proposed NO<sub>x</sub> permit limits are not supported by the data on which they rely. (Tr. at 3342-44).

EPD reasonably assumed a baseline emission rate of 0.3 lb/MMBtu, which was the arithmetic mean of the range of baseline emissions documented by the applicant (i.e., 0.15 to 0.47). (See EPD File Ex. 84 at 31). Petitioners have failed to prove by a preponderance of the evidence that the NO<sub>x</sub> emissions limitations in the Permit should be invalidated based on their evidence concerning baseline emissions rates.

Petitioners assert that the NO<sub>x</sub> limit should have been established based on an assumption of 90% control efficiency for the SCR. While the CEMS data demonstrated that some facilities with SCRs have operated at or close to 90% control efficiency for limited periods of time, EPD acted reasonably in using a control efficiency of less than 90%, given that control efficiencies diminish when the emissions from the boiler have lower NO<sub>x</sub> concentrations, and given the need for a safety factor. In addition, EPD reasonably took into account the fact that much of the data relied upon by Petitioners came from facilities that operate their SCRs only during the ozone season, rather than year-round. (Tr. at 2859-61, 2864, 2873). In order to arrive at NO<sub>x</sub> emissions limitations that will be achievable by Longleaf throughout the entire year, EPD imposed permit limits for NO<sub>x</sub> that are based on a control efficiency of 84% on an annual basis, and 77% on a 30-day basis. (See Tr. at 2322-23, 2431).

#### **E. PARTICULATE MATTER (PM) EMISSIONS LIMITATION**

Petitioners claim that EPD failed to consider or improperly considered “all available production processes or available methods, systems, and techniques” for control of PM. Specifically, Petitioners contend that EPD should have considered fuel cleaning, advanced hybrid particulate collector, fabric filter baghouse, dry electrostatic precipitator, wet electrostatic precipitator, agglomerator, cyclone and multicyclones, side stream separator, SO<sub>2</sub> control methods, sorbent injection, and low SO<sub>2</sub> to SO<sub>3</sub> conversion SCR catalyst for the control of PM emitted by the boilers. Petitioners contend that if all available control options are properly considered, the Permit would contain total PM limits of 0.018 lb/MMBtu on a 3-hour average and between 0.14 and 0.17 lb/MWh, depending on the thermal efficiency of the boilers, and an opacity limit of 5% on a 2 minute average. Finally, Petitioners claim that compliance with the total PM limit should be demonstrated by an annual stack test using Method 5 and/or Method

201A for filterable PM and Method 202 for condensable PM. (First Amended Petition at ¶¶ 144-157).

At the hearing, Petitioners admitted that the control technology selected by EPD for the control of total PM emitted by the boilers (i.e., the fabric filter baghouse) is the best available control technology. (Tr. at 192-93). However, Petitioners claim that EPD should have included clean fuels (i.e., PRB coal only), a supercritical boiler and coal washing for CAPP coal, if burned, among the technologies considered. (Tr. at 177, 184).

Petitioners also admitted that the 3-hour filterable PM limit of 0.012 lb/MMBtu meets the requirements of BACT and that the use of a PM CEMS to determine compliance with that limit is proper. (Tr. at 186, 277). Further, Petitioners admitted that Method 202 used to measure condensable PM is inaccurate in that it measures higher amounts of condensable PM than are present and, for this reason, the BACT emission limit should be set consistent with the method specified in the permit for measuring condensable PM. (Tr. at 1027-29). Notwithstanding, Petitioners claim that the emission limit for total PM set by EPD based on the technology selected is not reflective of BACT and that EPD should have calculated the limit using the baseline PM emissions rate from the boilers and a 99.95 to 99.99% control efficiency for the fabric filter baghouse. (Tr. at 185-86, 226-27).

Based on limits in other permits and limited stack test results, Petitioners contend that the total PM limit in the Permit should be 0.018 lb/MMBtu on a 3-hour basis. (Tr. at 228, 233, 238, 835). Petitioners claim that an opacity limit is also needed in the Permit to show continuous compliance (through use of a COMS) with the total PM limit, because the Permit requires only one stack test for condensable PM over the life of the facility. (Tr. at 271-72). Petitioners

contend that the opacity limit in the Permit should be 5%, based on limits in other permits and some data from operating facilities reviewed by Dr. Fox. (Tr. at 274-75).

Petitioners have failed to demonstrate by a preponderance of the evidence that the Permit's total PM emission limitation does not meet the requirements of BACT. EPD, after reviewing Longleaf's application materials and hundreds of public and agency comments, exercised its technical judgment and expertise to select an emission limitation for total PM that meets the definition of BACT. Petitioners have failed to establish that EPD's PM determination is unreasonable.

The technology that the Permit requires for the control of PM emissions — a fabric filter baghouse — is the best available control technology. Petitioners' expert Dr. Fox agrees. (Tr. at 192-93). The fact that the Permit does not require installation of a supercritical boiler does not affect this conclusion, because a boiler is not itself a control technology and because the type of boiler will not impact the amount or rate of pollutants emitted. (Tr. at 966, 2092-2093, 2734).

In developing the PM emission limits, EPD reasonably took into account its experience with PM at facilities with baghouses to determine what is achievable at Longleaf. (*See* Tr. at 2021-41, 2649-2703). When determining the Total PM emission limit, EPD took into account the fact that there is limited data on condensable PM and that Method 202, the only EPA approved test method for measuring condensable PM, is inaccurate. (*See* Tr. at 2729-30).

After consideration of the comments from EPA, EPD lowered both the filterable and Total PM permit limits, making the filterable limit one of the most stringent in the country. (Tr. at 2231, 2408). EPD reasonably relied upon permit decisions of other states, the EPA, and the EAB in making the BACT determination concerning PM.

The Permit includes a limit for filterable PM, which is a component of Total PM, of 0.012 lb/MMBtu on a 3-hour average. (EPD File Ex. 104 at Condition 2.15(d)). While this limit is one of the lowest in the country, it is actually more stringent than similar limits because compliance will be determined on a continuous basis. (Tr. at 2632-34).

The Permit includes a Total PM limit of 0.030 lb/MMBtu on a 3-hour average. (EPD File Ex. 104 at Condition 2.15(d)). Although this limit is not the lowest limit in the country, it results from EPD's imposition of a reasonable safety factor or margin of compliance in light of the limited data on condensable PM and the inaccuracy of the test method for measuring condensable PM. (Tr. at 2794-95, 2801). Consequently, the Total PM limit represents the maximum degree of reduction for PM that is achievable by the Longleaf facility on the basis of a 3-hour average. (Tr. at 2234, 2808, 3205).

Petitioners did not challenge the filterable PM limit of 0.012 lb/MMBtu and Petitioners' expert Dr. Fox agrees that this limit is BACT for Longleaf. (Tr. at 186, 277). Notwithstanding, Petitioners assert that the emission limit for Total PM should be lowered to 0.018 lb/MMBtu. Petitioners' assertion is based upon a limited number of permits, only one of which is for an operating facility, and four stack tests for that same facility. (Tr. at 879, 1036-38, 1730-36; *see also* Ex. P-99; Ex. P-104). Petitioners' evidence is not sufficient to show that Longleaf can achieve 0.018 lb/MMBtu over the entire life of the facility. (Tr. at 2792, 2794, 3206). Stack test data is only a snapshot in time of emissions and may not be reflective of the emissions under all circumstances over the entire life of the facility. (Tr. at 2619). Petitioners have failed to prove by a preponderance of the evidence that the total PM emission limitation in the Permit does not meet the requirements of BACT.

Petitioners have failed to present any legal or factual support for their contention that an opacity limit of 5% is necessary to determine compliance with the total PM limit. While the Permit only requires an initial stack test to determine compliance with total PM, compliance with the filterable portion of total PM will be determined continuously by a filterable PM CEMS. (Tr. at 2635; EPD File Ex. 104 at Conditions 4.1(f), (p) & (t), Condition 4.2(b), Condition 5.2(f)). Further, the opacity at the Longleaf facility is expected to be zero or near zero when the dry scrubber and the fabric filter baghouse are operating properly, which will be indicated by the SO<sub>2</sub> CEMS and filterable PM CEMS. (Tr. at 2740, 2747-48). Within one year of commencing operation, Longleaf will be required to submit an application for a Title V Operating Permit, which includes a CAM plan for total PM and SAM. (Tr. at 2750-58; EPD File Ex. 104 at Condition 10.2; Ex. R-1A). Longleaf's Title V permit will require continuous monitoring for total PM. (Tr. at 2749-58).

Recently in response to a comment on the draft PSD permit for the Deseret facility, EPA stated that opacity monitoring is not useful for assuring compliance with PM emission limits where those limits are extremely low. (Ex. R-35A at 66 (Response #4(e)(2))). The limits in this Permit are identical to the limits in the Deseret permit. (See EPD File Ex. 104 at Condition 2.15(d); Ex. R-34A at 9). Therefore, Petitioners have failed to prove by a preponderance of the evidence that an opacity limit of 5% is necessary to determine compliance with the total PM emission limitation in the Permit.

#### **F. SULFURIC ACID MIST (H<sub>2</sub>SO<sub>4</sub> or SAM) EMISSION LIMITATION**

Petitioners contend that the SAM emission limitation of 0.005 lb/MMBTU on a 3-hour average, in Permit Condition 2.15(l), does not satisfy the requirements of BACT. Petitioners assert that the design bases of the pollution controls that Longleaf has proposed (i.e., dry scrubber followed by a fabric filter baghouse) should be capable of removing more SAM, and

therefore Petitioners contend that the Permit SAM limit of 0.005 lb/MMBTU should be lowered to 0.0015 lb/MMBTU on a 3-hour average and 0.012 lb/NetMWhr (or lower) on a 30-day rolling average. (First Amended Petition at ¶¶ 158-162).

The Permit's BACT emission limitation for SAM is not the lowest emission limitation that has ever been set in a Permit. (*See* EPD File Ex. 108). It is, however, the lowest limit that EPD determined was achievable due to the limited SAM test data that exists and the inaccurate test methods that are currently used to measure SAM emissions. (Tr. at 2718). Under these circumstances, EPD's BACT determination was reasonable.

None of the parties can point to any performance data to support a lower SAM emission limitation. It is undisputed that hardly any such data exists, and, to the extent it does, most of it is confidential and thus was not available for review by EPD or Longleaf. (Tr. at 1046-47).

Further, the little amount of data that exists is the product of notoriously inaccurate test methods, and thus cannot be reasonably relied upon as an indicator of what the Longleaf facility is capable of achieving in practice. (*Id.*). Indeed, the paper that Petitioners' own expert, Dr. Fox, relied upon for her SAM emission calculations reports a margin of error of 50%. (Tr. at 2845-46). EPD's reluctance to set a lower BACT emission limitation for SAM due to the uncertainty that exists with SAM emissions is consistent with the concept of "achievable" in the definition of BACT. *See Newmont*, 12 E.A.D. 429, 442, slip op. at 14, 2005 EPA App. LEXIS 29, at \*37 (citation omitted) (holding that a permitting authority "may take into account the absence of long-term data, or the unproven long-term effectiveness of the technology").

### **1. The SAM Control Technology**

EPD selected a combination of SAM controls — low sulfur PRB and CAPP coal, dry scrubber, and fabric filter baghouse — that will allow the maximum degree of reduction of SAM

that is achievable for the Longleaf facility, taking into account energy, environment, and economic impacts.

EPD's SAM BACT determination followed the top-down process and included a review of top SAM control technologies, many of which were addressed as part of Longleaf's BACT analyses for SO<sub>2</sub> and PM. EPD rejected the top control technologies — WESP and sorbent injection — because of excessive economic costs and environmental impacts. (EPD File Ex. 84 at 162). Further, EPD rejected the use of a low SO<sub>2</sub> to SO<sub>3</sub> conversion catalyst in the SCR due to the detrimental impacts that the catalyst could have on NO<sub>x</sub> removal efficiencies. Petitioners have presented no evidence to challenge EPD's rejection of these technologies.

Petitioners instead appear to argue that EPD should have selected a wet scrubber over a dry scrubber as BACT for SAM. The preponderance of the evidence presented during the hearing demonstrates that a dry scrubber is more effective than a wet scrubber at SAM removal because of the downstream location of the fabric filter baghouse. For the foregoing reasons, this Tribunal finds that EPD's selection of a dry scrubber and fabric filter baghouse as the pollution control technologies for SAM was proper.

## **2. The Permit's SAM Emission Limitation**

Petitioners assert that the SAM emission limitation should be 0.001 lb/MMBtu. (*See Ex. P-182A*). This proposed limit is based on Dr. Fox's theoretical application of limited SAM data.

Dr. Fox's efforts only underscore the challenges that EPD faced when setting a SAM emission limitation for the Longleaf facility. Dr. Fox obtained her assumed SAM control efficiencies from a limited data set contained in a Southern Company report. (Tr. at 2845-46). This data was the product of a SAM test method, the controlled condensate method, that witnesses for all parties agreed is "notoriously inaccurate." (Tr. at 1048-54, 2845-46). As a result of this limited data and inaccurate test method, the authors of the report presented their

results with a 50% margin of error. (*Id.*). Limited data and unreliable test methods were the precise reasons why EPD refrained from setting a lower SAM emission limitation in the Permit. For these reasons, Petitioners have failed to demonstrate by a preponderance of the evidence that the Permit's SAM emission limitation does not satisfy the requirements of BACT.

## **G. ADDITIONAL IMPACTS ANALYSIS**

Petitioners allege that Longleaf's additional impacts analysis was inadequate. Petitioners further allege that EPD's reliance on Longleaf's inadequate additional impacts analysis was improper. Specifically, Petitioners contend that EPD underestimated potential vegetation impacts and relied upon an erroneous screening threshold for the sensitive vegetation that exists in Early County. Petitioners assert that the second-highest reported three-hour average SO<sub>2</sub> concentration in Longleaf's modeling results, 1,094 micrograms per cubic meter ("µg/m<sup>3</sup>"), exceeds the proper screening thresholds and demonstrates that the facility's SO<sub>2</sub> emissions will have an adverse impact on vegetation. (First Amended Petition at ¶¶ 197-205).

### **1. Applicable Law**

As part of a PSD permit application, Georgia law requires applicants to provide an analysis of the potential impairment to visibility, soils and vegetation that may occur from the proposed source and any economic growth associated with that source. GA. COMP. R. & REGS. r. 391-3-1-.02(7)(b)12 (incorporating 40 C.F.R. 52.21(o) by reference). This analysis is referred to as an additional impacts analysis. To determine whether a proposed source will have an impact on visibility, soils or vegetation, PSD permit applicants rely, in part, on the results of computerized air dispersion modeling. (Tr. at 1625-26, 3233-34).

Air dispersion models use mathematical equations to estimate ground level concentrations of particular pollutants from a particular source. (Tr. at 1931). The results of these models depend on the numerous inputs, including the emission rate for the particular

pollutant at issue, weather conditions (e.g. wind speed and wind direction), stack height, stack diameter, and exit gas flow conditions. (Tr. at 1932-33). EPA's recommended models and standards governing computerized air dispersion modeling are contained within 40 C.F.R. § 51, Appendix W.

Pursuant to Georgia Rule 391-3-1-.02(7)(b)8, PSD permit applicants must conduct computerized air dispersion modeling to demonstrate that the source emissions will not cause or contribute to a violation of (1) any NAAQS; or (2) any applicable maximum allowable increase over the baseline concentration in any area. *See* 40 C.F.R. § 52.21(k) (incorporated by reference in GA. COMP. R. & REGS. r. 391-3-1-.02(7)(b)8).

EPA and Georgia have promulgated both primary and secondary NAAQS. *See* 40 C.F.R. Part 50; GA. COMP. R. & REGS. r. 391-3-1-.02(4). Primary NAAQS are designed to protect public health; secondary NAAQS constitute standards deemed "requisite to protect the public welfare" from any known or anticipated adverse effects" of a particular pollutant. 42 U.S.C. § 7409(b)(1) & (2). "Effects on [public] welfare" include "effects on soils, water, crops, vegetation . . . visibility, and climate . . . ." 42 U.S.C. § 7602(h).

Of particular importance to EPD's additional impacts analysis in this case is the 3-hour secondary NAAQS for SO<sub>2</sub>, which is 0.5 parts per million ("ppm"), or 1,300 µg/m<sup>3</sup>. 40 C.F.R. § 50.5(a). Georgia has also established 1,300 µg/m<sup>3</sup> as its 3-hour SO<sub>2</sub> ambient air standard. GA. COMP. R. & REGS. r. 391-3-1-.02(4)(b)1.

Petitioners have failed to demonstrate by a preponderance of the evidence that EPD's additional impacts analysis was inadequate. The evidence shows that EPD followed accepted procedures and guidance to analyze Longleaf's modeling results and conclude that predicted

emissions from the Longleaf facility will not have a discernible effect on vegetation, soils, and visibility.

## **2. EPD’s Additional Impacts Analysis was Consistent with Applicable Law**

EPD’s reliance on applicable ambient air standards, EPA guidance, and EPA-approved air dispersion models to conclude that the Longleaf facility’s impacts to vegetation, soils, and visibility would be insignificant constitutes a proper additional impacts analysis.

The secondary NAAQS and EPA guidance document, “A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals,” are both designed to assess whether a predicted ambient concentration of a particular pollutant will have an adverse impact on vegetation and soils. *See* 42 U.S.C. § 7409(b). (*See* EPD File Ex. 655 at 2). In fact, EPA’s guidance document was explicitly established to assist air quality engineers in their additional impacts analysis. (*See* EPD File Ex. 655 at 2).

Longleaf’s modeling results demonstrate that the emissions from the Longleaf facility “will not threaten or exceed any ambient standard at any location.” (EPD File Ex. 84 at 192). Further, the highest recorded impacts attributable to the Longleaf facility fall considerably below EPA’s screening threshold. (*Id.*). For these reasons, EPD had a sufficient basis on which to reasonably conclude that any impact from the Longleaf facility on surrounding soils and vegetation would be “negligible.” (*Id.*).

## **3. Longleaf Facility’s Impact on Vegetation and Soil**

Petitioners have proposed alternative screening criteria for four species of plants that are found in Early County — slash pine, loblolly pine, shortleaf pine, and peanuts — in attempt to demonstrate that that EPD has underestimated the impact that the Longleaf facility will have on vegetation. Additionally, Petitioners introduced a new analysis of Longleaf’s modeling results.

Petitioners assert that the new analysis of Longleaf's modeling results and the alternative screening criteria support their claim that the EPD's adoption of Longleaf's additional impacts analysis was unreasonable.

**a. Petitioners' Suggested Screening Thresholds**

Petitioners contend that the applicable ambient air standards and EPA's screening threshold are not sufficiently protective of the sensitive vegetation in Early County. Petitioners rely on two documents to support of their argument: (1) a 1973 study the Tennessee Valley Authority titled *Botanical Studies in the Vicinity of Widows Creek Steam Plant, Review of Air Pollution Facts, Studies 1952 to 1972, and Results of 1973 Surveys*; and (2) a 1978 book entitled *Sulfur in the Environment*. (EPD File Ex. 645; Ex. P-165). According to Petitioners, both of these documents demonstrate that the screening thresholds relied upon by EPD underestimate the sensitivity of vegetation to SO<sub>2</sub> emissions. Petitioners assert that the screening thresholds should be 130 to 312 µg/m<sup>3</sup> for peanuts and 546 µg/m<sup>3</sup> for three sensitive varieties of pine trees. (Tr. at 806-07, 816).

The contents of these two documents do not render EPD's reliance on ambient air standards and EPA's screening guidance unreasonable. Most notably, Petitioners claim that EPA's screening threshold is outdated is undermined by their own reliance upon screening thresholds that were published prior to EPA's guidance. (*See* EPD File Ex. 645; Ex. P-165). Additionally, the 1978 book relied upon by Petitioners contains a screening threshold for peanuts that was derived from "artificial fumigation experiments" in which plants were exposed to known concentrations of SO<sub>2</sub> over longer averaging periods than the 3-hour SO<sub>2</sub> averaging period at issue in Petitioners' claim. (Ex. P-165 at 116-17).

Petitioners have presented no evidence that EPA or any other PSD-permitting agency anywhere in the United States has utilized the screening criteria which Dr. Fox derived from

these two documents as part of its additional impacts analysis for SO<sub>2</sub>. Further, if the purported screening thresholds in these two documents were a true indicator of the health of Early County's sensitive pine trees and peanut crops, this would imply that the current conditions in the County are not suitable for pine tree or peanut farming, which is clearly not the case. Longleaf's modeling results indicate that 3-hour SO<sub>2</sub> concentrations as high as 1,094 µg/m<sup>3</sup> could have already been present in Early County due to existing sources of SO<sub>2</sub>. (*See* Tr. at 1946-47). This level significantly exceeds the screening values advocated by Petitioners.

At best, Petitioners have suggested that other sources of information may exist to assist in the preparation of a sensitive vegetation impacts analysis where SO<sub>2</sub> is the pollutant of concern. The existence of this data alone, however, does not render EPD's reliance on the EPA guidance and secondary NAAQS unreasonable.

Even if this Tribunal were to accept the screening values advocated by Petitioners as the appropriate screening values, Petitioners have failed to demonstrate that Longleaf will meaningfully contribute to an exceedance of their suggested thresholds. Petitioners rely upon the second-highest 3-hour SO<sub>2</sub> concentration predicted in Longleaf's modeling analysis, 1,094 µg/m<sup>3</sup>, as the basis for their conclusion that the Longleaf facility will adversely affect sensitive vegetation in Early County. (Tr. at 819; First Amended Petition at ¶ 203). As Mr. McCann testified, however, Longleaf would have no impact at that receptor site during the period that recorded this value. (Tr. at 1946-47). Thus, Petitioners' reliance on the 1,094 µg/m<sup>3</sup> value is misplaced.

Petitioners' efforts to find an alternative value on which to argue that Longleaf's emissions will impact sensitive vegetation are similarly unpersuasive. Petitioners modeling expert, Mr. Tran, presented evidence of other Longleaf modeling results for receptor sites where

the total cumulative 3-hour SO<sub>2</sub> concentration was predicted to be greater than 568 µg/m<sup>3</sup> (i.e., impacts from Longleaf plus other modeled sources plus non-modeled background) and Longleaf's contribution was greater than or equal to 1 µg/m<sup>3</sup>. (See Ex. PR-50). This evidence suffers from several flaws.

First, Mr. Tran relied on a significance threshold — 1 µg/m<sup>3</sup> — that has no basis in applicable law or guidance. When asked to explain the significance of this chosen parameter, Mr. Tran offered no technical or regulatory justification. Rather, he simply replied that Petitioners' counsel had instructed him to perform the model in that manner. (Tr. at 3758-59).

Both PSD regulations and the Draft NSR Manual utilize a threshold of 25 µg/m<sup>3</sup> for predicting the significance of air quality impacts. 40 C.F.R. § 51.165(b)(2); Draft NSR Manual at C.28. Mr. Tran agreed that the 25 µg/m<sup>3</sup> significance threshold was “universally used.” (Tr. at 3759).

Of the 102 modeling results presented by Mr. Tran in Exhibit PR-50, there were only three instances when the 3-hour SO<sub>2</sub> impacts from the Longleaf facility were predicted to be greater than 25 µg/m<sup>3</sup> and the total cumulative impacts were predicted to be greater than 568 µg/m<sup>3</sup>. In fact, the maximum of Longleaf's impact was 33.75 µg/m<sup>3</sup>, slightly greater than the significance level. (Ex. PR-50; Tr. at 3807). These 3 events out of more than 140,000,000 modeled results does not establish, by a preponderance of the evidence, that Longleaf's emissions will have an adverse impact on vegetation.

Second, even if Mr. Tran's significance threshold was valid, his modeling results are not an accurate prediction of the total ambient SO<sub>2</sub> concentrations that could result from Longleaf's operation. Mr. Tran's results were all based on an SO<sub>2</sub> emission rate of 0.26 lb/MMBtu, a value that is more than twice the highest SO<sub>2</sub> emission limit in the Permit. (Tr. at 3805). Mr. McCann

testified that if Mr. Tran's modeling results were re-run at Longleaf's permitted emission rate of 0.12 lb/MMBtu, the predicted Longleaf impacts would decrease by approximately 50%. As a result, although there still would be predicted total cumulative 3-hour SO<sub>2</sub> concentrations greater than 568 µg/m<sup>3</sup>, Longleaf's contribution would be less than 25 µg/m<sup>3</sup>. (Tr. at 3808-09). Further, as Mr. McCann testified, the recent reductions in Georgia-Pacific's allowable SO<sub>2</sub> limits will reduce all of the concentrations at receptors impacted by Georgia-Pacific by at least 20 – 30%. (Tr. at 3812-13). Accordingly, Petitioners have failed to demonstrate by a preponderance of the evidence that Longleaf would significantly exceed any screening threshold.

**b. EPD's Consideration of Longleaf's Additional Impact Analysis**

Several times during the hearing, Petitioners elicited testimony in an apparent attempt to argue that EPD's additional impacts analysis for soils was inadequate. This claim was not articulated in Petitioners' First Amended Petition, and thus it is not properly before the Court and must be dismissed.

Even if this claim had been adequately pled, however, it must fail. Petitioners have failed to present any evidence in support of this claim besides Dr. Fox's unsupported allegation that EPD must conduct a soil impact analysis apart from the vegetation analysis. (Tr. at 827).

The evidence shows that EPD relied on applicable ambient air standards and EPA's screening threshold to conclude that the Longleaf facility would not have discernible adverse impacts on vegetation and soils. (EPD File Ex. 84 at 192). Petitioners have failed to present any evidence to suggest that EPD's approach was inadequate. For the foregoing reasons, Petitioners have failed to demonstrate by a preponderance of the evidence that EPD's additional impacts analysis was inadequate.

#### IV. CONCLUSION

After hearing 21 days of testimony and reviewing thousands of pages of exhibits, this Tribunal understands the complexity of the technical issues that Longleaf and EPD had to address in the development of the Permit. As would be the case with any very complicated and technical matter, Petitioners have been able to identify multiple points on which they disagree with EPD. Petitioners' expert was thorough and credible. However, in many instances this Tribunal was not persuaded that Petitioners' proposed limits would be consistently achievable.

In the final analysis, however, the weight of the evidence demonstrates that the limits imposed by EPD are reasonable and supported by law. This is a complex case that concerns a highly specialized area of regulatory law. Petitioners have challenged an agency decision that calls upon the agency's technical knowledge of the intricacies of air pollution control technologies, engineering principles, and to a certain extent, air dispersion modeling. EPD is the agency charged with the administration and enforcement of Georgia's Air Quality Act, O.C.G.A. § 12-9-7, *et seq.* As such, EPD's reasonable decisions should be afforded a measure of deference.

Petitioners' expert presented a detailed academic evaluation of the pollution controls and theoretical emissions limitations that she would consider appropriate for the Longleaf project. Indeed, it is clear that if she were the permitting authority, Dr. Fox would have exercised her professional judgment to require different controls and lower emissions limitations for this facility. However, that is not a sufficient basis to overturn this permit. So long as the Director's decision was consistent with law and within the reasonable bounds of her discretion, the permit should be upheld.

**ORDER**

For the foregoing reasons, Respondent's decision to issue the permit is **AFFIRMED**.

**SO ORDERED January 11, 2008**

A handwritten signature in black ink that reads "Stephanie M. Howells". The signature is written in a cursive style with a large initial 'S'.

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**STEPHANIE M. HOWELLS**  
**Administrative Law Judge**