APPENDIX I-2

Florida Department of Environmental Protection

Division of Air Resource Management

Regional Haze SIP – Public Comments from the National Parks Conservation Association, Coalition to Protect America's National Parks and Sierra Club

July 9, 2021

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Submitted via email to: Ashley.Kung@FloridaDEP.gov

Re: Conservation Organizations' Comments on Florida's Proposed Revisions Regional Haze State Implementation Plan for the Second Implementation Period

Dear Ms. Kung:

The National Parks Conservation Association, Coalition to Protect America's National Parks and Sierra Club ("Conservation Organizations") thank you for accepting these comments on the Florida Department of Environmental Protection's ("FL DEP") Proposed Revisions to Regional Haze State Implementation Plan for the Second Implementation Period.[1]

National Parks Conservation Association ("NPCA") is a national organization whose mission is to protect and enhance America's National Parks for present and future generations. NPCA performs its work through advocacy and education. NPCA and its nearly 1.6 million members and supporters nationwide work together to protect our nation's most iconic and inspirational places for future generations. NPCA's Sun Coast regional office is based in South Florida; we work together with over 100,000 members and supporters in Florida to advance protections for treasured ecosystems and the species they provide refuge for. NPCA has carried out our important work to help preserve our national park units and surrounding landscapes since our founding in 1919. NPCA is active nation-wide in advocating for strong air quality requirements to protect our parks, including submission of petitions and comments relating to

[1] The attachment comments include, "A Review of the Florida Regional Haze State Implementation Plan," which was prepared for NPCA by Joe Kordzi (July 2021) (Enclosure 1, "Kordzi Report"). Mr. Kordzi is an independent air quality consultant and engineer with extensive experience in the regional haze program.

visibility issues, regional haze State Implementation Plans, global warming and mercury impacts on parks, and emissions from individual power plants and other sources of pollution affecting National Parks and communities. NPCA's members live near, work at, and recreate in all the national parks, including those directly affected by emissions from Florida's sources.

The Coalition to Protect America's National Parks ("Coalition") is a non-profit organization composed of over 1,900 retired, former and current employees of the National Park Service ("NPS"). The Coalition studies, speaks, and acts for the preservation of America's National Park System. As a group, we collectively represent over 40,000 years of experience managing and protecting America's most precious and important natural, cultural, and historic resources.

The Sierra Club is a national nonprofit organization with approximately 830,000 members nationwide dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. The Sierra Club has long participated in Regional Haze rulemaking and litigation across the country in order to advocate for public health and our nation's national parks. The Florida Chapter of the Sierra Club has approximately 240,000 members and supporters.

As detailed below, FL DEP's proposed SIP will not result in reasonable progress towards improving visibility at the Class I Areas its sources impact. These Class I Areas include the Everglades National Park, which is "the largest subtropical wilderness in the United States Everglades National Park protects an unparalleled landscape that provides important habitat for numerous rare and endangered species like the manatee, American crocodile, and the elusive Florida panther."[2] To satisfy the Clean Air Act ("Act") and Regional Haze Rule ("RHR") the flaws identified in these comments and in the attached technical report by Joe Kordzi must be corrected before submittal to EPA, including:

- Inappropriately screening sources from the required four-factor analysis;
- Technical analyses that are inconsistent with the Act and RHR requirements;
- Lack of required practically enforceable emission limitations;
- Disregarding environmental justice impacts, resulting in a proposed SIP that does not reduce emissions and minimize harms to disproportionately impacted communities.

[2] NPS Formal Consultation Call with Florida DEP for Regional Haze SIP Development, Florida Regional Haze Consultation Presentation, at 9 (May 17, 2021) (Enclosure 2) "Everglades NP is an international treasure as well - a World Heritage Site, International Biosphere Reserve, a Wetland of International Importance, and a specially protected area under the Cartagena Treaty." *Id*. at 10.

Table of Contents

I. Introduction and Background

Congress set aside national parks and wilderness areas to protect our natural heritage for generations. Our national parks and wilderness areas are iconic, treasured landscapes, and these special places are designated "Class I Areas" under the CAA and as such, their air quality is entitled to the highest level of protection. To improve air quality in our most treasured landscapes, Congress passed the visibility protection provisions of the CAA in 1977, establishing "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in the mandatory class I Federal areas which impairment results from manmade air pollution."[3] "Manmade air pollution" is defined as "air pollution which results directly or indirectly from human activities."[4] In order to protect Class I Areas' "intrinsic beauty and historical and archeological treasures," the regional haze program establishes a national regulatory floor and requires states to design and implement plans to curb haze-causing emissions within their jurisdictions. Each state must submit for EPA review a SIP designed to make reasonable progress toward achieving natural visibility conditions.[5]

A regional haze SIP must provide "emissions limits, schedules of compliance and other measures as may be necessary to make reasonable progress towards meeting the national goal."[6] Two of the most critical features of a regional haze SIP are the requirements for installation of Best Available Retrofit Technology ("BART") limits on pollutant emissions and a long-term strategy for making reasonable progress towards the national visibility goal.[7] The haze requirements in the CAA present an unparalleled opportunity to protect and restore regional air quality by curbing visibility-impairing emissions from a host of polluting facilities that harm our communities and muddy our skies.

Unfortunately, the promise of natural visibility is unfulfilled because the air across Class I Areas remains polluted by industrial sources, including the sources covered in our comments. Notably, as detailed below FL DEP excluded from a four-factor analysis:

- Crystal River Units 4 and 5;
- Big Bend Units 3 and 4 from a four-factor analysis;
- Seminole Units 1 and 2 from a four-factor analysis;
- Nutrien White Springs Ag Chemical Plant;
- Mosaic New Wales;
- Bartow SAPs; and
- Breitburn Operating.

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[3] 42 U.S.C. § 7491(a)(1).
[4] *Id.* § 7491(g)(3).
[5] *Id.* § 7491(b)(2).
[6] 40 C.F.R. § 51.308(d)(3).
[7] *Id.*

Our comments further identify issues with FL DEP's proposed four-factor analysis for the following sources:

- Deerhaven Generating Station;
- Foley Mill;
- Northside Facility;
- WestRock Fernandina Beach; and
- WestRock Panama City Four-Factor.

Moreover, as discussed in Section VII, FL DEP's proposed SIP erroneously omits the sugar cane industry sources from a four-factor analysis. Florida's Class I Areas impacted by these and other sources include: Chassahowitzka Wilderness Area; Everglades National Park; and St. Marks Wilderness Area.

Implementing the regional haze requirements promises benefits beyond improving views. Pollutants that cause visibility impairment also harm public health. For example, oxides of nitrogen ("NO_X") are a precursor to ground-level ozone which is associated with respiratory disease and asthma attacks. NO_X also reacts with ammonia, moisture and other compounds to form particulates that can cause and/or worsen respiratory diseases, aggravate heart disease, and lead to premature death. Similarly, sulfur dioxide ("SO_2") increases asthma symptoms, leads to increased hospital visits, and can also form particulates. NO_X and SO_2 emissions also harm terrestrial and aquatic plants and animals through acid rain as well as through deposition of nitrates (which in turn cause ecosystem changes including eutrophication of mountain lakes).

II. Requirements for Periodic Comprehensive Revisions for Regional Haze SIPs

In developing its long-term strategy, a state must consider its anthropogenic sources of visibility impairment and evaluate different emission reduction strategies including and beyond those prescribed by the BART provisions.[8] A state should consider "major and minor stationary sources, mobile sources and area sources."[9] At a minimum, a state must consider the following factors in developing its long-term strategy:

> (A) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;
> (B) Measures to mitigate the impacts of construction activities;
> (C) Emissions limitations and schedules for compliance to achieve the reasonable progress goal;
> (D) Source retirement and replacement schedules;
> (E) Smoke management techniques for agriculture and forestry management purposes including plans as currently exist within the State for these purposes;
> (F) Enforceability of emission limitations and control measures; and
> (G) The anticipated net effect on visibility due to projected changes in point, area, and mobile emissions over the period addressed by the long-term strategy.[10]

[8] 40 C.F.R. § 51.308(f).
[9] *Id.* § 51.308(f)(2)(i).
[10] *Id.* § 51.308(f)(2)(iv).

Additionally, a state:

> Must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy.[11]

In developing its plan, the state must document the technical basis for the SIP, including monitoring data, modeling, and emission information, including the baseline emission inventory upon which its strategies are based.[12] All of this information is part of a state's revised SIP and subject to public notice and comment. A state's reasonable progress analysis must consider the four factors identified in the CAA and regulations. *See* CAA 169A(g)(1); 40 C.F.R. 51.308(f)(2)(i) ("the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment.")

EPA's 2017 RHR Amendments made clear that states are to first conduct the required four-factor analysis for its sources, and then use the results from its four-factor analyses and determinations to develop the reasonable progress goals.[13] Specifically, EPA explained in its final notice that it proposed, took and responded to comments and amended 40 C.F.R. § 51.308(f) to eliminate the cross-reference to 40 C.F.R. §51.308(d) to "codify …[its] long-standing interpretation of the way in which the existing regulations were intended to operate" to track "the actual [SIP] planning sequence" as follows, thus, states are required to:

> (1) [C]alculate baseline, current and natural visibility conditions, progress to date and the [Uniform Rate of Progress] URP;
> (2) [D]evelop a long-term strategy for addressing regional haze by evaluating the four factors to determine what emission limits and other measures are necessary to make reasonable progress;
> (3) [C]onduct regional-scale modeling of projected future emissions under the long-term strategies to establish RPGs and then compare those goals to the URP line; [FN73] and
> (4) [A]dopt a monitoring strategy and other measures to track future progress and ensure compliance.[14]

Moreover, in promulgating the RHR EPA stated that:

> The CAA requires states to determine what emission limitations, compliance schedules and other measures are necessary to make reasonable progress by considering the four factors. The CAA does not provide that states may then reject some control measures already determined to be reasonable if, in the aggregate, the controls are projected to result in too much or too little progress. Rather, the rate of progress that will be achieved

[11] 40 C.F.R. § 51.308(f)(2)(i).
[12] 40 C.F.R. § 51.308(f)(2)(i).
[13] 82 Fed. Reg. 3078, 3090-1 (Jan. 10, 2017).
[14] *Id.* at 3091.

> by the emission reductions resulting from all reasonable control measures is, by definition, a reasonable rate of progress. … [I]f a state has reasonably selected a set of sources for analysis and has reasonably considered the four factors in determining what additional control measures are necessary to make reasonable progress, then the state's analytical obligations are complete if the resulting RPG for the most impaired days is below the URP line. *The URP is not a safe harbor*, however, and states may not subsequently reject control measures that they have already determined are reasonable.[15]

Thus, the key determinant in whether a state's "robust determination" obligation has been satisfied under Section 51.308(f)(3)(ii)(B) is not whether the Reasonable Progress Goal ("RPG") of a Class I Area is below that Class I Area's URP, but rather whether a state has considered and determined requirements to make reasonable progress based on the four factors. A state must consider the four factors *regardless* of the status of any Class I Area's RPG.

The state's SIP revisions must meet certain procedural and consultation requirements.[16] The state must consult with the FLMs and look to the FLMs' expertise of the lands and knowledge of the way pollution harms them to guide the state to ensure SIPs do what they must to help restore natural skies.[17] The rule also requires that in "developing any implementation plan (or plan revision) or progress report, the State must include a description of how it addressed any comments provided by the Federal Land Managers."[18]

As you may know, in May 2020, NPCA shared the petition it submitted to the previous EPA Administrator – which sought reconsideration of the 2019 RH guidance[19] –alongside a cover letter to Florida.[20] In addition to NPCA, Sierra Club, Natural Resources Defense Council, Western Environmental Law Center, Appalachian Mountain Club, Coalition to Protect America's National Parks, and Earthjustice, signed the petition for reconsideration. As of the date of this comment letter, EPA has not responded to the Petition. Until EPA withdraws the illegal approaches in the 2019 guidance, we trust states will not follow those approaches, instead adhering closely to the regulation itself and working to achieve the CAA goal of Class I visibility restored to natural conditions.[21]

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[15] *See*, 82 Fed. Reg. 3078, 3093 (Jan. 10, 2017) (emphasis added).

[16] For example, in addition to the RHR requirements, states must also follow the SIP processing requirements in 40 C.F.R. §§ 51.104, 51.102.

[17] 40 C.F.R. § 51.308(i).

[18] *Id.* § 51.308(i)(3).

[19] EPA issued the 2019 Final Guidance on August 20, 2019 via Memorandum from Peter Tsirigotis, Director at EPA Office of Air Quality Planning and Standards to EPA Air Division Directors. Guidance on Regional Haze State Implementation Plans for the Second Implementation Period, EPA-457/B-19-003 (Aug. 2019), https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf. ("EPA 2019 RH Guidance")

[20] "Petition for Reconsideration of Guidance on Regional Haze State Implementation Plans for the Second Implementation Period," submitted by National Parks Conservation Association, Sierra Club, Natural Resources Defense Council, Coalition to Protect America's National Parks, Appalachian Mountain Club, Western Environmental Law Center and Earthjustice, to former EPA Administrator Andrew Wheeler (May 8, 2020). ("Conservation Organizations Petition"). (Enclosure 3)

[21] The Petition explained that, as issued, the Final Guidance conflicts with this statutory objective, previous rulemaking and guidance; misdirects states as to how they can go about complying with their legal obligations to make reasonable progress towards restoring natural visibility to protected public lands; and otherwise fails to set expectations that comport with legal requirements for the second planning period. Further, we petitioned the prior

On July 9, 2021, EPA issued a memorandum titled, “Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period.”[22] EPA’s memorandum provides important information regarding development of SIPs for all states for the regional haze second planning period in response to questions and information EPA is receiving from states and stakeholders and clarifies and provides information on existing statutory and regulatory requirements.[23] We strongly encourage FL DEP to take the time necessary to carefully review and consider all the information in EPA’s memorandum and develop supporting information and make necessary adjustments to its proposed SIP. Additionally, our expectation is that FL DEP will take EPA’s recent memorandum into consideration as it meaningfully considers and fully responds to our comments.

Finally, the duty to ensure reasonable progress requirements are met for purposes of the SIP rests with the state. While a state may request information and analysis from its sources, and importantly collaborate with its regional planning organization throughout the haze planning process, the state is ultimately accountable for preparing, adopting, and submitting a compliant SIP to EPA. Further, Florida’s SIP must be supported by a reasoned analysis that includes and cites to the technical support documentation it proposes to rely on and use as part of its SIP revision.[24]

III. FL DEP’s Source Selection Methodology is Flawed

A. Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods

As explained in the May 12, 2021, letter to the Air Division Directors of the VISTAS’ states, we commissioned an expert modeler to better understand VISTAS approach and found critical problems with the VISTAS model itself as well as the approach recommended to Southeastern states.[25]

1. Summary of VISTAS Flawed Modeling Input and Methodology Used to Identify Sources

NPCA’s commissioned independent review revealed that the VISTAS modeling effort suffers from four serious flaws summarized in Table I and further discussed below.

Administrator to replace it with guidance that comports with the CAA and the RHR, 42 U.S.C. §§ 7491, 7492; 82 Fed. Reg. 3078 (Jan. 10, 2017); 71 Fed. Reg. 60,612 (Oct. 13, 2006); 70 Fed. Reg. 39,104 (July 6, 2005); 64 Fed. Reg. 35,714 (July 1, 1999), and aids states in making progress towards achieving the national goal of natural visibility conditions at all Class I Areas. Conservation Organizations Petition at 1-2. The Petition includes a detailed analysis of the issues. As of the date of this comment letter, EPA has not responded to our Petition.

[22] EPA Memorandum from Peter Tsirigotis, Director, Office of Air Quality Planning and Standards, to Regional Air Division Directors, “Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period,” (July 9, 2019), https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation. (Enclosure 4)

[23] *Id.*

[24] *See, e.g.,* 40 C.F.R. §§ 51.100, 51.102, 51.103, 51.104, 51.105 and Appendix V to Part 51.

[25] Letter from Stephanie Kodish, NPCA, Leslie Griffith, SELC, and David Rogers, Sierra Club to VISTAS State Air Directions, “Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans” (May 12, 2021). (Enclosure 5)

Figure 1. Summary of VISTAS II CAMx Modeling Flaws and Consequences.

	Flawed Modeling Inputs and Methods	Consequences of Reliance on VISTAS Inputs By States in Preparing SIPs
1	Inaccurately reflects sulfate concentrations in the Southeast U.S.	Would excuse heavy sulfur dioxide (SO_2) polluters from review.
2	Used Electric Generating Unit (EGU) emission profiles from 2011 to project the EGUs emissions in 2028, inaccurately assuming that EGUs will operate in 2028 as they did in 2011.	Would fail to identify EGUs that must be analyzed for emission reductions because the model results do not accurately reflect the actual/most recent EGUs' contributions to visibility impairment.
3	Used outdated monitoring data that does not represent the dramatic shift in nitrate contribution to visibility impairment in the Southeast over the last 5-10 years. This shift was not reflected in future predictions.	Would erroneously exclude problematic sources from review and avoid emission controls for large NO_X emitting sources because the modeling inputs failed to properly identify EGUs and other point sources with large NO_X emissions as contributing to CIA visibility impairment.
4	Used high thresholds and unnecessary filters to select sources to analyze for emission reducing measures.	Would result in an unreasonably low number of industrial sources selected by each state for an emission control reasonable progress four-factor analysis.

2. VISTAS' High Threshold and Additional Methodology Excluded Polluting Facilities that Should be Addressed and Considered for Emission Reducing SIP Measures

By relying on the flawed VISTAS modeling to select which polluting sources to review for emission reductions, the Southeastern states plan to ignore hundreds of significant emission sources. According to NPCA's analysis, by heavily relying on the VISTAS' approach Florida:

- Selected only 11 point sources affecting Class I sites. In contrast, NPCA identified 80 industrial facilities in Florida that likely degrade visibility in 18 regional Class I Areas;
- Allows 50,444 tons of NO_X and 13,319 tons of SO_2 emissions to continue dirtying the air in our national parks and wilderness areas and communities;[26] and
- Ignores the fact that 18 of these sources are located in communities of color and more than 90% of the 69 facilities are located in communities living below the poverty line.[27]

FL DEP must revise its SIP to the extent it proposes to rely on these and other flawed methods discussed in the May 12, 2021 letter.

B. FL DEP's Source Selection Methodology is Flawed

As discussed in detail in the Kordzi Report, there are numerous issues with FL DEP's source selection methodology. For example:

- The agency does not explain or justify reliance on decreases in its projected 2028 emissions from the Foley Mill, Breitburn Gas Treating facility, Mosaic South Pierce, Monarch Hill, and Gulf Clean Energy Center.[28]
- FL DEP must explain its decision to base its source selection on projected 2028 emissions instead of actual emissions and compare how the suite of selected sources compare with a selection based on historical emissions [29]
- Use of the fractional bias calculation approach is suspect because when comparing the model's output to observed values, FL DEP did not use monitored or measured values for the observed values, instead used the Area of Influence (AoI) values.[30] The "AoI values are not known values and are simply other predicted values…"[31]

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[26] Emissions data was obtained from EPA's 2017 National Emissions Inventory (NEI) and EPA's 2019 Air Markets Data Program (AMPD) for power plants.
[27] US Census Bureau's American Community Survey 5-year estimates for 2012-2016 at the county level.
[28] Kordzi Report at 3.
[29] *Id.*
[30] *Id.* at 4-6.
[31] *Id.* at 5.

- The agency does not provide a reasoned bases for using a 1.00% PSAT threshold for selecting facilities.[32]

IV. The State's Analyses are Inconsistent with the Clean Air Act and Regional Haze Rule Requirements

A. FL DEP Wrongly Exempts Sources from the Four-Factor Analysis Requirement

1. Duke Energy Florida, LLC: Crystal River Units 4 and 5, SO_2 and NO_X Emissions

The Duke Crystal River Power Plant is a coal-fired power plant located in Crystal River, which consists of a facility operated on two tracks of land: "the Crystal River Energy Complex and the Citrus County Combined Cycle Station. The Crystal River Energy Complex consists of the North Plant and the South Plant."[33] The South Plant is no longer active.[34] "This facility is only about 20 kilometers north of the Chassahowitzka Wilderness Area and has the highest cumulative Q/d value for any facility in Florida at 518.9. Therefore, *FL DEP should give it its highest priority*."[35]

FL DEP did not require a four-factor analysis for Units 4 and 5, instead, the agency proposes that it is effectively controlled for SO_2 with wet scrubbers. FL DEP does not provide any analysis to support its proposed determination, it has not shown that a full four-factor analysis would likely result in the conclusion that no further controls are necessary.[36] Instead, the proposed SIP references an Air Construction Permit Revision issued on October 10, 2020, that expires on December 31, 2021. Specifically, the SIP proposes the following permit condition:[37]

> As determined by CEMS data, SO_2 emissions shall not exceed 0.20 lb/MMBtu based on a heat input-weighted 30-boiler operating day rolling average. Compliance shall be demonstrated as determined in 40 CFR 63.10021(a) and (b) of the MATS rule.[38]

By proposing to incorporate an expiring permit condition, once the permit expires, the SIP will lack enforceable limits.[39] Furthermore, contrary to FL DEP's assertions that the boilers effectively control SO_2, as discussed in the Kordzi Report, the emission controls can be further optimized, indeed, emission data shows Unit 5 (as well as Unit 4) are capable of operating much

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[32] *Id.* at 6.
[33] Air Permit No. 0170004-059-AC (PSD-FL-383I) at 3.
[34] *Id.*
[35] Kordzi Report at 9, referencing Q/d data retrieved from: https://npca.maps.arcgis.com/apps/MapSeries/index.html?appid=73a82ae150df4d5a8160a2275591e45d.
[36] Kordzi Report at 8, citing Regional Haze Guidance at 23.
[37] "This air pollution construction permit is issued under the provisions of: Chapter 403 of the Florida Statutes (F.S.). and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.)." *Id.* at 1.
[38] FL DEP SIP Revision, Monitoring Provisions: 2021-01 at 12 (June 9, 2021). ("Draft SIP Monitoring Requirements")
[39] Furthermore, construction permits issued to meet the Act's Title I requirements must not expire.

below the SO_2 limit on a continuous basis - and the only reason it is not is because it is not constrained by an emission limit.[40]

As discussed in Section VII.A of our comments, FL DEP erroneously ignores consideration of NO_X emissions from *all* sources. While Units 4 and 5 are controlled by SCR systems, based on their operations, FL DEP should "examine whether the SCR systems could be optimized, which would very likely be very cost-effective."[41] Just like the current SO2 limit, "[t]he current [NO_X] limit[s] [of 0.20 – 0.70 lbs/MMBtu, depending on the fuel burned] clearly has no effect on the operation of these SCR systems."[42]

FL DEP should require a four-factor $SO_2$and NOx analysis be performed for Crystal River Units 4 and 5, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting optimization of controls.

2. Tampa Electric Company (TECO): Big Bend Station Units 3 and 4 SO_2 and NO_X

Big Bend Power Station Units 3 and 4 are located in Gibsonton, and were added to the plant in 1976 and 1985, respectively.[43, 44] The scrubber for Unit 4 began operation in 1985, and since 1995 also scrubs Unit 3. "Both units [3 and 4] are equipped with wet scrubbers and SCR systems. Both units are permitted to burn natural gas, coal, pet coke, coal residue or mixtures thereof."[45] FL DEP did not require a four-factor analysis for Units 3 and 4, instead, proposes that it is effectively controlled for SO_2 with wet scrubbers. FL DEP does not provide any analysis to support its proposed determination, it has not shown that a full four-factor analysis would likely result in the conclusion that no further controls are necessary.[46] Instead, the proposed SIP references an Air Construction Permit Revision issued on August 11, 2020, that *expired* on March 31, 2021. Notably, there is not a permit to incorporate because by its terms the permit expired more than three months ago. Specifically, the SIP proposes to incorporate the following four expired permit conditions:[47]

- Unit 3 Regional Haze SO_2 Emission Limit: Section 3, Subsection B, Specific Condition 1 (effective upon issuance on August 11, 2020) states that "As determined by CEMS, the SO_2 emission rate shall not exceed 0.20 lb/MMBtu based on a heat input-weighted 30-boiler operating day rolling average. Compliance shall be demonstrated as determined in §63.10021(a) and (b) of the MATS rule."
- Compliance Requirements: Section 3, Subsection B, Specific Condition 2 (effective upon issuance on August 11, 2020) states that "To show compliance

[40] Kordzi Report at 8.
[41] *Id.* at 9.
[42] *Id.*
[43] TECO Fact Sheet, https://www.tampaelectric.com/company/ourpowersystem/powergeneration/bigbend/. Enclosure 6).
[44] NPCA calculated the Q/d for this facility, which is 104.
[45] Kordzi Report at 9.
[46] Kordzi Report at 8, citing Regional Haze Guidance at 23.
[47] Draft SIP at 15.

with the SO_2 emission limit given in Specific Condition 1 of this subsection the testing, monitoring, recordkeeping, etc., shall be conducted in accordance with the requirements of 40 CFR 63, Subpart UUUUU."

- Unit 4 Regional Haze SO_2 Emission Limit: Section 3, Subsection C, Specific Condition 12 (effective upon issuance on August 11, 2020) states that "As determined by CEMS, the SO_2 emission rate shall not exceed 0.20 lb/MMBtu based on a heat input-weighted 30-boiler operating day rolling average. Compliance shall be demonstrated as determined in §63.10021(a) and (b) of the MATS rule."
- Compliance Requirements: Section 3, Subsection C, Specific Condition 13 (effective upon issuance on August 11, 2020) states that "To show compliance with the SO_2 emission limit given in Specific Condition 12 of this subsection the testing, monitoring, recordkeeping, etc., shall be conducted in accordance with the requirements of 40 CFR 63, Subpart UUUUU."

Contrary to FL DEP's proposed SIP that lacks a basis for exempting the four-factor analyses for these units and pollutants, as discussed in the Kordzi Report, "[b]oth units are permitted to burn natural gas, coal, pet coke, coal residue or mixtures thereof … [it] makes it difficult to ascertain the performance potential of the SCR and scrubber systems because low SO_2 and NO_X periods could also reflect partial natural gas usage."[48] Nevertheless, based on the analysis in the Kordzi Report, it is clear that Unit 3 "could have achieved much lower NO_X emissions." Indeed, "[m]odern SCR systems are capable of consistently achieving monthly NO_X emissions of 0.05 lbs/MMBtu or less.[49] For Unit 4, the Kordzi Report and data presented and analyzed indicate that "the SCR system was not being used to its full capability and is minimally operated to achieve its permitted 30 day rolling limit of 0.10 lbs/MMBtu."[50]

FL DEP should require a four-factor $SO_2$and NO_X analysis be performed for Big Bend Station Units 3 and 4, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting optimization of controls.

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[48] Kordzi Report at 9.

[49] *See* EPA's proposal at 76 Fed. Reg. 491 (Jan. 11, 2011), *see also* 76 Fed. Reg. 52,388 (Aug. 22, 2011). In particular, see the discussion at 76 Fed. Reg. 52,404: "The Havana Unit 9 data shows that it has operated under 0.05 lbs/MMBtu from mid-2009 to the end of 2010 on a continuous basis. In fact, this unit has operated under 0.035 lbs/MMBtu for much of that time. The Parish Unit 7 data shows that it has operated under 0.05 lbs/MMBtu from mid-2006 to mid 2010 on a continuous basis. In fact, this unit has operated for months at approximately 0.035 lbs/MMBtu, and for approximately 2 years at approximately 0.04 lbs/MMBtu. The Parish Unit 8 data show that it has operated almost continuously under 0.045 lbs/MMBtu since the beginning of 2006. Other units' data show months of continuous operation below 0.05 lbs/ MMBtu. We believe this data demonstrates that similar coal fired units that have been retrofitted with SCRs are capable of achieving NOx emission limits of 0.05 lbs/MMBtu on a continuous basis."

[50] Kordzi Report at 11.

3. Seminole Electric Cooperative, Inc. (SECI): Seminole Generating Station: Units 1 and 2 SO_2 and NO_X

The Seminole Generating Station Units 1 and 2 - a fossil-fueled electric plant - is located in Palatka and is permitted to burn coal and fuel oil.[51, 52] Both units are equipped with wet scrubbers and SCR systems.[53] FL DEP did not require four-factor analyses for these units and pollutants, instead the SIP proposes to incorporate the following permit condition into the SIP:

> Sulfur Dioxide (SO_2) Emission Standard: Section 3, Specific Condition 3 (effective upon issuance of the final permit) states that "When combusting coal in Units 1 and 2, the owner or operator shall not cause to be discharged into the atmosphere from either unit any gases which contain SO_2 in excess of 0.20 lb/MMBtu based on a heat input-weighted 30-boiler operating day rolling average. Compliance shall be demonstrated in accordance with 40 CFR 63.10021(a) and (b) of the MATS rule." [Rules 62-210.300(1) & 62-204.800, F.A.C. (Compliance with the Regional Haze Rule); and, 40 CFR 63.10021(a) & (b)].[54]

The issues with this approach are the same as those expressed above: (1) the permit expires on December 31, 2021; (2) FL DEP does not provide any analysis to support its proposed determination, it has not shown that a full four-factor analysis would likely result in the conclusion that no further controls are necessary;[55] and (3) emission monitoring data presented in the Kordzi Report shows both Units are capable of meeting much more stringent limits.[56]

FL DEP should require a four-factor SO_2 and NO_X analysis be performed for Seminole Generating Station Units 1 and 2 for the scrubber and SCR units, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting optimization of controls because "it is likely that both the wet scrubber and SCR systems could be optimized or upgraded cost-effectively."[57] FL DEP's SIP must be modified to include the permit requirements, "which require that the facility … to shut down either [of the fossil fuel-fired EGUs] Unit 1 or Unit 2 [by 2028], which is reflected in the VISTAS inventory"[58] as well as SIP conditions reflecting optimization of controls in the nearer term.

4. Suwannee River/Swift Creek Complex, White Springs Agricultural Chemicals, Inc., Nutrien White Springs Sulfuric Acid Plants (SAPs), SO_2

The Nutrien SAPs are located in White Springs and is a phosphate fertilizer manufacturer. As discussed in the Kordzi Report:

> FL DEP exempts the Nutrien White Springs Ag Chemical Plant based on its conclusion that recent upgrades to the Sulfuric Acid Plants (SAPs) required by a [seven-year old]

[51] Air Permit No. 1070025-037-AC at 1, Kordzi Report at 11.
[52] NPCA calculated the Q/d for this facility, which is 337.
[53] Kordzi Report at 11.
[54] Draft SIP Monitoring Requirements at 14.
[55] EPA Regional Haze Guidance at 2.
[56] Kordzi Report at 11.
[57] *Id.*
[58] Draft SIP at 152.

consent decree are consistent with recent BACT determinations made for similar double-absorption, sulfur burning SAPs.[59]

The two units are double-absorption, sulfur-burning SAPs that were required to reduce their SO_2 via catalyst upgrades. The efficiency of the SO_2 control for these systems is very site specific, and FL DEP neither provides the detailed information - nor did it require the source to provide the information. Thus, the public is prohibited from meaningfully reviewing and commenting on FL DEP's proposed approach. Moreover, FL DEP provides no supporting reasoning for what appears to be its assertion that the SAP's emission limitations are equivalent to a four-factor analysis, FL DEP does not:

- Cite any BACT determinations;
- Provide a basis for characterizing the other SAPs as similar to Nutrien;
- Explain how a BACT analysis meets the RP four-factor analysis requirements; and
- Explain the recent upgrades.

Additionally, as discussed in detail in the Kordzi Report:

> BACT-level control limits cannot be assumed to equal those that result from an actual four-factor analysis in which the best performing controls must be considered. This is especially true considering that these types of controls are very site-specific and the resulting SO_2 control levels on a pound of SO_2 per ton of sulfuric acid can vary considerably.[60]

Based on an Air Construction permit, FL DEP proposes the following emission limits for the SAPS:[61]

Figure 2. Proposed Emission Limitations for Nutrien White Springs Sulfuric Acid Plants

SAP	Emission Limit	CD Compliance Date
Phase 1 – SAP F	2.6 lb/ton, 3-hr rolling average [1], **effective**	January 1, 2018 **(enforce)**
Phase 1 – SAP F	2.3 lb/ton, 365 day rolling average [2], **effective**	January 1, 2018 **(enforce)**
Phase 2 – SAP E	2.6 lb/ton, 3-hr rolling average [1]	January 1, 2020 or upon production exceeding 2,500 TPD, whichever is earlier
Phase 2 – SAP E	2.3 lb/ton, 365 day rolling average [2]	January 1, 2020 or upon production exceeding 2,500 TPD, whichever is earlier

1. Not including startup and shutdown periods.
2. Including startup and shutdown periods.

In addition to whether the limits represent RP, there are several issues with FL DEP's proposed emission limits. First, the emission limits exclude startup and shutdown periods. This is an issue

[59] *Id*. at 12.
[60] *Id.*
[61] Permit No. 0470002-122-AC, which expires on December 31, 2021, and allows for production increases Sulfuric Acid Plants (SAPs) E and F, at 1.

because under the Act SIP emission limitations must apply at all times.[62] Second, the compliance date for Phase 2 includes two options, once of which is time-specific, and as that date has passed, it is inappropriate for FL DEP to include the superfluous information. Third, for SAP E, which has the emission limit requirements as Phase 1 SAP F, the Phase 1 limits include "effective" and "enforce" language that is highlighted, and Phase does not contain this language. FL DEP has not made clear the difference between Phase 1 and Phase 2.

Moreover, Kordzi's review of "other similar sulfur burning SAPs"[63] explains that there are other SAPs with much lower limits than White Springs. Indeed, Nutrien admits this in its reply to FL DEP.[64] Finally, just because an emission limit for another plant is in a CD does not mean it is the "best" and most stringent limit the White Springs SAPs can meet.

FL DEP "must provide documentation and analysis showing that these controls are indeed equivalent to the best performing controls"[65] or should require a four-factor $SO_2$and NO_X analysis be performed for SAPs, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting reasonable progress control requirements.

5. Mosaic Fertilizer, LLC, New Wales Facility

Mosaic Fertilizer, LLC, New Wales facility is a phosphate fertilizer manufacturing facility located in Mulberry.[66] FL DEP proposes to exempt the SO2 emissions from the SAP Units 1-3 based on the following limits in its December 2017 SO_2 NAAQS SIP: a limit of 3.5 lb SO_2 per ton of 100% sulfuric acid on a 24-hr rolling average, and 4 lb/ton SO_2 on a 3-hour rolling average. As presented in the Kordzi Report, FL DEP has not demonstrated that these limits are equivalent to a four-factor analysis. Furthermore, while FL DEP explains that it found "SO_2 BACT determinations for sulfur burning, double absorption sulfuric acid plants with cesium-promoted catalysts in EPA's RACT/BACT/LAER Clearinghouse database are in the range of 3.0 to 4.0 lb/ton … [and] concludes these units are effectively controlled, and additional reasonable controls are unlikely to be found"[67] FL DEP does not present the data it refers to. Thus, the public is prohibited from meaningful review and comment. Moreover, "the range of 3.0 to 4.0 lb/ton represents a *potential increase* of 33% in the SO_2 emissions."[68] FL DEP should not use "[s]uch a wide range … to characterize the acceptable range of best performing controls."[69] Additionally, FL DEP's earlier determination is outdated and stale since it was made more than three years ago. Finally, FL DEP does not propose including these limits in its proposed regional haze monitoring plan. For these and the other issues identified in the Kordzi Report, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or should require a four-factor $SO_2$and NO_X analysis be performed for

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[62] See discussion in Section VI.
[63] *Id.,* citing Consent Decree for *United States of America et al v. PCS Nitrogen Fertilizer, L.P., Sulfuric, Inc., and White Springs Agricultural Chemicals Inc.,* Case No: 3:14-cv-007707-BAJ-SCR, Doc. 2-1 (Filed Nov. 6, 2014) at 13, https://www.epa.gov/sites/production/files/2014-11/documents/pcsnitrogenfertilizer-cd.pdf. (Enclosure 7)
[64] Kordzi Report at 12, citing Appendix G-2g at 5.
[65] Kordzi Report at 12.
[66] NPCA calculated the Q/d for this facility, which is 43.
[67] Kordzi Report at 12.
[68] *Id.*
[69] *Id.*

SAPs, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting reasonable progress controls.

6. Mosaic Fertilizer, LLC, Bartow Facility SAPs

The Bartow Facility is a SAP located in Bartow.[70] FL DEP proposes to exempt the SO2 emissions from the SAP Nos. 4-6 because they are each required to meet a limit of 4 lb/ton of 100% sulfuric acid [again, FL DEP neither specifies the averaging period(s)],[71] nor does its proposed SIP monitoring plan include this facility. The public is not provided an opportunity to review and comment on the emission limits and monitoring, recordkeeping and reporting requirements. As discussed in the Kordzi Report, FL DEP has not demonstrated that these limits are equivalent to a four-factor analysis. Furthermore, while FL DEP explains that it found "SO_2 BACT determinations for sulfur burning, double absorption sulfuric acid plants with cesium-promoted catalysts in EPA's RACT/BACT/LAER Clearinghouse database are in the range of 3.0 to 4.0 lb/ton … [and] concludes these units are effectively controlled, and additional reasonable controls are unlikely to be found,"[72] FL DEP does not present the data it refers to. The public is prohibited from meaningful review and comment. Moreover, "the range of 3.0 to 4.0 lb/ton represents a *potential increase* of 33% in the SO_2 emissions."[73] FL DEP should not use "[s]uch a wide range … to characterize the acceptable range of best performing controls."[74] For these and the other issues identified in the Kordzi Report, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or should require a four-factor SO_2 analysis be performed for SAPs, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting reasonable progress control requirements.

7. Breitburn Operating

FL DEP's only suggestion to exclude the Breitburn Operating facility from the four-factor analysis is that it is more than 300 km to the nearest Class I Area.[75, 76] As discussed in the Kordzi Report, this reasoning does not fall within the four-factors and thus does not support a valid conclusion for excluding it from the required four-factor analysis.[77] FL DEP should clarify this source's standing.

8. Deerhaven Generating Station

The FL DEP excludes the Deerhaven Generating Station from the four-factor analysis requirement based on "implement[ion of] a fuel co-firing project that will allow it to co-fire up to 100% natural gas, which will lead to substantial reductions of SO_2 emissions in the future."[78]

[70] NPCA calculated the Q/d for this facility, which is 132.
[71] Kordzi Report at 12.
[72] *Id.*
[73] *Id.*
[74] *Id.*
[75] Kordzi Report at 13.
[76] NPCA calculated the Q/d for this facility, which is 72.
[77] Kordzi Report at 13.
[78] *Id*.

However, the facility is not restricted to burning only natural gas, it can fire all gas, all coal, or a combination thereof. Therefore, while Unit 2 is the only coal-fired unit at Deerhaven, its recent ability to fire natural gas does not mean it will [exclusively] do so. As with retirements, unless FL DEP secures an enforceable commitment in its SIP, it must either eliminate Deerhaven under a valid method, or subject it to a proper four-factor analysis.[79]

B. Issues Regarding FL DEP's Proposed Four-Factor Analyses

1. Georgia-Pacific, Foley Cellulose, LLC, Foley Mill

The Foley Cellulose Perry Mill is a softwood Kraft Process Pulp Mill that manufactures bleached market pulps and dissolves cellulose pulps and is located in Perry. In the proposed SIP "Florida commits to providing a supplemental SIP to *complete* the four-factor analyses for Foley Cellulose Perry Mill."[80] Yet, Florida does not provide a date by when it will submit the SIP to EPA.

"FL DEP states that it is still in the process of reviewing Foley's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete."[81] As discussed in the Kordzi Report, the Foley analysis should be greatly revised. For example, rather than follow the RHR provisions that explain how feasibility of controls is defined, Georgia Pacific limited its search to one EPA database, apparently omitting other control options in use at similar facilities, including one in Florida.[82] Additionally, FL DEP should evaluate restricting the sulfur limit in the fuel oil burned to further reduce SO2 emissions.[83] Georgia Pacific also did not provide detailed supporting information for its cost calculations, thus the public is prevented from reviewing and commenting on its cost numbers. Despite the limited information provided, the Kordzi Report identifies numerous issues with the cost analysis.[84] FL DEP must correct Georgia Pacific's erroneous assertion that controls installed to control emissions at the bark boiler control SO2 emissions. Georgia Pacific provides no support for this assertion; indeed those controls were permitted to control particulate emissions.[85] Finally, the four-factor analysis relies on cost information that is more than five years old, which is too stale to rely on.

For these and the other issues identified in the Kordzi Report, FL DEP should require a complete and fully documented four-factor SO_2 analysis, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting the best performing controls. In sum, the Foley Cellulose Pulp Paper Mill analysis lacks information and consideration of **emission reduction options that must be further explored** including other wet scrubbers, dry scrubbers, and fuel switching.

[79] *Id*.
[80] Draft SIP at 7 (emphasis added).
[81] Kordzi Report at 13.
[82] *Id.*
[83] *Id.*
[84] *Id.*
[85] *Id.*

2. JEA Northside Generating Station Facility

The Northside Generating Station (NGS) is located in north Jacksonville. FL DEP's analysis proposes to exempt Units 1 and 2 from the SO_2 four-factor analyses because they are exceeding the MATS limit 0.20 lbs/MMBtu and are capable of achieving SO_2 limits of 0.15 lbs/MMBtu. The units are controlled with dry scrubbers, however, because the units burn a mixture of fuels and adequate data is not disclosed, the public cannot assess and comment on the efficiency of the controls. Therefore, as described in the Kordzi Report, "FL DEP should require that a four-factor analysis be performed that investigates the cost-effectiveness of optimizing the dry scrubber systems for these units. It is anticipated that any upgrades to these systems would be very cost-effective.[86]

The SNCR system for Units 1 and 2, which has a permit limit of 0.09 lbs/MMBtu on a 30 day rolling average basis, is not operated consistently. For this and the other reasons presented in the Kordzi Report (*e.g*., inflated interest rate, short 20-year life, incorrect fuel usage, additional fuel transportation costs that are not appropriate or have not been documented as justified), FL DEP should investigate this observation and if confirmed require that a four-factor analysis be performed that investigates the cost-effectiveness of continuously operating as well as optimizing the SNCR system for these units, which would appear to be very cost-effective.[87]

Finally, we support FL DEP's request for additional information on upgrades and optimization at Northside Unit 3 and urge the state to require the facility to **eliminate the burning of fuel oil altogether.**

3. WestRock Fernandina Beach

WestRock CP, LLC (WestRock) operates a fully integrated Kraft linerboard mill. WestRock Fernandina Beach, draft Minor Air Construction Permit.[88] For power boiler No. 7, FL DEP merely proposes a usage limitation of 125 tons per day of coal. WestRock acknowledges the unit capable of burning 100 percent natural gas, and yet erroneously suggests using less than 10% coal would fundamentally change the boiler.[89] If the boiler is capable of burning 100 percent natural gas it would be a fundamental change for FL DEP to consider and require it as a fuel in a four-factor analysis.[90] The other issues raised by WestRock should also be investigated by FL DEP and not accepted without justification and investigation.[91] For example, many cost items - which are not typically claimed as confidential - were so claimed by WestRock.[92] FL DEP's proposed SIP does not indicate that it independently verified these cost items, which it should.[93] WestRock also redacted the cost algorithms for the SDA systems, greatly modifying them.[94] The public is not able to review and reproduce WestRock's methodology, and FL DEP

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[86] Kordzi Report at 17-18.
[87] *Id.*
[88] Draft Air Permit No. 0890003-072-AC, for "No. 7 Power Boiler Regional Haze SO2 Reduction Project."
[89] Kordzi Report at 21.
[90] *Id.*
[91] *Id.*
[92] *Id. (*For example, "[t]hese items include (1) the cost factors and rates for operator and maintenance labor, electricity, chemicals, freshwater, and wastewater, and (2) sorbent, auxiliary power and waste disposal costs."*)*
[93] Kordzi Report at 21.
[94] *Id.*

must require the equations be provided as well as address the other issues described in the Kordzi Report. FL DEP must remove the general and administrative, property tax, and insurance cost items that WestRock added at the end because these cost items are inherently included in the cost algorithms.[95] Finally, WestRock Fernandina Beach Mill's boiler No. 7 should be **restricted to burning natural gas alone,** as eliminating coal as a fuel will reduce almost all SO_2 emissions from the facility.

4. WestRock Panama City

WestRock Panama City is a pulp and paper mill. FL DEP's SIP explains that " it is still in the process of reviewing Panama City's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete."[96] Thus, FL DEP does not have a proposed determination in the SIP for the public to review. Therefore, our comments focus on WestRock's four-factor analysis. There are fundamental issues with WestRock's analysis, which include: use of a 15-year (or 20-year); an interest rate of 4.75% that was not justified; and use of owner's costs and AFUDC are not allowed under the Control Cost Manual overnight methodology.[97] WestRock further alleges various options are "infeasible" - when in fact the concerns raised go to costs and not feasibility.[98] For these and the numerous other issues discussed in the Kordzi Report,[99] FL DEP FL must require a complete and fully documented four-factor analysis, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting reasonable progress control requirements. In sum, **analysis for WestRock Panama City is incomplete**. As FL DEP obtains additional information from the company the State must analyze fuel switching (to natural gas or lower emitting fuels) and additional SO_2 controls for boilers Nos. 3 and 4.

V. FL DEP Must Consider Emissions from and Include Emission Limitations on Pre-harvest Sugarcane Field Burning

More than 400,000 acres of sugarcane are grown in the Everglades Agricultural Area (EAA), where the pre-harvest field burning season lasts eight months (October-May). Palm Beach County alone, where 75% of the total sugarcane acreage is grown within the EAA, emits more emissions from agricultural fires stemming from annual sugarcane field burning than any other county in the entire United States for pollutants including $PM_{2.5}$, PM_{10}, NH_3, CO, NO_X, SO_2, VOC's, Acetaldehyde Benzene, Formaldehyde and more.[100]

Pre-harvest sugarcane burning releases greenhouse gas emissions and pollution which contributes to regional haze and climate change while also contributing to the pollution of nearby

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[95] *Id.*
[96] *Id.* at 22.
[97] *Oklahoma v. EPA*, 723 F.3d 1201, 1219 (10th Cir. 2013).
[98] Kordzi Report at 23 (Paragraph 93.).
[99] *Id.* at 22-25.
[100] EPA Air Emissions Inventories, 2017 National Emissions Inventory Data, https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#datas.

waterways through atmospheric deposition[101] and increases rates of soil subsidence[102] that threaten the long-term viability of agriculture within the EAA.

Medical research[103] has linked exposure to pre-harvest sugar field burning pollution to a wide variety of health issues including respiratory disease, cancer, kidney disease, and poor infant health outcomes; those most at risk are children and the elderly.

The current inherently racist wind-based sugarcane burning regulations[104] deny burn permits if winds are projected to blow the toxic smoke and ash plumes toward the more affluent Eastern Palm Beach County and Eastern Martin County communities near the coast while burn permits are currently approved with minimal/ineffective protections provided when the wind blows toward the predominately African-American and Latinx residents of the Glades communities of Western Palm Beach County, in addition to rural communities in Western Martin County, Hendry County, and Glades County. The EPA's Environmental Justice Screening and Mapping Tool[105] shows the Glades communities rank on average in the 80–100 percentile risk range for both cancer and respiratory health impacts as compared to the other EPA region, state, and national census block groups. The Glades communities, surrounded by 75% of the total sugarcane acreage within the EAA, should not have to disproportionately bear the brunt of the toxic, unnecessary, and outdated practice of pre-harvest sugar field burning in addition to 8 months of persistent ash fall called "black snow" while more affluent and whiter communities to the east of the EAA are given prioritized regulatory protection from the pollution produced by pre-harvest sugar field burning.

The Florida sugar industry is behind the times: Sugarcane growers in Louisiana, Brazil, Australia, Zimbabwe, and elsewhere in the world[106] are already switching from pre-harvest burning to modern, sustainable, green harvesting and benefiting from the utilization of sugarcane trash (leaves and tops) as an added resource and/or source of income. And yet the Florida sugar industry already green harvests[107] small amounts of sugarcane each year when it is convenient for them. A switch to green harvesting will not only improve visibility, public health and protect the environment but will also provide new economic opportunities for communities in and around the EAA and the industry itself; this has been exemplified in nations around the world where the switch has been made.

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[101] Kim H. Haag, Ronald L. Miller, Laura A. Bradner, and David S. McCulloch, "Water-Quality Assessment of Southern Florida: An Overview of Available Information on Surface and Ground-Water Quality and Ecology," U.S. Geological Survey Water-Resources Investigations Report 96-4177 (1996) https://pubs.usgs.gov/wri/1996/4177/report.pdf. (Enclosure 8)

[102] Jehangir H. Bhadha, Alan L. Wright, and George H. Snyder, "Everglades Agricultural Area Soil Subsidence and Sustainability," IFAS Extension University of Florida, Pub. # SL 311 (March 2, 2020) https://edis.ifas.ufl.edu/publication/ss523. (Enclosure 9)

[103] Stop Sugar Field Burning Now, Health Data, http://stopsugarburning.org/resources/#health.

[104] Stop Sugar Field Burning Now, Sugarcane Burning Rules, http://stopsugarburning.org/resources/#burningrules.

[105] EPA EJSCREEN: Environmental Justice Screening and Mapping Tool, https://www.epa.gov/ejscreen. (Enclosure 10)

[106] Stop Sugar Field Burning Now, Global Green Harvesting Trends, http://stopsugarburning.org/resources/#harvesting.

[107] Stop Sugar Field Burning Now, Green Harvesting Solutions, http://stopsugarburning.org/green-harvesting-solution/.

FL DEP's SIP proposal unlawfully fails to consider the full range of emissions from both point and nonpoint source pre-harvest sugar field burning emitted by the Florida sugar within its SIP. First, in developing its long-term strategy, DEP "must identify all anthropogenic *sources* of visibility impairment."[108] This should include consideration of all major and minor stationary sources, mobile sources, and area sources.[109] Florida's SIP defines a "major source" as, among other things, "a facility containing an emissions unit, or any group of emissions units," that "emits or has the potential to emit, in the aggregate, 10 tons per year or more of any one hazardous air pollutant (HAP), 25 tons per year or more of any combination of HAPs," as well as "[a]ny stationary source which emits, or has the potential to emit, 250 tons per year or more of a PSD pollutant . . . ."[110] An "emissions unit," in turn, is defined broadly as "[a]ny part or activity of a facility that emits or has the potential to emit any air pollutant,"[111] while a "facility" is defined as "[a]ll of the emissions units which are located on one or more contiguous or adjacent properties, and which are under the control of the same person (or persons under common control)."[112]

FL DEP's broad definition of a major source clearly encompasses a sugarcane field, which emits air pollutants when burned. A cane field also falls under the Clean Air Act's definition of a "stationary source" as "any building, structure, facility, or installation which emits or may emit any air pollutant." 42 U.S.C. § 7411(a)(3). Moreover, EPA has rejected the position that this broad definition of major source excludes agricultural operations.[113] Indeed, a stationary source does not require a smokestack, either literally or figuratively: EPA regulates municipal landfills as stationary sources, and concentrated animal feeding operations—whose emissions come in large part from animal waste found in open lagoons and ponds—"plainly fit the definition of stationary source[s]."[114] Thus, each field of burning sugarcane is clearly a "stationary source" under the Clean Air Act. Accordingly, FL DEP "must evaluate" any such source of visibility impairment "and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life" of the source.[115]

Given the close proximity of EAA sugarcane burning to the Everglades Class I Area and the broad definition of stationary source under the Clean Air Act and Florida's SIP, FL DEP must require that Florida sugar mills and associated cane fields perform a full four-factor analysis of emission reduction measures from pre-harvest sugar field burning that are necessary to ensure reasonable progress. As reflected in the attached comments, which we incorporate by reference, Green Harvesting (*i.e.*, cane harvesting without burning) is a readily available, cost-effective alternative to pre-harvest sugar field burning that FL DEP should require to not only eliminate the environmental injustice of disparate protection from smoke and ash, but mitigate

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[108] 40 C.F.R. § 51.308(d)(3)(iv) (emphasis added).
[109] *Id.*
[110] Fla. Admin Code R. 62-210.200(155).
[111] Fla. Admin Code R. 62-210.200(99).
[112] Fla. Admin Code R. 62-210.200(107).
[113] *Ass'n of Irritated Residents v. Fred Schakel Dairy*, 61 Env't Rep. Cas. (BNA) 1801 (E.D. Cal. Dec. 2, 2005) ("[I]t is the EPA's position that the CAA does not exempt major stationary agriculture sources.").
[114] 67 Fed. Reg. 63,551, 63,556-57 (Oct. 15, 2002).
[115] 40 C.F.R. § 51.308(d)(i).

climate change, create green jobs, and protect nearby Class 1 areas, such as Everglades National Park. At a minimum, FL DEP must reevaluate and require Green Harvesting as part of the "[b]asic smoke management practices for prescribed fire used for agricultural . . .vegetation management" that must be included in any Regional Haze SIP.[116]

VI. The Proposed SIP Does Not Contain Provisions to Ensure Emission Limitations are Permanent and Enforceable

A. The Proposed SIP Does Not Contain Provisions to Ensure Emission Limitations are Permanent, Enforceable and Apply at All Times

The CAA requires that states submit implementation plans that "contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal" of achieving natural visibility conditions at all Class I Areas.[117] The RHR requires that states must revise and update their regional haze SIP, and the:

> Periodic comprehensive revisions must include the *enforceable emissions limitations*, compliance schedules, and other measures that are necessary to make reasonable progress as determined pursuant to [51.308](f)(2)(i) through (iv)."[118]

Furthermore, EPA's RH Guidance further explains these requirements:

> This provision requires SIPs to include enforceable emission limitations and/or other measures to address regional haze, deadlines for their implementation, and provisions to make the measures practicably enforceable including averaging times, monitoring requirements, and record keeping and reporting requirements.[119]

Thus, EPA's RH Guidance recognizes EPA's long-standing position that SIPs must contain provisions with enforceable emissions limitations.

Additionally, while the SIP is the basis for demonstrating and ensuring state plans meet the regional haze requirements, state-issued permits must complement the SIP and SIP requirements.[120] State-issued permits must not frustrate SIP requirements.[121] For example, sources with PSD and minor source construction permits under Title I must not hold permits that allow emissions that conflict with SIP requirements.[122] Additionally, the Act's Title V operating

[116] 40 C.F.R. § 51.308(f)(2)(iv)(D).
[117] EPA 2019 RH Guidance at 42-43 (While NPCA filed a Petition for Reconsideration regarding EPA's issuance of the 2019 Guidance, it does not dispute the information in the Guidance referenced here regarding enforceable limitations, which cite to the "General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 74 Fed. Reg. 13,498 (April 16, 1992).
[118] 74 Fed. Reg. 13,568 (emphasis added).
[119] EPA 2019 RH Guidance at 42-43.
[120] 74 Fed. Reg. 13,498, 13,568 (April 16, 1992).
[121] Furthermore, to the extent stationary sources are granted permits by rule or other mechanisms, these other categories that allow construction and operation must also complement SIP requirements.
[122] Additionally, the proposed SIP revisions fail to contain source-specific "measures to mitigate the impacts of construction activities." 40 C.F.R. § 51.308(d)(3)(v)(B).

permits collect and implement all the Act's requirements–including the requirements in the SIP–as applicable to the particular permittee. Sources with Title V permits must not hold such permits if they contain permit terms and conditions that conflict with the SIP and Act's SIP requirements. Thus, the RP emission limits and other requirements included in FL DEP's regional haze SIP must be practically enforceable and adopted into the SIP, which means they need to contain the elements necessary for enforceability. FL DEP's proposed SIP lacks these required elements and the final SIP must include them. For example:

- FL DEP's proposed SIP refers to permit provisions that are not - and should be - included in the proposed SIP. The proposed SIP explains that "OUC Stanton has announced that it will end coal-firing by the end of 2027, and the units are already co-firing natural gas,"[123] and yet the proposed SIP materials do not include language to make these provisions enforceable.

- SIPs with emission limitations must contain record keeping and reporting requirements,[124] and the proposed SIP provisions lack these requirements.[125]

- The proposed SIP's references to the MATS rule and "40 CFR, 63, Subpart UUUUU"[126] for compliance are problematic. For purposes of SIP rules, "[a]s an enforceable method, States may use: (1) Any of the appropriate methods in appendix M to this part, Recommended Test Methods for State Implementation Plans; or (2) An alternative method following review and approval of that method by the Administrator; or (3) Any appropriate method in appendix A to 40 CFR part 60."[127] Neither the MATS rule nor Subpart UUUUU fall under one of these categories. For Crystal River, FL DEP proposes to rely on the following provision in a permit:

  > As determined by CEMS data, SO_2 emissions shall not exceed 0.20 lb/MMBtu based on a heat input-weighted 30-boiler operating day rolling average. Compliance shall be demonstrated as determined in 40 CFR 63.10021(a) and (b) of the MATS rule.[128]

[123] Pre-Hearing SIP Revision: 2021-01 at 288.
[124] *See, e.g.*, 40 C.F. R. § 51.211, Emission reports and recordkeeping. "The plan must provide for legally enforceable procedures for requiring owners or operators of stationary sources to *maintain records of and periodically report* to the State—(a) Information on the nature and amount of emissions from the stationary sources; and (b) Other information as may be necessary to enable the State to determine whether the sources are in compliance with applicable portions of the control strategy."(emphasis added) 40 C.F.R. § 51.210, General. "Each plan must provide for *monitoring the status of compliance* with any rules and regulations that set forth any portion of the control strategy. Specifically, the plan must meet the requirements of this subpart."
[125] Duke Crystal River Citrus (this is the only facility that has a vague records requirement), Duke Crystal River, JEA Northside Units 1 and 2, JEA Northside Unit 3, Nutrien White Springs, Seminole Generation Station, TECO Big Bend, and WestRock Fernandina Beach Mill.
[126] FL DEP SIP Revision, Monitoring Provisions: 2021-01, TECO Big Bend at 14-15.
[127] 40 C.F.R. § 51.212(c).
[128] FL DEP SIP Revision, Monitoring Provisions: 2021-01 at 12 (June 9, 2021). ("Draft SIP Monitoring Requirements")

This provision is inadequate because in addition to not falling into one of the categories identified in 40 C.F.R. § 51.212(c), 40 C.F.R. §§ 63.10021(a), (b) - as well as the broad reference to Subpart UUUUU - contains numerous options to demonstrate compliance and FL DEP's proposal does not specify which methodology applies to this and the other sources[129] that reference these regulations.

- SIPs that rely on continuous emission monitoring must include specific methodology and requirements in accordance with EPA's regulations,[130] which FL DEP's proposed SIP does not.

- The SIP must not contain conflicting methods for determining compliance. For the Duke River Citrus Company Combined Cycle facility the proposed SIP contains non-EPA methods[131] and then requires that those methods "shall be used to determine the fuel content *in conjunction with* the provisions of 40 CFR 75 Appendix D."[132] FL DEP must use EPA-approved methods.

- The draft SIP proposes to include two entire permit applications as part of the enforceable requirements; however, FL DEP did not include the permit applications in the materials for public review and comment.[133] FL DEP must either remove these references from the proposed SIP or renotice the SIP and provide an opportunity for the public to review and comment on the applications it intends to submit to EPA as part of the proposed SIP.

- The SIP emission limitations must apply at all times. FL DEP's proposed SIP contains provisions for the JEA Northside Units 1 and 2 that would exclude emissions during "periods of startup, shutdown and malfunction."[134] This is contrary to the Act's and EPA's requirements,[135] and Florida must remove these from the proposed SIP. As the Administrator explained in disapproving

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[129] The provisions for which FL DEP erroneously suggests relying on the MATS rule include: Duke Crystal River; Seminole Generating Station; and TECO Big Bend. Draft SIP Monitoring Requirements at 12, 14, 15.
[130] 40 C.F.R. § 51.214.
[131] In addition to providing for the use of non-EPA methods (ASTM), the SIP allows for "more recent versions" of those methods. The public must have an opportunity to review and comment on SIP provisions, and allowing the source to change methods outside the SIP public notice and comment process is not allowed.
[132] Draft SIP Monitoring Requirements at 12 (emphasis added).
[133] JEA Northside Unit 3 ("Application No. 0310045-057-AC") Draft SIP Monitoring Requirements at 13; WestRock Fernandina Beach Mill ("Application No. 0890003-072-AC").
[134] Draft SIP Monitoring Requirements at 12.
[135] *See, e.g.,* 52 Fed. Reg. 45,109 (Nov. 24, 1987); Steven Herman, Assistant Administrator for Enforcement and Compliance Assurance, and Robert Perciasepe, Assistant Administrator for Air and Radiation, "State Implementation Plans (SIPs): Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown," (Sept. 20, 1999), https://www.epa.gov/nsr/state-implementation-plans-policy-regarding-excess-emissions-during-malfunctions-startup-and (Enclosure 11); *see also*, 76 Fed. Reg. 52,604, 52,617-8 (Aug. 23, 2011) (EPA explained in its proposed disapproval of the Kansas RH SIP that because the provisions for Kansas City Power and Light included an automatic exemption from compliance with applicable emission limits for startup, shutdown, malfunction emissions they were inconsistent with EPA's RH rule and its September 20, 1999, guidance.); 76 Fed. Reg. 80,754, 80755-6 (Dec. 27, 2011) (EPA explained in its final action on the Kansas RH SIP the State withdrew the unapprovable startup, shutdown, malfunction provisions and thus the agency did not need to act on them.)

Wyoming's exemptions for startup, shutdown and malfunction emissions from the RH SIP requirements:

> The RHR states that 'Section 302(k) of the CAA requires emissions limits such as BART [and RP] to be met on a continuous basis. Although this provision does not necessarily require the use of continuous emissions monitoring, it is important that sources employ techniques that ensure compliance on a continuous basis.' 70 FR 39172. The rule goes on to state that '[m]onitoring requirements generally applicable to sources … are governed by other regulations." *See, e.g.*, 40 CFR part 64 (compliance assurance monitoring); 40 CFR 70.6(a)(3) (periodic monitoring); 40 CFR 70.6(c)(1) (sufficiency monitoring) (70 FR 39172). Therefore, it is clear that the rule intended for BART [and RP] emission limits to be met on a continuous basis and did not provide either explicitly or implicitly exceptions for startup, shutdown, or malfunction.[136]

- The proposed SIP does not specify the compliance dates for purposes of the RH RP SIP requirements. The proposed SIP identifies some State effective dates for the permits, but not enforcement of the SIP.[137] Since the permits either have or will expire and the emission limitations are for purposes of the SIP requirements, FL DEP must specify the effective date of these provisions for the SIP (*i.e.*, are they effective when adopted by the State into the SIP, or is effectiveness delayed until EPA's final action).

- The SIP lacks methodology for determining compliance. For example, the emission limitations for Nutrien (*i.e.*, pounds per ton and production limits in tons per day) lack methodology to determine compliance. Similarly, the tons per day limitations for WestRock Fernandina Beach lacks methodology.

- Use of emissions data from 40 C.F.R. Part 75,[138] must contain the following requirements for SIP use: (1) the owner/operator of each unit shall maintain, calibrate, and operate a CEMS, in full compliance with the requirements found at 40 CFR part 75, to accurately measure emissions, diluent, and stack gas volumetric flow rate from each unit. (2) Method. (A) For any hour in which fuel is combusted in a unit, the owner/operator of each unit shall calculate the hourly average SO2 emission rate in lb/MMBtu at the CEMS in accordance with the

[136] 79 Fed. Reg. 5032, 5170 (Jan. 30, 2014).
[137] For example, the Duke Crystal River Citrus Co. Combined Cycle's fuel sulfur limit was effective upon issuance of the permit on December 16, 2014; Duke Crystal River SO2 limit was effective upon issuance of the permit on October 30, 2020; JEA Northside Units 1 and 2 does not include a permit compliance date; JEA Northside Unit 3 is a draft and FL DEP must renotice the SIP to allow for public review and comment of those provisions; Nutrien White Springs SO2 emission limit was effective in the permit on December 21, 2018; Seminole Generating Station SO2 emission limits were effective upon issuance of the permit on April 14, 2021; TECO Big Bend SO2 emission limits were effective upon issuance of the permit on August 11, 2020; and WestRock Fernandina Beach Mill coal cap is a proposed permit with two effective dates January 1, 2022 and April 1, 2024. Pre-Hearing SIP Revision: 2021-01 at 11-16.
[138] This applies to data collected for the following sources: Crystal River Citrus Co. Combined Cycle; JEA Northside Units 1 and 2;

requirements of 40 CFR part 75. At the end of each operating day, the owner/operator shall calculate and record a new 30-day rolling average emission rate in lb/ MMBtu from the arithmetic average of all valid hourly emission rates from the CEMS for the current operating day and the previous 29 successive operating days. (B) An hourly average SO2 emission rate in lb/MMBtu is valid only if the minimum number of data points, as specified in 40 CFR part 75, is acquired by both the pollutant concentration monitor (SO2) and the diluent monitor. (C) Data reported to meet the requirements of this section shall not include data substituted using the missing data substitution procedures of subpart D of 40 CFR part 75, nor shall the data have been bias adjusted according to the procedures of 40 CFR part 75

- The compliance provisions do not allow for use of "any credible evidence" to enforce the emission limitations. FL DEP must amend its RH SIP proposal to all for use of any credible evidence.[139]

B. FL DEP Must Use Its Authority Under State Law and Require Emission Limitations in the SIP That Result in Reductions of Visibility Impairing Pollutants

For the second planning period, FL DEP requested four-factor analyses from a few sources and noted the RP requirement in EPA's regulations.[140] FL DEP's proposed SIP relies exclusively on *existing* permits for the following eight sources and only proposes minor emission controls on two sources.[141] Rather than rely on existing permits that did not take the regional haze requirements into consideration, in order to meet the Act's regional haze requirements, FL DEP should use its authority under State law and adopt emission limitations directly in the SIP that reduce emissions from its RP sources.[142]

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[139] "Enforceable test methods for each emission limit specified in the plan. For the purpose of submitting compliance certifications or establishing whether or not a person has violated or is in violation of any standard in this part, the plan must not preclude the use, *including the exclusive use, of any credible evidence or information*, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed…" 40 C.F.R. § 51.212(c) (emphasis added).
[140] *See,* Proposed SIP, Appendix G-1, Memorandum via Electronic Mail, from Jeff Koerner, Director Division of Air Resource Management, to Duke Energy Crystal River Power Plant", at 1-2 (June 22, 2020) ("Pursuant to 40 CFR 51.308(f)(2)(i), as part of the SIP development process, states must evaluate and determine whether any cost-effective emission reduction measures and strategies are available to ensure reasonable progress toward natural visibility conditions in each Class I area in the current implementation period.")
[141] Lower sulfur No. 6 fuel oil for Northside Unit 3, and limiting coal to 125 tons per day on Westrock Unit 7 (basically reflecting current usage).
[142] The Department clearly has authority to impose emission limitations directly in its SIP, including provisions that require retirement. Indeed, there are no limitations regarding the Department's authority in the Florida statute and regulations. For example, the Department "shall have the power and the duty to control and prohibit pollution of air and water in accordance with the law and rules adopted and promulgated by it and, for this purpose, to: (1) *Approve and promulgate* current and *long-range plans developed to provide for air* and water *quality control and pollution abatement*." Fla. Stat. § 403.061(1) (emphasis added). The State also has overarching legal authority to "adopt rules for control of air pollution in the state" Fla. Stat. § 403.061(7); "take enforcement action against violators of air pollution laws, rules, and permits" Fla. Stat. § 403.061(8); "establish and administer an air pollution control program" Fla. Stat. § 403.061(9); "require reports from air pollutant emission sources" Fla. Stat. § 403.061(13); "[p]erform *any* other act necessary to *control* and prohibit *air* and water *pollution*…" Fla. Stat. § 403.061(29)" and

C. FL DEP Proposes Including in the SIP Excerpts from Permits That Either Have or Will Soon Expire

FL DEP proposes including in the SIP various types of permits that either have or will soon expire.[143] The Act, EPA's regulations and guidance require that emission limitations and related provisions for practical enforceability are *permanently* enforceable. In relying on permits that are not permanent, FL DEP has not met this requirement.[144] FL DEP must include emission limitations in its proposed SIP that are permanent, and as discussed above, it has authority to do so directly without relying on a permit.[145]

D. Retirements

FL DEP should not be relying on anticipated coal retirements/emission reductions for visibility benefits unless they are codified in the haze plan. As such, FL DEP should:

- Disallow GRU's Deerhaven facility from burning any coal effective immediately as it is fully equipped to burn gas.
- OUC Stanton should not be allowed to burn coal at the facility beyond 2027 and earlier if possible.

"exercise the duties, powers, and responsibilities required of the state under the federal Clean Air Act" Fla. Stat. § 403.061(35).

[143] **Expired permits include**:
(i) Duke Energy Citrus Combined Cycle Project, Air Permit No. 0170004-047-AC, expired December 31, 2019 (Appendix G-3a-1);
(ii) Revised Minor Source Air Construction Permit 1050059-106-AC for the Mosaic Fertilizer New Wales Facility, expired October 19, 2019 (Appendix G-3f);
(iii) Mosaic Fertilizer, LLC, Bartow Facility, Minor Source Air Construction Permit, Permit No. 1050046-050-AC, permit expired October 31, 2019 (Appendix G-3e);
(iv) Tampa Electric Company, Big Bend Station, Air Construction Permit, Minor Revision and Addition to 0570039-122-AC, Air Permit No. 0570039-129-AC, permit expired March 31, 2021 (Appendix G-3i).

Permits that will soon expire include:
(i) Duke Energy Crystal River Power Plant, Air Construction Permit Revision, Air Permit No. 0170004-059-AC (PSD-FL-383I), will expire December 31, 2021 (Appendix G-3a-2);
(ii) JEA Northside Generating Station, Minor Air Construction Permit, Air Permit No. 0310045-57-AC, will expire December 31, 2023 (Appendix G-3c-2);
(iii) Suwannee River/Swift Creek Complex, White Springs Agricultural Chemicals, Inc., dba PCS Phosphate, White Springs, Production Increases Sulfuric Acid Plants (SAPs) E and F, Permit No. 0470002-122-AC, expires December 31, 2021 (Appendix G-3g);
(iv) Seminole Electric Cooperative, Inc., Seminole Generating Station, Air Construction Permit Revision, Air Permit No. 1070025-037-AC PSD-FL-018C & 372C, expires December 31, 2021 (Appendix G-3h);
(v) WestRock CP, LLC, Fernandina Beach Mill, Minor Air Construction Permit, Air Permit No. 0890003-072-AC, No. 7 Power Boiler Regional Haze SO2 Reduction Project, expires December 31, 2024 (Appendix G-3j).

[144] Alternatively, if FL DEP is creating stand-alone SIP measures that are enforceable as a matter of State law - without the existence of an underlying permit - then the SIP must explain that is the approach FL DEP proposes.

[145] *Supra*, n. 140.

Other coal plants that FL DEP anticipates will retire or reduce emissions need to be codified in the SIP as it has the authority to do so as explained above[146] and could account for those emission reductions if they do so:

- Big Bend units 2 & 3 should have enforceable retirements by 2023 in the SIP. Units 3 & 4 should not be allowed to co-fire coal effective immediately.
- The Seminole coal facility should have an enforceable retirement requirement in the haze SIP by 2028 (end of the haze planning period).

VII. FL DEP's Long-Term Strategy Control Measures are Inconsistent with the Clean Air Act and Regional Haze Rule Requirements

A. FL DEP Ignores and the SIP Lacks Controls for Nitrate Contributions from Point Sources at Class I Areas

FL DEP proposed SIP did not consider controls on nitrate contributions from point sources at Class I Areas. Nitrate contributions from point sources at Class I Areas that Florida impacts are not insignificant.[147] There are many opportunities for FL DEP to control NOx from the same point sources of interest for SO2 emissions. For example, for EGUs:

> [T]here are many NOx control opportunities that simply involve the optimization of or upgrades to existing controls, such as upgrading EGU combustion controls, SCR systems, or SNCR systems. Many of these types of controls have historically been found to be very cost-effective because they involve relatively low to no additional capital costs.[148]

FL DEP should require a complete and fully documented four-factor NO_X analyses for these sources, independently review the analyses, filling in gaps where necessary, and then establish practically enforceable emission limitations in the SIP reflecting reasonable progress controls.

B. Sources with Announced Retirements Must Have Practically Enforceable Provisions in the SIP Reflecting Permanent Closure or Four Factor Analyses

In order for a state to rely on source retirements in its proposed SIP and avoid the four-factor analysis requirement, the retirements must be practically enforceable. FL DEP just *assumes* units that have announced retirements should be considered as retired for the purpose of determining whether they should be selected to undergo a four-factor analysis. Contrary to the requirements, the proposed SIP lacks practically enforceable provisions reflecting the source requirements[149] for these sources.[150]

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[146] *Id.*
[147] Kordzi Report at 1.
[148] *Id.*
[149] *Id.* at Section 3.1, citing 40 C.F.R. 51.308(f)(2)(iv)(C), EPA Regional Haze Guidance at 22.
[150] *E.g.*, "**CD McIntosh, Jr. Power Plant** (12105-643111) –The Fossil Fuel Steam Generating Unit 3 (EU006) was permanently shut down in 2021. Documentation of the permanent shutdown is included in Appendix G-3 in the

In addition, even if FL DEP secures an enforceable SIP commitment for the specific retirements, the intervening years may leave a lot of time for the State to evaluate additional cost-effective controls.[151] As explained in the Kordzi Report:

> This is especially true if the potential controls include upgraded NOx combustion controls or upgrades to post combustion controls such as SNCR, SCR or scrubbers. In these cases, capital costs would be low and it is quite possible that some cost-effective controls would be available. Therefore, FL DEP should consider these types of controls as well.[152]

C. Determination of Control Efficiency

As explained in the Kordzi Report "FL DEP should consider that in cases in which the ultimate performance potential of a particular control is difficult to ascertain, it is not necessary for it to initially arrive at the final efficiency or controlled emission rate in the SIP."[153] Additionally, it is perfectly acceptable for FL DEP to approve a four-factor analysis on the basis of a known achievable level of control, with the proviso that a later performance test can be used to ultimately set the final efficiency or emission limit,[154] and then revise the SIP to reflect the final emission limit. This can be a particularly valuable strategy for certain cases in which design of the control system is very site-specific, such as an EGU SNCR system or industrial boiler wet venturi scrubbers.[155]

D. Issues Regarding the Cost-effectiveness Calculations

FL DEP suggests that the "four-factor analyses were completed for units at four facilities, consistent with EPA's Cost Control Manual and the 2019 Regional Haze Guidance"[156] As discussed in the Kordzi Report, the analyses did not follow EPA's Cost Control Manual in the following seven areas.

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formal SIP submittal." Proposed SIP at 252, 258. "**TECO** has announced that Unit 3 will be retired in 2023." *Id*. at 254. Duke Crystal River shut down the fossil fuel fired steam generator Units 1 and 2 which were significant sources of SO2 emissions." *Id.* at 257. "**Seminole Generating Station** has a permit to shut down one of the fossil fuel-fired steam EGUs (either Unit 1 or Unit 2). The VISTAS modeled emissions reflect the expected decrease in emissions that will result from shutting down one of these units." *Id.* " JEA has shut down the **St. Johns River Power Park** (SJRPP) Boilers 1 and 2 ... The VISTAS modeled emissions reflect the significant reduction in emissions resulting in shutdown of the SJRPP boilers." *Id.* "**TECO Big Bend** has shut down Unit 1, which is being repowered with a new NGCC. Big Bend Unit 2 has been converted to natural gas only, and Unit 3 is currently firing natural gas only but continues to have coal-firing capabilities. Units 2 and 3 are expected to be shut down by the end of 2023. Unit 4 has also been permitted to fire natural gas and is expected to co-fire coal and natural gas for the foreseeable future. The VISTAS modeled emissions are conservatively high compared to recent operational changes, as the VISTAS model projected coal-firing in Units 3 and 4 through 2028." *Id*. at 257-8. "There are no emissions from **Mosaic Plant City** after 2017 because the four SAPs at the facility have not operated since December 2017, and the facility was officially shut down November 21, 2019. The VISTAS modeled emissions reflect this shut down." *Id*. at 258.

[151] Kordzi Report, Section 3.1.

[152] *Id.*

[153] *Id.* Section 3.3

[154] *Id.*

[155] *Id.*

[156] Draft SIP at 261.

1. Control Cost Documentation

"It is important that all assertions, parameters, assumed control efficiencies, cost items, assumed future operating capacities, etc. in a control cost analysis be documented so that an independent analyst, with a reasonable amount of expertise, can duplicate the control cost figures. In general, there is little to no documentation provided to support any of these parameters in the four-factor analyses reviewed in Part 1. This documentation should include vendor quotes, actual costs from a similar facility, generally accepted estimate, etc. In particular, scrubber upgrades require specific knowledge of the scrubber configuration in order to determine what upgrades can be considered."[157]

2. Equipment Life

"In many cases, facilities have employed equipment lives that are too short. Regarding this, the Control Cost Manual states:

> The life of the control is defined in this Manual as the equipment life. This is the expected design or operational life of the control equipment. This is not an estimate of the economic life, for there are many parameters and plant-specific considerations that can yield widely differing estimates for a particular type of control equipment."[158]

EPA has consistently assumed a thirty-year equipment life for scrubber retrofits, scrubber upgrades, SCRs, and SNCR installations.[159] Much of this is summarized and cited in EPA's response to comments document for its Texas and Oklahoma Regional Haze SIP final disapproval and FIP.[160] The recent revision of the Control Cost Manual that covers a wet scrubber is another example.[161]

A number of EGU contractors have been assuming an equipment life of twenty years for SNCR systems, by reference to the Control Cost Manual. The April 25, 2019, SNCR update of the Control Cost Manual states on page 1-53, "[t]hus, an equipment lifetime of 20 years is assumed for the SNCR system in this analysis. … Unless there is a documentable reason to select a shorter life, thirty years should also be the default equipment life used for the cost analyses of these types of controls in any application. Use of a shorter equipment life artificially inflates the cost-effectiveness figures (higher $/ton)."[162]

3. Control Efficiency and Performance Optimization

As noted, many scrubber and SCR systems are suspected to be under performing. Unless verifiable documentation is provided by the facility in question, FL DEP should assume that these control systems are capable of operating at the high end of their efficiencies, as

157 Kordzi Report at 31.
158 *Id.* at 31-32.
159 *Id.* at 32.
160 *Id.*
161 *Id.*
162 *Id.* at 33.

demonstrated by other similarly configured units. Some controls, especially scrubber and SCR upgrades and SNCR installations are very site-specific and the final optimized control efficiency cannot be determined until on-site optimization has been performed. Therefore optimization should be required as part of any required scrubber or SCR upgrade or new SNCR installation.

4. Interest Rate

Many of FL DEP's control cost analyses assume an artificially high and undocumented interest rate.[163] This is contrary to the requirements in the Control Cost Manual, which states:

> For input to analysis of rulemakings, assessments of private cost should be prepared using firm-specific nominal interest rates if possible, or the bank prime rate if firm-specific interest rates cannot be estimated or verified.[164]

"Consequently, all facilities should provide verification of their interest rate, or the Bank Prime Interest Rate should be used in all control cost calculations. As of the end of June 2021, the Bank Prime Interest Rate is 3.25%. Using a higher interest rate will artificially increase the total annualized costs and worsen (higher $/ton) the cost-effectiveness of all controls."[165]

5. Retrofit Factors

"A number of control cost analyses have used retrofit factors greater than 1.0. Typically, this is a direct multiplier to capital and fixed operating costs and so has a large impact on the total annualized cost. The average retrofit factor assumed in almost all control cost estimating in the first round of regional haze SIP development was 1.0. All facilities should either use a retrofit factor of 1.0 or provide documentation of why their retrofit is more difficult than at other facilities."[166]

6. Baseline Emissions

It is important that a facility use the correct emissions baseline when calculating cost-effectiveness. An artificially low emissions baseline will cause the cost-effectiveness calculation to be artificially high (higher $/ton). Although these are not BART reviews, the BART Guidelines offered the following, which is still applicable:

The baseline emissions rate should represent a realistic depiction of anticipated annual emissions for the source. In general, for the existing sources subject to BART, you will estimate the anticipated annual emissions based upon actual emissions from a baseline period. When you project that future operating parameters (e.g., limited hours of operation or capacity utilization, type of fuel, raw materials or product mix or type) will differ from past practice, and if this projection has a deciding effect in the BART determination, then you must make these

[163] *Id.* at 33.
[164] *Id.*
[165] *Id.*
[166] *Id.*

parameters or assumptions into enforceable limitations. In the absence of enforceable limitations, you calculate baseline emissions based upon continuation of past practice.

7. Disallowed Cost Items

"AFUDC and owners' costs should not be included in any control cost analyses. Concerning this, as the Control Cost Manual states, 'owner's costs and AFUDC costs are capital cost items that are not included in the EPA Control Cost Manual methodology, and thus are not included in the total capital investment (TCI) estimates in this section.'"[167]

E. Issues regarding the direct Consultations with Other States

1. Georgia

As explained in the Kordzi Report:

> FL DEP includes its letter to Georgia requesting that Georgia examine certain sources for reasonable progress (appendix F1-a), and Georgia's similar letter to it (Appendix F1-d). However, it does not appear that FL DEP has included Georgia's response to its request.[168]

FL DEP should include Georgia's response to its request in its SIP and indicate if it is satisfied with that response.[169]

2. Alabama

FL DEP included Alabama's letter to it (Appendix F1-c), however, it does not appear that FL DEP has included any communication to Alabama in its SIP.[170] Contrary to assertions in the State of Alabama's response letter, Alabama's construction permit does not contain practically enforceable permit conditions to limit SO2 emissions at the Sanders Lead facility.[171] On November 17, 2017, Alabama Department of Environmental Management (ADEM) issued Air Permit No. X034 to the Sanders Lead Company, Facility No. 201-0005.[172] This permit allowed construction of an ammonia injection scrubber (Stack 15). These permit provisions were purportedly established to provide for attainment of the SO_2 NAAQS, however, ADEM's permit condition for the SO2 emissions is a rate of 315 lb/hr, based on a rolling 3-hour average. Deviations from the emission limit triggers inspection and correction action, but the corrective action taken is not reported to ADEM, so the public has no way to track and enforce compliance.

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[167] *Id.* at 34.
[168] *Id.* at 30.
[169] *Id.*
[170] *Id.*
[171] Appendix F-1c, Letter from Ronald W. Gore, Chief, Air Division, Alabama Department of Environmental Management, to Hastings Read, FL DEP (Dec, 7, 2020)
[172] Cover letter and permit from Ronald W. Gore, Chief, Air Division, ADEM, to Roy Baggett, Manager of Environmental Affairs, Sanders Lead Company, (Nov. 17, 2017) (Enclosure 12) ("Sanders Lead Company Construction Permit")

The monitoring provisions in the Sanders Lead construction permit are also problematic. For example, the permit allows the source to establish its own pressure differential across the scrubber, with no opportunity for public review and comment and no ADEM approval.[173] The permit also requires corrective action if the pressure differential "falls out of the range established by the facility,"[174] but lacks reporting of the corrective actions. The permit further requires ambient monitoring and provides ADEM's Director complete discretion to approve the type, number and location of the monitors, with no criteria for the Director to base his/her approval and no opportunity for public review and comment.[175] Additionally, the permit allows for use of methods that do not meet the requirements in EPA's SIP rules.[176] The permit gives carte blanche authority to the permittee to "install, operate and maintain a digital differential pressure monitoring system to continuously monitor each total enclosure."[177] The permit neither requires ADEM's approval of the digital monitoring system, nor was the public provided an opportunity to review and comment on the proposed system. Furthermore, the permit does not require that the facility report its SO_2 emissions to ADEM, so the public cannot verify ADEM's assertions regarding actual emissions. The permit requires that "[t]he Ammonia Injection Scrubber will be operational and Sanders Lead Company shall be in compliance with the above stated limits no later than October 1, 2019."[178] ADEM asserted the Company is in compliance in its letter to FL DEP, but provided no supporting documentation. Even if ADEM had provided monitoring data, the data would be suspect given the discretion given to the ADEM and the permittee in the permit regarding the monitoring provisions. Thus, FL DEP cannot rely on Alabama's assertions regarding emission controls at the Sanders Lead Company.[179] As part of the consultation process, FL DEP should ask that ADEM include practically enforceable emission limitations in its RH SIP for this source so that Florida can be assured that its impacted Class I Areas are protected in accordance with the Act and EPA's regulations.

F. FL DEP Should Disclose Emission Inventory Projections and Identify Measures Needed to Prevent Future Impairment of Visibility

The Regional Haze program requires states to adopt measures to prevent future visibility impairment as well as to address existing visibility impairment.[180] FL DEP's draft regional haze SIP revision lacks an analysis of 2028 emission inventory projections and *future source development*; thus the public has no information to assess whether emissions from specific source categories are projected to increase between 2011 and 2028 as seen in other states. FL DEP should analyze future emission inventory projections, explain what these emissions sources are within the state and discuss the programs it has in place to address any potential future increases in emissions. Importantly, FL DEP should evaluate the measures that may be needed to prevent any currently projected future increases in visibility-impairing emissions from sources

[173] Sanders Lead Company Construction Permit at 11.
[174] *Id.*
[175] *Id.* The permit also lacks provisions regarding monitor requirements.
[176] The permit allows for CEMS that follow Performance Specification 2 of 40 CFR part 60, appendix B, which is inconsistent with the requirements for CEMS and SIP methods discussed in Section VII.
[177] *Id.*
[178] *Id.* at 8.
[179] Additionally, as discussed in Section VII, because Title V permits are not permanent, such a permit for this source cannot be relied on for purposes of the RH SIP.
[180] *See*, 42 U.S.C. §7491(a)(1)); 40 C.F.R. §51.300(a).

and source categories. Moreover, as FL DEP develops permit modifications for existing sources and permits for new sources, it must take regional haze implications into consideration – these requirements should be discussed and committed to in the State's SIP. Finally, FL DEP should commit to revisit this issue as necessary in a supplemental proposed revision to its regional haze plan.

G. The Proposed SIP Violates the Act's Anti-Backsliding Requirement

FL DEP's proposed SIP violates the Clean Air Act's "anti-backsliding" requirement, 42 U.S.C. § 7410(*l*), because it proposes to remove BART and RP emission limitation provisions from the existing SIP *without* replacing them with equivalent or more stringent requirements.[181] Compared to the existing plan, without evidence that these sources have shut down and can no longer operate, the State's revised plan would allow for eight sources with source-specific BART and RP emission limitations to emit air pollution and worsen visibility impairment at affected Class I Areas. Section 110(*l*) of the Clean Air Act prevents a plan revision that would remove and weaken the existing SIP requirements in this manner.[182]

EPA previously approved BART and RP requirements for sources and units identified in Figure 3.[183] Now, the State proposes a SIP that would remove all these emission limits from the SIP. And the proposed SIP includes no reductions that would compensate for allowing these sources to either operate under existing permits and/or seek new permits to construct. FL DEP's proposed SIP merely explains that "these units have permanently shutdown" without providing

[181] Section 110(*l*) prohibits plan revisions that would interfere with an existing requirement to make reasonable further progress, including BART and RP determinations, as the Act's "applicable requirement[s]" include the regional haze program's BART requirements. *See Oklahoma v. EPA*, 723 F.3d 1201, 1204, 1207 (10th Cir. 2013). EPA cannot approve or issue an implementation plan that would interfere with "any . . . applicable requirement" of the Clean Air Act. 42 U.S.C. § 7410(l); *see also id.* § 7410(a)(2)(A) (each plan "shall" include enforceable emission limits or measures as necessary to meet the applicable requirements of the Act).

[182] When determining whether a plan revision interferes with NAAQS attainment, EPA has interpreted section 110(*l*) as preventing plan revisions that would increase overall air pollution or worsen air quality. For example, the Eleventh Circuit has upheld EPA's section 110(*l*) interpretation as prohibiting plan revisions that would increase emissions or worsen air quality. *Ala. Envtl. Council v. EPA*, 711 F.3d 1277, 1293 (11th Cir. 2013) (EPA interpreted section 110(*l*) to "permit approval of the SIP revision 'unless the agency finds it will make air quality worse'" (quoting 73 Fed. Reg. 60,957, 60,960 (Oct. 15, 2008))). In *Kentucky Resources Council, Inc. v. EPA*, 467 F.3d 986 (6th Cir. 2006), EPA interpreted section 110(*l*) as allowing the agency to approve a plan revision that weakened some existing control measures while strengthening others, but only "[a]s long as *actual emissions in the air are not increased*." *Id.* at 995 (quoting 70 Fed. Reg. 28,429, 28,430 (May 18, 2005)) (emphasis added). The court upheld EPA's interpretation, which "allow[ed] the agency to approve a [state implementation plan] SIP revision *unless the agency finds it will make the air quality worse*." *Kentucky Resources Council, Inc. v. EPA*, 467 F.3d at 995 (emphasis added). The Seventh Circuit has also upheld EPA's interpretation. *Indiana v. EPA*, 796 F.3d 803, 812 (7th Cir. 2015) (noting that EPA allows "emissions-increasing SIP revisions" if a state "identif[ies] substitute emissions reductions such that net emissions are not increasing."). Moreover, in a short discussion regarding a challenge to the Nevada regional haze plan, the Ninth Circuit suggested that a haze plan that "weakens or removes any pollution controls" would violate section 110(*l*). *WildEarth Guardians v. EPA*, 759 F.3d 1064, 1074 (9th Cir. 2014).

[183] 77 Fed. Reg. 71,111 (Nov. 29, 2012); 78 Fed. Reg. 53,250 (Aug. 29, 2013); 80 Fed. Reg. 64,344 (Oct. 23, 2015).

any evidence to support its assertion or making these retirements enforceable directly in the SIP.[184]

Figure 3. Excerpt from the Proposed SIP: Materials to be Removed from the SIP[185]

Facility Name	Facility ID	Units	Permanent Shutdown Date
Florida Power and Light – Turkey Point Power Plant	0250003	EU001 EU002	10/31/2016 12/31/2013
Duke Energy – Crystal River Power Plant	0170004	EU001, EU002	12/31/2018
City of Tallahassee – Purdom	1290001	EU007	12/31/2013
Florida Power and Light – Martin	0850010	EU001, EU002	12/31/2018
Lakeland – C.D. McIntosh	1050004	EU001	12/31/2015
Florida Power and Light (formerly Gulf Power) – Lansing Smith	0050014	EU001, EU002	03/31/2016
Mosaic Fertilizer, LLC (formerly CF Industries) - Plant City Facility	0570005	EU002, EU003, EU007, EU008	11/21/2019
Florida Power Development (FPD), LLC (formerly Florida Crushed Stone) - Brooksville Power Plant	0530380	EU002	06/30/2018
JEA St. Johns River Power Park	0310045	EU016 EU017	12/20/2017 12/14/2017

While FL DEP includes some documentation for one source: C.D. McIntosh, Jr. Power Plant, Unit 3 Retirement,[186] it provides no information that it has cancelled its permits.

In sum, by removing the BART and RP requirements from the existing SIP without supporting documentation and enforceable requirements, the revised SIP would allow for increases to air pollution and worsen air quality, in violation of the anti-backsliding provision of 42 U.S.C. § 7410. Before removing the RP and BART emission limitations from the SIP, FL DEP must include evidence in the proposed SIP to support its assertion that the sources have shut down and can no longer operate and include enforceable provisions accordingly directly in the SIP.

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[184] *Id.*
[185] Pre-Hearing SIP Revision 2021-01 at 17.
[186] Letter from Stephen Reinhart, Plant Manager, Lakeland Electric to David Read, FL DEP (April 9, 2021) (enclosure includes EPA Retired Unit Exemption form). Appendix G-3d.

H. FL DEP Did Not Respond to the MANE-VU Asks[187]

On August 25, 2017, the Mid-Atlantic/Northeast Visibility Union (MANE-VU), requested that FL DEP implement certain emission reduction measures under the federal Regional Haze Rule (40 C.F.R. § 51.308 (f)(2)(iii)) as MANE-VU's analysis found that Florida was a contributing state to visibility impairment at the Acadia National Park Class I Area, which Florida proposes to disagree with in the SIP.[188] Contrary to FL DEP's assertions, two of the MANE-VU Asks are of particular concern and relevance:

1. EGUs with a nameplate capacity larger than or equal to 25 MW with already installed NOx and/or SO_2 controls - *ensure the most effective use of control technologies on a year-round basis* to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions; and

4. EGUs and other large point emission sources larger than 250 MMBTU per hour heat input that have switched operations to lower emitting fuels - *pursue updating permits, enforceable agreements, and/or rules to lock-in lower emission rates for SO_2, NOx and PM.* The permit, enforcement agreement, and/or rule can allow for suspension of the lower emission rate during natural gas curtailment.

Regarding Ask 1, FL DEP is not proposing to require that certain sources perform reasonable upgrades and optimizations of existing controls, or that those controls be continuously run at their full capabilities. FL DEP's decision to ignore MANE-VU's fourth request, is also problematic because it is not proposing lower SIP emission rates commensurate with the fuel switch, which is of concern particularly where sources have considerable compliance latitude with regard to their permitting limits.

FL DEP should identify sources covered by MANE-VU Asks 1 and 4, examine permit limits for these sources, and where the source operates substantially under its permit limits, and include practically enforceable emission limits and monitoring, recordkeeping and reporting requirements in the SIP.

VIII. Florida Should Analyze the Environmental Justice Impacts of its Regional Haze SIP, and Should Ensure the SIP Will Reduce Emissions and Minimize Harms to Disproportionately Impacted Communities

A. Environmental Justice in Florida

The Florida State Legislature established the Florida Environmental Equity and Justice Commission (Florida Law, CH. 94-219) in 1994. The Commission was directed to conduct a study to determine if low-income and minority communities are more at risk from environmental

[187] Appendix F-4.
[188] *Id.*, Letter from Jeffrey F. Koerner, Director, Division of Air Resource Management, FL DEP, to Mr. David Foerter, Executive Director Mid-Atlantic/Northeast Visibility Union/Ozone Transport Commission (Jan. 19. 2018).

hazards than the general population and subsequently published a report[189] concluding specific communities, in particular lower-income communities of color, were disproportionately impacted by environmental hazards throughout the State and recommended that a center for environmental equity and justice be permanently established. In 1998, the Legislature formally created the Community Environmental Health Program and established the Center of Environmental Equity and Justice (CEEJ) (Florida Law, CH. 98-304) at Florida Agricultural and Mechanical University (FAMU).[190] The bill (HB 945) provided $672,000 for CEEJ and $100,000 for the Community Health Program; the bill language did not call for future appropriations. The mission of the CEEJ is to address environmental issues through research, education, training, and community outreach, and make recommendations to be used in developing policies that are designed to protect all citizens from exposure to environmental hazards.[191]

Since the foundation of the CEEJ in 1998, there have been no other legislative or Florida agency actions substantively addressing environmental justice and equity concerns. The notice of a recent move to Interim Secretary by a previous holder of the FL DEP environmental justice coordinator position may be the first notice given to the public that such a position was ever filled,[192] and we can find no publicly available information demonstrating FL DEP prioritization of environmental justice or equity concerns. There is no evidence that FL DEP is partnering with the CEEJ at FAMU to ensure environmental justice and equity concerns in the context of the regional haze rule SIP are properly evaluated. However, the CEEJ should be equipped to assist the FL DEP, which has been given authority under State law to work with other agencies,[193] in evaluating these environmental justice and equity issues by:

- examining issues relating to enforcement, evaluation, health effects and risks, and site placement;
- providing and facilitating education and training on environmental equity and justice issues to students, citizens, and local and state government employees through traditional media networks;
- developing research programs to elucidate and validate contaminant biomarkers of exposure, effect and susceptibility; in human populations;
- assessing environmental impacts on populations using geographical information systems and other technologies for developing strategies;
- focusing on the sampling and analysis of environmental contaminants in impacted communities;

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[189] Gragg, Richard D. III; Christaldi, Ronald A.; Leong, Stephen; and Cooper, Marc "The Location and Community Demographics of Targeted Environmental Hazardous Sites in Florida," Florida State University Journal of Land Use and Environmental Law: Vol. 12 : No. 1 , Article 1 (2018), https://ir.law.fsu.edu/jluel/vol12/iss1/1. (Enclosure 13)
[190] Chapter 98-304, Committee Substitute for House Bill 945, http://www.famu.edu/environmentalscience/ch98_304.pdf. (Enclosure 14)
[191] Florida Agricultural and Mechanical University, School of the Environment, The Center for Environmental Equity and Justice (CEEJ), http://www.famu.edu/index.cfm?environmentalscience&CEEJ. (Enclosure 15)
[192] FL DEP, Office of the Secretary, Shawn Hamilton, Interim Secretary, https://floridadep.gov/sec. (Enclosure16)
[193] Fla. Stat. § 403.061(3) Utilize the facilities and personnel of other state agencies, including the Department of Health, and delegate to any such agency any duties and functions as the department may deem necessary to carry out the purposes of this act.

- serving as a statewide environmental justice technical and public information resource.[194]

Historically, conservation and environmental work has concerned itself with protecting nature from people and has thus "siloed" its work (*e.g.*, mainstream conservation vs. environmental justice.) While this siloed approach has led to the protection of many vulnerable habitats, it ignores the reality that people live in concert with and are a part of nature; to protect one and not the other is a job half done. By considering viewshed protection and environmental justice at the same time, we can collectively begin to dismantle the silos that exist in conservation and environmental work and chart a new path forward.

Therefore, FL DEP should analyze the environmental justice impacts of its second planning period haze SIP. For those RP sources located near a low-income or minority community that suffers disproportionate environmental harms, FL DEP's four-factor analysis for that source should take into consideration how each considered measure would either increase or reduce the environmental justice impacts to the community. Such considerations will not only lead to sound policy decisions but are also pragmatic as pointed out above, where sectors and sources implicated under the regional haze program are of concern to disproportionately impacted communities in Florida. Thus, considering the intersection of these issues and advancing regulations accordingly will help deliver necessary environmental improvements across issue areas, reduce uncertainty for the regulated community, increase the state's regulatory efficiency, and result in more rational decision making.

B. Consideration of Environmental Justice to Comply with Executive Orders

There are additional legal grounds for considering environmental justice when determining reasonable progress controls. Under the CAA, states are permitted to include in a SIP measures that are authorized by state law but go beyond the minimum requirements of federal law.[195] Moreover, the State can also consider environmental justice when developing its haze plan, regardless of whether the CAA's haze provisions require such consideration. Ultimately, EPA will review the haze plan that Florida submits, and EPA will be required to ensure that its action on Florida's haze plan addresses any disproportionate environmental impacts of the pollution that contributes to haze. Executive Orders in place since 1994, require federal executive agencies such as EPA to:

> [M]ake achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental

[194] *Id.*

[195] *See Union Elec. Co v. EPA*, 427 U.S. 246, 265 (1976) ("States may submit implementation plans more stringent than federal law requires and . . . the Administrator must approve such plans if they meet the minimum requirements of s 110(a)(2)."); *Ariz. Pub. Serv. Co. v. EPA*, 562 F.3d 1116, 1126 (10th Cir. 2009) (quoting *Union Elec. Co.*, 427 U.S. at 265) ("In sum, the key criterion in determining the adequacy of any plan is attainment and maintenance of the national air standards . . . 'States may submit implementation plans more stringent than federal law requires and [ ] the [EPA] must approve such plans if they meet the minimum [Clean Air Act] requirements of § 110(a)(2).'"); *BCCA Appeal Group v. EPA*, 355 F.3d 817, 826 n. 6 (5th Cir. 2003) ("Because the states can adopt more stringent air pollution control measures than federal law requires, the EPA is empowered to disapprove state plans only when they fall below the level of stringency required by federal law.")

> effects of its programs, policies, and activities on minority populations and low-income populations"[196]

On January 27, 2021, the current Administration signed "Executive Order on Tackling the Climate Crisis at Home and Abroad."[197] The new Executive Order on climate change and environmental justice amended the 1994 Order and provides that:

> It is the policy of [this] Administration to organize and deploy the full capacity of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy; … protects public health … delivers environmental justice …[and that] … [s]uccessfully meeting these challenges will require the Federal Government to pursue such a coordinated approach from planning to implementation, coupled with substantive engagement by stakeholders, including State, local, and Tribal governments.[198]

FL DEP should facilitate EPA's compliance with these Executive Orders by considering environmental justice in its SIP submission.

C. EPA's Regional Haze Guidance for the Second Implementation Period

On August 20, 2019, EPA finalized its Regional Haze Guidance for the Second Planning Period.[199] Importantly, this guidance specifies, "States may also consider any beneficial non-air quality environmental impacts."[200] EPA also pointed to another EPA program that states could rely upon for guidance in interpreting how to apply the non-air quality environmental impacts standard:[201]

> When there are significant potential non-air environmental impacts, characterizing those impacts will usually be very source- and place-specific. Other EPA guidance intended for use in environmental impact assessments under the National Environmental Policy Act may be informative, but not obligatory to follow, in this task.

A collection of EPA policies and guidance related to the National Environmental Policy Act ("NEPA") is available at https://www.epa.gov/nepa/national-environmental-policy-act-policies-and-guidance. One of these policies concerns Environmental Justice.[202]

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[196] Exec. Order No. 12898, § 1-101, 59 Fed. Reg. 7629 (Feb. 16, 1994), as amended by Exec. Order No. 12948, 60 Fed. Reg. 6381 (Feb. 1, 1995).
[197] Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan. 27, 2021) ("Executive Order on Tackling the Climate Crisis at Home and Abroad").
[198] *Id.* at § 201.
[199] EPA 2019 RH Guidance.
[200] *Id.* at 49.
[201] *Id.* at 33.
[202] *See*, EPA Environmental Justice Guidance for National Environmental Policy Act Reviews, https://www.epa.gov/nepa/environmental-justice-guidance-national-environmental-policy-act-reviews.

D. EPA has a Repository of Material Available for Considering Environmental Justice

In addition to the NEPA guidance materials referenced above, EPA provides a wealth of additional material.[203] The most important aspect of assessing Environmental Justice is to identify the areas where people are most vulnerable or likely to be exposed to different types of pollution. EPA's EJSCREEN tool can assist in that task. It uses standard and nationally consistent data to highlight places that may have higher environmental burdens and vulnerable populations.[204]

E. EPA Must Consider Environmental Justice

As occurred in the first planning period, if a state fails to submit its SIP on time, or if EPA finds that all or part of a state's SIP does not satisfy the Regional Haze regulations, then EPA must promulgate its own Federal Implementation Plan to cover the SIP's inadequacy ("FIP"). Should EPA promulgate a FIP that reconsiders a state's four-factor analysis, it is completely free to reconsider any aspect of that state' analysis. The two Presidential Executive Orders referenced above require that federal agencies integrate Environmental Justice principles into their decision-making. EPA has a lead role in coordinating these efforts, and recently EPA Administrator Regan directed all EPA offices to clearly integrate environmental justice considerations into their plans and actions.[205] Consequently, should EPA promulgate a FIP, it has an obligation to integrate Environmental Justice principles into its decision-making. The non-air quality environmental impacts of compliance portion of the third factor, is a pathway for doing so.

Consistent with legal requirements and government efficiency, we urge FL DEP to take impacts to EJ communities, like the ones we have expressed for sugarcane field burning, into consideration as it evaluates all sources that impact regional haze.

Conclusion

Each state must submit for EPA review a SIP that is designed to make reasonable progress toward achieving natural visibility conditions.[206] Contrary to the requirements that FL DEP's regional haze SIP must provide "emissions limits, schedules of compliance and other measures as may be necessary to make reasonable progress towards meeting the national goal,"[207] FL DEP relies on existing permits and only seeks minor emission controls at two

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[203] *See,* EPA: Learn About Environmental Justice, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice. (Enclosure 17)

[204] *See*, EPA EJSCREEN: Environmental Justice Screening and Mapping Tool, Additional Resources and Tools Related to EJSCREEN, https://www.epa.gov/ejscreen/additional-resources-and-tools-related-ejscreen.

[205] *See*, EPA News Release, EPA Administrator Announces Agency Actions to Advance Environmental Justice, *Administrator Regan Directs Agency to Take Steps to Better Serve Historically Marginalized Communities* (April 7, 2021), https://www.epa.gov/newsreleases/epa-administrator-announces-agency-actions-advance-environmental-justice. (Enclosure 18)

[206] 42 U.S.C. § 7491(b)(2).

[207] *Id.*

sources for this ten-year planning period.[208] Florida should obtain and revise the required reasonable progress four-factor analyses, use reasonable and accurate inputs and then propose practically enforceable controls and emission limitations in the SIP that curb visibility-impairing emissions for its sources that emit visibility impairing pollution and are of concern for the treasured Class I Areas that also harm our communities. Please feel free to contact us if you have any questions or would like to discuss our comments.

Sincerely,

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[208] Lower sulfur No. 6 fuel oil for Northside Unit 3, and limiting coal to 125 tons per day on Westrock Unit 7 (basically reflecting current usage).

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List of Enclosures

1. Kordzi, Joe, "A Review of the Florida Regional Haze State Implementation Plan," which was prepared for NPCA by Joe Kordzi (July 2021).

2. NPS Formal Consultation Call with Florida DEP for Regional Haze SIP Development, Florida Regional Haze Consultation Presentation, at 9 (May 17, 2021).

3. "Petition for Reconsideration of Guidance on Regional Haze State Implementation Plans for the Second Implementation Period," submitted by National Parks Conservation Association, Sierra Club, Natural Resources Defense Council, Coalition to Protect America's National Parks, Appalachian Mountain Club, Western Environmental Law Center and Earthjustice, to former EPA Administrator Andrew Wheeler (May 8, 2020).

4. EPA Memorandum, from Peter Tsirigotis, Director, Office of Air Quality Planning and Standards, to Regional Air Division Directors, "Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period," (July 9, 2019), https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation.

5. Letter from Stephanie Kodish, NPCA, Leslie Griffith, SELC, and David Rogers, Sierra Club to VISTAS State Air Directions, "Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans" (May 12, 2021).

6. TECO Fact Sheet, https://www.tampaelectric.com/company/ourpowersystem/powergeneration/bigbend/.

7. Consent Decree for *United States of America et al v. PCS Nitrogen Fertilizer, L.P., Sulfuric, Inc., and White Springs Agricultural Chemicals Inc.,* Case No: 3:14-cv-007707-BAJ-SCR, Doc. 2-1 (Filed Nov. 6, 2014) at 13, https://www.epa.gov/sites/production/files/2014-11/documents/pcsnitrogenfertilizer-cd.pdf.

8. Haag, Kim H.; Miller, Ronald L.; Bradner, Laura A.; and David S. McCulloch "Water-Quality Assessment of Southern Florida: An Overview of Available Information on Surface and Ground-Water Quality and Ecology," U.S. Geological Survey Water-Resources Investigations Report 96-4177 (1996) https://pubs.usgs.gov/wri/1996/4177/report.pdf.

9. Bhadha, Jehangir H.; Wright, Alan L.; and George H. Snyder "Everglades Agricultural Area Soil Subsidence and Sustainability," IFAS Extension University of Florida, Pub. # SL 311 (March 2, 2020) https://edis.ifas.ufl.edu/publication/ss523.

10. EPA EJSCREEN: Environmental Justice Screening and Mapping Tool, https://www.epa.gov/ejscreen.

11. Steven Herman, Assistant Administrator for Enforcement and Compliance Assurance, and Robert Perciasepe, Assistant Administrator for Air and Radiation, “State Implementation Plans (SIPs): Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown,” (Sept. 20, 1999), https://www.epa.gov/nsr/state-implementation-plans-policy-regarding-excess-emissions-during-malfunctions-startup-and.

12. Cover letter and permit from Ronald W. Gore, Chief, Air Division, ADEM, to Roy Baggett, Manager of Environmental Affairs, Sanders Lead Company (Nov. 17, 2017).

13. Gragg, Richard D. III; Christaldi, Ronald A.; Leong, Stephen; and Cooper, Marc "The Location and Community Demographics of Targeted Environmental Hazardous Sites in Florida," Florida State University Journal of Land Use and Environmental Law: Vol. 12 : No. 1 , Article 1 (2018), https://ir.law.fsu.edu/jluel/vol12/iss1/1.

14. Chapter 98-304, Committee Substitute for House Bill 945, http://www.famu.edu/environmentalscience/ch98_304.pdf.

15. Florida Agricultural and Mechanical University, School of the Environment, The Center for Environmental Equity and Justice (CEEJ), http://www.famu.edu/index.cfm?environmentalscience&CEEJ.

16. FL DEP, Office of the Secretary, Shawn Hamilton, Interim Secretary, https://floridadep.gov/sec.

17. EPA: Learn About Environmental Justice, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice.

18. EPA News Release, EPA Administrator Announces Agency Actions to Advance Environmental Justice, *Administrator Regan Directs Agency to Take Steps to Better Serve Historically Marginalized Communities* (April 7, 2021), https://www.epa.gov/newsreleases/epa-administrator-announces-agency-actions-advance-environmental-justice.

Enclosures

Enclosure 1

A Review of the Florida Regional Haze State Implementation Plan

Prepared by

Joe Kordzi, Consultant

On behalf of

National Parks Conservation Association and the Sierra Club

July 2021

1 Introduction

This is a report concerning a review of the Florida Regional Haze State Implementation Plan (SIP).[1] Emissions and controls information for all EGUs were downloaded from EPA's Air Markets Program Data (AMPD) website.[2] Additional information was obtained from the Energy Information Agency (EIA).[3] Lastly, I reviewed the Title V operating permits for a number of units.

2 Apparent Errata

2.1 FL DEP repeats its message on page 279 that it is still reviewing the Foley Mill four-factor analysis on page 281 in the section concerning its analysis of the Panama City Mill.

3 General

3.1 In a number of areas, FL DEP assumes units that have announced retirements should be considered as retired for the purpose of determining whether they should be selected to undergo a four-factor analysis. The Regional Haze Guidance indicates, in order to implement this under Section 51.308(f)(2)(iv)(C) of the Regional Haze Rule, Source retirement and replacement schedules, Florida must include an enforceable commitment in its SIP.[4] In lieu of this, FL DEP must perform a four-factor analysis for each unit.

In addition, even if FL DEP secures an enforceable SIP commitment for the specific retirements, the intervening years may leave a lot of time in which to consider additional cost-effective controls. This is especially true if the potential controls include upgraded NOx combustion controls or upgrades to post combustion controls such as SNCR, SCR or scrubbers. In these cases, capital costs would be low and it is quite possible that some cost-effective controls would be available. Therefore, FL DEP should consider these types of controls as well.

3.2 FL DEP presents a great deal of information that demonstrates that 2028 visibility extinction due to sulfate is the primary driver for most VISTAS Class I Areas. In fact, FL DEP demonstrates that most of this sulfate driven extinction comes from EGU and non-EGU point sources. Nevertheless, nitrate contributions from point sources at Class I Areas that Florida impacts are not insignificant. Because point source sulfate is dominant, FL DEP should rightly focus on it. Unfortunately, its SIP does very little to control it and the comments reflect that fact. Nevertheless, as also described herein, there are many opportunities whereby FL DEP could likely control NOx from these same point sources. With regard to EGUs, there are many NOx control opportunities that simply

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[1] https://floridadep.gov/air/air/content/epa%E2%80%99s-regional-haze-program.
[2] See https://ampd.epa.gov/ampd/. This information is compiled and assessed in spreadsheets that are included in this analysis.
[3] See https://www.eia.gov/electricity/data/eia923/.
[4] See Regional Haze Guidance, page 22.

involve the optimization of or upgrades to existing controls, such as upgrading EGU combustion controls, SCR systems, or SNCR systems. Many of these types of controls have historically been found to be very cost-effective because they involve relatively low to no additional capital costs. In addition, in a few instances, new NOx controls should also be considered. FL DEP should require that where indicated, these sources should include NOx control evaluation in their four-factor analyses.

3.3 FL DEP should consider that in cases in which the ultimate performance potential of a particular control is difficult to ascertain, it is not necessary for it to initially arrive at the final efficiency or controlled emission rate. It is perfectly acceptable for FL DEP to approve a four-factor analysis on the basis of a known achievable level of control, with the proviso that a later performance test can be used to ultimately set the final efficiency or emission limit. This can be a particularly valuable strategy for certain cases in which design of the control system is very site-specific, such as an EGU SNCR systems or industrial boiler wet venturi scrubbers. There are many examples of this approach having been taken in consent decrees.

4 FL DEP's Source Selection Methodology is Flawed

4.1 Beginning on page 223, FL DEP discusses its strategy for ranking sources that impact the visibility of its Class I Areas. Tables 7-8, 7-9, and 7-10 present the Area of Influence (AoI), NOx and SO_2 facility contributions to visibility impairment on the 20% most impaired days for Florida's three Class I Areas. FL DEP indicates that these tables were constructed on the basis of 2028 emission projections. It appears from FL DEP's discussion on page 229 that it used the information to determine which sources to submit for tagging in the VISTAS PSAT modeling and used the same 2028 emissions in that analysis. FL DEP also states on page 230 that it considers the results to be a reasonable set of sources captured in the initial screening step. As FL DEP itself notes on page 245, the Regional Haze Guidance provides some advice for states regarding source selection. However, the Regional Haze Guidance also cautions states regarding 2028 emissions. For instance, it states:[5]

> Generally, the estimate of a source's 2028 emissions is based at least in part on information on the source's operation and emissions in a representative historical period. However, there may be circumstances under which it is reasonable to project that 2028 operations will differ significantly from historical emissions. Enforceable requirements are one reasonable basis for projecting a change in operating parameters and thus emissions; energy efficiency, renewable energy, or other such programs where there is a documented commitment to participate and a verifiable basis for quantifying any change in future emissions due to operational changes may be another. A state considering using assumptions about future operating parameters that are significantly different than historical operating parameters should consult with its EPA Regional office.

[5] Guidance on Regional Haze State Implementation Plans for the Second Implementation Period, EPA-457/B-19-003, August 2019." Hereafter referred to as the "Regional Haze Guidance." Page 17.

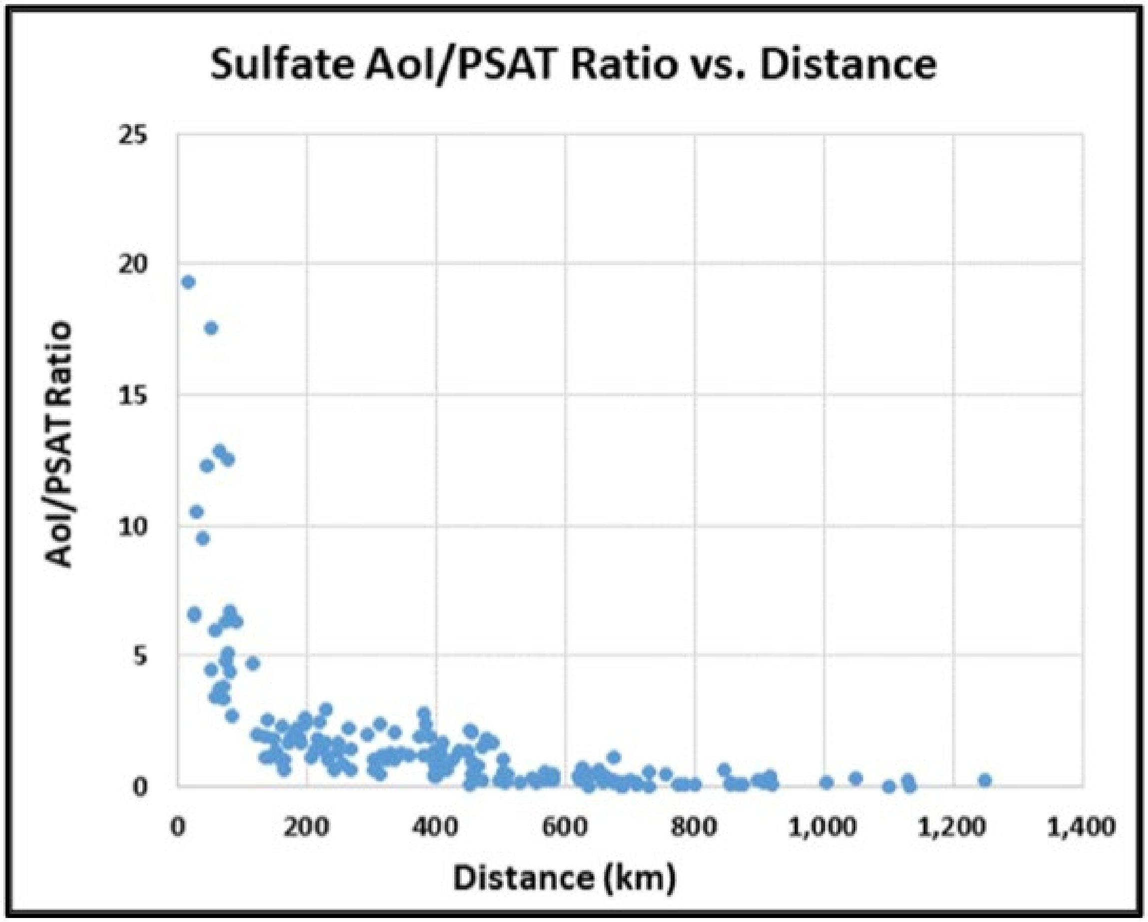
Beginning on page 259 in table 7-28, FL DEP compares its projected 2028 emissions (VISTAS Remodel) against 2017, 2018, and 2019 emissions. FL DEP does explain some large 2028 decreases but not all. For instance, 2028 decreases from the Foley Mill, Breitburn Gas Treating facility, Mosaic South Pierce, Monarch Hill, and Gulf Clean Energy Center do not appear to be explained.

Also, FL DEP should compare its suite of selected sources versus what it would have developed using a conventional Q/d or other approach that uses historical emissions. It is very important that FL DEP be completely transparent regarding this issue. Since it used projected 2028 emissions in lieu of actual emissions, it has based its source selection strategy on unsecured assumptions of future emission profiles. This is not dissimilar to making unsecured assumptions about a source's future emissions in a four-factor analysis, which is specifically not allowed.

4.2 Considering the previous comment, FL DEP should include a unit-level (as opposed to a facility level) listing of the NOx, SO_2, and PM emissions of all point sources for the last five years. This information was requested from FL DEP and promptly provided, but it should be a part of FL DEP's SIP.

4.3 On page 239, FL DEP compares its PSAT source selection results to the sources it would have selected had it stopped at AoI source selection. First, FL DEP presents Figure 7-54, which it states shows the ratio of AoI/PSAT contributions for sulfate as a function of distance from the facility to the Class I area. Below is that figure:

Figure 1. FL DEP's Figure 7-54: Ratio of AoI/PSAT % Contributions for Sulfate as a Function of Distance from the Facility to the Class I Area



In the above figure, each point represents one facility's ratio of its AoI to PSAT sulfate contribution at a Class I Area versus its distance to that Class I Area. At first glance, it appears to resemble an exponential decline function. However, inspection of the points closest to zero indicates that the scatter in the data greatly increases. For example, the point with the smallest distance has a value of about 19, whereas the next two closest points, that are only slightly farther away, have values of about 11 and 7. Moving only slightly farther away results in values that range from about 3 to 13. The amount of scatter in the data decreases with distance, but is still significant out to at least 400 km. This indicates that the correlation is likely invalid at distances of perhaps 100 km or less.

Following this FL DEP makes a fractional bias calculation. This is a common technique that has long been used to compare a model's output to observed values. The equation is as follows:[6]

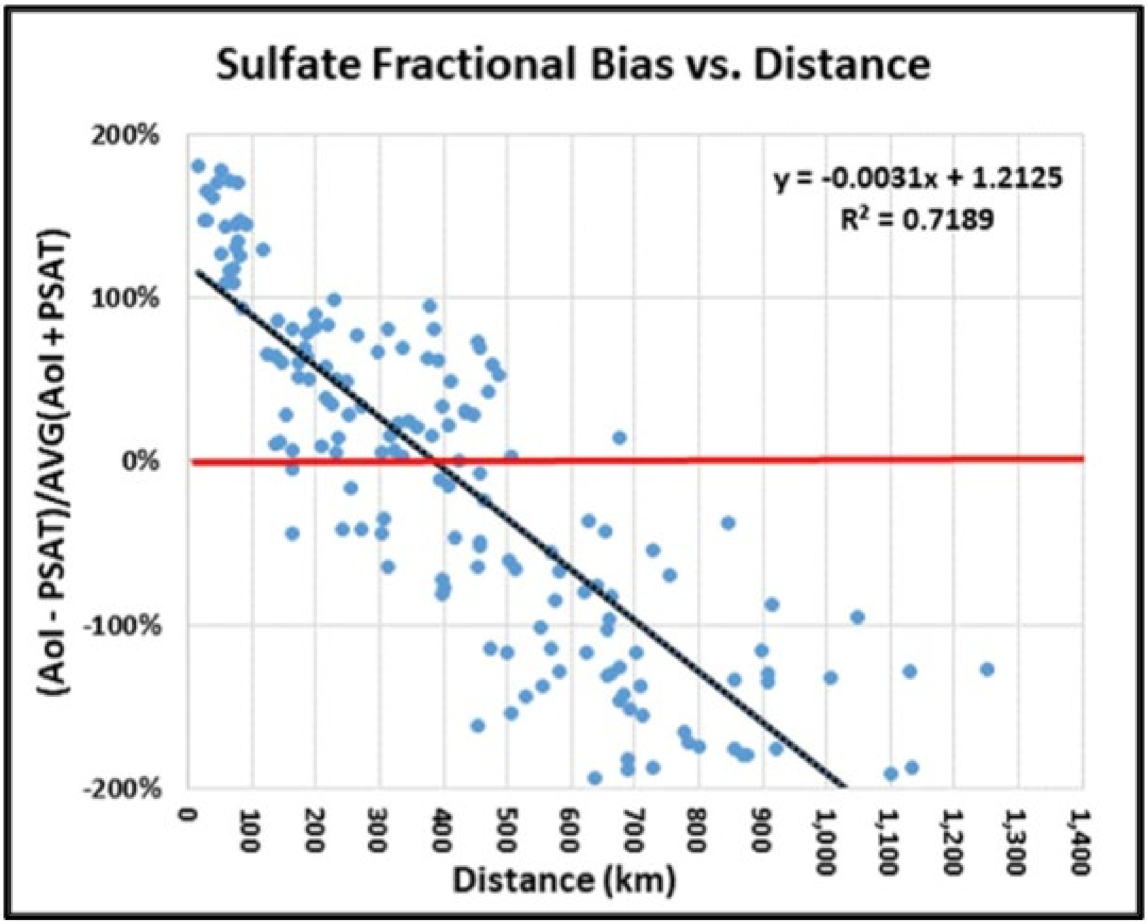
$$FB = 2\,x\,\left(\frac{OB - PR}{OB + PR}\right)$$

where OB = observed values, and PR = predicted (modeled) values.

[6] See for instance: https://www.epa.gov/sites/production/files/2020-10/documents/model_eval_protocol.pdf.

Typically, the observed values are monitored or measured values that can be viewed as known values, against which the predicted (modeled) values are compared. In this case, FL DEP uses the AoI values as the observed values and the PSAT values as the predicted values. However, the AoI values are not known values and are simply other predicted values; albeit predicted differently than the PSAT values. Therefore, FL DEP's use of the fractional bias calculation in this instance is suspect. That aside, FL DEP presents a graph of its fractional bias calculations. Below is that figure:

Figure 2. FL DEP's Figure 7-55: Fractional Bias for Sulfate as a Function of Distance from the Facility to the Class I Area



As can be seen from the above figure, there is again a great deal of scatter in the data. Calculated fractional bias values range from zero to 100% or greater for points that are essentially the same distance from the Class I Area. This means that at any given distance there is a wide range in the difference in correlation between the AoI and PSAT values. Considering these issues, FL DEP's conclusion on page 239 that "if the facility is less than 100 km from the Class I area, the AoI results are almost always at least three times higher than the PSAT results," is unfounded. Consequently, any sources that FL

DEP eliminated from consideration based on that metric should be re-examined. This includes the IFF Chemical Holdings and Symrise facilities that FL DEP eliminates on page 248.

4.4 On page 246, FL DEP states that it selected facilities to analyze for reasonable progress with at least a 1.00% PSAT threshold for sulfate or nitrate. FL DEP doesn't explain this selection other than stating that other VISTAS states used that threshold as well. FL DEP should explain why it selected this threshold. In addition, FL DEP should explain why this threshold is appropriate, considering the type of modeling performed, which utilizes a dirty background. For instance, FL DEP should the threshold EPA used to determine which Texas sources should receive a four-factor analysis in the Texas FIP.[7] Here EPA determined it was reasonable in dirty background modeling (which is what Florida/VISTAS employed) to require any individual unit with at least a 0.3% extinction contribution at any Class I Area to undergo a four-factor analysis.

5 FL DEP Wrongly Exempts Sources from a Four-Factor Analysis

5.1 In addition to the elimination of facilities from a four-factor analysis due to FL DEP's inappropriate use of the AoI/PSAT ratio discussed above, FL DEP inappropriately eliminates sources based on its contention they are already "effectively controlled." For instance, on page 249, FL DEP concludes that the Stanton facility is effectively controlled since it meets EPA's MATS rule.[8] Other examples are discussed below. FL DEP refers to the Regional Haze Guidance to support its position.[9] FL DEP concludes that it need not further consider controlling these and other sources discussed below. The following points address this issue:

- Because the Regional Haze Guidance is merely guidance, it does not take precedence over the Regional Haze Rule. In fact, the Regional Haze Rule does not provide any discussion at all concerning the topic of "effective controls." The Regional Haze Rule has long recognized that scrubber upgrades are generally cost-effective and should be examined by states to ensure reasonable progress.[10] To the extent FL DEP interprets EPA's guidance as suggesting otherwise, that interpretation has no basis in either the CAA or the Regional Haze Rule.

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[7] Technical Support Document for the Oklahoma and Texas Regional Haze Federal Implementation Plans, (FIP TSD), November 2014. See the discussion beginning on page A-49. Available here: https://www.regulations.gov/document/EPA-R06-OAR-2016-0611-0052.

[8] FL DEP also considers that OUC Stanton has publicly committed to end coal-firing operations by 2027. As discussed earlier in this report, retirements must be secured by an enforceable agreement that is a part of Florida's SIP or the units involved must undergo four-factor analyses.

[9] See the Regional Haze Guidance, page 22.

[10] For instance, see the Final Regional Haze Rule update, 82 Fed. Reg. 3088 (January 10, 2017): Here, EPA explains that Texas' analysis was in part rejected because it did not properly consider EGU scrubber upgrades. Also see the BART Final Rule, 70 Fed. Red. 39171 (July 6, 2005): "For those BART-eligible EGUs with preexisting post-combustion SO_2 controls achieving removal efficiencies of at least 50 percent, your BART determination should consider cost effective scrubber upgrades designed to improve the system's overall SO_2 removal efficiency."

- In fact, EPA's record for its Oklahoma FIP, indicates that underperforming scrubbers should be evaluated at 98% control (with a floor of 0.04 lbs/MMBtu) for Wet Flue Gas Desulfurization (WFGD) scrubbers, and 95% control (with a floor of 0.06 lbs/MMBtu) for Spray Dryer Absorbers (SDA).[11] Also, The IPM wet FGD Documentation states: "The least-squares curve fit of the data was defined as a "typical" wet FGD retrofit for removal of 98% of the inlet sulfur. It should be noted that the lowest available SO_2 emission guarantees, from the original equipment manufacturers of wet FGD systems, are 0.04 lb/MMBtu."[12]

- Although EPA's guidance states, regarding scrubbers installed as a result of regional haze first round requirements, that "we expect that any FGD system installed to meet CAA requirements since 2007 would have an effectiveness of 95 percent or higher,"[13] that does not relieve the state of evaluating achievable, cost-effective emission reductions. Here, a number of examples of non-regional haze requirements (e.g., NSPS, BACT, LAER, and MATS), which could serve as surrogate four-factor analyses, support imposing more stringent control and/or emission limits for SO_2[14] than EPA assumed for first round regional haze controls. For instance many of the EGUs that meet MATS do so by monitoring for HCl and so only control SO_2 indirectly. Even those that do satisfy MATS by controlling SO_2 are (assuming coal) usually limited to 30-day average SO_2 rates of 0.2 lbs/MMBtu, which is often much less stringent than would have been required under a source-by-source BART analysis.

- Moreover, FL DEP arbitrarily ignores achievable emission reductions. Given EPA's previous findings that scrubber upgrades can achieve 98% control for WFGD and 95% for SDA, the state must evaluate the cost-effectiveness of those emission limits under the four statutory factors. Many significant wet scrubber upgrades involve relatively low capital expenditures (e.g., liquid to gas improvements such as rings or trays, new spray headers/nozzles, etc.) and often consist of simply running all available absorbers and pumps and utilizing better reagent management or simply using more reagent and/or organic acid additives such as Dibasic Acid (DBA). These types of upgrades will likely result in very cost-effective scrubber upgrades. In fact, it appears that some of these types of upgrades have recently been performed on the Gavin units, discussed below.

- The problems with FL DEP's interpretation of the Regional Haze Guidance's advice notwithstanding, FL DEP has ignored a key qualifier of that advice. The Regional Haze Guidance states regarding its "effectively controlled" advice that

[11] See 76 FR 81742 (December 28, 2011).
[12] IPM Model – Updates to Cost and Performance for APC Technologies, Wet FGD Cost Development Methodology, Final January 2017, Sargent and Lundy. Page 2.
[13] Regional Haze Guidance, page 24, FN 53. EPA does not distinguish between WFGD and SDA scrubbers.
[14] See the example list in the Regional Haze Guidance, pages 23-25.

> [A] state that does not select a source or sources for the following or any similar reasons should explain why the decision is consistent with the requirement to make reasonable progress, i.e., why it is reasonable to assume for the purposes of efficiency and prioritization that a full four-factor analysis would likely result in the conclusion that no further controls are necessary.[15]

FL DEP has arbitrarily failed to consider technically and economically feasible upgrades to scrubbers and SCR systems.

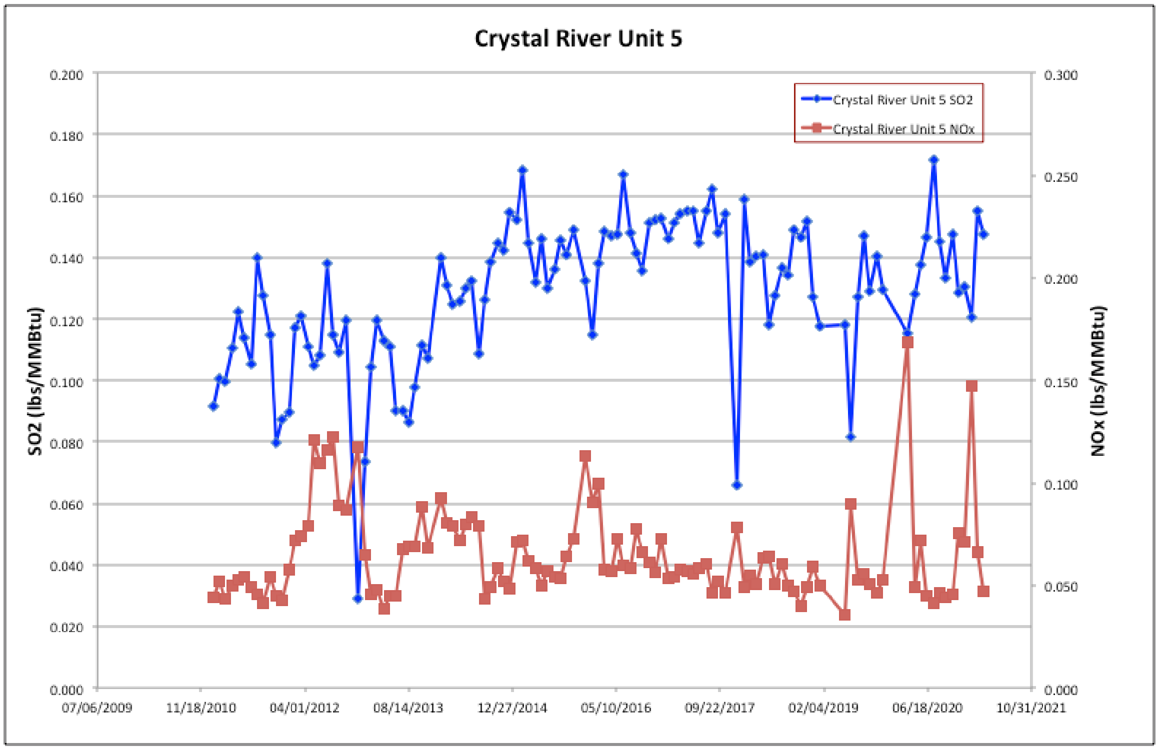
In summary, FL DEP cannot simply confer a blanket "effectively controlled" exemption to a proper four-factor analysis. It must investigate whether additional controls or upgrades to existing controls would be cost-effective. Comments concerning specific facilities follow.

5.1.1 On page 251, FL DEP exempts Crystal River Units 4 and 5 from a SO_2 four-factor analysis because it has accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. As above, this is inadequate, as it does not consider what the scrubber systems are capable of achieving. Below is a graph of the monthly SO_2 and NOx emissions of Unit 5:[16]

Figure 3: Monthly SO_2 and NOx emissions of Crystal River Unit 5

[15] See the Regional Haze Guidance, page 23

[16] All EGU emission data reviewed in this report were retrieved from EPA's Air Programs Markets Data website here: https://ampd.epa.gov/ampd/. These data are in the file, "Florida Emissions.xlsx."



As can be seen from the above graph, Unit 5's wet scrubber is capable of operating much below an SO_2 limit of 0.2 lbs/MMBtu on a continuous basis. In fact, from 2010 to 2013, this scrubber system has repeatedly demonstrated that it is capable of sustained performance below 0.10 lbs/MMBtu. It appears that it is currently not doing so because it is not constrained by a permit limit. Unit 4's performance is similar. FL DEP must perform or require an actual SO_2 four-factor analysis for these units that investigates whether the current wet scrubbers can be optimized or upgraded. In addition, the SCR systems for both units have demonstrated the capability to operate at or below 0.05 lbs/MMBtu on a monthly average basis. However, there is a great deal of fluctuation in system performance, with monthly NOx levels often approaching 0.1 lbs/MMBtu. Consequently, FL DEP should also examine whether the SCR systems could be optimized, which would very likely be very cost-effective. Regardless, FL DEP should tighten the monthly NOx limit, which according to the facility's Title V permit, ranges from 0.20 – 0.70 lbs/MMBtu, depending on the fuel burned. The current limit clearly has no effect on the operation of these SCR systems. This facility is only about 20 kilometers north of the Chassahowitzka Wilderness Area and has the highest cumulative Q/d value for any facility in Florida at 518.9.[17] Therefore, FL DEP should give it its highest priority.

5.1.2 On page 251, FL DEP exempts Big Bend Units 3 and 4 from a SO_2 four-factor analysis because these units have accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. Both units are equipped with wet scrubbers and SCR systems. Both units are permitted to burn natural gas, coal, pet coke, coal residue or mixtures

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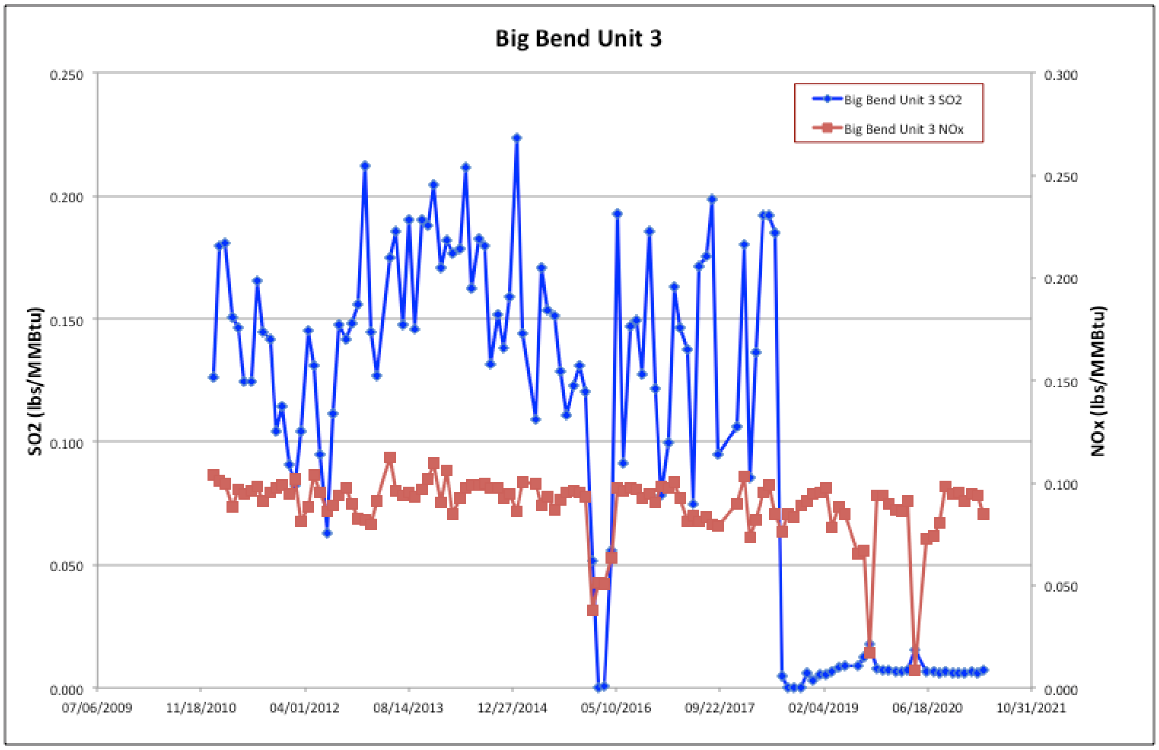
[17] Q/d data retrieved from: https://npca.maps.arcgis.com/apps/MapSeries/index.html?appid=73a82ae150df4d5a8160a2275591e45d.

thereof. This makes it difficult to ascertain the performance potential of the SCR and scrubber systems because low SO_2 and NOx periods could also reflect partial natural gas usage. Below is a graph of the monthly SO_2 and NOx emissions of Unit 3:[18]

Figure 4: Monthly SO_2 and NOx emissions of Big Bend Unit 3



As can be seen from the above figure, Unit 3's monthly NOx limit is fairly stable, even when it is burning natural gas, which it appears to have been doing exclusively since January 2019. NOx emissions from natural gas are inherently lower than those from burning coal. However, Unit 3's NOx emissions remained largely unchanged during this period. This indicates that Unit 3's SCR system managed to meet its permitted 30 day rolling average limit of 0.12 lbs/MMBtu but could have achieved much lower NOx emissions. Modern SCR systems are capable of consistently achieving monthly NOx emissions of 0.05 lbs/MMBtu or less.[19] Unit 3's SO_2 emissions have been very erratic, but have demonstrated the

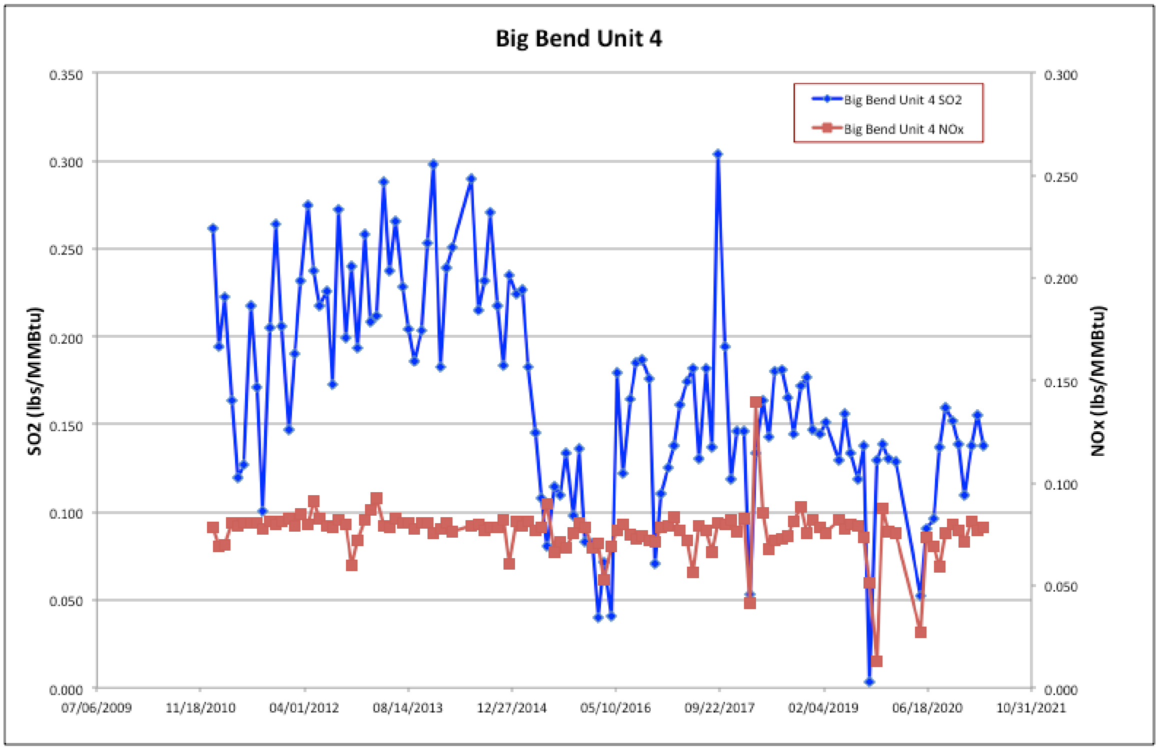
[18] See the file, "Florida Emissions.xlsx."

[19] See EPA's proposal at 76 FR 491 (January 11, 2011) and its final at 76 FR 52388 (August 22, 2011). In particular, see the discussion at 76 FR 52404: "The Havana Unit 9 data shows that it has operated under 0.05 lbs/MMBtu from mid-2009 to the end of 2010 on a continuous basis. In fact, this unit has operated under 0.035 lbs/MMBtu for much of that time. The Parish Unit 7 data shows that it has operated under 0.05 lbs/MMBtu from mid-2006 to mid 2010 on a continuous basis. In fact, this unit has operated for months at approximately 0.035 lbs/MMBtu, and for approximately 2 years at approximately 0.04 lbs/MMBtu. The Parish Unit 8 data show that it has operated almost continuously under 0.045 lbs/MMBtu since the beginning of 2006. Other units' data show months of continuous operation below 0.05 lbs/

capability to achieve monthly levels considerably under its new MATS limit of 0.20 lbs/MMBtu.

Below is a graph of the monthly SO_2 and NOx emissions of Unit 4:

Figure 5: Monthly SO_2 and NOx emissions of Big Bend Unit 4



It can be seen from the above figure that the monthly SO_2 emissions shifted downward after January 2015. According to the emissions data submitted to EPA. This corresponds to Unit 4's use of natural gas as a secondary fuel. Again, the NOx rate remained consistent, indicating that the SCR system was not being used to its full capability and is minimally operated to achieve its permitted 30 day rolling limit of 0.10 lbs/MMBtu.

For Both Units 3 and 4, FL DEP should require that a SO_2 and NOx four-factor analysis be performed to determine if the scrubber and SCR systems can be cost-effectively optimized or upgraded, which is likely.

5.1.3 On page 252, FL DEP exempts Seminole Units 1 and 2 from a SO_2 four-factor analysis because these units have accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. Both these units are permitted to burn coal and a limited amount of fuel oil. Both units are equipped with wet scrubbers and SCR systems. Based on the emission data, it appears that both scrubbers were upgraded around October

MMBtu. We believe this data demonstrates that similar coal fired units that have been retrofitted with SCRs are capable of achieving NOx emission limits of 0.05 lbs/MMBtu on a continuous basis."

2015. After that point, the monthly SO_2 average rate has been hovering around 0.15 lbs/MMBtu but both scrubber systems have demonstrated the ability to achieve 0.10 lbs/MMBtu. Both SCR systems have demonstrated the ability to achieve a monthly NOx average of 0.05 lbs/MMBtu or lower. However, Seminole's permitted limit is 0.07 lb/MMBtu based on a 12-month rolling average. FL DEP should perform or require four-factor analyses of both the scrubber and SCR systems, as it is likely that both the wet scrubber and SCR systems could be optimized or upgraded cost-effectively.

5.1.4 On page 252, FL DEP exempts the Nutrien White Springs Ag Chemical Plant based on its conclusion that recent upgrades to the Sulfuric Acid Plants (SAPs) required by a consent decree are consistent with recent BACT determinations made for similar double-absorption, sulfur burning SAPs. FL DEP does not discuss what it means by this statement. Nevertheless, as discussed above, BACT-level control limits cannot be assumed to equal those that result from an actual four-factor analysis in which the best performing controls must be considered. This is especially true considering that these types of controls are very site-specific and the resulting SO_2 control levels on a pound of SO_2 per ton of sulfuric acid can vary considerably. This is evident by examining the limits required of other similar sulfur burning SAPs in the cited consent decree.[20] As Nutrien itself notes in its July 8, 2020, reply to FL DEP, the Rhodia Plant in Houston has a limit much lower that White Springs.[21] Therefore blanket statements concerning BACT level limits for these types of controls are somewhat dubious. Also, there are numerous examples of CDs that do not require the best performing controls. Therefore, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or conduct/require a four-factor analysis.

5.1.5 On pages 252-3 FL DEP exempts the Mosaic New Wales and Bartow SAPs. Regarding the New Wales facility, FL DEP states that SAP No. 1-3 are each required to meet a limit of 3.5 lb SO_2 per ton of 100% sulfuric acid on a 24-hr rolling average, and 4 lb/ton SO_2 on a 3-hr rolling average. SAPs 4 and 5 are each required to meet a limit of 4 lb/ton [FL DEP does not specify the averaging period(s)]. Regarding the Bartow facility, FL DEP states that SAP No. 4-6 are each required to meet a limit of 4 lb/ton of 100% sulfuric acid [again, FL DEP does not specify the averaging period(s)]. In both cases, FL DEP states that SO_2 BACT determinations for sulfur burning, double absorption sulfuric acid plants with cesium-promoted catalysts in EPA's RACT/BACT/LAER Clearinghouse database are in the range of 3.0 to 4.0 lb/ton, so it concludes these units are effectively controlled, and additional reasonable controls are unlikely to be found.

Firstly, a range of 3.0 to 4.0 lbs/ton represents a potential increase of 33% in the SO_2 emissions. Such a wide range should not be used to characterize the acceptable range of best performing controls. Secondly, in its December 2017 SO_2 NAAQS SIP, FL DEP

[20] See https://www.epa.gov/sites/production/files/2014-11/documents/pcsnitrogenfertilizer-cd.pdf, page 13.
[21] See Appendix G-2g, page 5.

states that the New Wales permit will cause "the production-based emissions limits at the five sulfuric acid plants of 3.5 and 4 lbs SO_2/ton of 100% H_2SO_4 are effectively lowered to 1.6 & 1.8 lbs SO_2/ton of 100% H_2SO_4, respectively."[22] A little later, FL DEP states that the Bartow permit will cause "the production-based emissions limits at the 3 sulfuric acid plants of 4 lbs SO_2/ton of 100% H_2SO_4 are effectively lowered to 3.4 lbs SO_2/ton of 100% H_2SO_4. These limits are significantly lower than what FL DEP describes on pages 252-3 so FL DEP should therefore explain these differences. Regardless, as with the White Springs facility, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or conduct/require a four-factor analysis.

5.2 On page 250, FL DEP reasons that Breitburn Operating's over 300 km distance to the nearest Class I area was the primary justification for not selecting this facility for a reasonable progress evaluation. No other justification is provided. It does not appear that this facility was previously identified as an AoI source and it does not appear on FL DEP's summary of AoI sources that impact St. Mark's in Table 7-22, so FL DEP should clarify this source's standing. In any event, FL DEP's reasoning does not constitute any sort of valid conclusion for not conducting a proper four-factor analysis.

5.3 On page 250, FL DEP reasons that Deerhaven Generating Station is currently implementing a fuel co-firing project that will allow it to co-fire up to 100% natural gas, which will lead to substantial reductions of SO_2 emissions in the future. It eliminates this facility from a four-factor analysis on that basis. However, on page 288, FL DEP states that Gainesville Regional Utilities has received permits allowing for up to 100% natural gas firing in its Deerhaven Unit 2, which will allow it to fire all gas, all coal, or a combination thereof. Unit 2 is the only coal-fired unit at Deerhaven, but its recent ability to fire natural gas does not mean it will do so. As with retirements, unless FL DEP secures an enforceable commitment in its SIP, it must either eliminate Deerhaven under another valid method, or subject it to a proper four-factor analysis.

5.4 On page 241, FL DEP states that there are some facilities identified by AoI with a sulfate + nitrate contribution over 1% that were not PSAT tagged. It is unclear how this statement aligns with the statement on page 229 where FL DEP describes its individual AoI contribution of ≥5% for nitrates or sulfates test (individual facility nitrate contribution divided by total nitrate contributions from EGU + non-EGU point sources) for PSAT tagging. It is also unclear if the sources listed in Tables 7-21, 7-22, and 7-23 satisfy the 1% or the 5% test. FL DEP should clarify this situation and discuss why these sources were not PSAT tagged.

6 Discussion of the Foley Mill Four-Factor Analysis

[22] State Of Florida Department Of Environmental Protection, Proposed Revision To State Implementation Plan, Submittal Number 2017-04, Incorporation Of SO_2 Emissions Limits For Two Facilities In Polk County, December 1, 2017. Pages 11-12.

This is a review of the Foley Cellulose Pulp Paper Mill.[23] In general, Foley presents little data, details or documentation for its cost-effectiveness figures. On page 279 of its SIP, FL DEP states that it is still in the process of reviewing Foley's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete. FL DEP should note that until it finishes all of its four-factor analyses, it cannot set the Reasonable Progress Goals for its Class I Areas, since those goals must incorporate all reasonable progress controls.[24] For the reasons discussed below, Foley's analysis should be greatly revised.

6.1 Foley Mill apparently only considers controls as being technically feasible if they can be found installed on the source of interest in EPA's RACT/BACT/LAER Clearinghouse (RBLC). This database does not constitute the last word on the technical feasibility of controls for the Regional Haze Program. The fact that a control cannot be found in the RBLC does not mean that it has not been installed on the source of interest or that it is otherwise not technically feasible. EPA discusses what it means by technical feasibility in the BART Rule:[25]

> Control technologies are technically feasible if either (1) they have been installed and operated successfully for the type of source under review under similar conditions, or (2) the technology could be applied to the source under review. Two key concepts are important in determining whether a technology could be applied: ''availability'' and ''applicability.'' As explained in more detail below, a technology is considered ''available'' if the source owner may obtain it through commercial channels, or it is otherwise available within the common sense meaning of the term. An available technology is ''applicable'' if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible.

In Foley's case, it uses the RBLC to justify only considering wet scrubbers and DSI on its boilers and furnaces. However, there is no technical reason why dry scrubbers cannot also be installed on the boilers. The National Council for Air and Stream Improvement, Inc. (NCASI), which describes itself as serving the forest products industry and a repository of unbiased, scientific research and technical information, states that dry

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[23] Foley Cellulose LLC Facility Id No. 1230001, Regional Haze Rule – Reasonable Progress Analysis, October 2020. Found in Appendix G-2b of the Florida SIP.

[24] See Section 51.308(F)(3))(i): "A state in which a mandatory Class I Federal area is located must establish reasonable progress goals (expressed in deciviews) that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under paragraph (f)(2) of this section that can be fully implemented by the end of the applicable implementation period, as well as the implementation of other requirements of the CAA."

[25] See the BART Rule, 70 FR 39165 (July 6, 2005). Note that on 70 FR 39164, EPA provides a listing of many sources of information, in addition to the RBLC, that can be consulted on the question of technical feasibility.

scrubbers are available for paper mill boilers.[26] Also, the New Page/Westvaco/Luke Paper mill committed to install either a spray dryer absorber or a circulating dry scrubber resulting in approximately 90% emission reduction from the 2002 baseline.[27] Another applicable document is EPA Region 4's January 31, 2007 letter to the North Carolina Department of Environment, concerning the BART analysis for the Blue Ridge Canton Paper Mill.[28] This letter discusses a number of process changes applicable to recovery furnaces that could be assessed. Lastly, the both the Fernandina Beach and Panama City Mills, which operate boilers similar to Foley's boilers and also claim to have sourced applicable controls from the RBLC, evaluate dry scrubbing systems for their boilers as part of its four-factor analyses. Therefore, Foley should revise its four-factor analysis to include the consideration of various dry scrubbing technologies for the boilers and process changes for the recovery furnaces.

6.2 FL DEP should assess the cost-effectiveness of reducing the sulfur in Foley's usage of No. 6 fuel oil and tall oil, which is now limited to 2.5% by weight by permit. This would likely result in very cost-effective controls.

6.3 Foley spends one paragraph, on page 3-2 of its report, discussing its wet scrubber cost analysis for its No. 1 power boiler. It states that it scaled it based on a recent cost estimate for a lime kiln. A cost analysis was provided in Appendix B. Little data, details, or side calculations were provided. No documentation for any aspect of this analysis was provided. Due to the lack of documentation, little can be verified and Foley should provide side calculations for all its figures. However, some problems can be identified:

6.3.1 Foley's Title V permit states that a pre-scrubber is used. Foley should therefore discuss and assess what optimization or upgrades can be made to this control to further reduce SO_2.

6.3.2 Foley should consider other wet scrubbing technologies.[29]

6.3.3 As discussed later in this report, Foley must either document the basis for its use of a 5% interest rate or use the current Bank Prime interest rate of 3.25%.

6.3.4 Foley calculates an annual electricity cost of $133,793. Its notes this results from "E x Electricity Cost." However, "E" is the caustic cost, so this appears to be an error. At the beginning of Appendix B, Foley lists the cost of electricity as $0.0755/kWh, and that the electricity usage is 0.00175 kWh/acfm, with a

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[26] See NCASI memo dated June 9, 2006, transmitting a report entitled, "Retrofit Control Technology Assessment for NOx , SO_2 and PM Emissions From Kraft Pulp and Paper Mill Unit Operations by Arun V. Someshwar, Ph. D., NCASI." See the SO_2 sections on fuel oil and coal fired boilers.
[27] See https://www.federalregister.gov/d/2012-4663/p-128 concerning the New Page/Westvaco/Luke Paper kraft pulp mill boilers.
[28] See https://www.in.gov/idem/airquality/files/regional_haze_archive_epa_letter.pdf.
[29] See for instance, https://www.energy-xprt.com/articles/modern-gas-cleaning-techniques-for-trs-and-so2-control-in-the-pulp-and-paper-industry-6470.

reference acfm of 420,000. These figures also do not appear to result in Foley's figure of $133,793.

6.3.5 All figures should be explained and documented.

6.4 Foley also spends one paragraph, on page 3-2, discussing its DSI cost analysis for its No. 1 Power Boiler. A similar lack of information accompanies this analysis, although Foley does provide a DSI cost analysis. Due to the lack of documentation, little can be verified and Foley should provide side calculations for all its figures. However, some problems can be identified:

6.4.1 Foley's inclusion of owner costs is not allowed under the Control Cost Manual (see discussion later in this report). Again, Foley must use either document its use of a 5% interest rate or use the current Bank Prime interest rate of 3.25%.

6.4.2 Foley should explain its calculation of a 13 MW boiler equivalent, which assumes a 151.3 MMBtu/hr value with only a 30% efficiency. This efficiency appears low and Foley should provide documentation for it, as it is a key input into the DSI cost-effectiveness calculation.

6.4.3 All figures should be explained and documented.

6.5 On page 3-2, Foley spends two paragraphs discussing potential controls for its bark boiler. It states that it is already equipped with a scrubber and so only the use of more caustic is evaluated. Foley's proposed Title V permit revision states the following regarding it:

> PM emissions are controlled by a cyclone collector and a wet, Venturi scrubber. Water is utilized as the scrubbing media. Fly ash collected by the cyclone collector is recirculated back to the boiler. SO_2 emissions are controlled by internal absorption and partial removal in the wet, Venturi scrubber. Water flow rate and pH to the scrubber are adjusted to control SO_2 emissions from the scrubber.

6.6 Wet venturi scrubbers in this application are typically used to control particulates and it appears from Foley's proposed Title V permit revision that is the case here. Foley's permit mentions pH control but does not appear to require the use of a caustic solution in the wet venturi scrubber in order to promote the removal of SO_2. Consequently, Foley's assertion that the boiler is already equipped with a scrubber that is being represented as an SO_2 control device, and therefore other SO_2 control devices should not be assessed, is not justified. Foley should perform a cost analysis of additional SO_2 controls systems that are capable of 90% or better SO_2 removal efficiencies.

6.7 Foley provides little information concerning the bark boiler wet venturi scrubber upgrade in Appendix B. It estimates that the addition of caustic will result in 51% SO_2 removal. Foley does not present any information on whether the stated 51% removal efficiency represents the maximum removal possible. No documentation for any figures are provided. Complete documentation for all figures should be provided. Foley should provide information, and cost-effectiveness calculations, on the expected range of performance such an upgrade is capable of achieving.

6.8 On page 3-3, Foley discusses its SO_2 control analyses for its three recovery furnaces. Foley states that it used an American Forest and Paper Association publication from September 2001 as the basis for that cost analysis, escalating the capital cost to 2019 dollars. As the Control Cost Manual indicates, "[e]scalation with a time horizon of more than five years is typically not considered appropriate as such escalation does not yield a reasonably accurate estimate. Thus, obtaining new price quotes for cost items is advisable beyond five years."[30] EPA provides a detailed set of design equations for a packed tower scrubber suited to this application, along with an easy to use spreadsheet that incorporates those equations.[31] In fact, Foley makes a general reference to that information in calculating its caustic usage. Because Foley's cost estimate depends on information much older than five years, it should be discarded and Foley should make use of EPA's cost-effectiveness methodology or obtain a newer quote from a vendor. In so doing, Foley should update its SO_2 emissions baselines for the three furnaces, as they appear to be low, based on the data provided by FL DEP on page 279 of its SIP.

7 Discussion of the Northside Facility

This is a review of the Northside Generating Station Four-Factor Review.[32]

7.1 On page 251, FL DEP exempts the Northside Units 1 and 2 from a SO_2 four-factor analysis because it states that the units are already required by permit to meet an SO_2 limit of 0.15 lbs/MMBtu, which is more stringent than the MATS SO_2 limit of 0.2 lbs/MMBtu. Firstly, the fact that these units are capable of achieving SO_2 limits of 0.15 lbs/MMBtu that are stricter than the MATS 0.2 lbs/MMBtu limit for which FL DEP exempts the two Crystal River units reinforces the conclusion that MATS is not an indicator of a scrubber's true performance potential. Both of these units are equipped with dry scrubbers and SNCR systems. Below is a graph of Unit 1's monthly SO_2 and NOx emissions:[33]

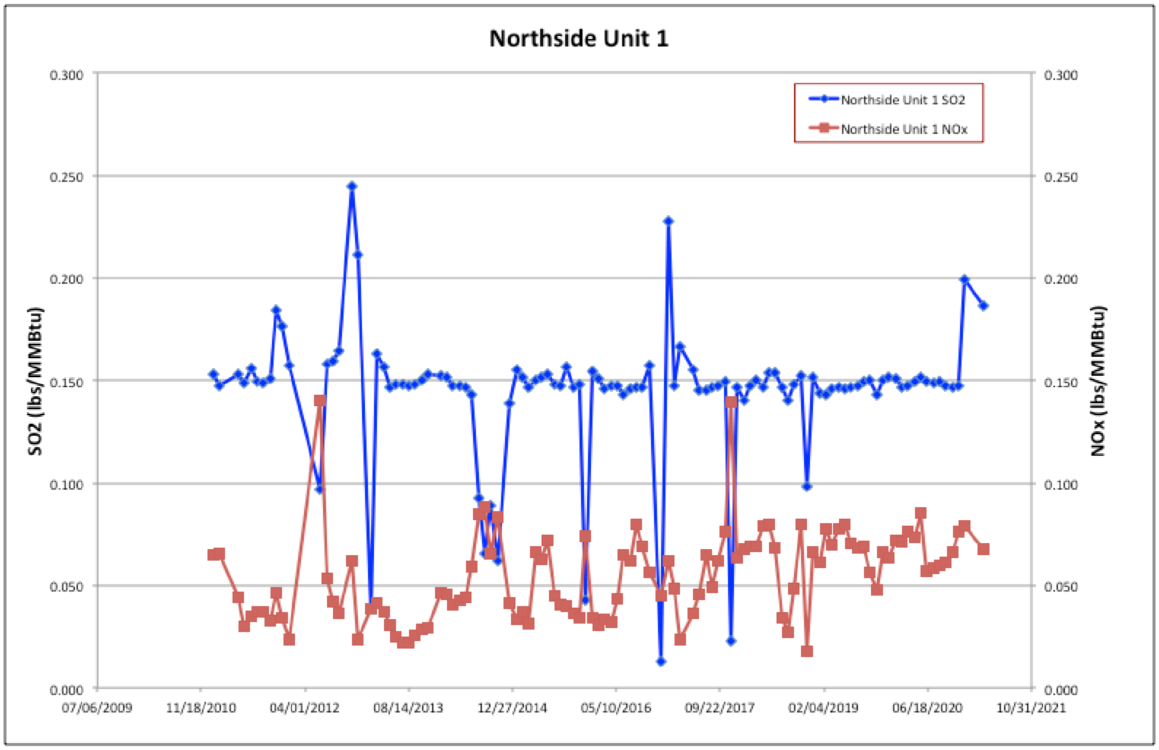
Figure 6. Northside Unit 1 SO_2 and NOx emissions

[30] Control Cost Manual, Section 1 Introduction, Chapter 2 Cost Estimation: Concepts and Methodology, November 2017. Page 18. Available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[31] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[32] Reasonable Progress Four-Factor Analysis, JEA Northside Generating Station (NGS), Golder Associates Inc., January 2021. Found in Appendix G-2c of the Florida SIP.

[33] See file, "Florida Emissions.xlsx."



A corresponding graph for Unit 2 is similar. Both units are permitted to burn natural gas, coal, pet coke, biomass or mixtures thereof. This makes it difficult to ascertain the performance potential of the SNCR and scrubber systems because low SO_2 and NOx periods could also reflect partial natural gas usage. Nevertheless, it appears that the SNCR system, which has a permit limit of 0.09 lbs/MMBtu on a 30 day rolling average basis, is not operated consistently. Many of the upward NOx spikes do not correspond to downward SO_2 spikes, which would seem to indicate periods of higher natural gas or biomass usage. Assuming that observation is correct, it appears that the SNCR system is capable of controlling the monthly NOx rate to 0.03 lbs/MMBtu or lower during periods of coal or pet coke usage. FL DEP should investigate this observation and if confirmed require that a four-factor analysis be performed that investigates the cost-effectiveness of optimizing the SNCR system for these units, which would appear to be very cost-effective.

7.2 In contrast to the SNCR systems, the dry scrubber appears to be operating very consistently. However, because the inlet SO_2 rate is not available, the dry scrubber's efficiency cannot be determined. Modern dry scrubbers are capable of continuous operation at 95% control. In fact, when EPA evaluated the Texas Regional Haze BART SIP, it found that Texas' underperforming scrubbers should be evaluated at 98% control (with a floor of 0.04 lbs/MMBtu) for Wet Flue Gas Desulfurization (WFGD) scrubbers, and 95% control (with a floor of 0.06 lbs/MMBtu) for Spray Dryer Absorbers (SDA).[34] FL DEP should require that a four-factor analysis be performed that investigates the cost-

[34] "Technical Support Document for the Texas Regional Haze BART Federal Implementation Plan, (BART FIP TSD), Revised December 2016."

effectiveness of optimizing the dry scrubber systems for these units. It is anticipated that any upgrades to these systems would be very cost-effective.

7.3 Unit 3 is permitted to burn natural gas, LP gas, No. 6 fuel oil, used "on specification" oil and blends of fuel oil and natural gas. It is limited to burning No. 6 fuel oil with a sulfur content of 1.8% by weight or less. Northside's four-factor analysis considers the cost-effectiveness of burning lower sulfur No. 6 oil or No. 2 oil. The following comments address this analysis:

7.3.1 As the Regional Haze Guidance indicates, states can consider restrictions on fuel types [some inapplicable information not reproduced]:[35]

> States have the flexibility to reasonably determine which control measures to evaluate, and the following is a list of example types of control measures that states may consider:
>
> Fuel mix with inherently lower SO_2, NOx , and/or PM emissions. States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source.
>
> Operating restrictions on hours, fuel input, or product output to reduce emissions. Energy efficiency and renewable energy measures that could be applied elsewhere in a state to reduce emissions from EGUs.

FL DEP should consider the elimination of fuel oil altogether. This would not constitute a fuel change that would fundamentally change the operation or design of the source, since Unit No. 3 primarily burns natural gas. This would not be the first time FL DEP has contemplated such a fuel change and it should do so in this case.[36]

7.3.2 Northside provides no documentation concerning its claims on page 10 that modifications are needed for Unit 3 to accept the lower viscosity fuel. Northside states that based on its estimate, a modification cost of approximately $1,000,000 will be needed, which includes inspection of burner and booster pumps, burner tuning/optimization, replacement of instrumentation, and test burns to determine boiler performance. As FL DEP notes on page 264, Northside should provide documentation for these costs. As FL DEP has noted regarding the Smurfit-Stone BART application referenced above, no such costs were needed in an industrial boiler project it cited and the cost-effectiveness of the switch to a lower sulfur fuel oils was basically the cost difference between the two fuels. In assessing BART for the AECC Bailey Unit 1, AECC itself concluded that "the fuel switching

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35 Regional Haze Guidance. Page 29.

36 See the March 2, 2007 letter from FL DEP to Smurfit-Stone concerning its BART application. Available here: http://arm-permit2k.dep.state.fl.us/psd/0890003/00002D32.pdf

options evaluated would not require capital investments in equipment, but instead the annual costs would be based upon operation and maintenance costs associated with the different fuel types." AECC estimated that the cost-effectiveness of switching Bailey Unit 1 to No. 6 fuel oil with 1% and 0.5% sulfur content by weight was $1,198/ton and $2,559/ton, respectively.[37]

7.3.3 FL DEP's conclusions that Northside's usage of a 7% interest rate, a 20 year life, incorrect fuel usage, and additional fuel transportation costs are not appropriate or have not been documented are entirely justified. Its conclusion, that switching to a lower sulfur fuel oil is cost-effective, is in line with the past experience of a number of BART determinations. In fact, switching to a lower sulfur fuel oil was commonly found to be cost-effective in the first planning period and there does not appear to be anything in this case that should separate Northside from those determinations.[38] In fact, FL DEP should investigate a switch to a No. 6 fuel oil with a 0.5% sulfur content, as was done in many of these cases. If it is confirmed that Northside's $1,000,000 capital cost is unwarranted or inflated the cost-effectiveness would greatly improve. Even if it is confirmed that Northside's $1,000,000 capital cost is, justified, FL DEP's cost-effectiveness figure of $3,053/ton should be viewed as cost-effective. After receiving documentation of Northside's capital costs for conversion, FL DEP should also reassess a conversion to ultra low sulfur diesel, as was done with the four boilers reviewed for the WestRock Fernandina Beach Mill.

8 Review of the WestRock Fernandina Beach Four-Factor Analysis

This is a review of the WestRock Fernandina Beach Mill four-factor analysis.[39] In general, WestRock should provide documentation for all cost figures.

8.1 FL DEP has concluded that reasonable progress for the No. 7 power boiler is a limitation of 125 tons per day of coal. For the reasons discussed below, there is no technical or regulatory reason why coal cannot be eliminated altogether, which would reduce this boiler's SO_2 emissions to essentially zero.

On page 2-5 of its report, WestRock states that the No. 7 power boiler is capable of burning 100% natural gas. However, WestRock states it is currently regulated as a pulverized coal unit under the Boiler MACT and it must combust at least 10 percent coal on an annual heat input basis to retain this designation. Were it to drop below 10% coal,

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37 See 83 FR 62209 (November 30, 2018).

38 See for instance, the Georgia Pacific Brunswick Power Boiler 4 (77 FR 11452, 77 FR 385010), the Wyman Unit 3 (76 FR 73956, 77 FR 24385), the Verso Androscoggin Power Boilers 1 and 2 (76 FR 73956, 77 FR 24385), the Public Service NH Newington Unit NT1 (77 FR 11809, 77 FR 50602), the Dynegy Roseton Units 1 and 2 (77 FR 24794, 77 FR 51915), and various sources in MA (77 FR 30932, 78 FR 57487). In all these cases, where the state reported the cost-effectiveness, it ranged from $528/ton - $3,324/ton, with many at the low end of the range. Fuel oil sulfur contents were typically reduced down to values of 0.7% to 0.5%.

39 Regional Haze Rule Four-Factor Analysis For The Westrock Fernandina Beach Mill, October 2020. Appendix G-2j.

WestRock argues that it would be regulated as a Gas 2 subcategory and because it would have to fire coal during its performance testing it would likely fail for HCl and possibly PM. Therefore, WestRock concludes it cannot fall below 10% coal usage because doing so would fundamentally change the boiler, which was designed as a pulverized coal unit. However, this argument does not extend to the elimination of coal altogether. Because WestRock concedes that this boiler can operate on 100% natural gas, there is no "fundamental change" consideration. [40]

On page 2-7, WestRock states that the existing ULSD burners in No. 7 Power Boiler are only capable of delivering 46% of full load and it would cost approximately $18.8 million to upgrade them it so the boiler could retain full backup capability. WestRock also argues that eliminating coal as a permitted fuel would require landfilling of the No. 5 Power Boiler bark ash, consuming landfill capacity better used for materials that cannot be disposed of by other means, eliminating a source of heat input to the unit, and potentially causing more truck traffic in and around the residential neighborhood surrounding the mill. All of these issues can and should be addressed in a four-factor analysis in which coal elimination is considered. WestRock should provide documentation for its claimed $18.8 capital cost and the remaining issues should either be monetized or assessed under the "energy and non-air quality environmental impacts of compliance" factor. FL DEP should therefore consider this option as well.

8.2 On page 2-11 of its report WestRock states that like Foley, it used an American Forest and Paper Association publication from September 2001 as the basis for its wet scrubber cost analysis, escalating the capital cost to 2019 dollars. Again, escalation over this length of time does not yield a reasonably accurate estimate and WestRock should obtain new price quotes. Or, like Foley, WestRock should use EPA's cost spreadsheet for a packed tower scrubber that is perfectly suited to this application.[41]

8.3 WestRock uses an SO_2 baseline of 1,247 tons based on a projection to 2028. On page 270 FL DEP concludes that this figure is low because the most recent emissions data shows that the two-year average from 2019 to 2020 was 754 tons. It is true that power boiler No. 7's SO_2 has declined over the last two years. However, there does not appear to be anything in the facility's Title V permit or its four-factor analysis that would point to a continuance of this level of SO_2 emissions. A three-year SO_2 average would yield a value of 1,050 tpy SO_2 and a five-year average would yield a value of 1,485 tpy SO_2. Therefore, it appears that WestRock's figure is reasonable.

8.4 There are a number of cost items in WestRock's cost analyses that were redacted, apparently due to confidentiality claims. These items include (1) the cost factors and

[40] As discussed earlier in this report, the "fundamental change" language is a reference to the Regional Haze Guidance's advice to states on page 30 concerning what control measures they can consider: "States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source."

[41] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

rates for operator and maintenance labor, electricity, chemicals, freshwater, and wastewater, and (2) sorbent, auxiliary power and waste disposal costs. These cost items are not typically claimed as confidential and should be verified by FL DEP, as they are important inputs and cannot be verified by an independent reviewer.

8.5 Westrock presents its SDA calculation in Appendix A. The following comments address this calculation:

8.5.1 WestRock uses a 90 MW boiler equivalency, which it states is based on a 1,021 MMBtu/hr heat input. At an unattainable 100% efficiency, this would be the equivalent of 300MW.[42] However, WestRock only assumes a 30% efficiency, which reduces the power to 90 MW. This efficiency appears low and WestRock should provide documentation for this figure, as it is a key input into the SDA cost-effectiveness calculation.

8.5.2 WestRock has adapted the Sargent & Lundy cost algorithms for SDA systems.[43] It is apparent that it has greatly modified these algorithms. Because some of the underlying equations were redacted, WestRock's results cannot be reproduced. WestRock should provide full working spreadsheets for all of its cost-effectiveness calculations. In addition, it should demonstrate that its adaptation can reproduce the example provided by Sargent & Lundy in its documentation (minus owners costs and AFUDC, which are disallowed cost items under the Control Cost Manual's overnight methodology). Lastly, WestRock should remove the general and administrative, property tax, and insurance cost items it has added at the end, as these cost items are inherently included in the cost algorithms.

9 Review of the WestRock Panama City Four-Factor Analysis

9.1.1 This is a review of the WestRock Panama City Four-Factor Analysis.[44] On page 281 of its SIP, FL DEP states that it is still in the process of reviewing Panama City's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete. FL DEP should note that until it finishes all of its four-factor analyses, it cannot set the Reasonable Progress Goals for its Class I Areas, since those goals must incorporate all reasonable progress controls.[45] In general,

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[42] 1 MMBtu/h = 0.2930710702 MW.

[43] IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology, Final January 2017, Prepared by Sargent & Lundy. Available here: https://www.epa.gov/airmarkets/documentation-epas-power-sector-modeling-platform-v6.

[44] Regional Haze Rule Four-Factor Analysis For The WestRock Panama City Mill, October 2020. Appendix G-2k.

[45] See Section 51.308(F)(3))(i): "A state in which a mandatory Class I Federal area is located must establish reasonable progress goals (expressed in deciviews) that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under paragraph (f)(2) of this

WestRock should provide documentation for all cost figures. As discussed later in this report, WestRock's use of a 15-year (or 20-year) life and an interest rate of 4.75% have not been justified. Owner's costs and AFUDC are not allowed under the Control Cost Manual overnight methodology.

9.2 On page 2-2, WestRock considers switching from No. 6 fuel oil to ULSD. The following comments address this issue. Similar comments apply to WestRock's other boilers that fire No. 2 and No. 6 fuel oil:

9.2.1 WestRock's Title V permit states that the No. 3 boiler already burns No. 2 fuel oil and WestRock confirms this boiler already has the capability of burning ULSD. Considering this, the cost-effectiveness of switching from No. 6 to ULSD should primarily reflect the cost differential of the two fuels, unless additional storage capacity or conversion of the existing No. 6 storage is needed. On page A-1, WestRock lists the capital cost as being $2,276,500 but does not provide any explanation for this figure. This cost must be documented.

9.2.2 WestRock redacts the cost factors and unit costs for the No. 6 and ULSD fuels. FL DEP should confirm this redaction is warranted under confidentiality claims, and in either case it should state whether it agrees with these figures.

9.2.3 WestRock assumes that converting to ULSD will only result in an SO_2 reduction of 5.4 tons per year. This boiler is only permitted to burn wood, bark, primary clarified wood fibers, primary residuals from the WWTP, natural gas, No. 2 fuel oil, No. 6 fuel oil, gases from the condensate stripper and NCGs. Considering this, WestRock should document the source(s) of the additional SO_2 and present its calculations for the SO_2 reduction.

9.3 On page 2-5, WestRock states that the No. 3 boiler burns some natural gas but it currently does not have the capacity to entirely replace burning fuel oil. It concludes replacing fuel oil in the No. 3 boiler with natural gas is technically infeasible because the existing gas supply lines to and within the facility are undersized, burners would have to be replaced, a natural gas contract would have to be negotiated, and other related issues. These are not issues that should cause a determination of technical infeasibility. In fact, all of these types of issues are either engineering problems or they can be otherwise monetized and thus accounted for in a cost-effectiveness analysis. They are common to control retrofits. Consequently, as discussed earlier with regard to the Fernandina Mill four-factor analyses, this does not constitute "fundamental change" consideration and WestRock should analyze a 100% switch the natural gas for the No. 3 boiler.
Similar comments apply to WestRock's similar discussion for the No. 4 boiler.

9.4 On page 2-5 WestRock discusses upgrading the wet venturi scrubber on Unit 3 for additional SO_2 control. It estimates that the current removal rate is 80% and discusses how a test to increase the efficiency to 98% removal failed. WestRock states that

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section that can be fully implemented by the end of the applicable implementation period, as well as the implementation of other requirements of the CAA."

operating the wet scrubber at this level is not sustainable. WestRock nevertheless calculates the cost-effectiveness of an upgrade to 98% efficiency. WestRock states that the amount of caustic needed for this efficiency level is an order of magnitude over stoichiometric. This is not surprising for a venturi scrubber, which is not as efficient as a packed tower scrubber. WestRock should perform a cost analysis of lower efficiencies and provide a graph of the amount of caustic needed for various levels of efficiencies, as the amount of caustic is a key input into the cost-effectiveness.[46] These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.5 WestRock should also investigate additional SO_2 controls for Boiler No. 3 that are capable of 90% or better SO_2 removal efficiencies. As discussed earlier in this report, EPA provides a detailed set of design equations for a packed tower scrubber suited to this application, along with an easy to use spreadsheet that incorporates those equations.[47] Such a system would use caustic more efficiently, and is capable of continuous operation at a very high effectiveness. It would not result in the operating issues WestRock describes it encountered in attempting to upgrade the wet venturi scrubber. WestRock should make use of EPA's cost-effectiveness methodology or obtain a quote from a vendor for a similar system. These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.6 On page A-2, WestRock presents its SDA cost-effectiveness calculation for the No. 3 boiler. The following comments address this calculation:

9.6.1 As with the Fernandina Mill, WestRock assumes a 30% boiler efficiency, which appears low, so it should provide documentation for this figure. Also as with the Fernandina Mill, there are a number of cost items in WestRock's cost analyses that it has redacted. These cost items are not typically claimed as confidential and should be verified by FL DEP, as they are important inputs and cannot be verified by an independent reviewer. These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.6.2 As with the Fernandina Mill, WestRock has adapted the Sargent & Lundy cost algorithms for SDA systems. It is apparent that it has greatly modified these algorithms. Because some of the underlying equations have been redacted, WestRock's results cannot be reproduced. WestRock should provide full working spreadsheets for all of its cost-effectiveness calculations. In addition, it should demonstrate that its adaptation can reproduce the example provided by Sargent & Lundy in its documentation (minus owners costs and AFUDC, which are disallowed cost items under the Control Cost Manual's overnight methodology). Lastly, WestRock should remove the general and administrative, property tax, and

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[46] Typically caustic usage for these curves is exponential so that after a point, rapidly increasing amounts of caustic are necessary for small increases in SO_2 removal. Therefore, it is quite likely that a slightly lower SO_2 removal would be much more cost-effective.

[47] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

insurance cost items it has added at the end, as these cost items are inherently included in the cost algorithms.

9.7 On page 4-13, WestRock begins its four-factor analyses for the No. 1 recovery boiler. The following comments address this issue. Similar comments apply to the No. 2 recovery boiler:

9.7.1 WestRock only draws from the RBLC for applicable controls and only considers good operating practices, low-sulfur fuel for startup, and a wet scrubber. As discussed earlier, the RBLC should not be viewed as the last word on the technical feasibility of controls. Also, FL DEP should consider EPA Region 4's January 31, 2007, letter to the North Carolina Department of Environment, concerning the BART analysis for the Blue Ridge Canton Paper Mill.[48] This letter discusses a number of process changes applicable to recovery furnaces that could be assessed.

9.7.2 On page 4-15, WestRock discusses the possibility of switching the No. 1 recovery boiler from No. 6 fuel oil to either ULSD or natural gas. Many of the issues already discussed relating to ULSD and natural gas infrastructure apply here as well. WestRock cites to a $18.8 million capital expense to convert this boiler to gas and a $2.3 million capital expense to convert it to ULSD. These costs must be documented.

9.7.3 As with the Fernandina Mill and the Foley Mill, WestRock used an American Forest and Paper Association publication from September 2001, as the basis for its wet scrubber cost analysis, escalating the capital cost to 2019 dollars. Again, escalation over this length of time does not yield a reasonably accurate estimate and WestRock should obtain new price quotes or use EPA's cost spreadsheet for a packed tower scrubber that is perfectly suited to this application.[49]

10 FL DEP Must Consider Emissions from the Sugar Industry

There are significant emissions from the sugar industry in Florida that impact the visibility at a number of Class I Areas. However, FL DEP does not consider them in its SIP. These emissions come from point and area sources.

10.1 Significant Sugar Industry Point Sources in Florida

The following table represents major sugar industry point sources:[50]

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48 See https://www.in.gov/idem/airquality/files/regional_haze_archive_epa_letter.pdf.

49 Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

50 Q/d data retrieved from: https://npca.maps.arcgis.com/apps/MapSeries/index.html?appid=73a82ae150df4d5a8160a2275591e45d.

Table 1. Major Sugar Industry Point Sources in Florida

Facility	**County**	**Industry**	**Cumulative Q/d**
U.S. Sugar Corporation	Hendry	Cane Sugar Manufacturing	26.0
Sugar Cane Growers Co-Op	Palm Beach	Cane Sugar Manufacturing	8.2
Osceola Farms	Palm Beach	Cane Sugar Manufacturing	5.6

Although the cumulative Q/d figures primarily reflect impacts on Everglades, other Class I Areas are impacted as well. FL DEP should discuss why it has not considered these sources for four-factor analyses and why it has not considered other Class I Areas. The review should include a thorough emission analysis of all significant units at each facility, along with an assessment of the potential for controls or optimization/upgrades to existing controls.

10.2 Significant Sugar Industry Non-Point Sources in Florida

In addition to point source impacts, area source emissions from burning sugar cane also have a significant impact. The following table indicates the top 10 Florida counties with the highest emissions from agricultural burning reported to EPA's National Emission Inventory in 2017:[51]

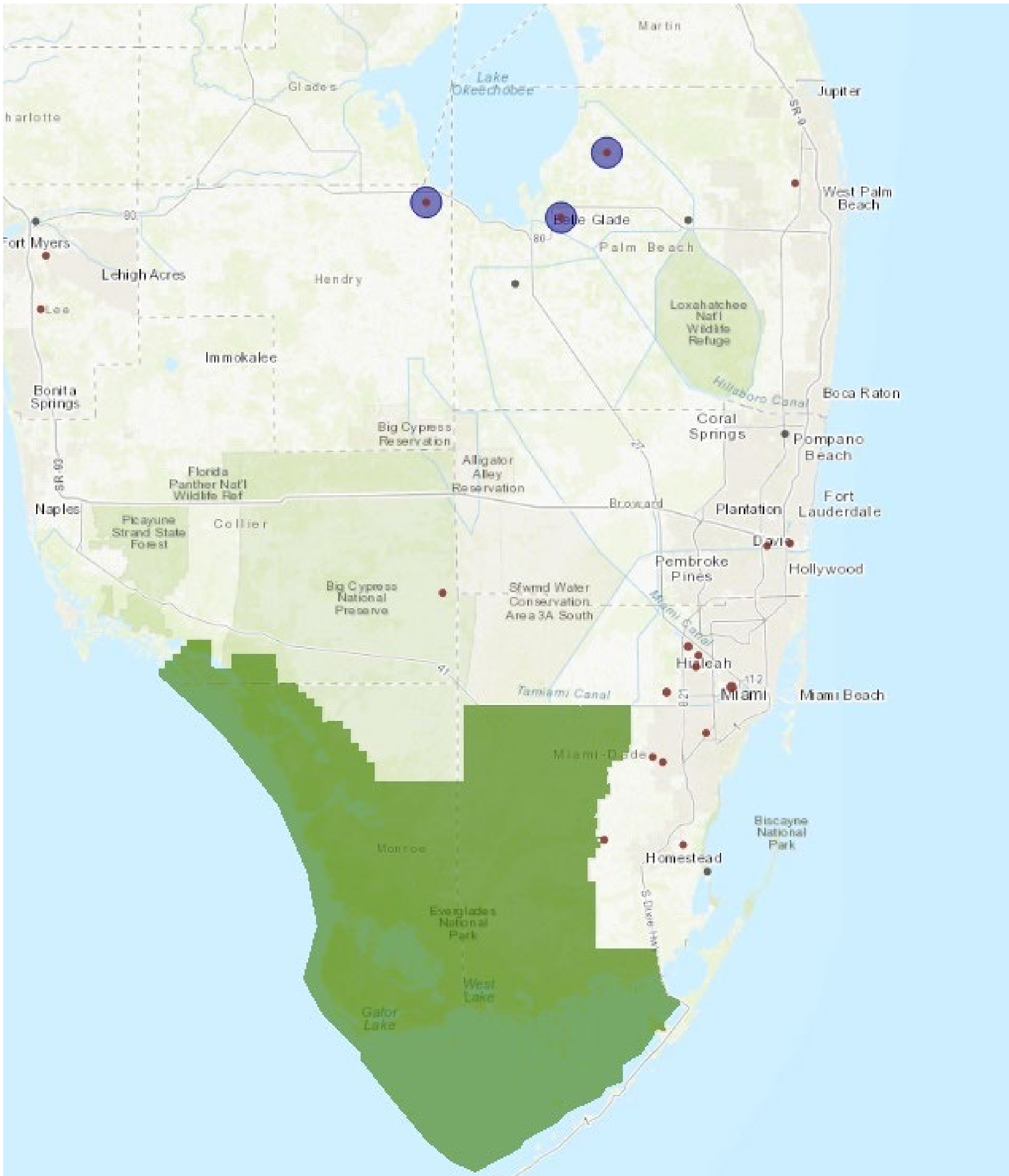
Table 2. Top 10 Florida Counties with Air Emissions from Agricultural Burning

County	NH_3	VOC	NOx	SO_2	PM25	PM10	Total
Palm Beach	8,380.6	3,043.1	1,224.2	660.2	1,829.6	2,114.5	17,252.2
Hendry	1,638.7	680.6	256.3	129.9	464.3	563.0	3,732.8
Glades	757.0	286.8	113.0	60.0	179.2	210.2	1,606.2
Martin	195.3	78.8	30.0	15.3	53.6	64.6	437.6
Jackson	90.1	83.5	22.5	6.9	86.6	119.9	409.5
Highlands	63.3	79.3	19.3	4.3	95.9	130.4	392.6
Suwannee	66.3	80.0	19.3	5.8	82.1	121.5	375.1
Indian River	52.5	71.2	17.2	3.8	85.4	115.9	346.0
Jefferson	52.6	48.7	12.6	4.4	45.4	68.2	231.9
Polk	29.5	43.0	10.2	2.0	53.0	72.2	209.8

There is in fact a relationship between the sugar industry point source locations and a number of the counties in which agricultural burning is conducted, as shown by the following map:

[51] Data retrieved from https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#datas. These data are in the file, "FL Ag Burning.xlsx."

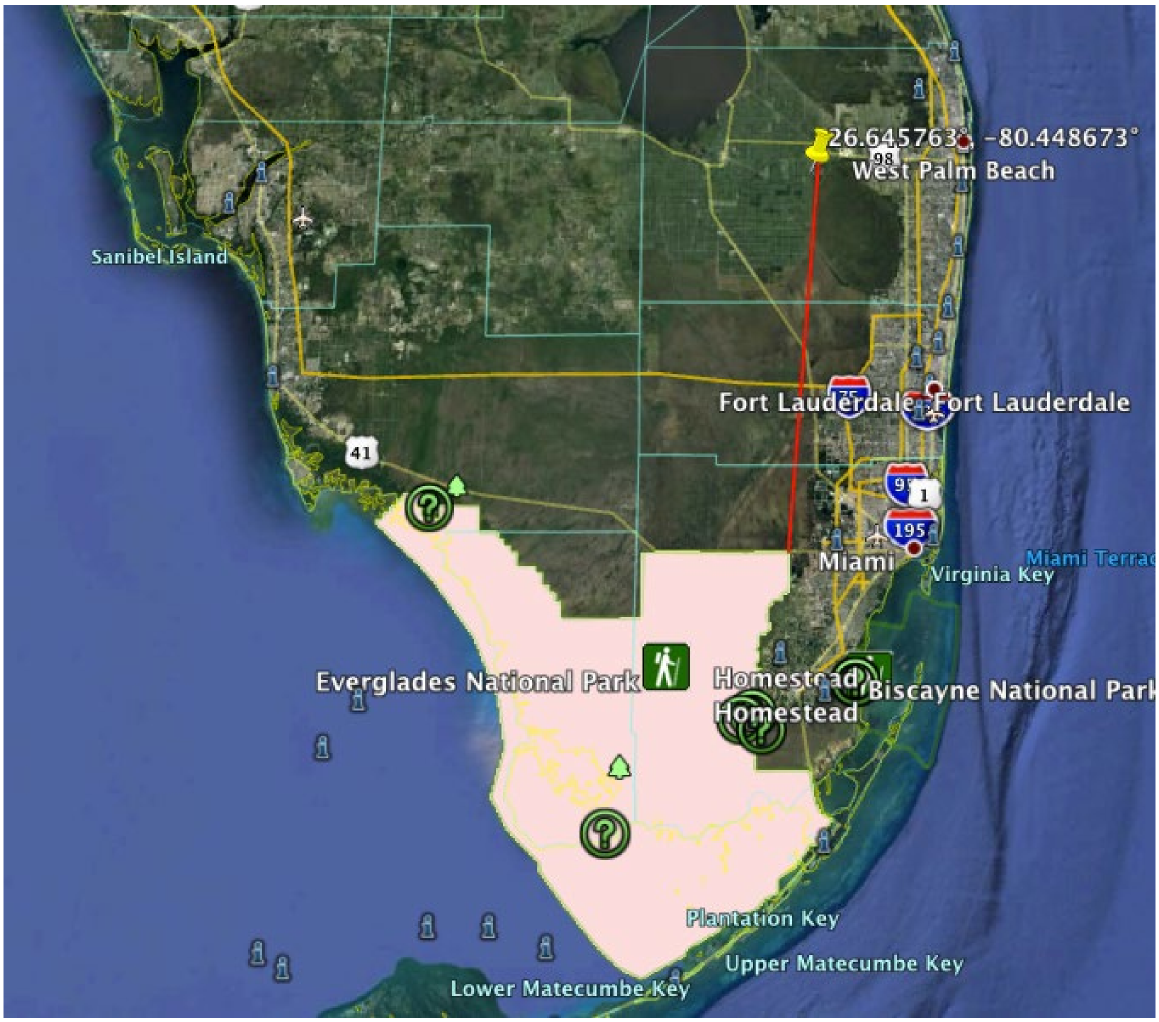
Figure 7. Location of Florida Sugar Industry Point Sources



In the above figure, the three large purple circles to the south and east of Lake Okeechobee are the three sugar industry point sources noted above. The top four counties with the highest agricultural burning emissions - Palm Beach, Hendry, Glades, and Martin, surround those point sources, providing much of the sugar cane for processing. In fact, Palm Beach County has been noted to be responsible for more emissions from agricultural fires that are attributable to sugarcane field burning than any other county in the United States.[52]

It is difficult to compare county-level area source emissions to point source emissions, since the former are spread out in a large area. Nevertheless, by way of an approximate comparison, if the emissions from Palm Beach county were considered to originate at the centroid of the county, the distance to the closest edge of Everglades would be approximately 104 km:[53]

Figure 8. Distance from Centroid of Palm Beach County to Everglades



In the above map, a red line, measuring 104 km is drawn from the centroidal location of Palm Beach County (latitude 26.645763, longitude -80.448673) to the closest edge of Everglades National Park (note that some areas of Palm Beach County are actually much

52 See http://stopsugarburning.org/resources/#emissions.

53 Centroidal location of Palm Beach County is latitude +26.645763°, longitude –80.448673°. Map obtained from Google Earth Pro.

closer). Q is calculated as the sum of NOx, SO_2, and PM10. The Palm Beach County Q/d for Everglades would then be approximately 38.5.[54] The other counties where sugarcane is burned would result in lower Q/d values, but these are still significant. Thus, there are large area source impacts that are readily identified that have gone unmentioned by FL DEP. The emissions discussed from these area sources are only from agricultural burning, most of which are due to sugar cane burning. Because much of the sugar cane acreage that is burned is owned or controlled by the sugar cane mills,[55] performing four-factor analyses would logistically be a relatively straightforward exercise.

10.3 Green Harvesting Sugar Cane is a Common Practice.

There is a great deal of literature that concludes that sugar cane burning is unnecessary and is only done in the U.S. for economic reasons.[56] In fact, green harvesting is already being implemented in other countries, other states, and indeed in Florida.[57] For the purposes of a regional haze four-factor analysis, the "measures"[58] are not typical emission controls retrofitted to point sources, such as SCR or scrubber systems. Rather, in this case, the measures consist of work practices, which would replace sugar cane burning with green harvesting work practices.[59] The sugarcane would be harvested in its green state through the use of mechanical harvesters, which separate the sugarcane leaves and tops from the sugar-bearing stalk without burning. In fact, the latest models of sugarcane harvesters CASE IH 8000 series and John Deere CH570 used by Florida sugar growers are already capable of harvesting both burnt and green cane.[60] For green harvesting, only simple ground and fan speed adjustments are necessary.[61] Thus, this is a proven control, there is no technical infeasibility issue and it is anticipated that major

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[54] That is, 1224.2 + 660.2 + 2114.5 / 104 = 38.45.

[55] For Instance, See Petition Requesting the Administrator to Object to the Title V, Operating Permit Renewal for the Okeelanta Sugar Mill and Refinery/Okeelanta Cogeneration Plant, available here: https://www.epa.gov/title-v-operating-permits/2015-petition-requesting-administrator-object-title-v-permit-okeelanta. Page 8: "Okeelanta exercises effective control over some 180,000 acres of sugarcane fields in and around the EAA."
Also see, Petition Requesting the Administrator To Object To The Title V Operating Permit Renewal For The United States Sugar Corporation's Clewiston Facility, available here: https://www.epa.gov/title-v-operating-permits/2015-petition-requesting-administrator-object-title-v-permit-us-sugar. Page 8: "U.S. Sugar exercises effective control over some 373,000 acres of sugarcane fields in and around the EAA;"

[56] For instance, see Comments By Earthjustice On Behalf Of Sierra Club On The Draft/Proposed Title V Air Operation Permit Renewal For The Okeelanta Corporation's Okeelanta Sugar Mill And Refinery (Facility Id No. 0990005) And The New Hope Power Company's Okeelanta Cogeneration Plant (Facility Id No. 0990332), available here: arm-permit2k.dep.state.fl.us/psd/0990005/U0002596.pdf. Specifically, see Appendix A, Report by Andrew Wood, PhD.

[57] See http://stopsugarburning.org/what-is-green-harvesting/.

[58] See https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partC-subpartii-sec7491.htm.

[59] See the 1999 Regional Haze Rule, 64 FR 35767 (July 1, 1999). Note that EPA has long viewed controls as including work practices.

[60] See https://www.caseih.com/apac/en-in/products/harvesters/sugar-cane-harvester-austoft-8000, and https://www.deere.com/en/harvesting/ch570-sugar-cane-harvester/.

[61] Viator, E.P, et al. 2007. Sugarcane Chopper Harvester Extractor Fan And Ground Speed Effects On Yield And Quality. *Applied Engineering in Agriculture.* 23(1): 31-34. Available here: https://pubag.nal.usda.gov/download/19263/PDF.

capital expenditures would not be necessary. Any remaining issues relating to yield differences can be monetized and included in a cost-effectiveness calculation. FL DEP should therefore require that these mills perform four-factor analyses in order to determine the cost-effectiveness of green harvesting.

11 Consultation Issues

Figures 7-17 and 7-18 indicate significant impacts at two of FL's Class I Areas from other states, primarily Georgia and Alabama. FL DEP includes its letter to Georgia requesting that Georgia examine certain sources for reasonable progress (appendix F1-a), and Georgia's similar letter to it (Appendix F1-d). However, it does not appear that FL DEP has included Georgia's response to its request. FL DEP should include Georgia's response to its request in its SIP and indicate if it is satisfied with that response.

Also, although FL DEP has included Alabama's letter to it (Appendix F1-c), it does not appear that FL DEP has included any communication to Alabama in its SIP. FL DEP should include its communication to Alabama in its SIP and indicate if it is satisfied with Alabama's response.

12 Common Problems in Cost-effectiveness Calculations

The following are intended to be general comments concerning cost analyses. For the reasons discussed elsewhere in this report, FL DEP must revise its regional haze SIP in order to properly consider the four factors. In so doing, it is encouraged to incorporate the information outlined in this section.

12.1 Control Cost Documentation

It is important that all assertions, parameters, assumed control efficiencies, cost items, assumed future operating capacities, etc. in a control cost analysis be documented so that an independent analyst, with a reasonable amount of expertise, can duplicate the control cost figures. In general, there is little to no documentation provided to support any of these parameters in the four-factor analyses reviewed in Part 1. This documentation should include vendor quotes, actual costs from a similar facility, generally accepted estimate, etc. In particular, scrubber upgrades require specific knowledge of the scrubber configuration in order to determine what upgrades can be considered. It is recognized that this level of documentation may include the use of Confidential Business Information (CBI). However, Florida and EPA have procedures in place to adequately treat CBI, so this should not present a problem.

12.2 Equipment Life

In many cases, facilities have employed equipment lives that are too short. Regarding this, the Control Cost Manual states: "The life of the control is defined in this Manual as the equipment life. This is the expected design or operational life of the control equipment. This is not an estimate of the economic life, for there are many parameters and plant-specific considerations that can yield widely differing estimates for a particular type of control equipment."[62] EPA has consistently assumed a thirty-year equipment life for scrubber retrofits, scrubber upgrades, SCRs, and SNCR installations. Much of this is summarized and cited to in EPA's response to comments document for its Texas and Oklahoma Regional Haze SIP final disapproval and FIP.[63] The recent revision of the Control Cost Manual that covers wet scrubber is another example.[64]

A number of EGU contractors have been assuming an equipment life of twenty years for SNCR systems, by reference to the Control Cost Manual. The 4/25/2019, SNCR update of the Control Cost Manual does state on page 1-53, "Thus, an equipment lifetime of 20 years is assumed for the SNCR system in this analysis."[65] However, this is a calculation example and does not indicate that EPA universally considers the equipment life for all SNCR systems installed on EGUs to be twenty years. Just prior to this statement, EPA notes, "As mentioned earlier in this chapter, SNCR control systems began to be installed in Japan the late 1980's. Based on data EPA collected from electric utility manufacturers, at least 11 of approximately 190 SNCR systems on utility boilers in the U.S. were installed before January 1993. In responses to another Institute of Coal Research (ICR), petroleum refiners estimated SNCR life at between 15 and 25 years." Therefore, based on a 1993 SNCR installation date, these SNCR systems are at least twenty-eight years old, which all other considerations aside, strongly argues for a thirty-year equipment life. Furthermore, an SNCR system is much less complicated than a SCR system, for which EPA clearly indicates the life should be thirty years. In an SNCR system, the only parts exposed to the exhaust stream are lances with replaceable nozzles. The injection lances must be regularly checked and serviced, but this can be done relatively quickly if necessary, is relatively inexpensive, and should be considered a maintenance item. In this regard, the lances are analogous to SCR catalyst, which is not considered when estimating equipment life. All other items, which comprise the vast majority of the SNCR system capital costs, are outside the exhaust stream and should be considered to last the life of the facility or longer.

Thus, all types of scrubbers, DSI systems, SCR systems, SNCR systems, and NOx combustion controls should have equipment lives of thirty years unless the unit's

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[62] *See* Control Cost Manual, Section 1, Chapter 2, Cost Estimation: Concepts and Methodology, November 2017, page 22.

[63] *See* Response to Comments for the Federal Register Notice for the Texas and Oklahoma Regional Haze State Implementation Plans; Interstate Visibility Transport State Implementation Plan to Address Pollution Affecting Visibility and Regional Haze; and Federal Implementation Plan for Regional Haze, Docket No. EPA-R06-OAR-2014-0754, 12/9/2015, available here: https://www.regulations.gov/document?D=EPA-R06-OAR-2014-0754-0087. *See* pages 240-245, 268, and 274. *See also* the Texas BART FIP proposal, which conducted extensive cost determinations for scrubber upgrades, at 82 FR 930 and 938. *See also* Control Cost Manual, Section 4, Chapter 2, Selective Catalytic Reduction, June 2019, pdf page 80: "For the purposes of this cost example, the equipment lifetime of an SCR system is assumed to be 30 years for power plants."

[64] Control Cost Manual, Section 5, SO_2 and Acid Gas Controls, Chapter 1 Wet and Dry Scrubbers for Acid Gas Control, April 2021. See page 1-35: "Given these considerations, we estimate an equipment life of 30 years as appropriate for wet FGD systems."

[65] Section 4, Chapter 1, Selective Noncatalytic Reduction, April 2019, page 1-53.

retirement is secured by an enforceable commitment. Unless there is a documentable reason to select a shorter life, thirty years should also be the default equipment life used for the cost analyses of these types of controls in any application. Use of a shorter equipment life artificially inflates the cost-effectiveness figures (higher $/ton).

12.3 Control Efficiency and Performance Optimization

As noted, many scrubber and SCR systems are suspected to be under performing. Unless verifiable documentation is provided by the facility in question, FL DEP should assume that these control systems are capable of operating at the high end of their efficiencies, as demonstrated by other similarly configured units. Some controls, especially scrubber and SCR upgrades and SNCR installations are very site-specific and the final optimized control efficiency cannot be determined until on-site optimization has been performed. Therefore optimization should be required as part of any required scrubber or SCR upgrade or new SNCR installation.

12.4 Interest Rate

Many control cost analyses assume an artificially high and undocumented interest rate. As the Control Cost Manual states: "For input to analysis of rulemakings, assessments of private cost should be prepared using firm-specific nominal interest rates if possible, or the bank prime rate if firm-specific interest rates *cannot be estimated or verified*" [emphasis added].[66] Consequently, all facilities should provide verification of their interest rate, or the Bank Prime Interest Rate should be used in all control cost calculations. As of the end of June 2021, the Bank Prime Interest Rate is 3.25%.[67] Using a higher interest rate will artificially increase the total annualized costs and worsen (higher $/ton) the cost-effectiveness of all controls.

12.5 Retrofit Factors

A number of control cost analyses have used retrofit factors greater than 1.0. Typically, this is a direct multiplier to capital and fixed operating costs and so has a large impact on the total annualized cost. The average retrofit factor assumed in almost all control cost estimating in the first round of regional haze SIP development was 1.0. All facilities should either use a retrofit factor of 1.0 or provide documentation of why their retrofit is more difficult than at other facilities.

12.6 Baseline Emissions

It is important that a facility use the correct emissions baseline when calculating cost-effectiveness. An artificially low emissions baseline will cause the cost-effectiveness calculation to be artificially high (higher $/ton). Although these are not BART reviews, the BART Guidelines offered the following, which is still applicable:[68]

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[66] *See* Section 1, Chapter 2, Cost Estimation: Concepts and Methodology, November 2017, page 16.
[67] *See* https://www.federalreserve.gov/releases/h15/.
[68] 70 FR 39167.

The baseline emissions rate should represent a realistic depiction of anticipated annual emissions for the source. In general, for the existing sources subject to BART, you will estimate the anticipated annual emissions based upon actual emissions from a baseline period. When you project that future operating parameters (e.g., limited hours of operation or capacity utilization, type of fuel, raw materials or product mix or type) will differ from past practice, and if this projection has a deciding effect in the BART determination, then you must make these parameters or assumptions into enforceable limitations. In the absence of enforceable limitations, you calculate baseline emissions based upon continuation of past practice.

12.7 Disallowed Cost Items

AFUDC and owners costs should not be included in any control cost analyses. Concerning this, the as the Control Cost Manual states, "owner's costs and AFUDC costs are capital cost items that are not included in the EPA Control Cost Manual methodology, and thus are not included in the total capital investment (TCI) estimates in this section."[69]

[69] Control Cost Manual, Section 4, Chapter 2, Selective Catalytic Reduction, June 2019, pdf page 65.

A Review of the Florida Regional Haze State Implementation Plan

Prepared by

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On behalf of

National Parks Conservation Association and the Sierra Club

July 2021

1 Introduction

This is a report concerning a review of the Florida Regional Haze State Implementation Plan (SIP).[1] Emissions and controls information for all EGUs were downloaded from EPA's Air Markets Program Data (AMPD) website.[2] Additional information was obtained from the Energy Information Agency (EIA).[3] Lastly, I reviewed the Title V operating permits for a number of units.

2 Apparent Errata

2.1 FL DEP repeats its message on page 279 that it is still reviewing the Foley Mill four-factor analysis on page 281 in the section concerning its analysis of the Panama City Mill.

3 General

3.1 In a number of areas, FL DEP assumes units that have announced retirements should be considered as retired for the purpose of determining whether they should be selected to undergo a four-factor analysis. The Regional Haze Guidance indicates, in order to implement this under Section 51.308(f)(2)(iv)(C) of the Regional Haze Rule, Source retirement and replacement schedules, Florida must include an enforceable commitment in its SIP.[4] In lieu of this, FL DEP must perform a four-factor analysis for each unit.

In addition, even if FL DEP secures an enforceable SIP commitment for the specific retirements, the intervening years may leave a lot of time in which to consider additional cost-effective controls. This is especially true if the potential controls include upgraded NOx combustion controls or upgrades to post combustion controls such as SNCR, SCR or scrubbers. In these cases, capital costs would be low and it is quite possible that some cost-effective controls would be available. Therefore, FL DEP should consider these types of controls as well.

3.2 FL DEP presents a great deal of information that demonstrates that 2028 visibility extinction due to sulfate is the primary driver for most VISTAS Class I Areas. In fact, FL DEP demonstrates that most of this sulfate driven extinction comes from EGU and non-EGU point sources. Nevertheless, nitrate contributions from point sources at Class I Areas that Florida impacts are not insignificant. Because point source sulfate is dominant, FL DEP should rightly focus on it. Unfortunately, its SIP does very little to control it and the comments reflect that fact. Nevertheless, as also described herein, there are many opportunities whereby FL DEP could likely control NOx from these same point sources. With regard to EGUs, there are many NOx control opportunities that simply

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1 https://floridadep.gov/air/air/content/epa%E2%80%99s-regional-haze-program.
2 See https://ampd.epa.gov/ampd/. This information is compiled and assessed in spreadsheets that are included in this analysis.
3 See https://www.eia.gov/electricity/data/eia923/.
4 See Regional Haze Guidance, page 22.

involve the optimization of or upgrades to existing controls, such as upgrading EGU combustion controls, SCR systems, or SNCR systems. Many of these types of controls have historically been found to be very cost-effective because they involve relatively low to no additional capital costs. In addition, in a few instances, new NOx controls should also be considered. FL DEP should require that where indicated, these sources should include NOx control evaluation in their four-factor analyses.

3.3 FL DEP should consider that in cases in which the ultimate performance potential of a particular control is difficult to ascertain, it is not necessary for it to initially arrive at the final efficiency or controlled emission rate. It is perfectly acceptable for FL DEP to approve a four-factor analysis on the basis of a known achievable level of control, with the proviso that a later performance test can be used to ultimately set the final efficiency or emission limit. This can be a particularly valuable strategy for certain cases in which design of the control system is very site-specific, such as an EGU SNCR systems or industrial boiler wet venturi scrubbers. There are many examples of this approach having been taken in consent decrees.

4 FL DEP's Source Selection Methodology is Flawed

4.1 Beginning on page 223, FL DEP discusses its strategy for ranking sources that impact the visibility of its Class I Areas. Tables 7-8, 7-9, and 7-10 present the Area of Influence (AoI), NOx and SO_2 facility contributions to visibility impairment on the 20% most impaired days for Florida's three Class I Areas. FL DEP indicates that these tables were constructed on the basis of 2028 emission projections. It appears from FL DEP's discussion on page 229 that it used the information to determine which sources to submit for tagging in the VISTAS PSAT modeling and used the same 2028 emissions in that analysis. FL DEP also states on page 230 that it considers the results to be a reasonable set of sources captured in the initial screening step. As FL DEP itself notes on page 245, the Regional Haze Guidance provides some advice for states regarding source selection. However, the Regional Haze Guidance also cautions states regarding 2028 emissions. For instance, it states:[5]

> Generally, the estimate of a source's 2028 emissions is based at least in part on information on the source's operation and emissions in a representative historical period. However, there may be circumstances under which it is reasonable to project that 2028 operations will differ significantly from historical emissions. Enforceable requirements are one reasonable basis for projecting a change in operating parameters and thus emissions; energy efficiency, renewable energy, or other such programs where there is a documented commitment to participate and a verifiable basis for quantifying any change in future emissions due to operational changes may be another. A state considering using assumptions about future operating parameters that are significantly different than historical operating parameters should consult with its EPA Regional office.

[5] Guidance on Regional Haze State Implementation Plans for the Second Implementation Period, EPA-457/B-19-003, August 2019." Hereafter referred to as the "Regional Haze Guidance." Page 17.

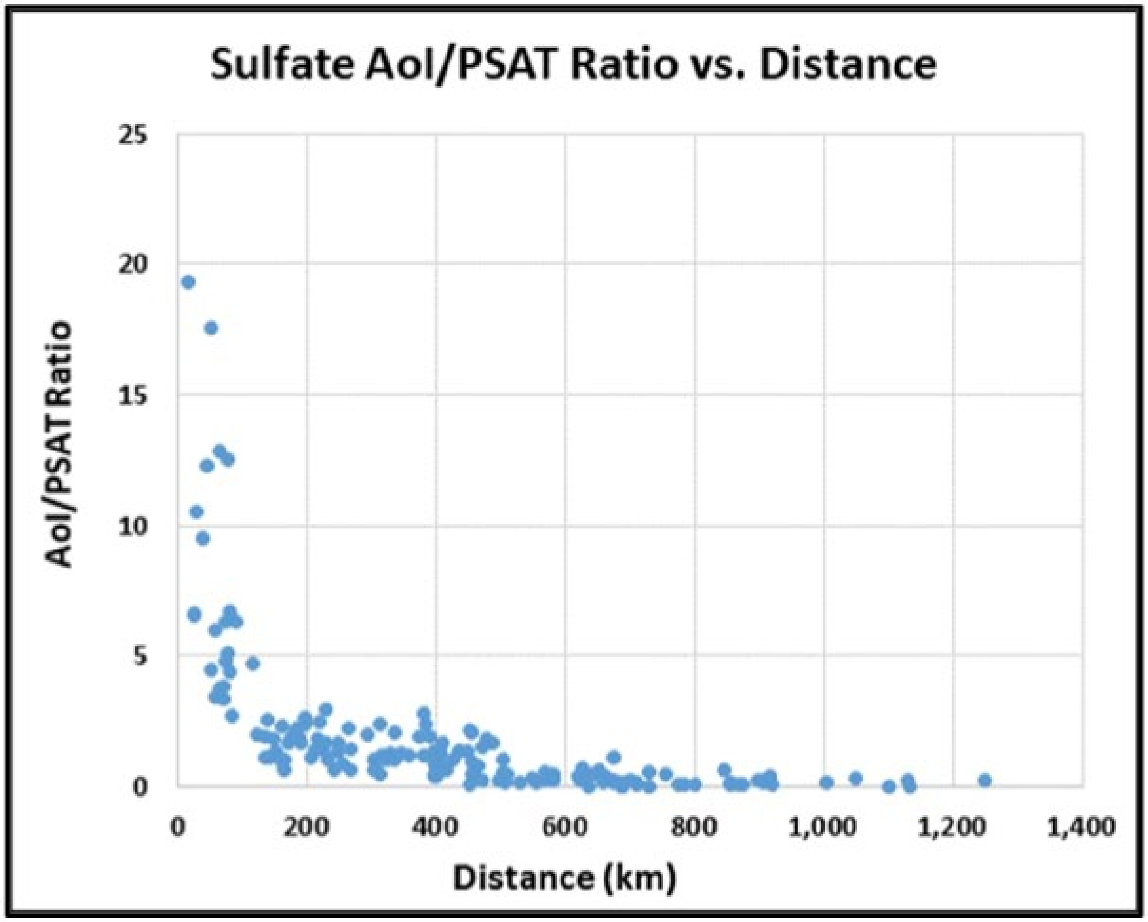
Beginning on page 259 in table 7-28, FL DEP compares its projected 2028 emissions (VISTAS Remodel) against 2017, 2018, and 2019 emissions. FL DEP does explain some large 2028 decreases but not all. For instance, 2028 decreases from the Foley Mill, Breitburn Gas Treating facility, Mosaic South Pierce, Monarch Hill, and Gulf Clean Energy Center do not appear to be explained.

Also, FL DEP should compare its suite of selected sources versus what it would have developed using a conventional Q/d or other approach that uses historical emissions. It is very important that FL DEP be completely transparent regarding this issue. Since it used projected 2028 emissions in lieu of actual emissions, it has based its source selection strategy on unsecured assumptions of future emission profiles. This is not dissimilar to making unsecured assumptions about a source's future emissions in a four-factor analysis, which is specifically not allowed.

4.2 Considering the previous comment, FL DEP should include a unit-level (as opposed to a facility level) listing of the NOx, SO_2, and PM emissions of all point sources for the last five years. This information was requested from FL DEP and promptly provided, but it should be a part of FL DEP's SIP.

4.3 On page 239, FL DEP compares its PSAT source selection results to the sources it would have selected had it stopped at AoI source selection. First, FL DEP presents Figure 7-54, which it states shows the ratio of AoI/PSAT contributions for sulfate as a function of distance from the facility to the Class I area. Below is that figure:

Figure 1. FL DEP's Figure 7-54: Ratio of AoI/PSAT % Contributions for Sulfate as a Function of Distance from the Facility to the Class I Area



In the above figure, each point represents one facility's ratio of its AoI to PSAT sulfate contribution at a Class I Area versus its distance to that Class I Area. At first glance, it appears to resemble an exponential decline function. However, inspection of the points closest to zero indicates that the scatter in the data greatly increases. For example, the point with the smallest distance has a value of about 19, whereas the next two closest points, that are only slightly farther away, have values of about 11 and 7. Moving only slightly farther away results in values that range from about 3 to 13. The amount of scatter in the data decreases with distance, but is still significant out to at least 400 km. This indicates that the correlation is likely invalid at distances of perhaps 100 km or less.

Following this FL DEP makes a fractional bias calculation. This is a common technique that has long been used to compare a model's output to observed values. The equation is as follows:[6]

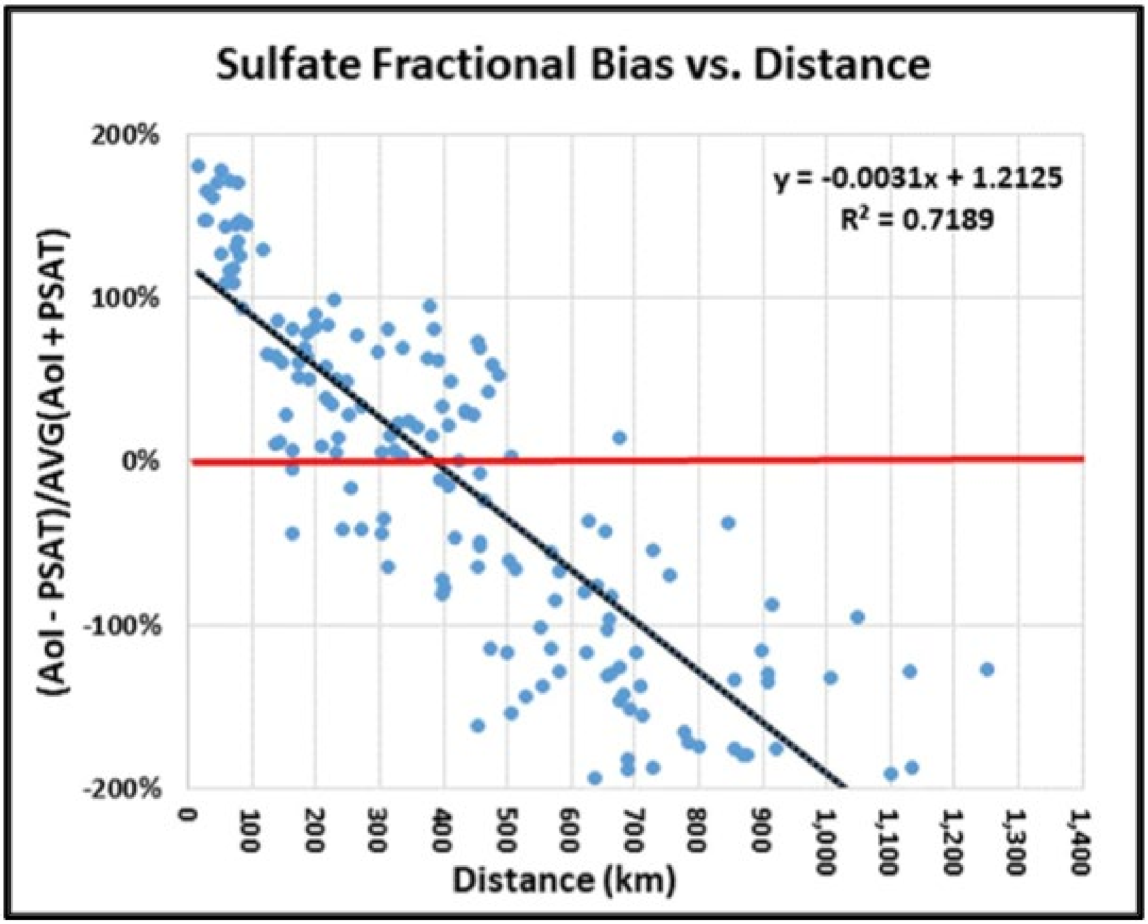
$$FB = 2\ x\ \left(\frac{OB - PR}{OB + PR}\right)$$

where OB = observed values, and PR = predicted (modeled) values.

[6] See for instance: https://www.epa.gov/sites/production/files/2020-10/documents/model_eval_protocol.pdf.

Typically, the observed values are monitored or measured values that can be viewed as known values, against which the predicted (modeled) values are compared. In this case, FL DEP uses the AoI values as the observed values and the PSAT values as the predicted values. However, the AoI values are not known values and are simply other predicted values; albeit predicted differently than the PSAT values. Therefore, FL DEP's use of the fractional bias calculation in this instance is suspect. That aside, FL DEP presents a graph of its fractional bias calculations. Below is that figure:

Figure 2. FL DEP's Figure 7-55: Fractional Bias for Sulfate as a Function of Distance from the Facility to the Class I Area



As can be seen from the above figure, there is again a great deal of scatter in the data. Calculated fractional bias values range from zero to 100% or greater for points that are essentially the same distance from the Class I Area. This means that at any given distance there is a wide range in the difference in correlation between the AoI and PSAT values. Considering these issues, FL DEP's conclusion on page 239 that "if the facility is less than 100 km from the Class I area, the AoI results are almost always at least three times higher than the PSAT results," is unfounded. Consequently, any sources that FL

DEP eliminated from consideration based on that metric should be re-examined. This includes the IFF Chemical Holdings and Symrise facilities that FL DEP eliminates on page 248.

4.4 On page 246, FL DEP states that it selected facilities to analyze for reasonable progress with at least a 1.00% PSAT threshold for sulfate or nitrate. FL DEP doesn't explain this selection other than stating that other VISTAS states used that threshold as well. FL DEP should explain why it selected this threshold. In addition, FL DEP should explain why this threshold is appropriate, considering the type of modeling performed, which utilizes a dirty background. For instance, FL DEP should the threshold EPA used to determine which Texas sources should receive a four-factor analysis in the Texas FIP.[7] Here EPA determined it was reasonable in dirty background modeling (which is what Florida/VISTAS employed) to require any individual unit with at least a 0.3% extinction contribution at any Class I Area to undergo a four-factor analysis.

5 FL DEP Wrongly Exempts Sources from a Four-Factor Analysis

5.1 In addition to the elimination of facilities from a four-factor analysis due to FL DEP's inappropriate use of the AoI/PSAT ratio discussed above, FL DEP inappropriately eliminates sources based on its contention they are already "effectively controlled." For instance, on page 249, FL DEP concludes that the Stanton facility is effectively controlled since it meets EPA's MATS rule.[8] Other examples are discussed below. FL DEP refers to the Regional Haze Guidance to support its position.[9] FL DEP concludes that it need not further consider controlling these and other sources discussed below. The following points address this issue:

- Because the Regional Haze Guidance is merely guidance, it does not take precedence over the Regional Haze Rule. In fact, the Regional Haze Rule does not provide any discussion at all concerning the topic of "effective controls." The Regional Haze Rule has long recognized that scrubber upgrades are generally cost-effective and should be examined by states to ensure reasonable progress.[10] To the extent FL DEP interprets EPA's guidance as suggesting otherwise, that interpretation has no basis in either the CAA or the Regional Haze Rule.

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[7] Technical Support Document for the Oklahoma and Texas Regional Haze Federal Implementation Plans, (FIP TSD), November 2014. See the discussion beginning on page A-49. Available here: https://www.regulations.gov/document/EPA-R06-OAR-2016-0611-0052.

[8] FL DEP also considers that OUC Stanton has publicly committed to end coal-firing operations by 2027. As discussed earlier in this report, retirements must be secured by an enforceable agreement that is a part of Florida's SIP or the units involved must undergo four-factor analyses.

[9] See the Regional Haze Guidance, page 22.

[10] For instance, see the Final Regional Haze Rule update, 82 Fed. Reg. 3088 (January 10, 2017): Here, EPA explains that Texas' analysis was in part rejected because it did not properly consider EGU scrubber upgrades. Also see the BART Final Rule, 70 Fed. Red. 39171 (July 6, 2005): "For those BART-eligible EGUs with preexisting post-combustion SO_2 controls achieving removal efficiencies of at least 50 percent, your BART determination should consider cost effective scrubber upgrades designed to improve the system's overall SO_2 removal efficiency."

- In fact, EPA's record for its Oklahoma FIP, indicates that underperforming scrubbers should be evaluated at 98% control (with a floor of 0.04 lbs/MMBtu) for Wet Flue Gas Desulfurization (WFGD) scrubbers, and 95% control (with a floor of 0.06 lbs/MMBtu) for Spray Dryer Absorbers (SDA).[11] Also, The IPM wet FGD Documentation states: "The least-squares curve fit of the data was defined as a "typical" wet FGD retrofit for removal of 98% of the inlet sulfur. It should be noted that the lowest available SO_2 emission guarantees, from the original equipment manufacturers of wet FGD systems, are 0.04 lb/MMBtu."[12]

- Although EPA's guidance states, regarding scrubbers installed as a result of regional haze first round requirements, that "we expect that any FGD system installed to meet CAA requirements since 2007 would have an effectiveness of 95 percent or higher,"[13] that does not relieve the state of evaluating achievable, cost-effective emission reductions. Here, a number of examples of non-regional haze requirements (e.g., NSPS, BACT, LAER, and MATS), which could serve as surrogate four-factor analyses, support imposing more stringent control and/or emission limits for SO_2[14] than EPA assumed for first round regional haze controls. For instance many of the EGUs that meet MATS do so by monitoring for HCl and so only control SO_2 indirectly. Even those that do satisfy MATS by controlling SO_2 are (assuming coal) usually limited to 30-day average SO_2 rates of 0.2 lbs/MMBtu, which is often much less stringent than would have been required under a source-by-source BART analysis.

- Moreover, FL DEP arbitrarily ignores achievable emission reductions. Given EPA's previous findings that scrubber upgrades can achieve 98% control for WFGD and 95% for SDA, the state must evaluate the cost-effectiveness of those emission limits under the four statutory factors. Many significant wet scrubber upgrades involve relatively low capital expenditures (e.g., liquid to gas improvements such as rings or trays, new spray headers/nozzles, etc.) and often consist of simply running all available absorbers and pumps and utilizing better reagent management or simply using more reagent and/or organic acid additives such as Dibasic Acid (DBA). These types of upgrades will likely result in very cost-effective scrubber upgrades. In fact, it appears that some of these types of upgrades have recently been performed on the Gavin units, discussed below.

- The problems with FL DEP's interpretation of the Regional Haze Guidance's advice notwithstanding, FL DEP has ignored a key qualifier of that advice. The Regional Haze Guidance states regarding its "effectively controlled" advice that

[11] See 76 FR 81742 (December 28, 2011).

[12] IPM Model – Updates to Cost and Performance for APC Technologies, Wet FGD Cost Development Methodology, Final January 2017, Sargent and Lundy. Page 2.

[13] Regional Haze Guidance, page 24, FN 53. EPA does not distinguish between WFGD and SDA scrubbers.

[14] See the example list in the Regional Haze Guidance, pages 23-25.

> [A] state that does not select a source or sources for the following or any similar reasons should explain why the decision is consistent with the requirement to make reasonable progress, i.e., why it is reasonable to assume for the purposes of efficiency and prioritization that a full four-factor analysis would likely result in the conclusion that no further controls are necessary.[15]

FL DEP has arbitrarily failed to consider technically and economically feasible upgrades to scrubbers and SCR systems.

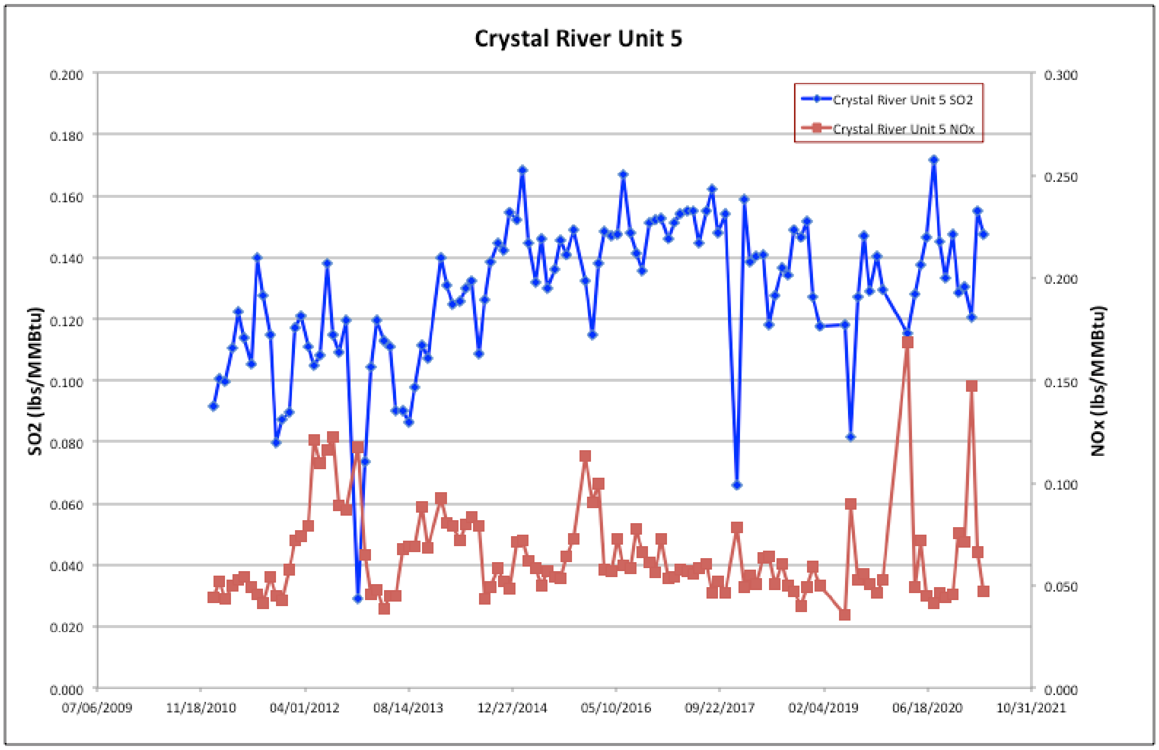
In summary, FL DEP cannot simply confer a blanket "effectively controlled" exemption to a proper four-factor analysis. It must investigate whether additional controls or upgrades to existing controls would be cost-effective. Comments concerning specific facilities follow.

5.1.1 On page 251, FL DEP exempts Crystal River Units 4 and 5 from a SO_2 four-factor analysis because it has accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. As above, this is inadequate, as it does not consider what the scrubber systems are capable of achieving. Below is a graph of the monthly SO_2 and NOx emissions of Unit 5: [16]

Figure 3: Monthly SO_2 and NOx emissions of Crystal River Unit 5

[15] See the Regional Haze Guidance, page 23

[16] All EGU emission data reviewed in this report were retrieved from EPA's Air Programs Markets Data website here: https://ampd.epa.gov/ampd/. These data are in the file, "Florida Emissions.xlsx."



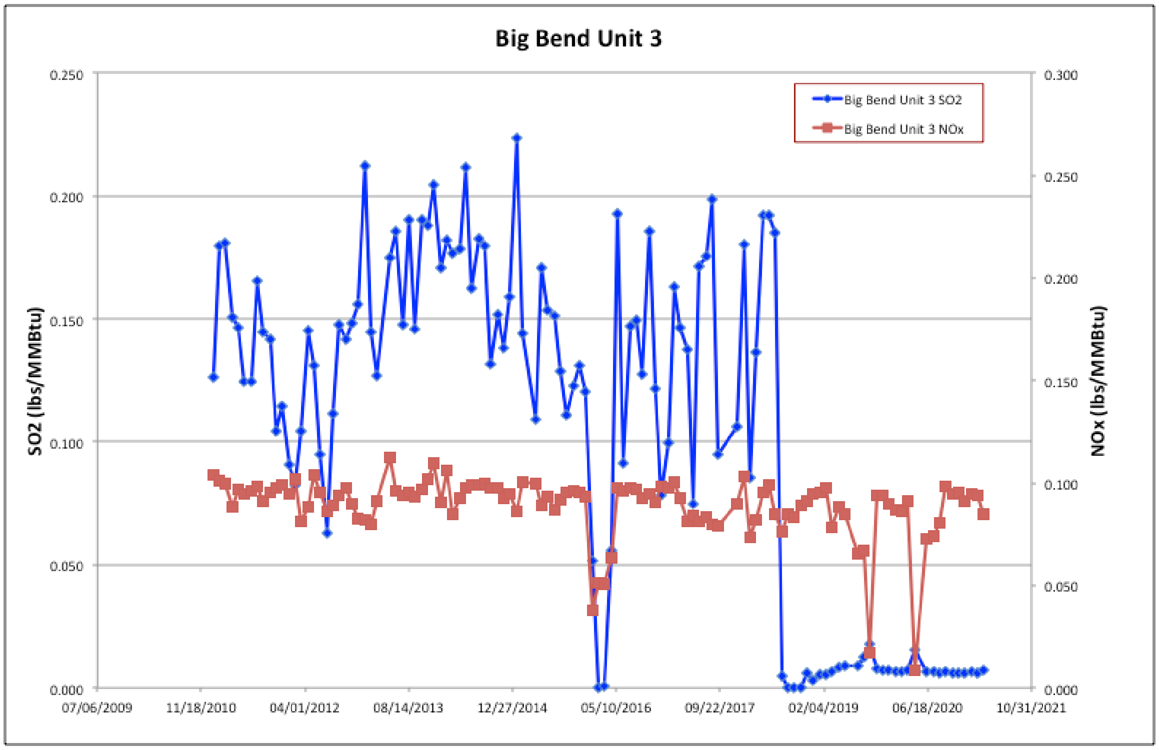
As can be seen from the above graph, Unit 5's wet scrubber is capable of operating much below an SO_2 limit of 0.2 lbs/MMBtu on a continuous basis. In fact, from 2010 to 2013, this scrubber system has repeatedly demonstrated that it is capable of sustained performance below 0.10 lbs/MMBtu. It appears that it is currently not doing so because it is not constrained by a permit limit. Unit 4's performance is similar. FL DEP must perform or require an actual SO_2 four-factor analysis for these units that investigates whether the current wet scrubbers can be optimized or upgraded. In addition, the SCR systems for both units have demonstrated the capability to operate at or below 0.05 lbs/MMBtu on a monthly average basis. However, there is a great deal of fluctuation in system performance, with monthly NOx levels often approaching 0.1 lbs/MMBtu. Consequently, FL DEP should also examine whether the SCR systems could be optimized, which would very likely be very cost-effective. Regardless, FL DEP should tighten the monthly NOx limit, which according to the facility's Title V permit, ranges from 0.20 – 0.70 lbs/MMBtu, depending on the fuel burned. The current limit clearly has no effect on the operation of these SCR systems. This facility is only about 20 kilometers north of the Chassahowitzka Wilderness Area and has the highest cumulative Q/d value for any facility in Florida at 518.9.[17] Therefore, FL DEP should give it its highest priority.

5.1.2 On page 251, FL DEP exempts Big Bend Units 3 and 4 from a SO_2 four-factor analysis because these units have accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. Both units are equipped with wet scrubbers and SCR systems. Both units are permitted to burn natural gas, coal, pet coke, coal residue or mixtures

[17] Q/d data retrieved from: https://npca.maps.arcgis.com/apps/MapSeries/index.html?appid=73a82ae150df4d5a8160a2275591e45d.

thereof. This makes it difficult to ascertain the performance potential of the SCR and scrubber systems because low SO_2 and NOx periods could also reflect partial natural gas usage. Below is a graph of the monthly SO_2 and NOx emissions of Unit 3:[18]

Figure 4: Monthly SO_2 and NOx emissions of Big Bend Unit 3



As can be seen from the above figure, Unit 3's monthly NOx limit is fairly stable, even when it is burning natural gas, which it appears to have been doing exclusively since January 2019. NOx emissions from natural gas are inherently lower than those from burning coal. However, Unit 3's NOx emissions remained largely unchanged during this period. This indicates that Unit 3's SCR system managed to meet its permitted 30 day rolling average limit of 0.12 lbs/MMBtu but could have achieved much lower NOx emissions. Modern SCR systems are capable of consistently achieving monthly NOx emissions of 0.05 lbs/MMBtu or less.[19] Unit 3's SO_2 emissions have been very erratic, but have demonstrated the

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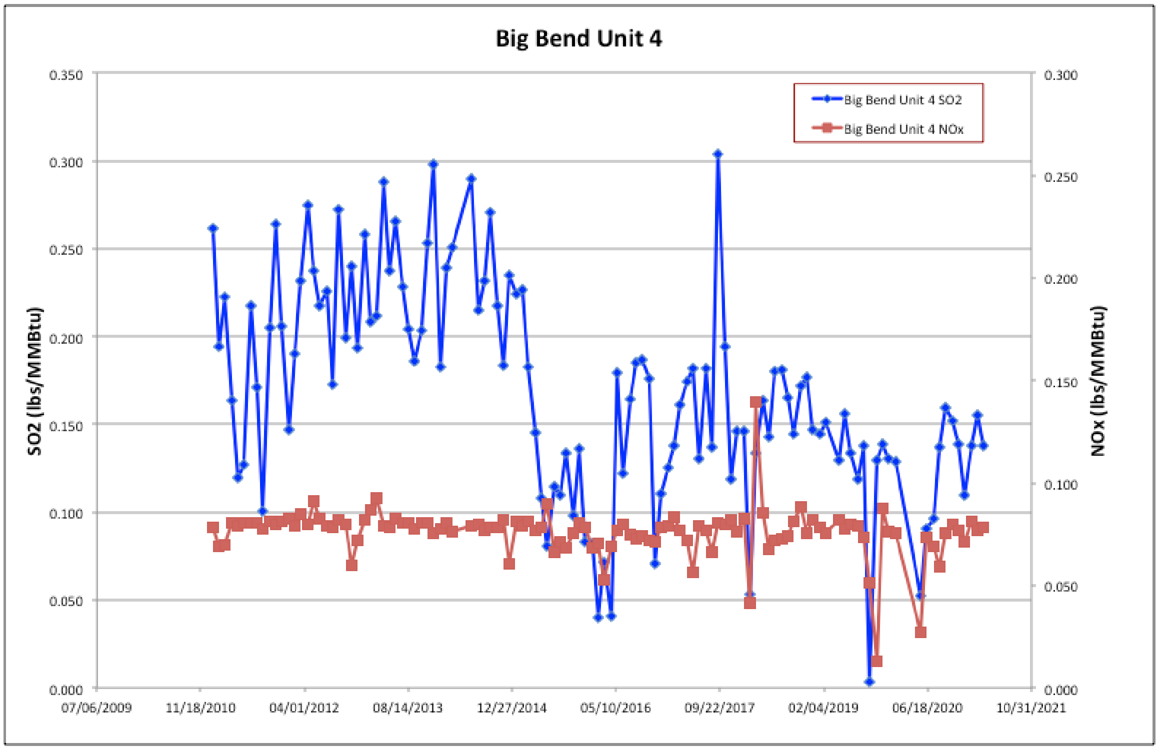
[18] See the file, "Florida Emissions.xlsx."

[19] See EPA's proposal at 76 FR 491 (January 11, 2011) and its final at 76 FR 52388 (August 22, 2011). In particular, see the discussion at 76 FR 52404: "The Havana Unit 9 data shows that it has operated under 0.05 lbs/MMBtu from mid-2009 to the end of 2010 on a continuous basis. In fact, this unit has operated under 0.035 lbs/MMBtu for much of that time. The Parish Unit 7 data shows that it has operated under 0.05 lbs/MMBtu from mid-2006 to mid 2010 on a continuous basis. In fact, this unit has operated for months at approximately 0.035 lbs/MMBtu, and for approximately 2 years at approximately 0.04 lbs/MMBtu. The Parish Unit 8 data show that it has operated almost continuously under 0.045 lbs/MMBtu since the beginning of 2006. Other units' data show months of continuous operation below 0.05 lbs/

capability to achieve monthly levels considerably under its new MATS limit of 0.20 lbs/MMBtu.

Below is a graph of the monthly SO_2 and NOx emissions of Unit 4:

Figure 5: Monthly SO_2 and NOx emissions of Big Bend Unit 4



It can be seen from the above figure that the monthly SO_2 emissions shifted downward after January 2015. According to the emissions data submitted to EPA. This corresponds to Unit 4's use of natural gas as a secondary fuel. Again, the NOx rate remained consistent, indicating that the SCR system was not being used to its full capability and is minimally operated to achieve its permitted 30 day rolling limit of 0.10 lbs/MMBtu.

For Both Units 3 and 4, FL DEP should require that a SO_2 and NOx four-factor analysis be performed to determine if the scrubber and SCR systems can be cost-effectively optimized or upgraded, which is likely.

5.1.3 On page 252, FL DEP exempts Seminole Units 1 and 2 from a SO_2 four-factor analysis because these units have accepted the MATS SO_2 limit of 0.2 lbs/MMBtu. Both these units are permitted to burn coal and a limited amount of fuel oil. Both units are equipped with wet scrubbers and SCR systems. Based on the emission data, it appears that both scrubbers were upgraded around October

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MMBtu. We believe this data demonstrates that similar coal fired units that have been retrofitted with SCRs are capable of achieving NOx emission limits of 0.05 lbs/MMBtu on a continuous basis."

2015. After that point, the monthly SO_2 average rate has been hovering around 0.15 lbs/MMBtu but both scrubber systems have demonstrated the ability to achieve 0.10 lbs/MMBtu. Both SCR systems have demonstrated the ability to achieve a monthly NOx average of 0.05 lbs/MMBtu or lower. However, Seminole's permitted limit is 0.07 lb/MMBtu based on a 12-month rolling average. FL DEP should perform or require four-factor analyses of both the scrubber and SCR systems, as it is likely that both the wet scrubber and SCR systems could be optimized or upgraded cost-effectively.

5.1.4 On page 252, FL DEP exempts the Nutrien White Springs Ag Chemical Plant based on its conclusion that recent upgrades to the Sulfuric Acid Plants (SAPs) required by a consent decree are consistent with recent BACT determinations made for similar double-absorption, sulfur burning SAPs. FL DEP does not discuss what it means by this statement. Nevertheless, as discussed above, BACT-level control limits cannot be assumed to equal those that result from an actual four-factor analysis in which the best performing controls must be considered. This is especially true considering that these types of controls are very site-specific and the resulting SO_2 control levels on a pound of SO_2 per ton of sulfuric acid can vary considerably. This is evident by examining the limits required of other similar sulfur burning SAPs in the cited consent decree.[20] As Nutrien itself notes in its July 8, 2020, reply to FL DEP, the Rhodia Plant in Houston has a limit much lower that White Springs.[21] Therefore blanket statements concerning BACT level limits for these types of controls are somewhat dubious. Also, there are numerous examples of CDs that do not require the best performing controls. Therefore, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or conduct/require a four-factor analysis.

5.1.5 On pages 252-3 FL DEP exempts the Mosaic New Wales and Bartow SAPs. Regarding the New Wales facility, FL DEP states that SAP No. 1-3 are each required to meet a limit of 3.5 lb SO_2 per ton of 100% sulfuric acid on a 24-hr rolling average, and 4 lb/ton SO_2 on a 3-hr rolling average. SAPs 4 and 5 are each required to meet a limit of 4 lb/ton [FL DEP does not specify the averaging period(s)]. Regarding the Bartow facility, FL DEP states that SAP No. 4-6 are each required to meet a limit of 4 lb/ton of 100% sulfuric acid [again, FL DEP does not specify the averaging period(s)]. In both cases, FL DEP states that SO_2 BACT determinations for sulfur burning, double absorption sulfuric acid plants with cesium-promoted catalysts in EPA's RACT/BACT/LAER Clearinghouse database are in the range of 3.0 to 4.0 lb/ton, so it concludes these units are effectively controlled, and additional reasonable controls are unlikely to be found.

Firstly, a range of 3.0 to 4.0 lbs/ton represents a potential increase of 33% in the SO_2 emissions. Such a wide range should not be used to characterize the acceptable range of best performing controls. Secondly, in its December 2017 SO_2 NAAQS SIP, FL DEP

[20] See https://www.epa.gov/sites/production/files/2014-11/documents/pcsnitrogenfertilizer-cd.pdf, page 13.
[21] See Appendix G-2g, page 5.

states that the New Wales permit will cause "the production-based emissions limits at the five sulfuric acid plants of 3.5 and 4 lbs SO_2/ton of 100% H_2SO_4 are effectively lowered to 1.6 & 1.8 lbs SO_2/ton of 100% H_2SO_4, respectively."[22] A little later, FL DEP states that the Bartow permit will cause "the production-based emissions limits at the 3 sulfuric acid plants of 4 lbs SO_2/ton of 100% H_2SO_4 are effectively lowered to 3.4 lbs SO_2/ton of 100% H_2SO_4. These limits are significantly lower than what FL DEP describes on pages 252-3 so FL DEP should therefore explain these differences. Regardless, as with the White Springs facility, FL DEP must provide documentation that these controls are indeed equivalent to the best performing controls or conduct/require a four-factor analysis.

5.2 On page 250, FL DEP reasons that Breitburn Operating's over 300 km distance to the nearest Class I area was the primary justification for not selecting this facility for a reasonable progress evaluation. No other justification is provided. It does not appear that this facility was previously identified as an AoI source and it does not appear on FL DEP's summary of AoI sources that impact St. Mark's in Table 7-22, so FL DEP should clarify this source's standing. In any event, FL DEP's reasoning does not constitute any sort of valid conclusion for not conducting a proper four-factor analysis.

5.3 On page 250, FL DEP reasons that Deerhaven Generating Station is currently implementing a fuel co-firing project that will allow it to co-fire up to 100% natural gas, which will lead to substantial reductions of SO_2 emissions in the future. It eliminates this facility from a four-factor analysis on that basis. However, on page 288, FL DEP states that Gainesville Regional Utilities has received permits allowing for up to 100% natural gas firing in its Deerhaven Unit 2, which will allow it to fire all gas, all coal, or a combination thereof. Unit 2 is the only coal-fired unit at Deerhaven, but its recent ability to fire natural gas does not mean it will do so. As with retirements, unless FL DEP secures an enforceable commitment in its SIP, it must either eliminate Deerhaven under another valid method, or subject it to a proper four-factor analysis.

5.4 On page 241, FL DEP states that there are some facilities identified by AoI with a sulfate + nitrate contribution over 1% that were not PSAT tagged. It is unclear how this statement aligns with the statement on page 229 where FL DEP describes its individual AoI contribution of ≥5% for nitrates or sulfates test (individual facility nitrate contribution divided by total nitrate contributions from EGU + non-EGU point sources) for PSAT tagging. It is also unclear if the sources listed in Tables 7-21, 7-22, and 7-23 satisfy the 1% or the 5% test. FL DEP should clarify this situation and discuss why these sources were not PSAT tagged.

6 Discussion of the Foley Mill Four-Factor Analysis

[22] State Of Florida Department Of Environmental Protection, Proposed Revision To State Implementation Plan, Submittal Number 2017-04, Incorporation Of SO_2 Emissions Limits For Two Facilities In Polk County, December 1, 2017. Pages 11-12.

This is a review of the Foley Cellulose Pulp Paper Mill.[23] In general, Foley presents little data, details or documentation for its cost-effectiveness figures. On page 279 of its SIP, FL DEP states that it is still in the process of reviewing Foley's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete. FL DEP should note that until it finishes all of its four-factor analyses, it cannot set the Reasonable Progress Goals for its Class I Areas, since those goals must incorporate all reasonable progress controls.[24] For the reasons discussed below, Foley's analysis should be greatly revised.

6.1 Foley Mill apparently only considers controls as being technically feasible if they can be found installed on the source of interest in EPA's RACT/BACT/LAER Clearinghouse (RBLC). This database does not constitute the last word on the technical feasibility of controls for the Regional Haze Program. The fact that a control cannot be found in the RBLC does not mean that it has not been installed on the source of interest or that it is otherwise not technically feasible. EPA discusses what it means by technical feasibility in the BART Rule:[25]

> Control technologies are technically feasible if either (1) they have been installed and operated successfully for the type of source under review under similar conditions, or (2) the technology could be applied to the source under review. Two key concepts are important in determining whether a technology could be applied: ''availability'' and ''applicability.'' As explained in more detail below, a technology is considered ''available'' if the source owner may obtain it through commercial channels, or it is otherwise available within the common sense meaning of the term. An available technology is ''applicable'' if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible.

In Foley's case, it uses the RBLC to justify only considering wet scrubbers and DSI on its boilers and furnaces. However, there is no technical reason why dry scrubbers cannot also be installed on the boilers. The National Council for Air and Stream Improvement, Inc. (NCASI), which describes itself as serving the forest products industry and a repository of unbiased, scientific research and technical information, states that dry

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[23] Foley Cellulose LLC Facility Id No. 1230001, Regional Haze Rule – Reasonable Progress Analysis, October 2020. Found in Appendix G-2b of the Florida SIP.

[24] See Section 51.308(F)(3))(i): "A state in which a mandatory Class I Federal area is located must establish reasonable progress goals (expressed in deciviews) that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under paragraph (f)(2) of this section that can be fully implemented by the end of the applicable implementation period, as well as the implementation of other requirements of the CAA."

[25] See the BART Rule, 70 FR 39165 (July 6, 2005). Note that on 70 FR 39164, EPA provides a listing of many sources of information, in addition to the RBLC, that can be consulted on the question of technical feasibility.

scrubbers are available for paper mill boilers.[26] Also, the New Page/Westvaco/Luke Paper mill committed to install either a spray dryer absorber or a circulating dry scrubber resulting in approximately 90% emission reduction from the 2002 baseline.[27] Another applicable document is EPA Region 4's January 31, 2007 letter to the North Carolina Department of Environment, concerning the BART analysis for the Blue Ridge Canton Paper Mill.[28] This letter discusses a number of process changes applicable to recovery furnaces that could be assessed. Lastly, the both the Fernandina Beach and Panama City Mills, which operate boilers similar to Foley's boilers and also claim to have sourced applicable controls from the RBLC, evaluate dry scrubbing systems for their boilers as part of its four-factor analyses. Therefore, Foley should revise its four-factor analysis to include the consideration of various dry scrubbing technologies for the boilers and process changes for the recovery furnaces.

6.2 FL DEP should assess the cost-effectiveness of reducing the sulfur in Foley's usage of No. 6 fuel oil and tall oil, which is now limited to 2.5% by weight by permit. This would likely result in very cost-effective controls.

6.3 Foley spends one paragraph, on page 3-2 of its report, discussing its wet scrubber cost analysis for its No. 1 power boiler. It states that it scaled it based on a recent cost estimate for a lime kiln. A cost analysis was provided in Appendix B. Little data, details, or side calculations were provided. No documentation for any aspect of this analysis was provided. Due to the lack of documentation, little can be verified and Foley should provide side calculations for all its figures. However, some problems can be identified:

6.3.1 Foley's Title V permit states that a pre-scrubber is used. Foley should therefore discuss and assess what optimization or upgrades can be made to this control to further reduce SO_2.

6.3.2 Foley should consider other wet scrubbing technologies.[29]

6.3.3 As discussed later in this report, Foley must either document the basis for its use of a 5% interest rate or use the current Bank Prime interest rate of 3.25%.

6.3.4 Foley calculates an annual electricity cost of $133,793. Its notes this results from "E x Electricity Cost." However, "E" is the caustic cost, so this appears to be an error. At the beginning of Appendix B, Foley lists the cost of electricity as $0.0755/kWh, and that the electricity usage is 0.00175 kWh/acfm, with a

[26] See NCASI memo dated June 9, 2006, transmitting a report entitled, "Retrofit Control Technology Assessment for NOx , SO_2 and PM Emissions From Kraft Pulp and Paper Mill Unit Operations by Arun V. Someshwar, Ph. D., NCASI." See the SO_2 sections on fuel oil and coal fired boilers.
[27] See https://www.federalregister.gov/d/2012-4663/p-128 concerning the New Page/Westvaco/Luke Paper kraft pulp mill boilers.
[28] See https://www.in.gov/idem/airquality/files/regional_haze_archive_epa_letter.pdf.
[29] See for instance, https://www.energy-xprt.com/articles/modern-gas-cleaning-techniques-for-trs-and-so2-control-in-the-pulp-and-paper-industry-6470.

reference acfm of 420,000. These figures also do not appear to result in Foley's figure of $133,793.

6.3.5 All figures should be explained and documented.

6.4 Foley also spends one paragraph, on page 3-2, discussing its DSI cost analysis for its No. 1 Power Boiler. A similar lack of information accompanies this analysis, although Foley does provide a DSI cost analysis. Due to the lack of documentation, little can be verified and Foley should provide side calculations for all its figures. However, some problems can be identified:

6.4.1 Foley's inclusion of owner costs is not allowed under the Control Cost Manual (see discussion later in this report). Again, Foley must use either document its use of a 5% interest rate or use the current Bank Prime interest rate of 3.25%.

6.4.2 Foley should explain its calculation of a 13 MW boiler equivalent, which assumes a 151.3 MMBtu/hr value with only a 30% efficiency. This efficiency appears low and Foley should provide documentation for it, as it is a key input into the DSI cost-effectiveness calculation.

6.4.3 All figures should be explained and documented.

6.5 On page 3-2, Foley spends two paragraphs discussing potential controls for its bark boiler. It states that it is already equipped with a scrubber and so only the use of more caustic is evaluated. Foley's proposed Title V permit revision states the following regarding it:

> PM emissions are controlled by a cyclone collector and a wet, Venturi scrubber. Water is utilized as the scrubbing media. Fly ash collected by the cyclone collector is recirculated back to the boiler. SO_2 emissions are controlled by internal absorption and partial removal in the wet, Venturi scrubber. Water flow rate and pH to the scrubber are adjusted to control SO_2 emissions from the scrubber.

6.6 Wet venturi scrubbers in this application are typically used to control particulates and it appears from Foley's proposed Title V permit revision that is the case here. Foley's permit mentions pH control but does not appear to require the use of a caustic solution in the wet venturi scrubber in order to promote the removal of SO_2. Consequently, Foley's assertion that the boiler is already equipped with a scrubber that is being represented as an SO_2 control device, and therefore other SO_2 control devices should not be assessed, is not justified. Foley should perform a cost analysis of additional SO_2 controls systems that are capable of 90% or better SO_2 removal efficiencies.

6.7 Foley provides little information concerning the bark boiler wet venturi scrubber upgrade in Appendix B. It estimates that the addition of caustic will result in 51% SO_2 removal. Foley does not present any information on whether the stated 51% removal efficiency represents the maximum removal possible. No documentation for any figures are provided. Complete documentation for all figures should be provided. Foley should provide information, and cost-effectiveness calculations, on the expected range of performance such an upgrade is capable of achieving.

6.8 On page 3-3, Foley discusses its SO_2 control analyses for its three recovery furnaces. Foley states that it used an American Forest and Paper Association publication from September 2001 as the basis for that cost analysis, escalating the capital cost to 2019 dollars. As the Control Cost Manual indicates, "[e]scalation with a time horizon of more than five years is typically not considered appropriate as such escalation does not yield a reasonably accurate estimate. Thus, obtaining new price quotes for cost items is advisable beyond five years."[30] EPA provides a detailed set of design equations for a packed tower scrubber suited to this application, along with an easy to use spreadsheet that incorporates those equations.[31] In fact, Foley makes a general reference to that information in calculating its caustic usage. Because Foley's cost estimate depends on information much older than five years, it should be discarded and Foley should make use of EPA's cost-effectiveness methodology or obtain a newer quote from a vendor. In so doing, Foley should update its SO_2 emissions baselines for the three furnaces, as they appear to be low, based on the data provided by FL DEP on page 279 of its SIP.

7 Discussion of the Northside Facility

This is a review of the Northside Generating Station Four-Factor Review.[32]

7.1 On page 251, FL DEP exempts the Northside Units 1 and 2 from a SO_2 four-factor analysis because it states that the units are already required by permit to meet an SO_2 limit of 0.15 lbs/MMBtu, which is more stringent than the MATS SO_2 limit of 0.2 lbs/MMBtu. Firstly, the fact that these units are capable of achieving SO_2 limits of 0.15 lbs/MMBtu that are stricter than the MATS 0.2 lbs/MMBtu limit for which FL DEP exempts the two Crystal River units reinforces the conclusion that MATS is not an indicator of a scrubber's true performance potential. Both of these units are equipped with dry scrubbers and SNCR systems. Below is a graph of Unit 1's monthly SO_2 and NOx emissions:[33]

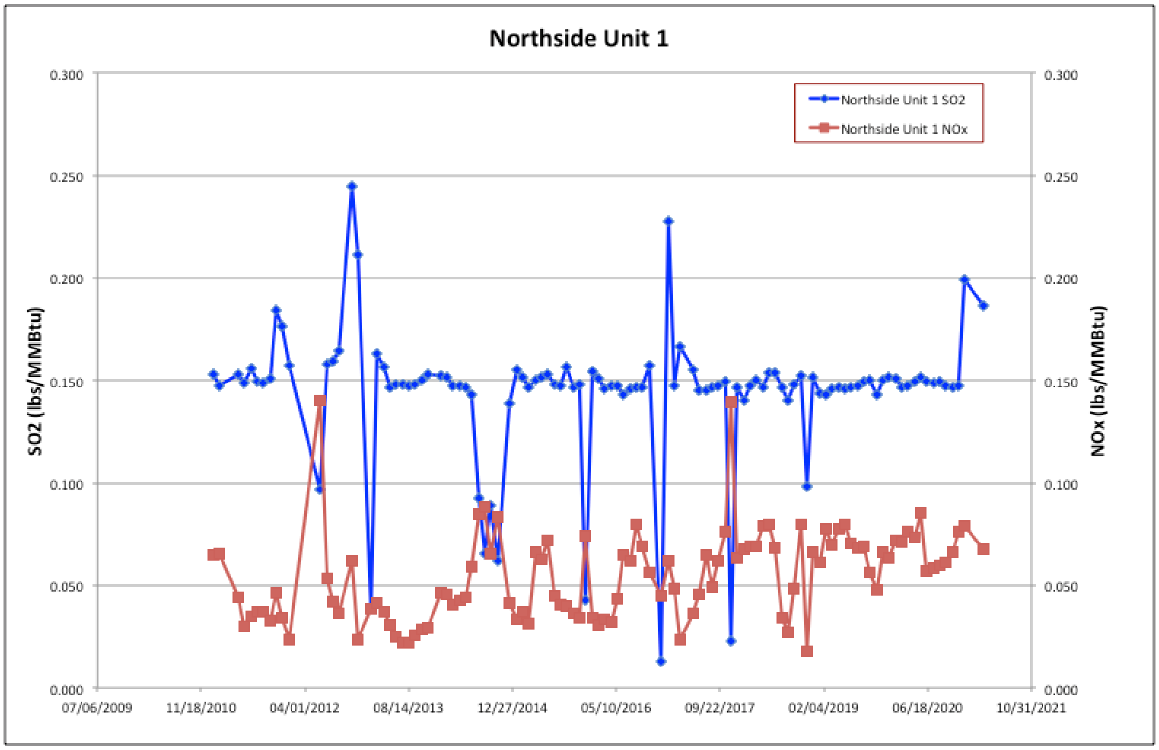
Figure 6. Northside Unit 1 SO_2 and NOx emissions

[30] Control Cost Manual, Section 1 Introduction, Chapter 2 Cost Estimation: Concepts and Methodology, November 2017. Page 18. Available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[31] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[32] Reasonable Progress Four-Factor Analysis, JEA Northside Generating Station (NGS), Golder Associates Inc., January 2021. Found in Appendix G-2c of the Florida SIP.

[33] See file, "Florida Emissions.xlsx."



A corresponding graph for Unit 2 is similar. Both units are permitted to burn natural gas, coal, pet coke, biomass or mixtures thereof. This makes it difficult to ascertain the performance potential of the SNCR and scrubber systems because low SO_2 and NOx periods could also reflect partial natural gas usage. Nevertheless, it appears that the SNCR system, which has a permit limit of 0.09 lbs/MMBtu on a 30 day rolling average basis, is not operated consistently. Many of the upward NOx spikes do not correspond to downward SO_2 spikes, which would seem to indicate periods of higher natural gas or biomass usage. Assuming that observation is correct, it appears that the SNCR system is capable of controlling the monthly NOx rate to 0.03 lbs/MMBtu or lower during periods of coal or pet coke usage. FL DEP should investigate this observation and if confirmed require that a four-factor analysis be performed that investigates the cost-effectiveness of optimizing the SNCR system for these units, which would appear to be very cost-effective.

7.2 In contrast to the SNCR systems, the dry scrubber appears to be operating very consistently. However, because the inlet SO_2 rate is not available, the dry scrubber's efficiency cannot be determined. Modern dry scrubbers are capable of continuous operation at 95% control. In fact, when EPA evaluated the Texas Regional Haze BART SIP, it found that Texas' underperforming scrubbers should be evaluated at 98% control (with a floor of 0.04 lbs/MMBtu) for Wet Flue Gas Desulfurization (WFGD) scrubbers, and 95% control (with a floor of 0.06 lbs/MMBtu) for Spray Dryer Absorbers (SDA).[34] FL DEP should require that a four-factor analysis be performed that investigates the cost-

[34] "Technical Support Document for the Texas Regional Haze BART Federal Implementation Plan, (BART FIP TSD), Revised December 2016."

effectiveness of optimizing the dry scrubber systems for these units. It is anticipated that any upgrades to these systems would be very cost-effective.

7.3 Unit 3 is permitted to burn natural gas, LP gas, No. 6 fuel oil, used "on specification" oil and blends of fuel oil and natural gas. It is limited to burning No. 6 fuel oil with a sulfur content of 1.8% by weight or less. Northside's four-factor analysis considers the cost-effectiveness of burning lower sulfur No. 6 oil or No. 2 oil. The following comments address this analysis:

7.3.1 As the Regional Haze Guidance indicates, states can consider restrictions on fuel types [some inapplicable information not reproduced]:[35]

> States have the flexibility to reasonably determine which control measures to evaluate, and the following is a list of example types of control measures that states may consider:
>
> Fuel mix with inherently lower SO_2, NOx , and/or PM emissions. States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source.
>
> Operating restrictions on hours, fuel input, or product output to reduce emissions. Energy efficiency and renewable energy measures that could be applied elsewhere in a state to reduce emissions from EGUs.

FL DEP should consider the elimination of fuel oil altogether. This would not constitute a fuel change that would fundamentally change the operation or design of the source, since Unit No. 3 primarily burns natural gas. This would not be the first time FL DEP has contemplated such a fuel change and it should do so in this case.[36]

7.3.2 Northside provides no documentation concerning its claims on page 10 that modifications are needed for Unit 3 to accept the lower viscosity fuel. Northside states that based on its estimate, a modification cost of approximately $1,000,000 will be needed, which includes inspection of burner and booster pumps, burner tuning/optimization, replacement of instrumentation, and test burns to determine boiler performance. As FL DEP notes on page 264, Northside should provide documentation for these costs. As FL DEP has noted regarding the Smurfit-Stone BART application referenced above, no such costs were needed in an industrial boiler project it cited and the cost-effectiveness of the switch to a lower sulfur fuel oils was basically the cost difference between the two fuels. In assessing BART for the AECC Bailey Unit 1, AECC itself concluded that "the fuel switching

[35] Regional Haze Guidance. Page 29.
[36] See the March 2, 2007 letter from FL DEP to Smurfit-Stone concerning its BART application. Available here: http://arm-permit2k.dep.state.fl.us/psd/0890003/00002D32.pdf

options evaluated would not require capital investments in equipment, but instead the annual costs would be based upon operation and maintenance costs associated with the different fuel types." AECC estimated that the cost-effectiveness of switching Bailey Unit 1 to No. 6 fuel oil with 1% and 0.5% sulfur content by weight was $1,198/ton and $2,559/ton, respectively.[37]

7.3.3 FL DEP's conclusions that Northside's usage of a 7% interest rate, a 20 year life, incorrect fuel usage, and additional fuel transportation costs are not appropriate or have not been documented are entirely justified. Its conclusion, that switching to a lower sulfur fuel oil is cost-effective, is in line with the past experience of a number of BART determinations. In fact, switching to a lower sulfur fuel oil was commonly found to be cost-effective in the first planning period and there does not appear to be anything in this case that should separate Northside from those determinations.[38] In fact, FL DEP should investigate a switch to a No. 6 fuel oil with a 0.5% sulfur content, as was done in many of these cases. If it is confirmed that Northside's $1,000,000 capital cost is unwarranted or inflated the cost-effectiveness would greatly improve. Even if it is confirmed that Northside's $1,000,000 capital cost is, justified, FL DEP's cost-effectiveness figure of $3,053/ton should be viewed as cost-effective. After receiving documentation of Northside's capital costs for conversion, FL DEP should also reassess a conversion to ultra low sulfur diesel, as was done with the four boilers reviewed for the WestRock Fernandina Beach Mill.

8 Review of the WestRock Fernandina Beach Four-Factor Analysis

This is a review of the WestRock Fernandina Beach Mill four-factor analysis.[39] In general, WestRock should provide documentation for all cost figures.

8.1 FL DEP has concluded that reasonable progress for the No. 7 power boiler is a limitation of 125 tons per day of coal. For the reasons discussed below, there is no technical or regulatory reason why coal cannot be eliminated altogether, which would reduce this boiler's SO_2 emissions to essentially zero.

On page 2-5 of its report, WestRock states that the No. 7 power boiler is capable of burning 100% natural gas. However, WestRock states it is currently regulated as a pulverized coal unit under the Boiler MACT and it must combust at least 10 percent coal on an annual heat input basis to retain this designation. Were it to drop below 10% coal,

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[37] See 83 FR 62209 (November 30, 2018).

[38] See for instance, the Georgia Pacific Brunswick Power Boiler 4 (77 FR 11452, 77 FR 385010), the Wyman Unit 3 (76 FR 73956, 77 FR 24385), the Verso Androscoggin Power Boilers 1 and 2 (76 FR 73956, 77 FR 24385), the Public Service NH Newington Unit NT1 (77 FR 11809, 77 FR 50602), the Dynegy Roseton Units 1 and 2 (77 FR 24794, 77 FR 51915), and various sources in MA (77 FR 30932, 78 FR 57487). In all these cases, where the state reported the cost-effectiveness, it ranged from $528/ton - $3,324/ton, with many at the low end of the range. Fuel oil sulfur contents were typically reduced down to values of 0.7% to 0.5%.

[39] Regional Haze Rule Four-Factor Analysis For The Westrock Fernandina Beach Mill, October 2020. Appendix G-2j.

WestRock argues that it would be regulated as a Gas 2 subcategory and because it would have to fire coal during its performance testing it would likely fail for HCl and possibly PM. Therefore, WestRock concludes it cannot fall below 10% coal usage because doing so would fundamentally change the boiler, which was designed as a pulverized coal unit. However, this argument does not extend to the elimination of coal altogether. Because WestRock concedes that this boiler can operate on 100% natural gas, there is no "fundamental change" consideration. [40]

On page 2-7, WestRock states that the existing ULSD burners in No. 7 Power Boiler are only capable of delivering 46% of full load and it would cost approximately $18.8 million to upgrade them it so the boiler could retain full backup capability. WestRock also argues that eliminating coal as a permitted fuel would require landfilling of the No. 5 Power Boiler bark ash, consuming landfill capacity better used for materials that cannot be disposed of by other means, eliminating a source of heat input to the unit, and potentially causing more truck traffic in and around the residential neighborhood surrounding the mill. All of these issues can and should be addressed in a four-factor analysis in which coal elimination is considered. WestRock should provide documentation for its claimed $18.8 capital cost and the remaining issues should either be monetized or assessed under the "energy and non-air quality environmental impacts of compliance" factor. FL DEP should therefore consider this option as well.

8.2 On page 2-11 of its report WestRock states that like Foley, it used an American Forest and Paper Association publication from September 2001 as the basis for its wet scrubber cost analysis, escalating the capital cost to 2019 dollars. Again, escalation over this length of time does not yield a reasonably accurate estimate and WestRock should obtain new price quotes. Or, like Foley, WestRock should use EPA's cost spreadsheet for a packed tower scrubber that is perfectly suited to this application.[41]

8.3 WestRock uses an SO_2 baseline of 1,247 tons based on a projection to 2028. On page 270 FL DEP concludes that this figure is low because the most recent emissions data shows that the two-year average from 2019 to 2020 was 754 tons. It is true that power boiler No. 7's SO_2 has declined over the last two years. However, there does not appear to be anything in the facility's Title V permit or its four-factor analysis that would point to a continuance of this level of SO_2 emissions. A three-year SO_2 average would yield a value of 1,050 tpy SO_2 and a five-year average would yield a value of 1,485 tpy SO_2. Therefore, it appears that WestRock's figure is reasonable.

8.4 There are a number of cost items in WestRock's cost analyses that were redacted, apparently due to confidentiality claims. These items include (1) the cost factors and

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[40] As discussed earlier in this report, the "fundamental change" language is a reference to the Regional Haze Guidance's advice to states on page 30 concerning what control measures they can consider: "States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source."

[41] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

rates for operator and maintenance labor, electricity, chemicals, freshwater, and wastewater, and (2) sorbent, auxiliary power and waste disposal costs. These cost items are not typically claimed as confidential and should be verified by FL DEP, as they are important inputs and cannot be verified by an independent reviewer.

8.5 Westrock presents its SDA calculation in Appendix A. The following comments address this calculation:

8.5.1 WestRock uses a 90 MW boiler equivalency, which it states is based on a 1,021 MMBtu/hr heat input. At an unattainable 100% efficiency, this would be the equivalent of 300MW.[42] However, WestRock only assumes a 30% efficiency, which reduces the power to 90 MW. This efficiency appears low and WestRock should provide documentation for this figure, as it is a key input into the SDA cost-effectiveness calculation.

8.5.2 WestRock has adapted the Sargent & Lundy cost algorithms for SDA systems.[43] It is apparent that it has greatly modified these algorithms. Because some of the underlying equations were redacted, WestRock's results cannot be reproduced. WestRock should provide full working spreadsheets for all of its cost-effectiveness calculations. In addition, it should demonstrate that its adaptation can reproduce the example provided by Sargent & Lundy in its documentation (minus owners costs and AFUDC, which are disallowed cost items under the Control Cost Manual's overnight methodology). Lastly, WestRock should remove the general and administrative, property tax, and insurance cost items it has added at the end, as these cost items are inherently included in the cost algorithms.

9 Review of the WestRock Panama City Four-Factor Analysis

9.1.1 This is a review of the WestRock Panama City Four-Factor Analysis.[44] On page 281 of its SIP, FL DEP states that it is still in the process of reviewing Panama City's four factor analyses and that it will supplement its SIP with a determination of whether any controls or measures are necessary for reasonable progress and include any permit conditions, as necessary, when its review is complete. FL DEP should note that until it finishes all of its four-factor analyses, it cannot set the Reasonable Progress Goals for its Class I Areas, since those goals must incorporate all reasonable progress controls.[45] In general,

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[42] 1 MMBtu/h = 0.2930710702 MW.

[43] IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology, Final January 2017, Prepared by Sargent & Lundy. Available here: https://www.epa.gov/airmarkets/documentation-epas-power-sector-modeling-platform-v6.

[44] Regional Haze Rule Four-Factor Analysis For The WestRock Panama City Mill, October 2020. Appendix G-2k.

[45] See Section 51.308(F)(3))(i): "A state in which a mandatory Class I Federal area is located must establish reasonable progress goals (expressed in deciviews) that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under paragraph (f)(2) of this

WestRock should provide documentation for all cost figures. As discussed later in this report, WestRock's use of a 15-year (or 20-year) life and an interest rate of 4.75% have not been justified. Owner's costs and AFUDC are not allowed under the Control Cost Manual overnight methodology.

9.2 On page 2-2, WestRock considers switching from No. 6 fuel oil to ULSD. The following comments address this issue. Similar comments apply to WestRock's other boilers that fire No. 2 and No. 6 fuel oil:

9.2.1 WestRock's Title V permit states that the No. 3 boiler already burns No. 2 fuel oil and WestRock confirms this boiler already has the capability of burning ULSD. Considering this, the cost-effectiveness of switching from No. 6 to ULSD should primarily reflect the cost differential of the two fuels, unless additional storage capacity or conversion of the existing No. 6 storage is needed. On page A-1, WestRock lists the capital cost as being $2,276,500 but does not provide any explanation for this figure. This cost must be documented.

9.2.2 WestRock redacts the cost factors and unit costs for the No. 6 and ULSD fuels. FL DEP should confirm this redaction is warranted under confidentiality claims, and in either case it should state whether it agrees with these figures.

9.2.3 WestRock assumes that converting to ULSD will only result in an SO_2 reduction of 5.4 tons per year. This boiler is only permitted to burn wood, bark, primary clarified wood fibers, primary residuals from the WWTP, natural gas, No. 2 fuel oil, No. 6 fuel oil, gases from the condensate stripper and NCGs. Considering this, WestRock should document the source(s) of the additional SO_2 and present its calculations for the SO_2 reduction.

9.3 On page 2-5, WestRock states that the No. 3 boiler burns some natural gas but it currently does not have the capacity to entirely replace burning fuel oil. It concludes replacing fuel oil in the No. 3 boiler with natural gas is technically infeasible because the existing gas supply lines to and within the facility are undersized, burners would have to be replaced, a natural gas contract would have to be negotiated, and other related issues. These are not issues that should cause a determination of technical infeasibility. In fact, all of these types of issues are either engineering problems or they can be otherwise monetized and thus accounted for in a cost-effectiveness analysis. They are common to control retrofits. Consequently, as discussed earlier with regard to the Fernandina Mill four-factor analyses, this does not constitute "fundamental change" consideration and WestRock should analyze a 100% switch the natural gas for the No. 3 boiler.
Similar comments apply to WestRock's similar discussion for the No. 4 boiler.

9.4 On page 2-5 WestRock discusses upgrading the wet venturi scrubber on Unit 3 for additional SO_2 control. It estimates that the current removal rate is 80% and discusses how a test to increase the efficiency to 98% removal failed. WestRock states that

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section that can be fully implemented by the end of the applicable implementation period, as well as the implementation of other requirements of the CAA."

operating the wet scrubber at this level is not sustainable. WestRock nevertheless calculates the cost-effectiveness of an upgrade to 98% efficiency. WestRock states that the amount of caustic needed for this efficiency level is an order of magnitude over stoichiometric. This is not surprising for a venturi scrubber, which is not as efficient as a packed tower scrubber. WestRock should perform a cost analysis of lower efficiencies and provide a graph of the amount of caustic needed for various levels of efficiencies, as the amount of caustic is a key input into the cost-effectiveness.[46] These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.5 WestRock should also investigate additional SO_2 controls for Boiler No. 3 that are capable of 90% or better SO_2 removal efficiencies. As discussed earlier in this report, EPA provides a detailed set of design equations for a packed tower scrubber suited to this application, along with an easy to use spreadsheet that incorporates those equations.[47] Such a system would use caustic more efficiently, and is capable of continuous operation at a very high effectiveness. It would not result in the operating issues WestRock describes it encountered in attempting to upgrade the wet venturi scrubber. WestRock should make use of EPA's cost-effectiveness methodology or obtain a quote from a vendor for a similar system. These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.6 On page A-2, WestRock presents its SDA cost-effectiveness calculation for the No. 3 boiler. The following comments address this calculation:

9.6.1 As with the Fernandina Mill, WestRock assumes a 30% boiler efficiency, which appears low, so it should provide documentation for this figure. Also as with the Fernandina Mill, there are a number of cost items in WestRock's cost analyses that it has redacted. These cost items are not typically claimed as confidential and should be verified by FL DEP, as they are important inputs and cannot be verified by an independent reviewer. These same comments apply to WestRock's similar discussion for the No. 4 boiler.

9.6.2 As with the Fernandina Mill, WestRock has adapted the Sargent & Lundy cost algorithms for SDA systems. It is apparent that it has greatly modified these algorithms. Because some of the underlying equations have been redacted, WestRock's results cannot be reproduced. WestRock should provide full working spreadsheets for all of its cost-effectiveness calculations. In addition, it should demonstrate that its adaptation can reproduce the example provided by Sargent & Lundy in its documentation (minus owners costs and AFUDC, which are disallowed cost items under the Control Cost Manual's overnight methodology). Lastly, WestRock should remove the general and administrative, property tax, and

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[46] Typically caustic usage for these curves is exponential so that after a point, rapidly increasing amounts of caustic are necessary for small increases in SO_2 removal. Therefore, it is quite likely that a slightly lower SO_2 removal would be much more cost-effective.

[47] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

insurance cost items it has added at the end, as these cost items are inherently included in the cost algorithms.

9.7 On page 4-13, WestRock begins its four-factor analyses for the No. 1 recovery boiler. The following comments address this issue. Similar comments apply to the No. 2 recovery boiler:

9.7.1 WestRock only draws from the RBLC for applicable controls and only considers good operating practices, low-sulfur fuel for startup, and a wet scrubber. As discussed earlier, the RBLC should not be viewed as the last word on the technical feasibility of controls. Also, FL DEP should consider EPA Region 4's January 31, 2007, letter to the North Carolina Department of Environment, concerning the BART analysis for the Blue Ridge Canton Paper Mill.[48] This letter discusses a number of process changes applicable to recovery furnaces that could be assessed.

9.7.2 On page 4-15, WestRock discusses the possibility of switching the No. 1 recovery boiler from No. 6 fuel oil to either ULSD or natural gas. Many of the issues already discussed relating to ULSD and natural gas infrastructure apply here as well. WestRock cites to a $18.8 million capital expense to convert this boiler to gas and a $2.3 million capital expense to convert it to ULSD. These costs must be documented.

9.7.3 As with the Fernandina Mill and the Foley Mill, WestRock used an American Forest and Paper Association publication from September 2001, as the basis for its wet scrubber cost analysis, escalating the capital cost to 2019 dollars. Again, escalation over this length of time does not yield a reasonably accurate estimate and WestRock should obtain new price quotes or use EPA's cost spreadsheet for a packed tower scrubber that is perfectly suited to this application.[49]

10 FL DEP Must Consider Emissions from the Sugar Industry

There are significant emissions from the sugar industry in Florida that impact the visibility at a number of Class I Areas. However, FL DEP does not consider them in its SIP. These emissions come from point and area sources.

10.1 Significant Sugar Industry Point Sources in Florida

The following table represents major sugar industry point sources:[50]

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[48] See https://www.in.gov/idem/airquality/files/regional_haze_archive_epa_letter.pdf.

[49] Control Cost Manual, Section 5 – SO_2 and Acid Gas Controls, Chapter 1 – Wet and Dry Scrubbers for Acid Gas Control. Also see the accompanying spreadsheet. Both are available here: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[50] Q/d data retrieved from: https://npca.maps.arcgis.com/apps/MapSeries/index.html?appid=73a82ae150df4d5a8160a2275591e45d.

Table 1. Major Sugar Industry Point Sources in Florida

Facility	**County**	**Industry**	**Cumulative Q/d**
U.S. Sugar Corporation	Hendry	Cane Sugar Manufacturing	26.0
Sugar Cane Growers Co-Op	Palm Beach	Cane Sugar Manufacturing	8.2
Osceola Farms	Palm Beach	Cane Sugar Manufacturing	5.6

Although the cumulative Q/d figures primarily reflect impacts on Everglades, other Class I Areas are impacted as well. FL DEP should discuss why it has not considered these sources for four-factor analyses and why it has not considered other Class I Areas. The review should include a thorough emission analysis of all significant units at each facility, along with an assessment of the potential for controls or optimization/upgrades to existing controls.

10.2 Significant Sugar Industry Non-Point Sources in Florida

In addition to point source impacts, area source emissions from burning sugar cane also have a significant impact. The following table indicates the top 10 Florida counties with the highest emissions from agricultural burning reported to EPA's National Emission Inventory in 2017:[51]

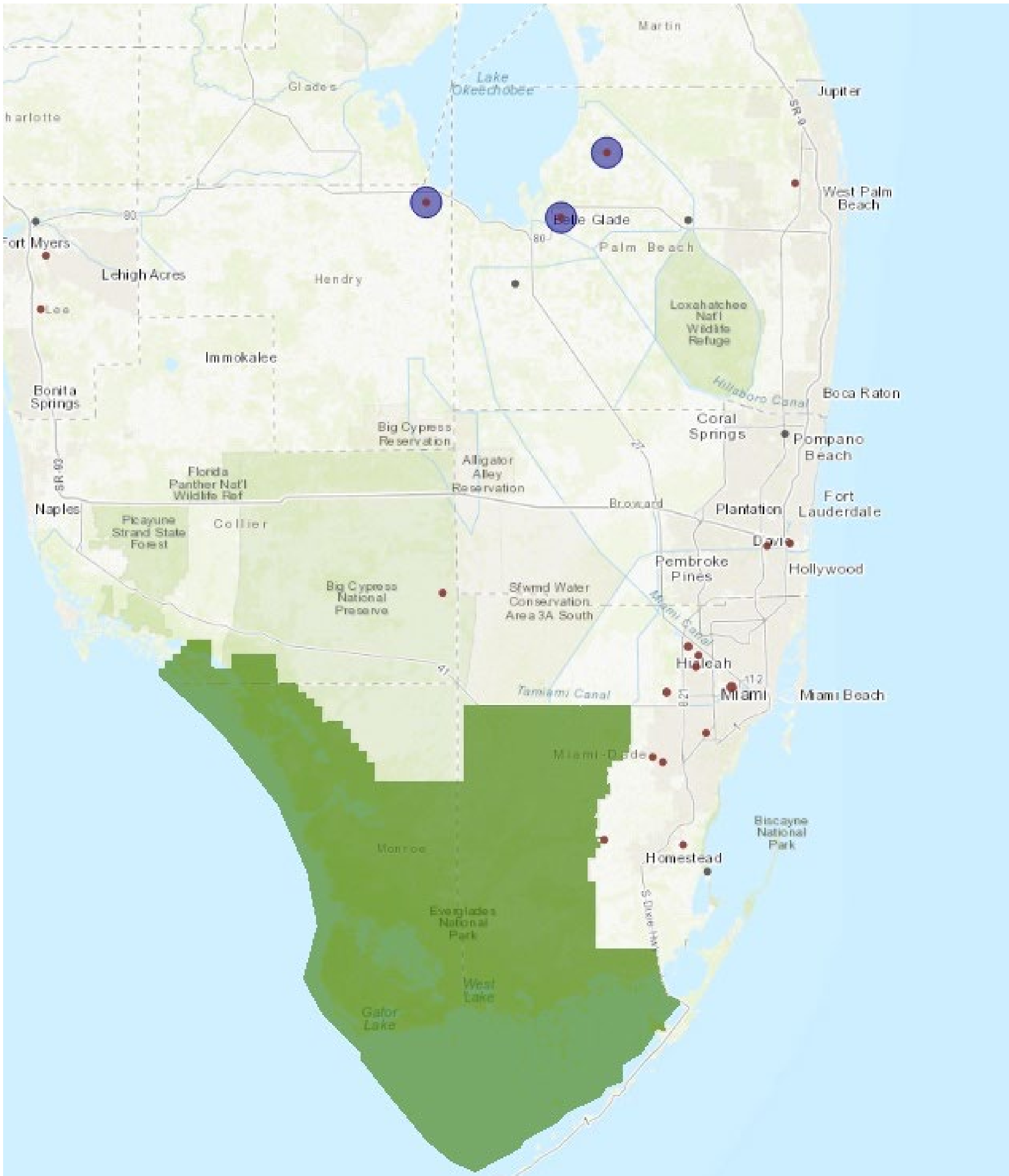
Table 2. Top 10 Florida Counties with Air Emissions from Agricultural Burning

County	NH_3	VOC	NOx	SO_2	PM25	PM10	Total
Palm Beach	8,380.6	3,043.1	1,224.2	660.2	1,829.6	2,114.5	17,252.2
Hendry	1,638.7	680.6	256.3	129.9	464.3	563.0	3,732.8
Glades	757.0	286.8	113.0	60.0	179.2	210.2	1,606.2
Martin	195.3	78.8	30.0	15.3	53.6	64.6	437.6
Jackson	90.1	83.5	22.5	6.9	86.6	119.9	409.5
Highlands	63.3	79.3	19.3	4.3	95.9	130.4	392.6
Suwannee	66.3	80.0	19.3	5.8	82.1	121.5	375.1
Indian River	52.5	71.2	17.2	3.8	85.4	115.9	346.0
Jefferson	52.6	48.7	12.6	4.4	45.4	68.2	231.9
Polk	29.5	43.0	10.2	2.0	53.0	72.2	209.8

There is in fact a relationship between the sugar industry point source locations and a number of the counties in which agricultural burning is conducted, as shown by the following map:

[51] Data retrieved from https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#datas. These data are in the file, "FL Ag Burning.xlsx."

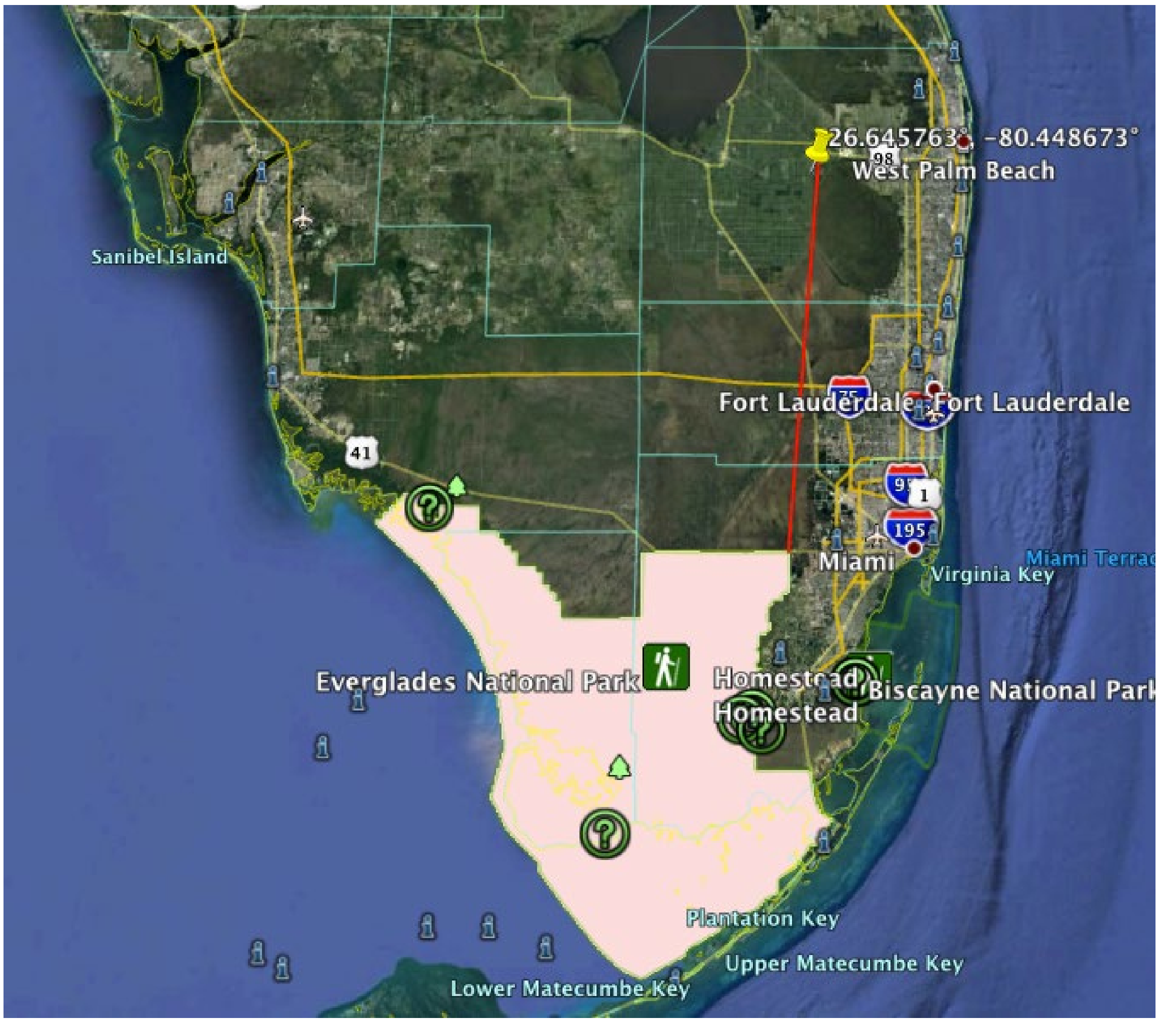
Figure 7. Location of Florida Sugar Industry Point Sources



In the above figure, the three large purple circles to the south and east of Lake Okeechobee are the three sugar industry point sources noted above. The top four counties with the highest agricultural burning emissions - Palm Beach, Hendry, Glades, and Martin, surround those point sources, providing much of the sugar cane for processing. In fact, Palm Beach County has been noted to be responsible for more emissions from agricultural fires that are attributable to sugarcane field burning than any other county in the United States.[52]

It is difficult to compare county-level area source emissions to point source emissions, since the former are spread out in a large area. Nevertheless, by way of an approximate comparison, if the emissions from Palm Beach county were considered to originate at the centroid of the county, the distance to the closest edge of Everglades would be approximately 104 km:[53]

Figure 8. Distance from Centroid of Palm Beach County to Everglades



In the above map, a red line, measuring 104 km is drawn from the centroidal location of Palm Beach County (latitude 26.645763, longitude -80.448673) to the closest edge of Everglades National Park (note that some areas of Palm Beach County are actually much

[52] See http://stopsugarburning.org/resources/#emissions.

[53] Centroidal location of Palm Beach County is latitude +26.645763°, longitude –80.448673°. Map obtained from Google Earth Pro.

closer). Q is calculated as the sum of NOx, SO_2, and PM10. The Palm Beach County Q/d for Everglades would then be approximately 38.5.[54] The other counties where sugarcane is burned would result in lower Q/d values, but these are still significant. Thus, there are large area source impacts that are readily identified that have gone unmentioned by FL DEP. The emissions discussed from these area sources are only from agricultural burning, most of which are due to sugar cane burning. Because much of the sugar cane acreage that is burned is owned or controlled by the sugar cane mills,[55] performing four-factor analyses would logistically be a relatively straightforward exercise.

10.3 Green Harvesting Sugar Cane is a Common Practice.

There is a great deal of literature that concludes that sugar cane burning is unnecessary and is only done in the U.S. for economic reasons.[56] In fact, green harvesting is already being implemented in other countries, other states, and indeed in Florida.[57] For the purposes of a regional haze four-factor analysis, the "measures"[58] are not typical emission controls retrofitted to point sources, such as SCR or scrubber systems. Rather, in this case, the measures consist of work practices, which would replace sugar cane burning with green harvesting work practices.[59] The sugarcane would be harvested in its green state through the use of mechanical harvesters, which separate the sugarcane leaves and tops from the sugar-bearing stalk without burning. In fact, the latest models of sugarcane harvesters CASE IH 8000 series and John Deere CH570 used by Florida sugar growers are already capable of harvesting both burnt and green cane.[60] For green harvesting, only simple ground and fan speed adjustments are necessary.[61] Thus, this is a proven control, there is no technical infeasibility issue and it is anticipated that major

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[54] That is, 1224.2 + 660.2 + 2114.5 / 104 = 38.45.

[55] For Instance, See Petition Requesting the Administrator to Object to the Title V, Operating Permit Renewal for the Okeelanta Sugar Mill and Refinery/Okeelanta Cogeneration Plant, available here: https://www.epa.gov/title-v-operating-permits/2015-petition-requesting-administrator-object-title-v-permit-okeelanta. Page 8: "Okeelanta exercises effective control over some 180,000 acres of sugarcane fields in and around the EAA."
Also see, Petition Requesting the Administrator To Object To The Title V Operating Permit Renewal For The United States Sugar Corporation's Clewiston Facility, available here: https://www.epa.gov/title-v-operating-permits/2015-petition-requesting-administrator-object-title-v-permit-us-sugar. Page 8: "U.S. Sugar exercises effective control over some 373,000 acres of sugarcane fields in and around the EAA;"

[56] For instance, see Comments By Earthjustice On Behalf Of Sierra Club On The Draft/Proposed Title V Air Operation Permit Renewal For The Okeelanta Corporation's Okeelanta Sugar Mill And Refinery (Facility Id No. 0990005) And The New Hope Power Company's Okeelanta Cogeneration Plant (Facility Id No. 0990332), available here: arm-permit2k.dep.state.fl.us/psd/0990005/U0002596.pdf. Specifically, see Appendix A, Report by Andrew Wood, PhD.

[57] See http://stopsugarburning.org/what-is-green-harvesting/.

[58] See https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partC-subpartii-sec7491.htm.

[59] See the 1999 Regional Haze Rule, 64 FR 35767 (July 1, 1999). Note that EPA has long viewed controls as including work practices.

[60] See https://www.caseih.com/apac/en-in/products/harvesters/sugar-cane-harvester-austoft-8000, and https://www.deere.com/en/harvesting/ch570-sugar-cane-harvester/.

[61] Viator, E.P, et al. 2007. Sugarcane Chopper Harvester Extractor Fan And Ground Speed Effects On Yield And Quality. *Applied Engineering in Agriculture.* 23(1): 31-34. Available here: https://pubag.nal.usda.gov/download/19263/PDF.

capital expenditures would not be necessary. Any remaining issues relating to yield differences can be monetized and included in a cost-effectiveness calculation. FL DEP should therefore require that these mills perform four-factor analyses in order to determine the cost-effectiveness of green harvesting.

11 Consultation Issues

Figures 7-17 and 7-18 indicate significant impacts at two of FL's Class I Areas from other states, primarily Georgia and Alabama. FL DEP includes its letter to Georgia requesting that Georgia examine certain sources for reasonable progress (appendix F1-a), and Georgia's similar letter to it (Appendix F1-d). However, it does not appear that FL DEP has included Georgia's response to its request. FL DEP should include Georgia's response to its request in its SIP and indicate if it is satisfied with that response.

Also, although FL DEP has included Alabama's letter to it (Appendix F1-c), it does not appear that FL DEP has included any communication to Alabama in its SIP. FL DEP should include its communication to Alabama in its SIP and indicate if it is satisfied with Alabama's response.

12 Common Problems in Cost-effectiveness Calculations

The following are intended to be general comments concerning cost analyses. For the reasons discussed elsewhere in this report, FL DEP must revise its regional haze SIP in order to properly consider the four factors. In so doing, it is encouraged to incorporate the information outlined in this section.

12.1 Control Cost Documentation

It is important that all assertions, parameters, assumed control efficiencies, cost items, assumed future operating capacities, etc. in a control cost analysis be documented so that an independent analyst, with a reasonable amount of expertise, can duplicate the control cost figures. In general, there is little to no documentation provided to support any of these parameters in the four-factor analyses reviewed in Part 1. This documentation should include vendor quotes, actual costs from a similar facility, generally accepted estimate, etc. In particular, scrubber upgrades require specific knowledge of the scrubber configuration in order to determine what upgrades can be considered. It is recognized that this level of documentation may include the use of Confidential Business Information (CBI). However, Florida and EPA have procedures in place to adequately treat CBI, so this should not present a problem.

12.2 Equipment Life

In many cases, facilities have employed equipment lives that are too short. Regarding this, the Control Cost Manual states: "The life of the control is defined in this Manual as the equipment life. This is the expected design or operational life of the control equipment. This is not an estimate of the economic life, for there are many parameters and plant-specific considerations that can yield widely differing estimates for a particular type of control equipment."[62] EPA has consistently assumed a thirty-year equipment life for scrubber retrofits, scrubber upgrades, SCRs, and SNCR installations. Much of this is summarized and cited to in EPA's response to comments document for its Texas and Oklahoma Regional Haze SIP final disapproval and FIP.[63] The recent revision of the Control Cost Manual that covers wet scrubber is another example.[64]

A number of EGU contractors have been assuming an equipment life of twenty years for SNCR systems, by reference to the Control Cost Manual. The 4/25/2019, SNCR update of the Control Cost Manual does state on page 1-53, "Thus, an equipment lifetime of 20 years is assumed for the SNCR system in this analysis."[65] However, this is a calculation example and does not indicate that EPA universally considers the equipment life for all SNCR systems installed on EGUs to be twenty years. Just prior to this statement, EPA notes, "As mentioned earlier in this chapter, SNCR control systems began to be installed in Japan the late 1980's. Based on data EPA collected from electric utility manufacturers, at least 11 of approximately 190 SNCR systems on utility boilers in the U.S. were installed before January 1993. In responses to another Institute of Coal Research (ICR), petroleum refiners estimated SNCR life at between 15 and 25 years." Therefore, based on a 1993 SNCR installation date, these SNCR systems are at least twenty-eight years old, which all other considerations aside, strongly argues for a thirty-year equipment life. Furthermore, an SNCR system is much less complicated than a SCR system, for which EPA clearly indicates the life should be thirty years. In an SNCR system, the only parts exposed to the exhaust stream are lances with replaceable nozzles. The injection lances must be regularly checked and serviced, but this can be done relatively quickly if necessary, is relatively inexpensive, and should be considered a maintenance item. In this regard, the lances are analogous to SCR catalyst, which is not considered when estimating equipment life. All other items, which comprise the vast majority of the SNCR system capital costs, are outside the exhaust stream and should be considered to last the life of the facility or longer.

Thus, all types of scrubbers, DSI systems, SCR systems, SNCR systems, and NOx combustion controls should have equipment lives of thirty years unless the unit's

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[62] *See* Control Cost Manual, Section 1, Chapter 2, Cost Estimation: Concepts and Methodology, November 2017, page 22.

[63] *See* Response to Comments for the Federal Register Notice for the Texas and Oklahoma Regional Haze State Implementation Plans; Interstate Visibility Transport State Implementation Plan to Address Pollution Affecting Visibility and Regional Haze; and Federal Implementation Plan for Regional Haze, Docket No. EPA-R06-OAR-2014-0754, 12/9/2015, available here: https://www.regulations.gov/document?D=EPA-R06-OAR-2014-0754-0087. *See* pages 240-245, 268, and 274. *See also* the Texas BART FIP proposal, which conducted extensive cost determinations for scrubber upgrades, at 82 FR 930 and 938. *See also* Control Cost Manual, Section 4, Chapter 2, Selective Catalytic Reduction, June 2019, pdf page 80: "For the purposes of this cost example, the equipment lifetime of an SCR system is assumed to be 30 years for power plants."

[64] Control Cost Manual, Section 5, SO_2 and Acid Gas Controls, Chapter 1 Wet and Dry Scrubbers for Acid Gas Control, April 2021. See page 1-35: "Given these considerations, we estimate an equipment life of 30 years as appropriate for wet FGD systems."

[65] Section 4, Chapter 1, Selective Noncatalytic Reduction, April 2019, page 1-53.

retirement is secured by an enforceable commitment. Unless there is a documentable reason to select a shorter life, thirty years should also be the default equipment life used for the cost analyses of these types of controls in any application. Use of a shorter equipment life artificially inflates the cost-effectiveness figures (higher $/ton).

12.3 Control Efficiency and Performance Optimization

As noted, many scrubber and SCR systems are suspected to be under performing. Unless verifiable documentation is provided by the facility in question, FL DEP should assume that these control systems are capable of operating at the high end of their efficiencies, as demonstrated by other similarly configured units. Some controls, especially scrubber and SCR upgrades and SNCR installations are very site-specific and the final optimized control efficiency cannot be determined until on-site optimization has been performed. Therefore optimization should be required as part of any required scrubber or SCR upgrade or new SNCR installation.

12.4 Interest Rate

Many control cost analyses assume an artificially high and undocumented interest rate. As the Control Cost Manual states: "For input to analysis of rulemakings, assessments of private cost should be prepared using firm-specific nominal interest rates if possible, or the bank prime rate if firm-specific interest rates *cannot be estimated or verified*" [emphasis added].[66] Consequently, all facilities should provide verification of their interest rate, or the Bank Prime Interest Rate should be used in all control cost calculations. As of the end of June 2021, the Bank Prime Interest Rate is 3.25%.[67] Using a higher interest rate will artificially increase the total annualized costs and worsen (higher $/ton) the cost-effectiveness of all controls.

12.5 Retrofit Factors

A number of control cost analyses have used retrofit factors greater than 1.0. Typically, this is a direct multiplier to capital and fixed operating costs and so has a large impact on the total annualized cost. The average retrofit factor assumed in almost all control cost estimating in the first round of regional haze SIP development was 1.0. All facilities should either use a retrofit factor of 1.0 or provide documentation of why their retrofit is more difficult than at other facilities.

12.6 Baseline Emissions

It is important that a facility use the correct emissions baseline when calculating cost-effectiveness. An artificially low emissions baseline will cause the cost-effectiveness calculation to be artificially high (higher $/ton). Although these are not BART reviews, the BART Guidelines offered the following, which is still applicable:[68]

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[66] *See* Section 1, Chapter 2, Cost Estimation: Concepts and Methodology, November 2017, page 16.
[67] *See* https://www.federalreserve.gov/releases/h15/.
[68] 70 FR 39167.

The baseline emissions rate should represent a realistic depiction of anticipated annual emissions for the source. In general, for the existing sources subject to BART, you will estimate the anticipated annual emissions based upon actual emissions from a baseline period. When you project that future operating parameters (e.g., limited hours of operation or capacity utilization, type of fuel, raw materials or product mix or type) will differ from past practice, and if this projection has a deciding effect in the BART determination, then you must make these parameters or assumptions into enforceable limitations. In the absence of enforceable limitations, you calculate baseline emissions based upon continuation of past practice.

12.7 Disallowed Cost Items

AFUDC and owners costs should not be included in any control cost analyses. Concerning this, the as the Control Cost Manual states, "owner's costs and AFUDC costs are capital cost items that are not included in the EPA Control Cost Manual methodology, and thus are not included in the total capital investment (TCI) estimates in this section."[69]

[69] Control Cost Manual, Section 4, Chapter 2, Selective Catalytic Reduction, June 2019, pdf page 65.

Our National Parks

***Florida Regional Haze Consultation** – 5/17/2021*
NPS, Air Resources Division
Florida Department of Environmental Protection

5/17/2021
NPS Formal Consultation Call with Florida DEP for Regional Haze SIP Development

Attendees:

- National Park Service
    - Denesia Cheek, Southeast Regional Office – Atlanta, GA
    - Kirsten King, Air Resources Division (ARD) – Denver, CO
    - Debbie Miller, ARD – Denver, CO
    - Melanie Peters, ARD – Denver, CO
    - Jim Renfro, Great Smoky Mountains NP
    - Don Shepherd, ARD – Denver, CO
    - Andrea Stacy, ARD – Denver, CO
- Florida DEP
    - Jeff Koerner
    - Ashley Kung
    - Hastings Read
- FWS
    - Jaron Ming
- USFS
    - Jeremy Ash

NPS photos from left to right: Acadia NP, Denali NP, Yellowstone NP, Everglades NP

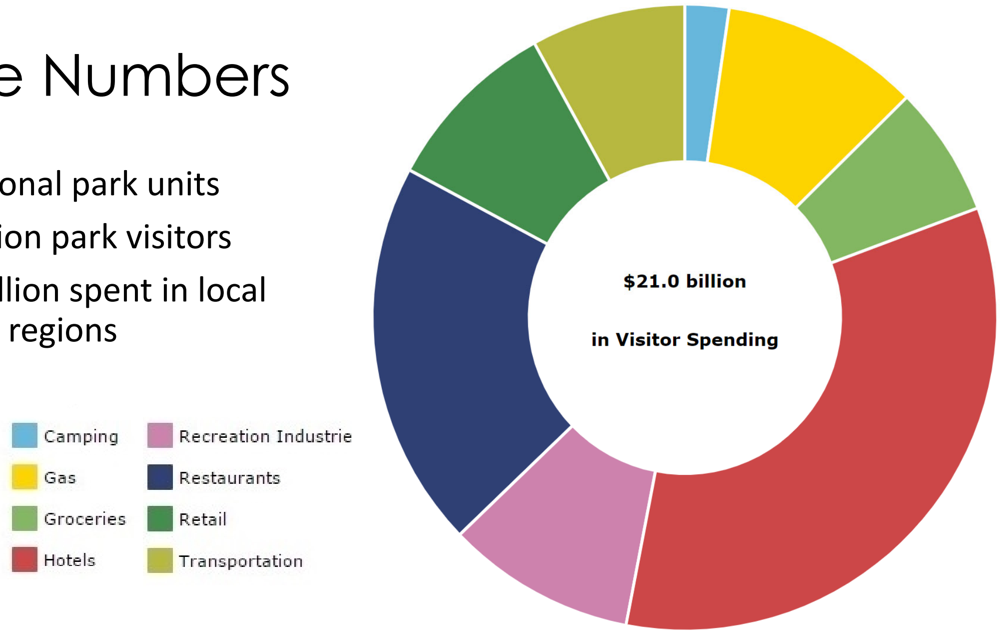
Agenda

- Welcome & Introductions
- NPS Regional Haze Background
- NPS Areas in Florida
- Everglades Visibility Data
- NPS Concerns with VISTAS Approaches to RH & Feedback for Florida
  - Source Selection
  - Exclusion of NO_x/Nitrate
  - URP & Visibility Considerations
- Next-Steps

We welcome discussion at any time during this presentation. Please feel free to ask question or add information along the way.

By the Numbers

- 423 national park units
- 328 million park visitors
- $21.0 billion spent in local gateway regions



Nationally in **2019** (a 2020 report was not completed due to the pandemic)

328 million park visitors spent an estimated $21 billion in local gateway regions while visiting National Park Service lands across the country.

These expenditures supported a total of

- 341 thousand jobs,
- $14.1 billion in labor income,
- $24.3 billion in value added, and
- $41.7 billion in economic output in the national economy.

National parks are incredible places that highlight natural and cultural features while boosting local economies.

Graphics from: https://www.nps.gov/subjects/socialscience/vse.htm

By the Numbers

- **48** Class I areas
- In **24** states
- **90%** of visitors surveyed say that scenic views are ***extremely*** to ***very*** important
- **100%** of visitors surveyed rate clean air in the **top 5** attributes to protect in national parks

List of NPS managed Class I areas: https://www.nps.gov/subjects/air/npsclass1.htm

States with at least one NPS managed Class I area:
AK, AZ, CA, CO, FL, HI, ID, KY, ME, MI, MN, MT, NC, ND, NM, OR, SD, TN, TX, UT, VA, VI, WA, WY

Statistics citation:
Kulesza C and Others. 2013. National Park Service visitor values & perceptions of clean air, scenic views, & dark night skies; 1988–2011. Natural Resource Report. NPS/NRSS/ARD/NRR—2013/622. National Park Service. Fort Collins, Colorado

NPS photo of Great Smoky Mountains NP, NC & TN

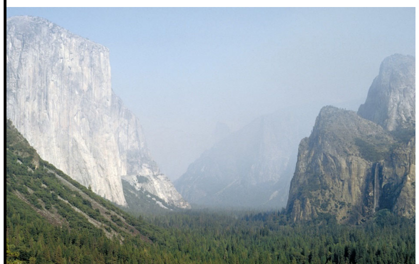
The NPS has an affirmative legal responsibility to protect clean air in national parks.

- 1916 NPS Organic Act: created the agency with the mandate to conserve the scenery, natural and cultural resources, and other values of parks in a way that will leave them unimpaired for the enjoyment of future generations. This statutory responsibility to leave National Park Service units "unimpaired," requires us to protect all National Park Service units from the harmful effects of air pollution.
- In the 1970 Clean Air Act: authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources. The Act also requires the Environmental Protection Agency to set air quality standards.
- 1977 Clean Air Act Amendments: these amendments to the Clean Air Act provide a framework for federal land managers such as the National Park Service to have a special role in decisions related to new sources of air pollution, and other pollution control programs to protect visibility, or how well you can see distant views. The Act established a national goal to prevent future and remedy existing visibility impairment in national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres that were in existence when the amendments were enacted. (Class I areas)
- 1990 Clean Air Act Amendments: created regulatory programs to address acid rain and expanded the visibility protection and toxic air pollution programs. The acid rain regulations began a series of regional emissions reductions from electric generating facilities and industrial sources that have substantially reduced air pollutant emissions.

NPS photo of Washington DC: https://npgallery.nps.gov/AirWebCams/wash

Visibility goal:

Restore natural conditions by 2064

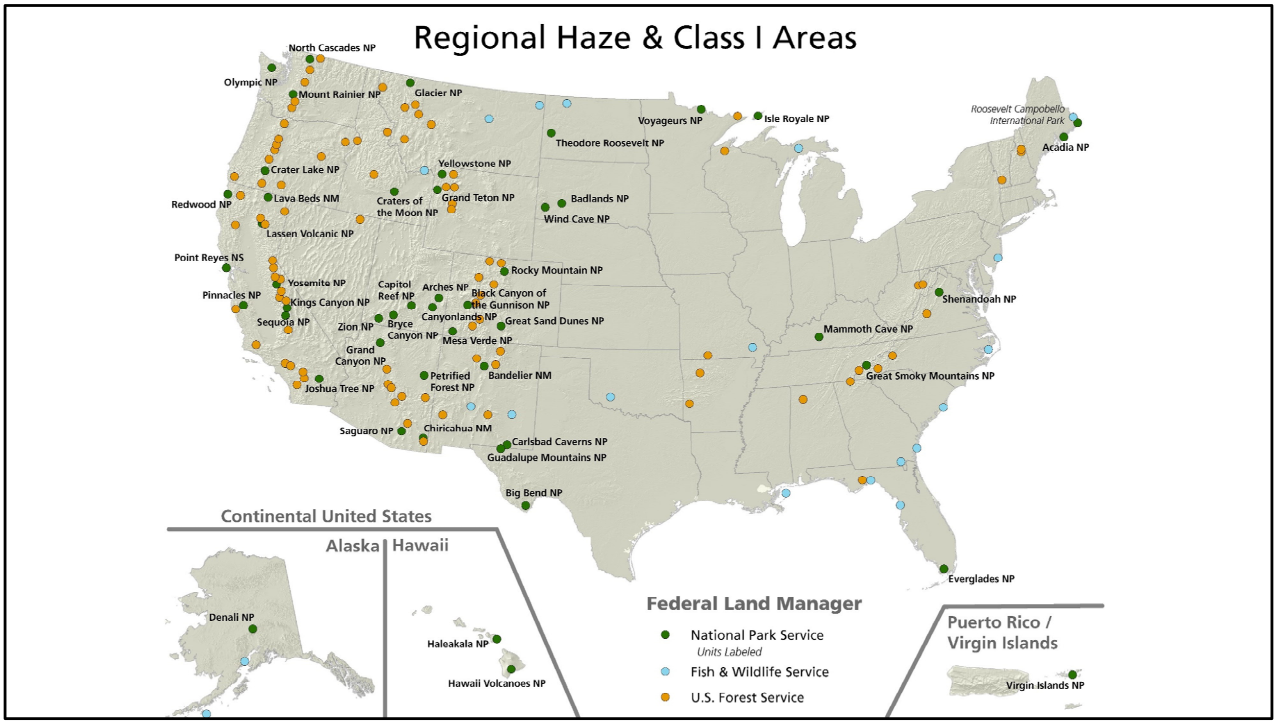
  

Yosemite NP, California

Left to right images illustrate hazy to clear conditions.

Haze obscures the color and detail in distant features.

NPS photos of Half Dome in Yosemite NP, CA



As you know, the NPS is one of three Federal Land Managers (FLMs) with responsibility for the 156 mandatory Class I areas nationwide where visibility is an important value (40 CFR 81). The NPS manages 48 Class I areas including Everglades National Park in Florida.

NPS map of Class I areas, 2020

Units managed by the National Park Service in Florida:

1. Big Cypress National Preserve, Ochopee, FL
2. Biscayne National Park, Miami, Key Biscayne & Homestead, FL
3. Canaveral National Seashore, Titusville and New Smyrna Beach, FL
4. Castillo de San Marcos National Monument, St. Augustine, FL
5. De Soto National Memorial, Bradenton, FL
6. Dry Tortugas National Park, Key West, FL
7. Everglades National Park, Miami, Naples, and Homestead, FL
8. Fort Caroline National Memorial, the Timucuan Preserve; Jacksonville, FL
9. Fort Matanzas National Monument, St. Augustine, FL
10. Gulf Islands National Seashore, Gulf Breeze, Florida and Ocean Springs, Mississippi
11. Timucuan Ecological and Historic Preserve, Jacksonville, FL

Statistics are from the 2019 Visitor Spending Effects - Economic Contributions of National Park Visitor Spending - Social Science (U.S. National Park Service) (nps.gov)

NPS photo of Everglades NP, FL

From the Everglades NP website–

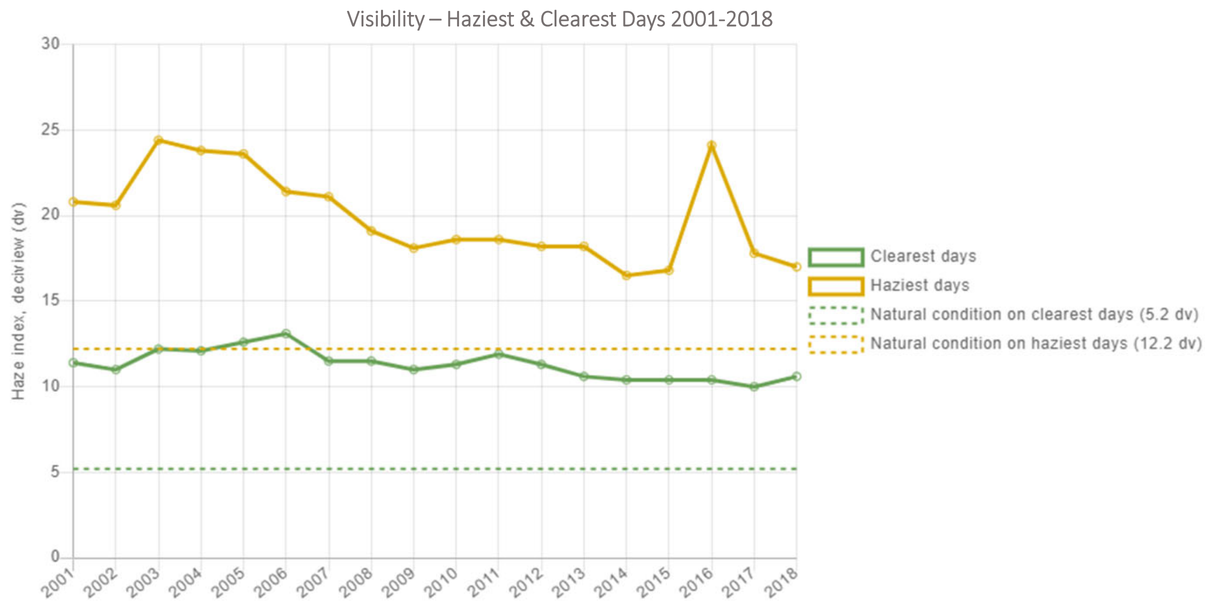
America's Everglades - The largest subtropical wilderness in the United States
Everglades National Park protects an unparalleled landscape that provides important habitat for numerous rare and endangered species like the manatee, American crocodile, and the elusive Florida panther.

NPS photo of Everglades NP, FL

Everglades NP is an international treasure as well - a World Heritage Site, International Biosphere Reserve, a Wetland of International Importance, and a specially protected area under the Cartagena Treaty.

NPS photo of Everglades NP, FL

Everglades National Park



There is a long history of visibility monitoring at Everglades National Park (20 years!)

This chart shows annual average visibility on haziest and clearest days, as compared to natural conditions, going back to 2001. The regional haze metric is now based on most-impaired days rather than haziest but, it is still interesting to see the range of visibility conditions experienced by park visitors and monitored in the park.

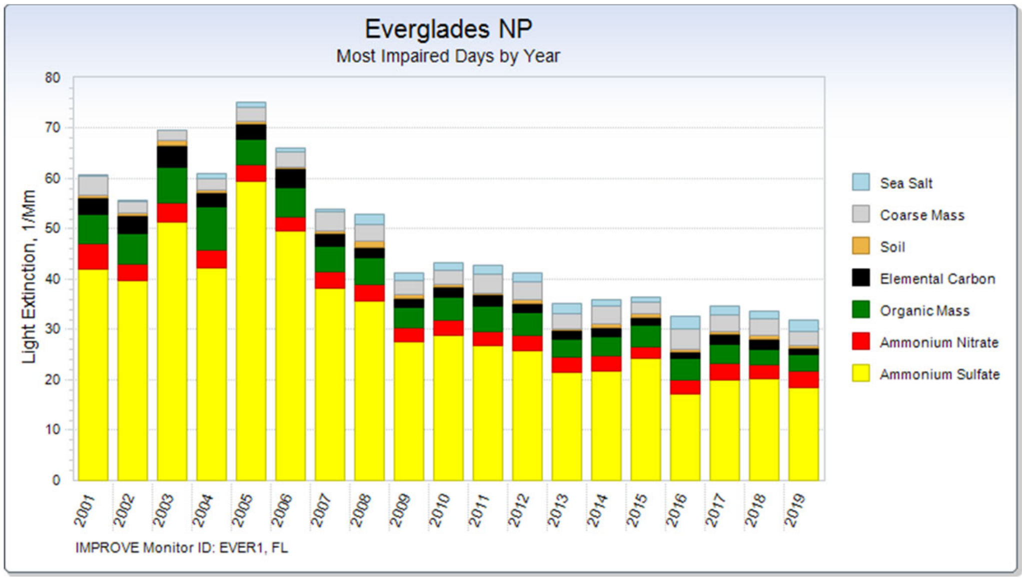
Monitoring data show moderate but steady improvement on both haziest and clearest days. 2016 and 2017 were influenced significantly by fire events on the haziest days.

Progress has been made since first Regional Haze planning phase, and we want to continue to make progress over this second planning phase as well.

Long term visibility trend graph from: https://www.nps.gov/subjects/air/park-conditions-trends.htm?tabName=trends&parkCode=EVER&paramCode=Visibility&startYr=2001&endYr=2018&monitoringSite=EVER1%20(IMPROVE)&timePeriod=Custom

Everglades National Park

Haze Composition - Most Impaired Days 2001-2019

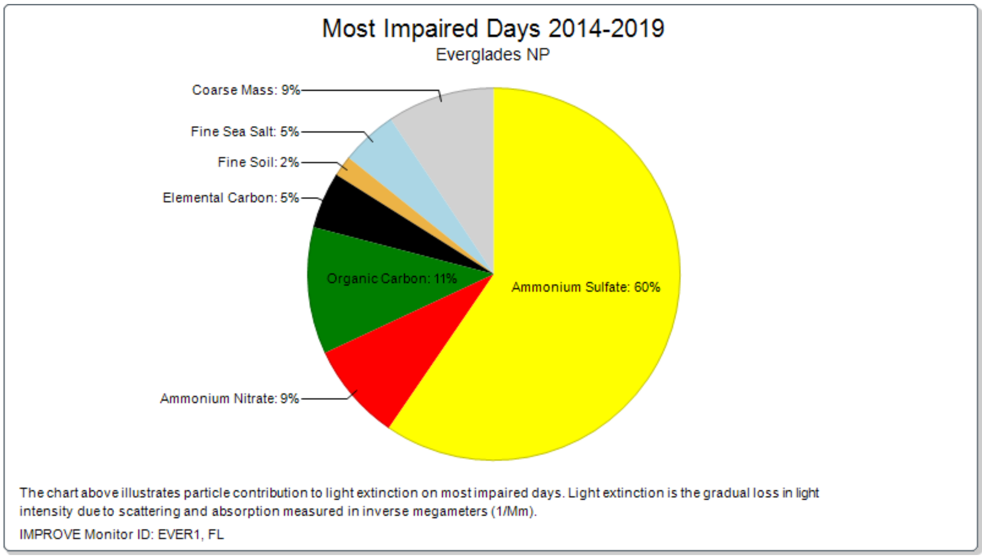


Over the past 20 years visibility monitoring data from the park show us that visibility has also improved on the most impaired days. Notably, the amount of light extinction (haze) from ammonium sulfate is now half what it was on most impaired days in the early and mid 2000's.

Most impaired days haze composition graph from: http://vista.cira.colostate.edu/Improve/aqrv-summaries/

Everglades National Park

Haze Composition - Most Impaired Days 2014-2019



Over the last 5 years, on average ammonium sulfate is responsible for 60% of the light extinction monitored at Everglades NP on most impaired day. On this same set of days organic carbon makes up 11 % while ammonium nitrate and coarse mass are each responsible for 9% of light extinction.

Most impaired days haze composition pie chart from: http://vista.cira.colostate.edu/Improve/aqrv-summaries/

VISTAS Approach Concerns

Source Selection

- The *individual facility percent-of-total-impact* metrics are arbitrarily high and inherently less protective of the more-impacted Class I areas in the VISTAS region.
- The threshold for selecting an individual facility is **80-times** higher in the most-impacted Class I area than in the least-impacted Class I area in the VISTAS region.

As we shared with VISTAS and member states on 5/21/2021, we have several overarching concerns with the VISTAS approach to regional haze SIP development—specifically source selection and the exclusion of NO_x. However, as we will discuss, these to not necessarily apply to Florida. We present them here for discussion and to answer any questions you may have about our perspective.

One of the primary concerns we have with the VISTAS approach in this round is the source selection methodology used by member states to identify sources for four factor analysis and associated potential emission reduction opportunities.

Our recent review of Florida's draft RH SIP highlighted for us that the *individual facility percent-of-total-impact* metrics employed by VISTAS are arbitrarily high and inherently less protective of the more-impacted Class I areas in the VISTAS region. Consequently, the absolute value threshold for selecting an individual facility is 80-times higher in the most-impacted VISTAS Class I area than in the least-impacted Class I area in the VISTAS region. A US Forest Service area, Dolly Sods Wilderness in West Virginia is the "most impacted" or visually impaired Class I area in the VISTAS region while the NPS managed Everglades National Park in Florida is the least impacted. This means that the absolute value of the percent-of-total impact threshold requires a source to have an impact that is 80-times greater to be selected for consideration at Dolly Sods vs. Everglades NP. This approach is biased against and offers the least protection for the most impacted areas.

Florida's Everglades NP, by virtue of it's least impaired status, is receiving the highest level of protection under this *percent-of-total-impact* based metric.

VISTAS Approach Concerns

Source Selection

- Underlying EWRT*Q/d analysis

- Updated NPS lists of facilities
  - 80% of total
  - Absolute Value Threshold

To be clear, the main problem with the VISTAS source selection methodology is the application of an *individual-facility-percent-contribution* trigger for source selection.

We recognize and appreciate that the underlying the EWRT*Q/d metric employed by VISTAS is superior to a simple Q/d approach because it brings extinction and meteorology on the 20% MID into consideration. Accordingly, we have now updated our earlier recommendations for NPS Class I areas by using the VISTAS AOI results with EWRT*Q/d in two different ways:

1. The first applied a threshold that captures 80% of the total Class I Area impact (e.g., 80% of the TCI), as was recommended in the 2016 draft regional haze guidance. This produced a list of all the facilities that contribute up to 80% of the total cumulative impact in a given NPS VISTAS Class I area. We are calling these results the "80% cut-off results."
2. The second alternative applied an absolute value threshold of $[(EWRT(SO_4)*Q/d(SO_2))+(EWRT(NO_3)*Q/d\ (NO_x))] = 0.0067$ for an individual facility impact. This was the lowest absolute value of EWRT*Q/d for sources Florida selected for four factor analysis at Everglades NP—a Mosaic fertilizer plant. We are calling these results the "absolute value threshold results." Because Everglades NP is the least-impacted Class I Area in the VISTAS region (based on total cumulative impact), this likely represents the lowest absolute value threshold used to select a facility for four factor analysis within the VISTAS region.

Florida DEP noted that the 80% of total impact guidance was in EPA's 2016 draft guidance and not part of the final 2019 Regional Haze Guidance. This is true, but we had to pick a number to illustrate what may be a more reasonable approach, so we started there. A similar approach identifying sources that contribute to the top 90% or 70% or some other portion of the total cumulative impact may also be perfectly reasonable. For example, Arkansas used 70% of total impacts in a similar analysis to identify sources for four-factor analysis. The point is that this approach moves away from the need to attribute a specific percent contribution to any one source by identifying a group of sources that are cumulatively having a significant effect on visibility. In this way, states can reasonably identify sources contributing to visibility impairment at Class I areas without biasing the results in a way that is less protective of more impacted areas.

VISTAS Approach Concerns

Exclusion of NO_x/Nitrate

- The VISTAS analyses justifying exclusion of NO_x do not adequately account for current conditions on the 20% most-impaired days.
- As SO_2 emissions decline and the seasonality of most-impaired days shifts, nitrate is increasingly important in many VISTAS Class I areas.
- States should evaluate control opportunities in this planning period.

Ammonium nitrate is a significant anthropogenic haze causing pollutant. Over the past 10 years the importance of ammonium nitrate on the 20% most impaired days has increased in most NPS managed VISTAS Class I areas. This is due in part to the dramatic reductions in ammonium sulfate and the shifting seasonality of most impaired days to more spring and winter days when ammonium nitrate can dominate.

VISTAS rationale for excluding NO_x emissions from reasonable progress is based on an outdated modeling base year (2011) and inaccurate assumptions about the current and future distribution of most impaired days. We recognize that the modeling meets EPA standards and are not suggesting that it needs to be re-done. Instead, we recommend that VISTAS states recognize the current monitoring data and the demonstrated importance of ammonium nitrate on most impaired days and use this information to supplement their current source selection analyses and the determination of which pollutants to consider in four-factor analyses.

By recognizing the importance and value of recent visibility monitoring data VISTAS states have an opportunity to adjust course and consider meaningful NO_x emission reduction opportunities in this round of RH SIP development. Reducing NO_x emissions would have additional regional co-benefits for ozone and acid deposition.

VISTAS Approach Concerns

Visibility Benefit & URP Considerations

- Emission control decisions should be based upon the four factors identified in the Clean Air Act and not introduce an unintended fifth visibility factor.
- 2028 projections below the URP glidepath do not represent a "safe harbor" for avoiding otherwise reasonable emission controls.

The visibility benefit of individual emission controls, by design, is not part of reasonable progress as established by the CAA:

Reasonable progress goals are established through the application of the four factors (40 CFR § 51.308 d 1):

1. costs of compliance,
2. the time necessary for compliance,
3. the energy and non-air quality environmental impacts of compliance, and
4. the remaining useful life

In § II.B.5.a (pg 38) of the 2019 RH guidance, EPA states that "…because regional haze results from a multitude of sources over a broad geographic area, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement."

Being ahead of URP goals does not justify the decision to delay or forego controls that are otherwise reasonable.

Florida Draft SIP Feedback

Source Selection

- Best of the VISTAS states because Everglades NP is the cleanest.
- New NPS list of sources for Florida:

C.D. MCINTOSH, JR. POWER PLANT
MIAMI-DADE WATER AND SEWER DEPARTMENT
MOSAIC FERTILIZER LLC (New Wales)
MOSAIC FERTILIZER, LLC (Bartow)
TAMPA ELECTRIC COMPANY (TEC)

- All but one of these was selected (and screened) by Florida.
  - Question: Why was Miami-Dade Water and Sewer not tagged for PSAT modeling? This facility is 38km from Everglades NP.

Our analysis finds that, because Everglades NP is the least impacted NPS Class I area in VISTAS, Florida selected a reasonable set of sources to evaluate for reasonable progress as part of regional haze SIP development. By re-running the VISTAS AOI analysis and applying the absolute value threshold we identify the five sources listed above as relevant to Everglades NP.

We understand that the EGUs are meeting MATS standard SO_2 emissions rate limit of 0.2 lb/MMBtu and that the fertilizer plants have recently installed modern SO_2 controls in order to meet the NAAQS. This is allowable justification for screening from full four-factor analysis and we do not have any further comment on these sources for this planning period.

We are curious: Why was Miami-Dade Water and Sewer (38km from Everglades NP) not tagged for PSAT modeling? What can you tell us about emissions from that facility?

Florida shared that Miami-Dade Water and Sewer did not trigger the individual AoI contribution of ≥ 5% for nitrates or sulfates established as a threshold for PSAT modeling.

NPS recommends adding a reminder of this rationale to the footnote of Table 7-23 which identifies Miami-Dade Water and Sewer as among 12 facilities not tagged for PSAT modeling without further explanation.

Florida also shared that the AOI analysis likely overpredicted the importance of this facility given it's close proximity to the park (an observed issue with the AOI sources that were tagged). Further, they highlighted that in 2011 Miami-Dade Water and Sewer was using high sulfur content fuel and that current and future emissions are expected to be lower as that fuel is no longer available/used.

Again, our analysis **<u>only considered NPS Class I areas</u>**.

Florida Draft SIP Feedback

Exclusion of NO_x/Nitrate

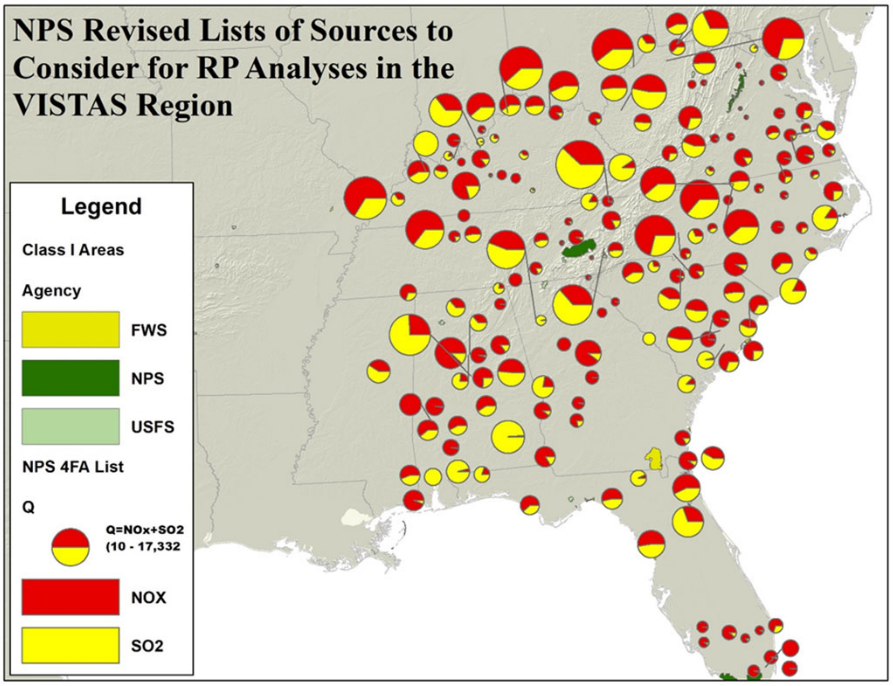
- In the specific case of Everglades NP, we agree that NO_x/Nitrate does not need to be a focus area for this planning period.
- Most of the SO_2 sources in southern Florida appear well controlled. Consider looking into NO_x control opportunities in the next round.

Visibility Benefit & URP Considerations

- We appreciate that Florida is not leaning on these considerations when making control determinations.

From 2014-2019 monitoring data from Everglades NP show that ammonium sulfate accounts for 60% of visibility impairing pollution on most impaired days and ammonium nitrate accounts for 9%. For this reason, we agree that it makes sense for Florida to focus on SO2 emission reduction to address reasonable progress for Everglades NP.

Florida did not rely on visibility benefit or URP considerations when making control determinations.



This map shows the most recent emissions inventory data (2020-CAMD/2017-NEI) for VISTAS sources identified by the earlier (2020) NPS Q/d methodology. Although we are now recommending VISTAS states consider alternate approaches to source selection, this map illustrates the current distribution and scale of NO_x and SO_2 stationary sources in the region.

For southern Florida, we observe that the point source emissions are relatively low and almost entirely NO_x. We recommend that Florida DEP consider opportunities to tackle these emission sources in the next planning period.

Given the lack of large SO_2 point sources in the area, where is all of the visibility impairing SO_2 coming from?

Florida DEP shared that emissions from marine vessels outside the North American Emission Control Area (ECA) are a likely source of SO_2 affecting visibility in Everglades NP. The ECA is quite narrow in the straights of Florida allowing higher sulfur emissions from international vessels closer to shore than is permissible for most of the US. Regulation of marine emissions is outside Florida jurisdiction.

NPS appreciates Florida DEPs commitment to exploring this issue and continuing to improve air quality and visibility in the region.

NPS produced map, April 2021

Florida Draft SIP Feedback

Additional Feedback

- Cost estimates for the pulp and paper four-factor analyses presented in the draft Florida SIP may be inflated by an unjustified interest rate. Even so, the costs to control emissions at those sources appear reasonable.
  - Many states are considering $5,000 to $7,000/ton reasonable in this round
  - Washington State has established a $6,300/ton threshold for pulp and paper sources
  - Oregon is applying a $10,000/ton threshold to pulp and paper sources.

While Florida pulp and paper emission sources are not likely to affect Everglades NP, we encourage Florida to conduct rigorous four factor analysis and to require all technically feasible and cost-effective controls in the interest of reducing haze in the region. By correcting the interest rate Florida may find the costs of these controls even more reasonable than presented in the draft SIP.

National Park Service RHR - Round 2

- Thank you for meeting with us!
- Please share:
  - Anticipated SIP schedule
  - How you will respond to NPS comments
- Please let us know:
  - When public comment period opens
  - If/when a public hearing will be held
- The NPS will:
  - Email call summary & any add'l information
    - By **June 1, 2021**
  - Share our comments with EPA Region 4

The NPS will submit an email summary of the May 17, 2021 consultation call along with final review comments by June 1, 2021

The NPS requested the state to notify all parties when the draft SIP will be open for public review and comment, and to alert the parties to any public hearing dates.

The Florida DEP agreed and confirmed NPS comments will be addressed in the public draft.

Please reach out to us with any questions and include the above list of NPS staff on any formal notifications of public documents.

NPS photo of Everglades NP, Mangroves

May 8, 2020

Via Federal Express and Email

Administrator Andrew Wheeler
Office of the Administrator
United States Environmental Protection Agency
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
Wheeler.andrew@epa.gov

Re: Petition for Reconsideration of Guidance on Regional Haze State Implementation Plans for the Second Implementation Period

Dear Administrator Wheeler:

I. Introduction

National Parks Conservation Association, Sierra Club, Natural Resources Defense Council, Western Environmental Law Center, Appalachian Mountain Club, Coalition to Protect America's National Parks, and Earthjustice (hereinafter "Conservation Organizations") hereby petition[1] the Administrator of the United States Environmental Protection Agency ("EPA") to reconsider the entitled "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period" (hereinafter "Final Guidance" or "Guidance")[2] and replace it with

[1] This Petition is filed pursuant to section 4(d) of the Administrative Procedure Act ("APA"), 5 U.S.C. § 553(e), and, to the extent it may be applicable and relevant, section 307(d)(7)(B) of the Clean Air Act, 42 U.S.C. § 7607(d)(7)(B).
[2] EPA issued the Final Guidance on August 20, 2019 via Memorandum from Peter Tsirigotis, Director at EPA Office of Air Quality Planning and Standards to EPA Air Division Directors.

guidance that comports with the Clean Air Act ("CAA") and the Regional Haze Rule, and aids states in making progress towards achieving the national goal of natural visibility conditions at all Class I areas.[3] The Final Guidance is a significant departure from the Draft Guidance[4] issued in 2016 for the second planning period and contains provisions that are expressly at odds with the Clean Air Act and Regional Haze Rule. The table below summarizes how key provisions of the Final Guidance should be revised to comply with the requirements of the applicable statutes and regulations.

The Guidance unlawfully directs states on how they may exclude certain emission sources from four-factor consideration and delay or altogether avoid reducing emissions necessary to meet Congress's mandate that the states make reasonable progress towards the national goal of restoring natural visibility to Class I area national parks and wilderness areas. 42 U.S.C. § 7491(b)(2). The Guidance not only conflicts with the text and purpose of the Clean Air Act and the Regional Haze Rule itself, but it conflicts with EPA's 2016 Draft Guidance by arbitrarily constraining EPA review authority, diminishing the science of regional haze, and recasting technical and analytical requirements for State Implementation Plans ("SIPs"). Implementation of the Final Guidance will result in inconsistencies between SIPs, create arbitrary exceptions allowing states to avoid controlling emission sources, impede progress toward the national goal of a restoring natural visibility, and may actually degrade visibility at some Class I areas.

Section of the Petition	Summary of Issue	Applicable Regional Haze Rule or other Regulations[5]
III.A.	States must comprehensively identify sources of human-caused visibility-impairing emissions across source categories and cannot arbitrarily defer some sources to another implementation period.	Section 51.308(f)(3)(ii) of the Regional Haze Rule and Clean Air Act section 169A(b)
III.B.	States have only limited discretion to decide which sources they consider for reasonable progress. SIPs will be found deficient where they fail to require emission reductions that collectively make reasonable progress towards natural visibility at all Class I areas in each planning period; no backsliding is permitted.	82 Fed. Reg. at 3,088 and sections 51.308(f)(2)(i), 51.308(f)(3)(ii)(A), 51.308(f)(3)(ii)(B)
III.C.	States cannot arbitrarily circumvent a four-factor analysis for sources that intend to retire.	Sections 51.308(f)(2)(i), 51.308(f)(2)(iv)(C)

[3] 42 U.S.C. §§ 7491, 7492; 82 Fed. Reg. 3078 (Jan. 10, 2017); 71 Fed. Reg. 60,612 (Oct.13, 2006); 70 Fed. Reg. 39,104 (July 6, 2005); 64 Fed. Reg. 35,714 (July 1, 1999).
[4] Draft Guidance on Progress Tracking Metrics, Long-term strategies, Reasonable Progress Goals and Other Requirements for Regional Haze State Implementation Plans for the Second Implementation Period, (hereinafter "Draft Guidance") 81 Fed. Reg. 44,608 (July 8, 2016).
[5] Clean Air Act section 110(k)(5) provides EPA the authority to review a SIP and assess the adequacy of that SIP. Therefore any aspect of this guidance that interferes with that authority is in conflict.

III.D.	States cannot consider being under the uniform rate of progress ("URP") when selecting sources for a four-factor analysis. The glidepath is not a safe harbor; rather a state must take measures necessary to make progress towards natural visibility at any Class I areas its emissions affect.	82 Fed. Reg. at 3,093
III.E.	Previous installation of certain types of controls does not excuse a state from considering more stringent levels of control.	Section 51.308(f)(2)(iv)(D)
III.G.	States must include both "dominant" and "non-dominant" pollutants in their analyses of controls.	82 Fed. Reg. at 3,088 and sections 51.308(f)(3)(ii)(A), 51.308(f)(3)(ii)((B), 51.308(f)(2)(i)
III.H.	States cannot eliminate volatile organic compounds ("VOCs") and ammonia emissions from consideration.	82 Fed. Reg. at 3,088 and sections 51.308(f)(3)(ii)(A), 51.308(f)(3)(ii)(B), 51.308(f)(2)(i)
IV.A.	States must use methods permitted by statute and regulation to identify its sources that potentially affect visibility at Class I areas in other states, not merely any "reasonable method."	82 Fed. Reg. at 3,094 and sections 51.308(f)(2)(i), 51.308(d)(3)(iv)
IV.B.	States must consider cumulative impacts of sources or groups of sources to all affected Class I areas.	Section 51.308(f)(2)(i)
V.A.	States must prioritize emissions within their borders to achieve reasonable progress.	Sections 51.308(f)(1)(vi)(B), 51.308(f)(2)(iv)(D), and Clean Air Act section 169A(b)
VI.B.	States must adhere to the accounting principles of the Control Cost Manual and should compile and make publicly available the documentation for generic cost estimates.	Section 51.308(f)(2)(i)
VII.A.	States cannot allow sources to discontinue the use of currently operating controls.	Section 51.308(f)(2) and Clean Air Act section 169A(b)(2)
VIII	States should use regional scale modeling to support their regional haze SIPs.	Section 51.308(f)(3)(ii)(A), Appendix W to Part 51
IX.A.	If a state's reasonable progress goal ("RPG") is above the URP, the state's "robust demonstration" must include a consideration of specific items identified by EPA.	Section 51.308(f)(3)(ii)
X.A.	States must submit to EPA the emission inventory used in a regional haze SIP.	Section 51.308(f)(2)(iii), Clean Air Act section

		110(k)(5), and EPA's Emission Inventory Guidance[6]
X.B.	States must ensure that Federal Land Managers' ("FLMs") opinions and concerns are made transparent to the public, considered by the state and addressed in the SIP.	Sections 51.308(i), 51.308(f)(4) and Clean Air Act sections 169A(a) and (d)
XI.B.	Decisions on which controls to require as part of the long-term strategy cannot merely ratify past determinations.	Section 51.308(f)(2)(i)
XI.C.	EPA must ensure that long-term strategies include appropriate measures to prevent future as well as remedy existing impairment of visibility.	Clean Air Act section 169A(a)

This Petition seeks reconsideration and substantial revision of the Final Guidance so that the Guidance will direct states to deliver on the statutory objective of preventing future and remedying existing Class I area visibility impairment that results from human-caused pollution. As issued, the Final Guidance conflicts with this statutory objective, previous rulemaking and guidance; misdirects states as to how they can go about complying with their legal obligations to make reasonable progress towards restoring natural visibility to protected public lands; and otherwise fails to set expectations that comport with legal requirements for the second planning period.

In addition to the provisions noted in the table above, the Conservation Organizations incorporate several recommendations from their Comments on EPA's Draft Guidance[7] and request that EPA reconsider and revise the Final Guidance to direct states with regard to the following issues:

- States should ensure that modeled emissions are tied to enforceable limits for sources with appropriate averaging times that reflect year-round abilities of existing controls or operation.
- Light extinction thresholds should be tailored to Class I areas and low enough to bring in most sources of visibility-impairing pollution.
- States should include all visibility-impairing pollutants when calculating a source's annual emissions.
- States should identify and consider the best available emission control measures in the four-factor reasonable progress analysis.

[6] EPA, Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (May 2017), https://www.epa.gov/sites/production/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf.
[7] Conservation Organizations incorporate by reference their full Comments on the 2016 proposed Draft Guidance.

- States should analyze the climate and environmental justice impacts of measures to achieve reasonable progress.

The gains made in the first regional haze planning period established a critical, if delayed, foundation for our national parks and wilderness areas to make progress towards the natural visibility which they and their visitors and neighboring communities are due. The Final Guidance not only hinders future gains but in some cases actually jeopardizes the gains made in the first planning period. Conservation Organizations urge EPA to reconsider its Final Guidance and instead issue a revised guidance that directs states to fulfill regulatory requirements for reasonable progress in the second planning period to help attain clearer skies at America's prized national parks and wildernesses.

II. SIP development steps

As EPA states in the Final Guidance, the key steps to developing a regional haze SIP start with identifying the twenty percent most anthropogenically impaired days and the twenty percent clearest days and determining baseline, current, and natural visibility conditions for each Class I area within the state, and then determining which Class I area(s) in other states may be affected by the state's own emissions.[8] States must then screen sources and conduct a four-factor analysis of which controls are required before establishing reasonable progress goals.[9] Once a state has determined the reasonable progress measures to require at specific sources, the state must quantify the "reasonable progress goal"—i.e., the visibility improvement that will result from implementing the controls merited by a four-factor analysis.[10] Additional steps include regional scale modeling of the long-term strategy to set the RPGs for 2028 and progress, degradation, and URP glidepath checks.[11]

Some of the most problematic provisions of the Final Guidance, which are contrary to several requirements of the Regional Haze Rule and Clean Air Act, involve the selection of sources for analysis. After discussing these provisions, this Petition discusses the determination of affected Class I areas in other states, ambient data analysis, the characterization of factors for emission control measures, decisions on what control measures are necessary to make reasonable progress, regional scale modeling of the long-term strategy to set the RPGs for 2028, progress, degradation, and URP glidepath checks, and additional requirements for regional haze SIPs. After addressing how these various provisions of the Guidance are contrary to the regulatory requirements, the Petition provides several overarching recommendations that EPA should consider when revising the Guidance, including advising states that in order for a SIP to be approvable it must result in measures to reduce visibility impairing pollution beyond those required from the past planning period and reflective of an adequate reasonable progress analysis.

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[8] Final Guidance at 5.
[9] *Id.*
[10] *Id.*
[11] *Id.* at 5-6.

III. Selection of sources for analysis

A. Selection of sources under section 51.308(f)(3)(ii)(A).

In the Final Guidance, EPA presents a statement at the beginning of the section II.B.3 that is in conflict with the Regional Haze Rule's requirements:

> A key flexibility of the regional haze program is that a state is not required to evaluate all sources of emissions in each implementation period. Instead, a state may reasonably select a set of sources for an analysis of control measures. . . . Accordingly, it is reasonable and permissible for a state to distribute its own analytical work, and the compliance expenditures of source owners, over time by addressing some sources in the second implementation period and other sources in later periods.[12]

This statement by EPA is contrary to the requirements in section 51.308(f)(3)(ii) of the Regional Haze Rule and section 169A(b) of the Clean Air Act.

In a footnote, EPA indicates that "analysis of control measures" refers to an analysis of what emission control measures for a particular source are necessary in order to make reasonable progress and must include consideration of the four statutory factors and consideration of the five additional factors listed in 40 C.F.R. § 51.308(f)(2)(iv).[13] This important requirement of how sources should be selected by states for analyses is presented as if it were a secondary consideration. In other words, EPA's Guidance now advises states that they can arbitrarily delay the selection of sources for evaluation, or exclude certain sources as noted *infra*, and thereby "distribute [their] analytical work" and the "compliance expenditures of source owners" as if it is a stand-alone, top-level decision that states can make, divorced of the need to apply the four statutory factors and the five additional factors to actually make reasonable progress.

If a state were to arbitrarily "distribute its own analytical work, and the compliance expenditures of source owners, over time"[14] as the guidance provides, it would not be able to address section 51.308(f)(3)(ii)(B), which requires:

> If a State contains sources which are reasonably anticipated to contribute to visibility impairment in a mandatory Class I Federal area in another State for which a demonstration by the other State is required under (f)(3)(ii)(A), the State must demonstrate that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area that would be reasonable to

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[12] *Id.* at 9.
[13] *Id.* at 9 n.22.
[14] *Id.* at 9.

> include in its own long-term strategy. The State must provide a robust demonstration, including documenting the criteria used to determine which sources or groups or sources were evaluated and how the four factors required by paragraph (f)(2)(i) were taken into consideration in selecting the measures for inclusion in its long-term strategy.

A state that arbitrarily excludes sources from consideration cannot determine if it actually has "sources which are reasonably anticipated to contribute to visibility impairment in a mandatory Class I Federal area." To satisfy that requirement, a state must first have a reasonable understanding of the emissions from all of its sources and it must have a reasoned methodology for excluding sources from a four-factor analysis (e.g., those sources are inconsequential or do not have cost-effective control options). Similarly, if a state, which arbitrarily excludes sources from evaluation, has a RPG that is above the URP, it cannot satisfy section 51.308(f)(3)(ii)(A)[15], which requires that it demonstrate "there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area that would be reasonable to include in the long-term strategy." In contrast, not only was this advice absent from EPA's Draft Guidance, the Draft Guidance provided detailed, valid information on source selection.[16]

Additionally, as mentioned *infra* section IV.A, the Final Guidance also arbitrarily allows states to decide whether they contribute to out-of-state Class I areas by claiming states can use any reasonable method for quantifying the impacts of its own emissions on out-of-state Class I areas.[17] The Final Guidance also allows a state to disregard its impacts on an out-of-state Class I area that a neighboring state may identify as being affected by emissions from the state developing the long-term strategy.[18] By allowing states to arbitrarily make these determinations, EPA is attempting to slice the program into inconsequential bits and pieces that set the

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[15] EPA noted in the 2017 Regional Haze Rule revision:

[I]n a situation where the RPG for the most impaired days is set above the glidepath, a contributing state must make the same demonstration with respect to its own long-term strategy that is required of the state containing the Class I area, namely that there are no other measures needed to provide for reasonable progress. The intent of this proposal was to ensure that states perform rigorous analyses, and adopt measures necessary for reasonable progress, with respect to Class I areas that their sources contribute to, regardless of whether such areas are located within their borders.

82 Fed. Reg. at 3099. *See also* 81 Fed. Reg. 66,331, 66,631 (Sept. 27, 2016) ("[A]n evaluation of the four statutory factors is required . . . regardless of the Class I area's position on the glidepath. . . . [T]he URP does not establish a 'safe harbor' for the state in setting its progress goals."); 81 Fed. Reg. 295, 326 (Jan. 5, 2016) ("[T]he uniform rate of progress is not a 'safe harbor' under the Regional Haze Rule"); EPA, Guidance for Setting Reasonable Progress Goals under the Regional Haze Program (hereinafter "RPGs Guidance") (June 2007) 4–1, https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf.

[16] Draft Guidance at 57-83.

[17] Final Guidance at 8.

[18] *Id.* at 9.

provisions of the Final Guidance against fulfilling the requirements of the Clean Air Act and Regional Haze Rule that compel a comprehensive "regional" approach to restoring visibility. EPA should strike the above-mentioned language discussing selection of sources under section 51.308(f)(3)(ii)(A) from the Final Guidance and restore the language from the Draft Guidance.

B. States have only limited discretion to decide which sources they consider for reasonable progress.

In Section II.B.3.d of the Final Guidance, EPA states, "[t]he source-selection step is intended to add flexibility and discretion to the state planning process – ultimately, the state decides which sources to consider for reasonable progress."[19] This blanket statement, written as if a state has unbounded discretion to determine which sources it evaluates under reasonable progress, is incorrect. A state cannot arbitrarily determine which sources it evaluates under the Regional Haze Rule's reasonable progress requirements. Ultimately, a state's source selection criteria is a part of its long-term strategy. As EPA indicated in the Regional Haze Rule revision, a state does not have discretion to arbitrarily exclude sources from a four-factor analysis. Specifically, EPA stated:

> [W]e expect states to exercise reasoned judgment when choosing which sources, groups of sources or source categories to analyze. Consistent with CAA section 169A(g)(1) and our action on the Texas SIP, a state's reasonable progress analysis must consider a meaningful set of sources and controls that impact visibility. If a state's analysis fails to do so, for example, by arbitrarily including costly controls at sources that do not meaningfully impact visibility or failing to include cost-effective controls at sources with significant visibility impacts, then the EPA has the authority to disapprove the state's unreasoned analysis and promulgate a [Federal Implementation Plans ("FIPs")]. [20]

A state with a RPG below the URP that followed this guidance and arbitrarily excluded sources from a four-factor analysis runs afoul of section 51.308(f)(3)(ii)(A), which requires a "robust demonstration" that "there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area that would be reasonable to include in the long-term strategy." If a state that followed this guidance had emission sources that potentially affect visibility at a Class I area in another state, it would similarly be unable to satisfy the same requirement found in section 51.308(f)(3)(ii)(B). EPA should reconsider this provision, and delete it from the Final Guidance.

C. States cannot arbitrarily circumvent a four-factor analysis for sources that intend to retire.

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[19] Final Guidance at 20.
[20] 82 Fed. Reg. at 3088.

In Section II.B.3.d of the Final Guidance, EPA also states "[i]f a source is expected to close by December 31, 2028, under an enforceable requirement, a state may consider that to be sufficient reason to not select the source at the source selection step."[21] EPA goes on to extend this deadline by adding an indeterminate grace period: "The year 2028 is not a bright line for these considerations, so a state may be able to justify not selecting a source for analysis of control measures because there is an enforceable requirement for the source to cease operation by a date after 2028."[22] EPA further advises states that consideration of source retirement and replacement schedules required by Section 51.308(f)(2)(iv)(C) are automatically considered if a state decides to not subject sources which will retire by 2028 to a four-factor analysis.[23]

This is a departure from EPA's long-standing requirement in the regional haze program and is in conflict with basic requirements of the Regional Haze Rule. Remaining useful life is one of the four statutory factors that a state must consider when selecting the sources for which it will determine what control measures are necessary to make reasonable progress.[24]

The Clean Air Act does not define the phrase "remaining useful life." However, EPA, in regulations and guidance, has clarified the meaning of the phrase. EPA has consistently stated that the potential retirement of a facility can be used to shorten a source's remaining useful life only if the retirement is federally enforceable.[25] Thus, in order to affect the remaining useful life, a retirement commitment must be included in a pre-existing document that can be enforced in federal court, such as a consent decree entered by a federal court, or a state must incorporate the retirement date into its SIP. If a potential retirement is not federally enforceable, it cannot be relied upon to shorten the remaining useful life of a source.

EPA's 2007 Guidance on reasonable progress incorporates and refers to the best available retrofit technology ("BART") Guidelines,[26] which instruct states on how to calculate the remaining useful life of a source. EPA defines a source's "remaining useful life" as the difference between the date that controls would be installed and "the date the facility permanently stops

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[21] Final Guidance at 20.
[22] *Id.*
[23] *Id.* at 22.
[24] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("[A]n agency rule would be arbitrary and capricious if the agency has . . . entirely failed to consider an important aspect of the problem."); *Pub. Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1216 (D.C. Cir. 2004) ("A statutorily mandated factor, by definition, is an important aspect of any issue before an administrative agency, as it is for Congress in the first instance to define the appropriate scope of an agency's mission.").
[25] *E.g.*, 83 Fed. Reg. 62,204, 62,232 (Nov. 30, 2018) ("We are proposing to agree with Arkansas' cost analysis for dry scrubbers and switching to low sulfur coal for Independence Units 1 and 2, and with the state's decision to assume a 30-year capital cost recovery period in the cost analysis. It is appropriate to assume a 30-year capital cost recovery period in the cost analysis since Entergy's plans to cease coal combustion at the Independence facility are not state or federally-enforceable."); 83 Fed. Reg. 43,586, 43,604 (Aug. 27, 2018) (Considering the retirement of certain units where there was evidence that the units had actually been retired at the time of the rulemaking and that the plant had requested cancellation of its air permit).
[26] RPGs Guidance at 5-3. There is no conflict with the 2007 Guidance's interpretation of "remaining useful life" and the Final Guidance. *See* Final Guidance at 34.

operations."[27] If the remaining useful life affects the selection of controls, "this date should be assured by a federally- or State-enforceable restriction preventing further operation."[28] EPA discusses a situation where a source "intends to shut down a source by a given date, but wishes to retain the flexibility to continue operating beyond that date in the event."[29] In that instance, EPA instructs a state to include in its SIP the controls that would be required if the source continues to operate past the planned retirement date.[30] "The source would not be allowed to operate after the 5–year mark without such controls."[31]

Allowing states to avoid a four-factor analysis based on alleged intent to retire would render the other statutory factors meaningless and violate the requirements of the Regional Haze Rule.[32] Many states have already begun analyzing their sources to determine which should be brought forward for a four-factor analysis. Consequently, a source that retires by December 31, 2028 (or later), has at least eight years of potential emission reductions. Even considering this shortened remaining useful life, cost-effective controls, which often can be installed in months, can frequently be justified. For instance, a source could simply switch to a lower sulfur content coal or fuel oil, which would require little to no installation time and may be quite cost-effective. Despite EPA's advice, any source that demonstrably or potentially impacts visibility at a Class I area and would otherwise be subject to a four-factor analysis under section 51.308(f)(2)(i), regardless of its retirement date, must undergo a real analysis to determine if cost-effective controls are available.[33] EPA should revise the Final Guidance to reiterate that only enforceable retirements may alter the remaining useful life and otherwise require that states subject sources that intend to retire to a four-factor analysis if a state selects the source for analysis of emission control measures.

D. States cannot consider being under the URP when selecting sources for a four-factor analysis.

In Section II.B.3.e of the Final Guidance, EPA makes two flawed statements regarding a state's RPG that were not present in the Draft Guidance. First, EPA states "[t]he fact that visibility conditions in 2028 will be on or below the URP glidepath is not a sufficient basis by itself for a state to select no sources for analysis of control measures; however, the state may

[27] 40 C.F.R. pt. 51, App. Y § (IV)(D)(4)(k)(2).
[28] *Id.*
[29] *Id.* § (IV)(D)(4)(k)(3).
[30] *Id.*
[31] *Id.*
[32] The United States Court of Appeals for the Fifth Circuit recently found that EPA must consider statutory factors listed in a similar provision of the Clean Water Act when revising best available technology ("BAT") limits. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d 999, 1026-27 (5th Cir. 2019).
[33] EPA's draft guidance also allowed for states to forgo a four-factor analysis on sources secured by an enforceable commitment to retire by 2028. We disagree with that position for the reason expressed above. However, EPA tempered its reasoning in its draft guidance by stating that its position rested on the fact that due to the shortened second planning period (unlike future planning periods), there would be a shorter interval for states to install controls. Also, EPA did not state that states could extend source retirements beyond 2028 as it does in the final guidance.

consider this information when selecting sources."[34] EPA then cites to the 2017 Regional Haze Rule revisions; however, those citations make it absolutely clear that states cannot in fact follow this guidance:

> We disagree that the states should be able to reevaluate whether a control measure is necessary to make reasonable progress based on the RPGs. The CAA requires states to determine what emission limitations, compliance schedules and other measures are necessary to make reasonable progress by considering the four factors. The CAA does not provide that states may then reject some control measures already determined to be reasonable if, in the aggregate, the controls are projected to result in too much or too little progress. [35]

Consequently, states have no path available to them to "consider this information when selecting sources."

Similarly, EPA's later advice that "[r]ather, that fact [that a state's RPG is below the URP] would serve to demonstrate that, after a state has gone through its source selection and control measure analysis, it has no 'robust demonstration' obligation per 40 CFR 51.308(f)(3)(ii)(A) and/or (B)"[36] is potentially at odds with the Regional Haze Rule. In the above cited portion of the 2017 Regional Haze Rule revision, EPA actually stated, "if a state has reasonably selected a set of sources for analysis and has reasonably considered the four factors in determining what additional control measures are necessary to make reasonable progress, then the state's analytical obligations are complete if the resulting RPG for the most impaired days is below the URP line."[37] A state's "robust demonstration" obligation does not end because it has merely "gone through its source selection and control measure analysis." Rather, as EPA actually explained, the state must have "reasonably selected a set of sources for analysis and has reasonably considered the four factors in determining what additional control measures are necessary to make reasonable progress." [38] EPA must reconsider this provision, and delete it from the Final Guidance.

E. Previous installation of certain types of controls does not excuse a state from considering more stringent levels of control.

In section II.B.3.f of the Final Guidance, EPA discusses circumstances under which a state can choose not to select a source that has previously installed controls for a four-factor analysis.[39] Much of this information conflicts with previous guidance and the Regional Haze

[34] Final Guidance at 22.
[35] 82 Fed. Reg. at 3093. *See also* 81 Fed. Reg. at 66,631; 81 Fed. Reg. at 326; RPGs Guidance at 4-1.
[36] Final Guidance at 22.
[37] 82 Fed. Reg. at 3093.
[38] *Id.*
[39] *Id.* In comparison to the blanket exemptions in EPA's Final Guidance, the Draft Guidance only considered exempting power plant units, "in certain limited situations," with "highly effective control technology within the 5 years prior to submission of the SIP, such as year-round operation of flue gas desulfurization (FGD) with an

Rule. First, EPA states, "[i]n general, if post-combustion controls were selected and installed fairly recently . . . to meet a [Clean Air Act] requirement, there will be only a low likelihood of a significant technological advancement that could provide further reasonable emission reductions having been made in the intervening period."[40] EPA presents no basis for making this conclusion.

There are many instances in which post-combustion controls have been installed in which those controls do not operate at peak efficiency. This includes controls that are not operated continuously, controls that were never designed to operate at peak efficiency (e.g., undersized sulfur dioxide ("SO_2") scrubber or selective catalytic reduction ("SCR") systems) and partially bypassed controls (e.g., SO_2 scrubber or SCR systems). In fact, EPA has made it a point in past actions to ensure that existing controls are examined to determine if they can be cost-effectively upgraded. For instance, the 2005 BART revision to the Regional Haze Rule devotes several paragraphs to specific potential scrubber upgrades it recommends be examined.[41]

EPA also demonstrated that scrubber upgrades to a number of coal-fired power plants utilizing outdated and inefficient scrubber systems were highly cost-effective, and could achieve removal efficiencies of ninety-five percent which is near the ninety-eight to ninety-nine percent removal efficiencies of newly-installed scrubber systems.[42] In fact, as EPA notes in its 2017 Regional Haze Rule revision, EPA disapproved Texas' four-factor analysis in part because "it did not include scrubber upgrades that would achieve highly cost-effective emission reductions that would lead to significant visibility improvements."[43] Consequently, EPA's blanket guidance that examination of potential upgrades to recently installed post-combustion controls is unlikely necessary is demonstrably false. Even if, considering the entire universe of potential post-combustion control upgrades, the vast majority cannot be cost-effectively upgraded to result in significant visibility benefits, which is unlikely, there is no justification in the Regional Haze Rule to skip an examination of the remaining units.

EPA goes on to present examples of pollutant-specific controls that have been installed due to a requirement outside of the regional haze program for which it "believes it may be reasonable for a state not to select a particular source for further analysis."[44] This list includes new source performance standard ("NSPS") controls installed since July 31, 2013; best available control technology ("BACT") or lowest achievable emission rate ("LAER") controls installed since July 31, 2013; power plants with FGD controls that meet the 2012 model attainment test systems ("MATS") standard; particulate matter ("PM") controls under National Emission

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effectiveness of at least 90 percent or year-round operation of selective catalytic reduction with an effectiveness of at least 90 percent." EPA specifically requested comment "on whether to include this additional screening mechanism and if so, then what criteria may be appropriate for its inclusion."

[40] *Id.*

[41] *See* 70 Fed. Reg. 39,103, 39,171 (July 6, 2005).

[42] *See* 81 Fed. Reg. at 305.

[43] *See* 82 Fed. Reg. at 3088.

[44] Final Guidance at 23.

Standards for Hazardous Air Pollutants ("NESHAP") since July 31, 2013; boilers that have installed an FGD or SCR system that operates year round and has a total efficiency of ninety percent; and any BART-eligible unit that has installed BART controls.[45] EPA reasons that due to their recent installation and the similarity of the requirements for those programs, it is unlikely that a four-factor analysis will result in additional cost-effective controls.[46] But, as EPA notes in its 2005 BART revision to the Regional Haze Rule, it reviewed some of these standards and concluded they may not be the most stringent available.[47] Furthermore, the 2017 revision to the Regional Haze Rule warned states that "we anticipate that a number of BART-eligible sources that installed only moderately effective controls (or no controls at all) *will need to be reassessed*. Under the 1999 [Regional Haze Rule and] 40 CFR 51.308(e)(5), BART-eligible sources are subject to the requirements of 40 CFR 51.308(d), which addresses regional haze SIP requirements for the first implementation period, in the same manner as other sources going forward."[48] This is in contrast to EPA's Final Guidance statement that "if a source installed and is currently operating controls to meet BART emission limits, it may be unlikely that there will be further available reasonable controls for such sources."[49] Therefore, a state must first subject a source to a four-factor analysis under section 51.308(f)(2)(i) before it is able to determine whether there are no emission reducing options available (including upgrades to existing controls).

Regarding which control measures states should consider in assessing reasonable progress, EPA states "there is no statutory or regulatory requirement to consider all technically feasible measures or any particular measures. A range of technically feasible measures available to reduce emissions would be one way to justify a reasonable set."[50] This conflicts with past guidance and with the Regional Haze Rule. Although there is no requirement that controls required under the reasonable progress requirements of the Regional Haze Rule uniformly be the most stringent available, not considering this level of control bypasses section 51.308(f)(2)(i), which requires that the state perform a four-factor analysis. A state cannot consider "the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment" unless it considers all feasible controls available, including upgrades to existing controls.

EPA acknowledged that a range of controls should be evaluated in a four-factor analysis in its Draft Guidance:

> In order to define a control measure with sufficient specificity to assess its cost and potential for emission reductions, the state should specify and consider the range of control efficiencies that the measure is capable of achieving. For example, when

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[45] *Id.* at 23-25.
[46] *Id.* at 25.
[47] *See* 70 Fed. Reg. at 39,163-64.
[48] 82 Fed. Reg. at 3083 (emphasis added).
[49] Final Guidance at 25.
[50] *Id.* at 29.

> evaluating a flue gas desulfurization system to reduce SO_2 emissions, the state should consider both a system capable of achieving a 90 percent reduction in SO_2 emissions as well as a more advanced system capable of achieving a 97 or 98 percent reduction. The state should not limit its analysis to either an unrealistically high and prohibitively expensive control efficiency or to a control efficiency that is substantially lower than has been achieved at other sources.[51]

Furthermore, EPA does not require that states secure the operation of controls with this level of efficiency through an enforceable commitment.

Just because a source has the most effective or highly effective control technology does not mean that it is required to be operated to a level reflective of its maximum pollution reduction capability. Thus, states should not be screening such sources out of review during the second implementation period. By allowing states to "screen out" and choose not to select such sources for a full four-factor analysis, EPA may be allowing states to ignore very cost-effective emission reducing options like simply requiring sources with highly effective controls to operate those controls in the most effective manner to reduce air pollutants. EPA should revise the Final Guidance to recommend that sources with existing pollution control technology evaluate options that could improve the emissions reduced through more effective use of that control technology. This could include requiring year-round operation of controls, reducing capacity, imposing more effective percent reduction requirements, requiring sources to meet more stringent emission limits, or requiring that emission limits apply on shorter averaging times to ensure continuous levels of emission reduction.

F. States should ensure that modeled emissions are tied to enforceable limits for sources with appropriate averaging times that reflect year-round abilities of existing controls or operation.

EPA should revise the Final Guidance to recommend that wherever possible, whether they are screened in or out, states should make sure that the emissions relied upon in the state's RPG demonstration are enforceable, and also that they reflect the lowest emission rates feasible at the facility given its existing configuration. This is particularly true for major sources that are screened out on the basis of emissions that reflect unenforceable conditions.

However, this is also true for sources that are screened out on the basis of emissions that do not reflect their full capacity for emission reductions. For example, if a source is screened out with emissions that reflect using its controls only seventy-five percent of the time, the state should nevertheless require year-round operation of the control. Requirements reflecting existing capacity for emission reductions are inherently reasonable, and represent low hanging fruit necessitating reduced resource expenditure for potentially large gain. Moreover, states routinely rely on actual emissions in assessing current visibility and using that assessment as a jumping off point to determine if additional reductions are necessary. Where a state is to rely on operational

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[51] Draft Guidance at 87.

realities, such reliance must be justified by enforceable emission limits. Indeed, failing to take advantage of such reasonable progress measures is an example of one of the pitfalls of using this type of a screening process in the first place. EPA should recommend that states assure reasonable progress by requiring that sources have enforceable limits or conditions reflecting their full emission reduction capacity if they are to be screened out.

G. States must include both "dominant" and "non-dominant" pollutants in their analyses of controls.

In Section II.B.3.a of the Final Guidance, EPA advises states that they can skip analyses of controls for sources with "non-dominant" pollutants. Specifically, EPA states:

> When selecting sources for analysis of control measures, a state may focus on the PM species that dominate visibility impairment at the Class I areas affected by emissions from the state and then select only sources with emissions of those dominant pollutants and their precursors. Also, it may be reasonable for a state to not consider measures for control of the remaining pollutants from sources that have been selected on the basis of their emissions of the dominant pollutants.[52]

This position, absent from the Draft Guidance, directs states to produce deficient regional haze SIPs and is in conflict with the Regional Haze Rule's requirements and preamble language in the 2017 Regional Haze Rule revision.

The preamble specifically states that a "reasonable progress analysis must consider a meaningful set of sources and controls that impact visibility. If a state's analysis fails to do so, for example, by . . . *failing to include cost-effective controls at sources with significant visibility impacts*, then the EPA has the authority to disapprove the state's unreasoned analysis and promulgate a FIP.[53] This provision in the Guidance would allow states to arbitrarily determine that because one pollutant has a greater impact on visibility at a Class I area(s), the state may simply ignore other visibility impacting pollutants for one or all sources in the state emitting the non-dominant pollutants, despite the availability of cost-effective controls under reasonable progress criteria. It would also allow states to conclude that when examining a source that emits multiple pollutants that contribute to haze (e.g., SO_2, Nitrogen Oxide ("NOx")), potential reductions for the non-dominant pollutant can be summarily ignored. Furthermore, EPA does not provide any metric for what it considers a "dominant" pollutant.[54] For instance, if a state has determined that fifty-one percent of the visibility impact at a Class I area is due to SO_2, forty

[52] Final Guidance at 11.
[53] 82 Fed. Reg. at 3088. EPA states elsewhere in its 2017 Regional Haze Rule revision, that "A state may refer to its own experience, past EPA actions, the preamble to this rule as proposed and this final rule preamble, and existing guidance documents for direction on what constitutes a reasoned determination." 82 Fed. Reg. at 3099.
[54] Merriam-Webster defines dominant as "(a) commanding, controlling, or prevailing over all others," or as "(b) very important, powerful, or successful."

percent is due to NOx, and nine percent is due to PM, would SO_2 be considered dominant (and consequently the only analyzed pollutant), or must its share of the visibility impact be greater?

This provision in the Final Guidance has potentially far-reaching negative impacts on the Regional Haze Rule's requirements that states make reasonable progress, as many large sources emit multiple types of visibility impacting pollutants. Still other sources may emit significant levels of non-dominant emissions for which emission reducing control or measures may be well within the framework of the four-factor analysis. If this is not corrected, a state could assume it would be justified in concluding that state-wide, SO_2 is its "dominant" pollutant and forego control analysis of a large gas-fired power plant emitting thousands of tons of NOx which could also significantly impact visibility at one or more Class I areas.

The Final Guidance also directly conflicts with multiple sections of the Regional Haze Rule. For instance, a state following the guidance would not be able to determine if it was even subject to section 51.308(f)(3)(ii)(B), because by arbitrarily excluding pollutants or entire sources from review it could not determine if it "reasonably [was] anticipated to contribute to visibility impairment in a mandatory Class I Federal area in another State." Nor could that state "demonstrate that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area." Similarly, if that state's RPG was above its URP, it could not satisfy section 51.308(f)(3)(ii)(A), which requires the same demonstration. Such a state would also not be able to reasonably satisfy its state-to-state consultation requirements under section 51.308(f)(2)(i), which requires it to "evaluate and determine the emission reduction measures that are necessary to make reasonable progress" and "include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy." By severely compromising the entire foundation of a state's technical demonstration, EPA is directing states to submit deficient SIPs. For these reasons, EPA should delete the above-quoted language from the Final Guidance.

H. States cannot eliminate VOCs and ammonia emissions from consideration.

In Section II.B.3.a. of the Final Guidance, EPA also advises states that irrespective of their particular state emissions inventories or the acknowledged potential impacts of VOCs and ammonia on Class I areas, they can completely disregard these pollutants. Specifically, EPA states:

> In the first implementation period, many states eliminated VOC and ammonia emissions from consideration based on the expectation that anthropogenic VOC emissions make only a small contribution to visibility impairment and that formation of nitrate and sulfate PM is most effectively reduced by reducing emissions of NOx and SO_2 rather than by anthropogenic emissions of ammonia. EPA believes that, in general, this

> would also be a reasonable approach for the second implementation period.[55]

This position is completely absent from EPA's regulations and was not present in the Draft Guidance.

VOCs are organic chemicals emitted by products or industrial processes that when released into the atmosphere can react with sunlight and NOx to form tropospheric ("ground-level") ozone. In addition, VOCs are important precursor of Secondary Aerosol Formation ("SOA"). SOA comprises a large fraction of atmospheric aerosol mass and can have significant effects on atmospheric chemistry, visibility, human health, and climate.[56] A major source of VOCs in the United States is the oil and gas industry, which includes wells, gas gatherings and processing facilities, storage, and transmission and distribution pipelines. According to data from EPA and the Energy Information Agency ("EIA"), more than 20 million tons of VOCs are emitted from point and non-point sources in the oil and gas industry every year. Studies on oil and gas emissions have indicated that VOC source signatures associated with oil and gas operations can be clearly differentiated from urban sources dominated by vehicular exhaust emissions.[57][58] According to a recent air quality study by the National Park Service ("NPS") in Carlsbad Caverns National Park, high levels of light alkanes such as ethane, propane, butane, and, pentane compounds were consistent with oil and gas emissions. However, high alkanes ("$>C_8$") and aromatics are assumed to contribute more significantly to SOA formation.[59]

In California alone, statewide agricultural operations produce an average of 272.12 tons per day ("tpd") of ammonia ("NH_3") emissions.[60] Of those 272.12 tpd, 158.50 tpd is attributed to "agricultural waste" specifically from dairy cattle.[61] In regions such as California's heavily polluted San Joaquin Valley, ammonia concentrations are found to be much higher than NOx

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[55] Final Guidance at 12.
[56] Ziemann, Paul J., & R. Atkinson, *Kinetics, products, and mechanisms of secondary organic aerosol formation*, 41, no. 19 Chem. Soc'y Reviews 6582, 6582 (2012).
[57] *See* Odum J.R., T. Hoffmann, F. Bowman, D. Collins, R.C. Flagan, & J.H. Seinfeld, *Gas/Particle Partitioning and Secondary Organic Aerosol Yields*, 30 Environ. Sci. Technol., 2580, 2580-2585 (1996).
[58] *See* Swarthout, R. F., Russo, R. S., Zhou, Y., Hart, A. H., and Sive, B. C., *Volatile organic compound distributions during the NACHTT campaign at the Boulder Atmospheric Observatory: Influence of urban and natural gas sources*, J. Geophys. Res. Atmos., 118, 10,614–10,637, (2013), *available at* https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/jgrd.50722.
[59] Ziemann, *supra* note 56, at 6583; *see also* Takekawa, Hideto, Hiroaki Minoura, and Satoshi Yamazaki, *Temperature dependence of secondary organic aerosol formation by photo-oxidation of hydrocarbons*, Atmospheric Environment 37, no. 24, 3413-3424 (2003).
[60] California Air Resources Board, 2016 SIP Emission Almanac Projection Data by EIC: Annual Average Emissions (Tons/Day) Statewide, Miscellaneous Processes 620-Farming Operations, https://www.arb.ca.gov/app/emsinv/2017/emseic_query.php?F_YR=2012&F_DIV=-4&F_SEASON=A&SP=SIP105ADJ&SPN=SIP105ADJ&F_AREA=CA&F_EICSUM=620.
[61] *Id.*

concentrations.[62] When mixed with the region's NOx emissions (primarily from mobile sources), this excess ammonia helps form high levels of haze causing ammonium nitrate, which accounts for the majority of PM2.5 emissions found in the San Joaquin Valley.[63]

The San Joaquin Valley is home to multiple communities such as Bakersfield, Fresno, and Visalia that rank amongst the very topmost polluted cities for both annual and twenty-four hour PM2.5 pollution. [64] The entire air basin is also listed as being in extreme nonattainment with the 1997 and 2006 PM2.5 NAAQS standards.[65] As it relates to regional haze pollution, the San Joaquin Valley is located directly adjacent to the Southern Sierra Nevada Mountains, home to heavily polluted Class 1 areas like Sequoia and Kings Canyon National Parks—both of which fall within the jurisdiction of the San Joaquin Valley Air District.

Despite ammonia being a major precursor to PM2.5 pollution in the region, its emissions are currently not controlled in the San Joaquin Valley under the state's various PM2.5 SIPs.[66] Beyond ammonia, agricultural sources in California also produce and average of 145.90 tpd of direct PM10 and 21.79 tpd of direct PM2.5 emissions.[67]

In its 2005 BART amendments to the Regional Haze Rule, EPA left it to the states to individually determine if these two pollutants, which EPA acknowledges can potentially impact visibility, should be addressed.[68] In the Draft Guidance, EPA acknowledged that much of its guidance on BART remained applicable to the second round of SIPs and included an entire appendix devoted to identifying which portions of the BART guidance remained applicable.[69] This appendix has been deleted in EPA's Final Guidance. By arbitrarily excluding potential visibility-impairing pollutants from review, EPA's guidance conflicts with the same sections of the Regional Haze Rule as described *supra* section III.G, primarily preamble language to the 2017 Regional Haze Rule revision and sections 51.308((f)(3)(ii)(A), 51.308((f)(3)(ii)(B), and 51.308(f)(2)(i). EPA should revise the Final Guidance to direct states to inventory and evaluate potential visibility-impairing pollutants including VOCs and ammonia and determine associated control measures necessary to make reasonable progress. .

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[62] San Joaquin Valley Air Pollution Control District, 2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards, at 5-6, http://valleyair.org/pmplans/documents/2018/pm-plan-adopted/2018-Plan-for-the-1997-2006-and-2012-PM2.5-Standards.pdf.
[63] *Id.* at 3-12.
[64] American Lung Association, 2019 State of the Air Report: Most Polluted Cities Ranking, https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/most-polluted-cities.html.
[65] San Joaquin Valley Air Pollution Control District, *supra* note 62, at ES-8.
[66] *See generally, id.* at 4-1 through 4-34.
[67] *See* California Air Resources Board, *supra* note 60.
[68] *See* 70 Fed. Reg. 39,104, 39,112-14 (July 6, 2005). EPA stated that scientific and technical data shows "that ammonia in the atmosphere can be a precursor to the formation of particles such as ammonium sulfate and ammonium nitrate . . . [and] certain aromatic VOC emissions such as toluene, xylene, and trimethyl-benzene are precursors to the formation of secondary organic aerosol." *Id.* at 39,114.
[69] Draft Guidance at Appendix D.

I. Light extinction thresholds should be tailored to Class I areas and low enough to bring in most sources of visibility-impairing pollution.

States choosing light extinction as a metric for visibility impacts should use Class I-specific figures to identify sources for a four-factor analysis. If a threshold is applied, states must ensure that the threshold is low enough to bring in most sources harming a Class I area. In the Final Guidance, EPA recommends visibility metrics and thresholds in terms of inverse megameters of light extinction.[70] Although light extinction may be acceptable as a metric, states should not use a generic extinction threshold for selecting sources for consideration of pollution controls for each of the Class I areas evaluated in their regional haze SIPs. If a light extinction threshold is too high, it can significantly limit the amount of sources a state evaluates for controls to make reasonable progress.

States must make clear how each source's visibility impacts are to be determined. States must explain whether the sources' potential emissions were modeled, what visibility-impairing pollutants were modeled for each source, whether all units were modeled for all sources, whether sources were modeled for impacts on the twenty percent worst days or some other timeframe, and identify and allow public review of and comment on the technical approach that the state employed to determine source-specific visibility extinction, pursuant to 40 C.F.R. § 51.308(f)(2). Any proposed extinction threshold for defining sources to target for controls is only as good as the underlying technical analysis to define if a source exceeds the extinction threshold. States must address these requirements and justify any and all extinction thresholds that they rely on for each Class I area impacted by states' sources.

For any souces that exceed an extinction threshold but are not subject to reduction requirements, states should provide a thorough four-factor analysis of controls or provide justification as to why a four-factor analysis would not likely lead to a determination that additional controls are needed to make reasonable progress. For any sources that a state claims already has adequate controls or justifies for other reasons that a four-factor analysis of controls would not result in additional controls, the state must document in its regional haze SIP why it makes this finding. To the extent such justification is relying on other regulatory or permit requirements, the state must document those regulatory or permit requirements in detail and indicate whether such requirements are already or will be submitted to EPA as part of the SIP

J. State's using the Q/d metric should include all visibility-impairing pollutants when calculating a source's annual emissions.

In Section II.B.3.b of the Final Guidance, EPA discusses the use of a source's annual emissions in tons divided by distance in kilometers between the source and the nearest Class I area (often referred to as Q/d) as a surrogate for source visibility impacts, along with a reasonably selected threshold for this metric.[71] As EPA notes, although Q/d is the least

[70] Final Guidance at 19.
[71] Final Guidance at 13.

complicated technique, it should "be limited to source selection for the purpose of developing a list of sources for which a state may conduct a four-factor analysis" because the metric is a less reliable indicator of actual visibility impact.[72]

EPA should revise the Final Guidance to require states using the Q/d metric to include all visibility-impairing pollutants when determining the annual emissions being used to obtain a source or source category's estimated visibility impacts. As discussed further *supra* section III.H, states cannot eliminate certain emissions, such as VOCs and ammonia emissions, from consideration. Additionally, EPA should recommend that states using the Q/d metric not use the Q/d threshold from the first implementation period for the second implementation period. Rather, the Q/d threshold should be lower in order to address more sources, including sources that are lower emitting and sources that are further in distance than the sources addressed in the first implementation period.

IV. Determination of affected Class I areas in other states

A. States must use methods permitted by statute and regulation to identify its sources that impact visibility at Class I areas in other states, not merely any "reasonable method."

In Section II.B.2 of the Final Guidance, EPA inserts a blanket statement that jeopardizes making progress towards the Clean Air Act Class I visibility goal and obfuscates the Regional Haze Rule's requirements regarding how a state should identify its sources that impact the visibility at Class I areas in other states: "As an initial matter, a state has the flexibility to use any reasonable method for quantifying the impacts of its own emissions on out-of-state Class I areas, and it may use any reasonable assessment for this determination."[73]

EPA does not provide any explanation or examples of what it considers "reasonable." Thus, this statement would allow a state to use any methodology, regardless of its scientific rigor, to identify those sources. Furthermore, once having identified these sources, however loosely, the state can then "assess" those sources any way it wishes. Confusingly, EPA seems to distinguish between quantifying the impacts of these sources and assessing these impacts. This single statement would serve to hand a state seemingly unlimited discretion over a key step in preparing its SIP, in marked contrast to what it proposed.

As EPA states in its 2017 Regional Haze Rule revision:

> On July 8, 2016, we released Draft Guidance that discusses how states can determine which Class I areas they ''may affect'' and therefore must consider when selecting sources for inclusion in a four-factor analysis. The Draft Guidance discusses various approaches that states used during the first implementation

[72] *Id.*
[73] Final Guidance at 8.

> period, provides states with the flexibility to choose from among these approaches in the second implementation period, and recommends that states adopt ‘‘a conservative . . . approach to determining whether their sources may affect visibility at out-of-state Class I areas.[74]

Indeed, EPA's Draft Guidance did provide actual guidance to the states on this issue:

> Once contributions by sources, groups of sources or geographic areas have been quantified in some manner, the EPA recommends that states adopt a conservative (more protective approach of visibility) approach to determining whether their sources may affect visibility at out-of-state Class I areas. For example, states could consider all Class I areas for which the state contributes at least one percent to anthropogenic light extinction from all U.S. sources on any day within the 20 percent most impaired days. States may choose a different threshold to determine which out-of-state Class I areas may be affected by the States sources, but must provide an adequate explanation of why the threshold is sufficiently protective of visibility.[75]

EPA followed this statement with more than twelve pages of highly technical guidance detailing approaches it deemed acceptable.[76] The Final Guidance deletes most of this and provides a summary approach void of technical rigor or analytical teeth. The Regional Haze Rule makes plain that a state's long-term strategy, including its application of the four statutory factors, be comprised of a robust initial step—the assessment of the state's emission sources on downwind states' Class I areas. However, by diminishing actual guidance and inventing this undefined and ambiguous standard, EPA creates confusion and ambiguity for states, leaving states to determine reasonability on a SIP-by-SIP basis. EPA should restore the discussion and directives to states from the Draft Guidance.

B. Application of a threshold for cumulative impacts to multiple Class I areas.

EPA should reconsider and revise the Final Guidance to recommend that states quantitatively document the results of the screening process for each Class I area rather than presenting only the impacts at the most affected or nearest Class I area. This allows the public to know the scope of the source's impacts and assures that the SIP comports with the letter and spirit of the regional haze program, a program grounded in the fact that regional haze is a regional problem and that Class I area impacts are felt typically by a multitude of sources' pollution that defy state boundaries.

EPA should also make clear that states must consider cumulative impacts of sources or groups of sources to all affected Class I areas. A source's cumulative impacts across Class I

[74] 82 Fed. Reg. at 3094.
[75] Draft Guidance at 58.
[76] Draft Guidance at 58-70.

areas provides a valuable screen to identify sources for further analysis. As EPA conceded and the court found in *Nat'l Parks Conservation Ass'n v. EPA*, in considering the visibility improvement expected from the use of controls, states must take into account the visibility impacts at all impacted Class I areas rather than focusing solely on the benefits at the most impacted areas.[77] This must include sources that have relatively small impacts in isolation but larger cumulative impacts either in the aggregate or across Class I areas.

V. Ambient data analysis

A. States must prioritize emissions within their borders to achieve reasonable progress.

International emissions contribute to visibility impacts. Rather than encouraging states to pursue an adjustment to the end goal of natural visiblity due to international emissions, EPA should be directing states to focus on the emissions within their borders for which requirements would help achieve reasonable progress. We encourage EPA to work with states, FLMs, stakeholders, and other countries to develop emissions inventories for cross-border pollution as well as scientifically valid methods for assessing long range emissions transport. However, the development of accurate accounting and modeling should not come with the expense of postponing or ignoring domestic emission-reducing measures. EPA's updated 2028 modeling[78] attempts to incorporate international emissions, but the agency itself makes clear that the science upon which the modeling rests is questionable.[79] EPA should reconsider and revise its Guidance to clarify that assessing international emissions is a work in progress and opportunity for partnership across a broad set of stakeholders, but the mandate of the Clean Air Act compels states to take measures to make reasonable progress by reducing emissions in their borders, not look to analysis to excuse doing so because other nations also contribute to regional haze.

We also urge EPA to revise the Final Guidance to clarify that affected states also have an obligation to take appropriate action to address international emissions.[80] Although EPA and the states are not required to "compensate" for international emissions, it is well within EPA and the states' rights and obligations to formally request reductions from international sources where appropriate, or to take permitting actions in the United States that will lead to emission reductions in other countries.

For example, Mexico's Carbon I and II power plants, which are less than twenty miles from the Texas border, are responsible for significant levels of pollution across several of the border states. Despite noting the significant impact of Mexican sources on its Class I areas, and

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[77] *Nat'l Parks Conservation Ass'n v. EPA*, 803 F.3d 151, 165 (3d Cir. 2015).
[78] EPA, Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling (Sept. 19, 2019), https://www.epa.gov/sites/production/files/2019-10/documents/updated_2028_regional_haze_modeling-tsd-2019_0.pdf ("Updated 2028 Modeling").
[79] *Id.* at 67.
[80] 64 Fed. Reg. 35,714, 35,755 (July 1, 1999) ("The States retain a duty to work with EPA in helping the Federal government use appropriate means to address international pollution transport concerns.").

requesting federal efforts to reduce impacts from international emissions,[81] Texas approved water discharge and mining permits for a coal mine in Maverick County. Rejecting these permits instead would have prevented the Mexican company Dos Republicas from mining high-sulfur coal that is transported and burned at the Carbon I & II facilities. EPA should remove its false implication that international emissions are entirely "uncontrollable" and should instead make clear that states must demonstrate that they are doing what is within their control to address international emissions—both generally and in particular.

EPA also discusses an "adjustment" to the URP for prescribed wildland fires. Wildfires, particularly in the West, have grown hotter, bigger, and more frequent with climate change. We recognize the role of prescribed fire in both managing fire size due to climate impacts and in restoration of natural ecosystems—which can, if effective, reduce the size and scale of fires later. There are, as a result of increased prescribed fire, potential benefits to both short- and long-term air quality. In planning for prescribed wildland fires, states should consider effects on visibility, alongside health and other concerns, including potential control measures and the potential benefits. A State cannot adjust a URP based on prescribed fires unless these fires actually result in visbility impairment on the "most-impaired" days. The Final Guidance should be clear that analysis of and planning for prescribed wildland fires need to be tailored to the planning period basis and would not automatically apply to the next planning period.

VI. Characterization of factors for emission control measures

A. States should identify and consider the best available emission control measures in the four-factor reasonable progress analysis.

In Section II.B.4.a of the Final Guidance, EPA advises states that they have the flexibility to reasonably determine which control measures to evaluate, and the agency lists examples of types of emission control measures states may consider.[82] EPA should reconsider its approach to ensure that the best controls for a source or source category are identified, evaluated, and the appropriate option determined. Identification of all available control measures is an important first step to ensure the best controls or emission reduction measures emerge from a four-factor analysis. However, EPA should revise the Final Guidance to ensure evaluation of the best control options.

1. EPA should reiterate and expand upon Step 1 of the BART-Guidelines regarding the identification of all available emission control techniques.

EPA should encourage states to consider various sources of information and types of emissions control techniques in developing its long-term strategy. Specifically, EPA should make clear that states must look to new source review control technology determinations, including major source BACT and LAER determinations, as well as state minor source BACT

[81] Texas Revisions to the State Implementation Plan (SIP) Concerning Regional Haze, at ES-2 (Feb. 25, 2009).
[82] Final Guidance at 29-30.

determinations. EPA should also recommend that states evaluate technologies that were considered in applicable new source performance standards, as well as those emission controls that were required in applicable new source performance standards.[83] EPA should also recommend that states consider the control techniques evaluated and required for similar source BART determinations.

In addition, EPA should recommend that states consider BACT determinations and other new source control requirements that states have adopted in minor new source review permits. Several states have minor source BACT provisions which may provide useful information for control technology considerations, and/or states have adopted targeted emission control requirements for source categories that do not have parallel federal requirements.[84]

Further, EPA should recommend that states investigate controls for source categories evaluated in reasonably available control measures ("RACM")/ reasonably available control technology ("RACT") and best available control measures ("BACM")/BACT determinations for nonattainment areas, a good starting point for information for control techniques available for a particular source category. States should also be encouraged to consult vendors or vendor groups such as the Institute of Clean Air Companies for control techniques for sources or source categories.

States should consider inherently lower-emitting processes, by themselves, and in combination with add-on controls. A state should not reject a combination of control measures altogether when the control measures could also be applied independently, unless the state is instead focusing on a control measure that is more effective at reducing emissions than the individual control measures.

In general, EPA should provide flexibility for states to consider innovative technologies tied to quantifiable and enforceable emission reduction requirements and to consider control techniques that some could view as "redefining the source" such as a change in fuel form. The BART Guidelines seemed to limit such controls from consideration for BART. Setting aside whether this was appropriate for BART determinations, States should not be constrained when evaluating measures to consider for the long-term strategy to make reasonable progress towards the national visibility goal.

In evaluating measures for the long-term strategy, states may need to address sources that were constructed many decades ago and/or sources to which pollution controls have not typically

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[83] As EPA acknowledges in the BART guidelines, the NSPS standards do not always require the most stringent level of available control technology for a source category. 40 C.F.R. Part 51, Appendix Y, Section IV.D.2. In some cases, EPA evaluates more stringent controls in an NSPS proposed rulemaking, but ultimately requires a less stringent control to set the NSPS standard. EPA should make clear that NSPS standards are likely insufficient for purposes of reasonable progress determinations because the standards will not be reflective of the reduction measures available and otherwise meeting the four factors as SIPs are being advanced.
[84] *See, e.g.*, Colorado Regulation No. 7 – Control of Ozone via Ozone Precursors and Control of Hydrocarbon via Oil and Gas Emissions,
https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8546&fileName=5%20CCR%201001-9.

been applied. There may be little experience with applying pollution controls to such sources. However, the lack of information on "available" control technologies should not be used as a justification to eliminate a source from consideration of controls (or to only evaluate less effective controls). In such cases, States should be encouraged to consider innovative technologies, technologies that may not have historically been applied to the source type but could be transferred to the source type, emission unit replacement with more energy efficient/less polluting technology, and other such measures in evaluating how to best reduce haze-forming pollution from the source or source type.

2. EPA should advise states how to determine "available" and "technically feasible" control techniques for long-term strategy measures.

EPA should elaborate on how to determine whether a control technique is considered "available" or "technically feasible" for a source or source category. Section IV(D)(1) of the BART Guidelines[85] states in part that that "available retrofit control options are those with a practical potential for application to the emissions unit . . ." and "technologies which have not yet been applied to (or permitted for) full scale operations need not be considered available; we do not expect the source owner to purchase or construct a process or control device that has not already been demonstrated in practice." EPA should recommend that states take a broader view in determining what control strategies are "available" for a source or source category, especially if traditional pollution controls had not been historically applied to that source category. In such cases, states may need to examine more innovative options for pollution control at such sources or source categories, including the consideration of promising pollution control options that have not already been demonstrated in practice but which offer quantifiable emission reductions.

Section IV(D)(1) of the BART Guidelines includes provisions to determine whether a control option is "technically feasible." Those provisions, as well as the discussion on available technologies, generally track guidance on evaluations for BACT determinations set out in EPA's New Source Review Workshop Manual.[86]

Sources often make availability or technical infeasibility arguments to avoid having to consider a pollution control, pointing out that that the control has not been used on the specific type of coal the source utilizes or on the particular size plant. Given that states may be having to determine controls for sources or source categories that have not been traditionally controlled in the long-term strategies, EPA should encourage states in such situations to fully evaluate controls that can be transferred from other source categories or that can be altered to accommodate the specific source or source category in question. EPA should recommend in such situations that states consult with, for example, environmental consultants, research technical journals, or air pollution control conference articles. States should also consider technologies demonstrated outside of the United States. EPA's New Source Review Workshop Manual describes how to

[85] 40 C.F.R. § Pt. 51, App. Y.
[86] U.S. EPA, New Source Review Workshop Manual, at B.17-B.21 (Draft Oct. 1990).

identify all control options "with potential application to the source and pollutant under evaluation."[87]

In summary, EPA should reconsider and revise the Final Guidance to elaborate on how states should evaluate available and technically feasible control techniques with the goal of ensuring that all potential controls with a practical application to a source or source category are considered in the development of the long-term strategy.

B. Cost analyses for the long-term strategy.

1. States must adhere to the accounting principles of the Control Cost Manual.

EPA should require states to follow the accounting principles and generic factors of EPA's Control Cost Manual because states and EPA have historically determined whether the costs of control measures are "reasonable" based on the costs that other similar sources determined in other regulatory actions including permits.[88] If EPA does not require all states to use the same accounting principles, it will be extremely difficult to compare costs of control between sources to evaluate whether the controls are cost effective.

2. States should compile and make publicly available the documentation for generic cost estimates.

EPA's Final Guidance suggests that states may reduce time and effort in determining control costs by using generic cost estimates or estimation algorithms, such as the Control Strategy Tool.[89] However, we request that EPA require the documentation for such generic cost estimates to be compiled and made publicly available. As stated in Sierra Club and National Parks Conservation Association's comments on EPA's proposed revisions to the Control Cost Manual, the Integrated Planning Model's SCR cost database is based on Sargent & Lundy's confidential database and the underlying data and methods used to develop the regression equations have not been publicly reviewed and analyzed.[90] Given that the cost estimates may be a primary basis for rejecting a control measure, the underlying data for such cost estimates must be publicly available.

C. EPA should reconsider and revise the Final Guidance regarding how to address energy and non-air quality environmental impacts of control measures.

EPA should state that the third factor of energy and non-air quality environmental impacts should generally be based on the same methodology laid out in the BART Guidelines. Section 8.1.1 of the BART Guidelines indicates that states must consider the energy and non-air quality environmental impacts as part of the cost analyses. With respect to taking into account non-air quality environmental impacts, we agree in general to take into account such impacts in

[87] *Id.* at B.10-B.11.
[88] Final Guidance at 31.
[89] *Id.* at 32.
[90] *See* September 10, 2015 Comment Letter from Sierra Club and National Parks Conservation Association to U.S. EPA, Docket ID No. EPA-HQ-OAR-2015-0341, at 8.

the cost analysis if the costs can be quantified. Otherwise, such impacts may need to be discussed qualitatively and weighed in the four-factor analysis.

EPA should also revise the Final Guidance and recommend that states analyze the climate and environmental justice impacts of regional haze SIPs. Although the Regional Haze Rule does not define "non-air quality environmental impacts," the BART Guidelines, which inform a state's reasonable progress analysis, explain that the term should be interpreted broadly.[91] Climate change[92] and environmental justice[93] impacts are the types of non-air quality impacts that states should consider when they determine reasonable progress measures for specific sources. Incorporating climate change and environmental justice impacts into the regional haze analysis will further states' climate and environmental justice policy goals, and it will also help states ensure that their actions related to regional haze planning support their other work on climate and environmental justice issues. Most of the same sectors and sources implicated under the regional haze program are also implicated in climate and environmental justice initiatives. As a result, when states determine "the emissions reduction measures that are necessary to make reasonable progress," they should assess how those measures will either reduce or exacerbate greenhouse gas emissions and/or environmental justice impacts on nearby disproportionately burdened communities.

VII. Decisions on what control measures are necessary to make reasonable progress

A. States cannot allow sources to discontinue the use of currently operating controls.

In Section II.B.5.e of the Final Guidance, EPA advises states how currently controlled sources may be able to discontinue those controls under reasonable progress:

> It is also possible that a source may be operating an emission control device but could remain in compliance with applicable emission limits if it stopped operation of the device. The state may reasonably consider based on appropriate factors whether continued operation of that device is necessary to make reasonable progress, such that the regional haze SIP submission for the second implementation period must make such operation of the device (or attainment of an equivalent level of emission control) enforceable.[94]

Suggesting to states that they may discontinue the use of controls that are already operating is antithetical to the regional haze program. Rather, EPA should revise the Final Guidance to require states to evaluate more effective operation of existing controls, including year-round

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[91] 40 C.F.R. pt. 51, App. Y at § (IV)(D)(4)(i), (IV)(D)(4)(j).
[92] *See, e.g.*, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (EPA endangerment finding); Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2015), https://www.ipcc.ch/report/ar5/syr/.
[93] *See* EPA, Learn about Environmental Justice, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (last visited April 24, 2020); Exec. Order No. 12,898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Fed. Reg. 7629 (Feb. 11, 1994).
[94] Final Guidance at 43.

operation requirements. Further, the Clean Air Act is clear that visibility is not a factor in determining reasonable progress measures required at a source.

In evaluating controls for a source that already had a control installed, such as a wet or dry scrubber for SO_2 or SCR or selective non-catalytic reduction ("SNCR") for NOx, states must be required to evaluate whether these controls can be more effectively operated. Companies tend to operate their air pollution control systems to the level needed to ensure compliance with applicable emission limits rather than to the maximum emission reduction capability of the pollution control technology. For example, there are electrical generating units ("EGUs") that are only operating their installed SCR or SNCR systems during the ozone season to meet limits under the Cross State Air Pollution Rule ("CSAPR"). Indeed, in projecting operations and emissions scenarios for evaluating the CSAPR program, EPA included assumptions for dispatchable SCR, SNCR, and also scrubbers, which reflected the fact that no emission limits or consent decrees required continuous operation of the pollution controls installed at many EGUs. EPA should thus recommend that states, at a minimum, require year-round operation of existing scrubbers, SCRs, SNCRs, or other controls as one of the control options considered.

Additionally, there are numerous examples of scrubbers, SCRs, and SNCRs that, when operated, are not operated to achieve the maximum emission reductions that could be accommodated within the existing control technology at a particular unit, primarily because the applicable emission limitation does not require operation of those pollution controls to achieve the maximum emission reductions. As mentioned *supra* section III.E, states should consider sources that already have in place the most stringent controls available for additional control in the development of the long-term strategy during the second implementation period.

EPA should revise the Final Guidance to recommend that sources with existing pollution control technology evaluate options that could improve the emissions reduced through more effective use of that control technology. This could include requiring year-round operation of controls, imposing more effective percent reduction requirements, requiring sources to meet more stringent emission limits, and requiring that emission limits apply on shorter averaging times to ensure continuous levels of emission reduction.

VIII. Regional scale modeling of the long-term strategy to set the RPGs for 2028

A. States should use regional scale modeling to support their regional haze SIPs.

In Section II.B.6 of the Final Guidance, EPA advises states that they are not required to use regional scale modeling to support their regional haze SIPs. Specifically, under Step 6, EPA states that a state must:

> Determine the visibility conditions in 2028 that will result from implementation of the LTS and other enforceable measures to set the RPGs for 2028. Typically, a state will do

> this through regional scale modeling, *although the Regional Haze Rule does not explicitly require regional scale modeling*.[95]

Were a state to forego estimating source or source categories emitting visibility-impairing pollutants, as the guidance provides, it would not be able to satisfy a number of basic requirements of the Regional Haze Rule. Estimating the visibility impacts from a collection of sources is a prerequisite of establishing a state's RPG. As EPA explains in its 2017 Regional Haze Rule revision, this is a key first step in a state setting its RPG: "the 2007 guidance clearly describes the goal-setting process as starting with the evaluation of control measures. First, we recommended that states '[i]dentify the key pollutants and sources and/or source categories that are contributing to visibility impairment at each Class I area.'"[96] If a state did not estimate the visibility impacts from source or source categories, it could not satisfy the requirement in Section 51.308(f)(3)(ii)(A) that it demonstrate, "there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area." Indeed, this misplaced advice is not even internally consistent with other sections of the Final Guidance, which cover many techniques for estimating the visibility impacts of sources or source categories. Estimating the collective visibility impacts of sources or source categories to determine the RPG is a fundamental requirement of the regional haze program.

In fact, there is no known substitute for the use of photochemical air quality models to project the visibility impact from thousands of individual sources, influenced by complex meteorological fields and atmospheric chemical interactions at a Class I area, ten years into the future, as EPA makes clear in Appendix W to Part 51.[97] The use of air quality models has been a cornerstone of the technical demonstration of the regional haze program (and many other air programs) since its inception. Almost every EPA Regional Haze Rule revision and guidance either discusses the use of air quality models or assumes their use. In fact, EPA recently updated its modeling guidance for regional haze.[98] The very first sentence of the section specifically devoted to regional haze is: "[t]his section focuses on the modeling analysis needed to set RPGs that reflect the enforceable emission limitations, compliance schedules, and other measures included in the long-term strategy of a regional haze SIP."[99] Part 51 makes it clear that air quality

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[95] Final Guidance, Table 1, at 6 (emphasis added).

[96] *See* 82 Fed. Reg. at 3092-93. Notably, EPA does not abandon its 2007 Guidance and in fact refers to in several places in its rule revision.

[97] *See* 40 C.F.R. Pt. 51; App. W, Section 2.0 (a), "Guideline on Air Quality Models," ("Increasing reliance has been placed on concentration estimates from air quality models as the primary basis for regulatory decisions concerning source permits and emission control requirements. In many situations, such as review of a proposed new source, no practical alternative exists."); *see also id.* at Section 1.0 (b), ("The impacts of new sources that do not yet exist, and modifications to existing sources that have yet to be implemented, can only be determined through modeling.") This is precisely the challenge of setting RPGs – accounting for modifications to potentially dozens of existing sources (e.g., installation of controls).

[98] Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.s and Regional Haze, EPA 454/R-18-009, (Nov. 2018).

[99] *Id.* at 143.

modeling is a necessary tool in the setting of RPGs and EPA should not imply otherwise in its guidance.

Instead of guiding states on modeling, EPA repeatedly informs states that they can use "surrogates" to estimate visibility impacts of a body of sources. Specifically, EPA states that "the Regional Haze Rule does not require states to develop estimates of individual source or source category visibility impacts, or to use an air quality model to do so. Reasonable surrogate metrics of visibility impact may be used instead."[100] EPA lists a number of surrogates that can be used for this purpose, including Q/d, wind trajectories, and daily light extinctions budgets and states that states can use "other reasonable techniques."[101] However, although more strongly worded in its Draft Guidance,[102] EPA does state in its Final Guidance, "[s]urrogate metric here refers to a quantitative metric that is correlated to some degree with visibility impacts as they would be estimated via air quality modeling."[103] Consequently, although EPA tells states that modeling is unnecessary and that surrogate measures can be used, modeling is required in order to check the validity of visibility surrogates. EPA should reconsider this provision, and clarify that modeling is needed to assess the collective visibility impacts of sources or source categories to establish RPGs.

IX. Progress, degradation, and URP glidepath checks

A. If a state's RPG is above the URP, the state's "robust demonstration" must include a consideration of specific items identified by EPA.

In section II.B.7.c of the Final Guidance, EPA discusses what could constitute a "robust demonstration," required under section 51.308(f)(3)(ii)(A) when a state's RPG is above the URP.[104] EPA states that a simple "narrative explanation of how the state has already conducted the source selection and control measures analyses in such a manner that addresses the requirements of 51.308(f)(3)(ii)" may suffice.[105] EPA then goes on to note that such a state *may* consider a long list of additional items, including reconsideration of its visibility threshold, acceptable cost threshold, additional technically feasible controls, how its determination criteria compares to that of other states, etc.[106]

In contrast, EPA's Draft Guidance did not state that a simple narrative would suffice. The Draft Guidance stated that such a demonstration *should* include consideration of a similar listing

[100] Final Guidance at 12.
[101] *Id.* at 13.
[102] Draft Guidance at 76 ("Before relying on Q/d as a surrogate for screening purposes, a state should investigate how well Q/d relates to visibility impacts for the 20 percent most impaired and 20 percent clearest days, in terms of both the central tendency of the relationship (e.g., the regression line) and the variability of the relationship (e.g., the error of the regression). This understanding should be developed through relevant modeling of some actual cases or model plant scenarios, or another appropriate approach.")
[103] Final Guidance at 10 n.25.
[104] *Id.* at 50.
[105] *Id.*
[106] *Id.* at 50-51.

of items. EPA's pivot from *should* consider to *may* consider substantially misinterprets and is directly at odds with what the robust demonstration required under section 51.308(f)(3)(ii)(A) should contain.

Moreover, states should not rely on EPA's Updated 2028 Modeling[107] to determine which Class I areas are projected to be at or below the URP. Projected conditions for 2028 are tied to the 2064 natural conditions endpoint adjustments to account for international anthropogenic contributions, as well as wildfires. By EPA's own admission as discussed *supra* section V.A, these adjustments lack scientific validation and should not be relied on to determine whether a Class I area is on track to meet its URP in 2028.[108] The result of the updated modeling adjustments reduced the number of Interagency Monitoring of Protected Visual Environments ("IMPROVE") sites projected to be above the glidepath from forty-seven to eight. IMPROVE monitors are not the same as Class I areas, however many Class I areas share monitors; only ninety-nine monitoring sites (representing 142 Class I areas) were evaluated.[109] EPA must reconsider and revise the Final Guidance to specify what a "robust demonstration" under section 51.308(f)(3)(ii)(A) requires and that a state's demonstration should include consideration of the specific list of items identified by the agency.

X. Additional requirements for regional haze SIPs

A. States must submit to EPA the emission inventory used in a regional haze SIP.

In section II.B.8.c of the Final Guidance, regarding section 51.308(f)(6)(v) which covers the requirements for the state's emissions inventory, EPA states that "[t]he emission inventories themselves are not required SIP elements and so are not required to be submitted according [sic] the procedures for SIP revisions. The emission inventories themselves are not subject to EPA review."[110] This conflicts with the Regional Haze Rule, is internally inconsistent with the rule and other state requirements, and is impracticable. First, EPA's statement conflicts with several sections of the Regional Haze Rule. For instance, section 51.308(f)(2)(iii) requires that the state must document the following:

> [T]he technical basis, including modeling, monitoring, cost, engineering, and emissions information, on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects. . . . The emissions information must include, but need not be limited to, information on emissions in a year at least as recent as the most recent year for which the State has submitted emission inventory information to

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[107] *See* Updated 2028 Modeling.
[108] *Id.* at 67.
[109] *Id.* at 3 n.6.
[110] Final Guidance at 55.

> the Administrator in compliance with the triennial reporting requirements of subpart A of this part.

Here, it is clear that a state is required to document the technical basis of all aspects of its regional haze demonstration. A state's emission inventory is a foundational aspect of its technical demonstration. In fact, EPA specifically calls out "emissions information," and clarifies that the emissions information must include "information on emissions in a year at least as recent as the most recent year for which the State has submitted emission inventory information to the Administrator."[111]

Plainly, a state is required to submit the emission inventory it is using as part of its technical demonstration to EPA, and that inventory must include certain specified elements. Because states are already required to submit specified emission inventories to EPA as part of other requirements ("Part A"), EPA clarifies that a state may refer to that submission instead of physically including it in its SIP. However, the mere fact that EPA specifies a state may use an already prepared work product does not shield it from a review of its suitability for the task at hand. [112] For instance, EPA has frequently stated that states may use the technical work of RPOs in their SIPs. That position has never been interpreted to mean information is shielded from EPA review.[113] Indeed, EPA has a duty to review that inventory in the context of the state's regional haze SIP submission.[114] Thus, a state's emission inventory is an inseverable part of its regional haze SIP and subject to EPA's review.

Despite this, EPA appears to imply in its guidance that it cannot bring to the state's attention potential faults in the emission inventory a state used to support its regional haze SIP, nor even examine that inventory in the context of its review of the state's regional haze SIP. EPA should revise the Final Guidance to advise states that a state's emission inventory is a part of the state's SIP and subject to EPA's review.

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[111] *Id.*

[112] *See* EPA's "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations," EPA-454/B-17-002, at 11 (May 2017), ("[Inventory information provided to EPA] will allow the EPA to make a determination whether the emissions information used in Regional Haze analysis is sufficient for the purposes of the SIP.")

[113] For instance, in the Texas FIP, EPA observed that under the current regulation each state "must document the technical basis, including modeling, monitoring and emissions information, on which the State is relying to determine its apportionment of emission reduction obligations necessary for achieving *reasonable progress* in each mandatory Class I Federal area it affects." 79 Fed. Reg. 74,818, 74,829 (Dec. 16, 2014) (emphasis in original). While the current regulations provide that, "[s]tates may meet this requirement by relying on technical analyses developed by the regional planning organization and approved by all State participants," 40 C.F.R. § 51.308(d)(3)(iii), the Texas haze rule clarified that in situations "where a regional planning organization's analyses are limited, incomplete *or do not adequately assess the four factors*, however, then states must fill in any remaining gaps to meet this requirement." *Id.* (emphasis added).

[114] In the 2017 Regional Haze Rule revision, EPA makes it a point to review a number of circuit court opinions that affirm EPA's review authority, including the Eight Circuit's conclusion that EPA "must 'review the substantive content of the . . . determination." 82 Fed. Reg. at 3090 (quoting *Ariz. el rel. Darwin v. EPA*, 815 F.3d 519, 531 (9th Cir. 2016).

B. States must ensure that FLM opinions and concerns are made transparent to the public, considered by the state and addressed in the SIP.

In Section II.B.8.a of the Final Guidance, EPA provides guidance to the states regarding the FLM consultation requirements in the Regional Haze Rule, 40 C.F.R. § 51.308. Although EPA reiterates that states are required to consult with FLMs, EPA should reconsider and revise the Final Guidance to ensure that states give credence to the opinions and concerns expressed by FLMs. FLMs have affirmative duties under section 169A(a) and (d) of the Clean Air Act as well as mandates to protect and manage public lands under the Wilderness Act[115] and the Organics Act[116]. Therefore, EPA should revise the Final Guidance to direct states that to work collaboratively with FLM to develop regional haze SIPs that satisfy federal agency duties and public resource protections.

XI. Overarching recommendations

A. EPA should emphasize that the end result must be reasonable progress.

EPA should make clear in a revised Final Guidance that the end result of any state's implementation plan must be real, reasonable progress. Consequently, each new plan must require that states actually reduce their emissions that contribute to visibility impairment. The statute requires each haze plan to contain "emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress . . . ."[117] Therefore, any interpretation of the Regional Haze Rule via guidance should direct a state's long-term strategy to be more than just a hand waving exercise—each plan must require adequate emission limits and other enforceable measures to make reasonable progress.[118] EPA should revise the Final Guidance to explicitly provide that actually requiring emission reductions which constitute reasonable progress must be the outcome of the four-factor analysis to meet the applicable requirements; deliberation, no matter how well documented, is not enough. Emission reductions recognized through the four-factor analysis must result in emission reduction measures enforceable through a state or federal regional haze plan.

B. Decisions on which controls to require as part of the long-term strategy cannot merely ratify past determinations.

EPA must also revise the Final Guidance to clarify that decisions on which controls to require as part of long-term strategy cannot rest solely on controls required by past SIPs and state rules. Although EPA stated in the Draft Guidance that decisions on whether controls for a source or source category are cost-effective or provide sufficient visibility improvement cannot rely solely on past decisions evaluating controls for similar sources[119], that language is completely absent from the Final Guidance. EPA must revise the Final Guidance to state this point. For

[115] 16 U.S.C. §§ 1131-1136.
[116] 54 U.S.C. § 100101.
[117] 42 U.S.C. § 7491(b)(2).
[118] *See id.*
[119] Draft Guidance at 97, 103.

example, costs or technologies which were previously considered unreasonable or infeasible at a later date may become more common and may nevertheless be necessary in the second or future planning periods to make reasonable progress. Likewise, making reasonable progress in the current and future planning periods will require the implementation of controls that individually account for smaller visibility impacts than those contemplated in the first planning period and in other past emission reducing rules and permits. Therefore, EPA must revise the Final Guidance to direct states to conduct new source-specific, four-factor emission reduction analyses.

C. EPA must ensure that long-term strategies include appropriate measures to prevent future as well as remedy existing impairment of visibility.

The Clean Air Act not only requires that existing visibility impairment be remedied, but that future impairment be prevented. 42 U.S.C. § 7491(a)(1). As such, it is imperative that each state's long-term strategy be required to include measures to prevent regional haze visibility impairment and that such plans take into account the effect of new sources, as well as existing sources of visibility impairment. EPA must revise its Guidance to comport with this requirement.

EPA has historically relied on the prevention of significant deterioration ("PSD") permitting program and the visibility new source review ("NSR") requirements mandated by 40 C.F.R. § 51.307[120] to address this requirement of the national visibility goal.[121] These provisions essentially mandate that new and modified major sources that are subject to major source permitting requirements do not adversely impact visibility in any Class I area. However, much has changed in the PSD and NSR permitting programs since 1980. The current PSD rules, as well as the major source nonattainment NSR rules, now exempt many modifications at existing major sources that were previously subject to PSD review. As a result, the PSD and visibility NSR rules do not provide as comprehensive Class I areas protections as they previously did, due to impacts from modified sources. Further, there have been significant increases in emissions near some Class I areas due to oil and gas emissions and other activities that are not adequately addressed by the PSD permitting program.

EPA must revise its Final Guidance to ensure that states prevent future impairment by analyzing new and modified emission sources and by requiring mitigation of the cumulative visibility-impairing emissions. As we discuss below, it is especially important for EPA to articulate that states consider minor, area, and other new growth, or modification of stationary sources that are not subject to the Class I area protections of the PSD permitting and visibility NSR requirements.

[120] 40 C.F.R. §51.307(b)(2) and (c) provides that the PSD requirements of 40 C.F.R. §51.166(o), (p)(1) through (2), and (q) apply to new and modified major proposing to locate in nonattainment areas that may have an impact on visibility in a mandatory Class I area.
[121] *See* 45 Fed. Reg. 80,089 (Dec. 2, 1980).

1. The 2002 PSD and nonattainment NSR Rule revisions exempt many modifications from PSD permitting that could result in large, visibility-impairing emission increases from existing major sources.

EPA has historically relied on the PSD and nonattainment/visibility NSR permitting programs to meet the requirement of preventing future impairment of visibility. The PSD permitting requirements specifically provide for ensuring that a new or modified major source will not adversely impact visibility in a Class I area[122], and the EPA's visibility NSR rules in 40 C.F.R. §51.307(c) require new and modified major sources proposing to locate in nonattainment areas that may impact visibility in a Class I area to meet these same requirements of the PSD program.[123] However, the December 2002 revisions to the PSD and nonattainment NSR permitting requirements significantly reduced the scope of modifications that would trigger PSD or nonattainment NSR as major modifications by drastically changing the methodology for determining whether a significant emission increase would occur as a result of a modification.[124]

Despite these significant regulatory changes which reduced the scope of modified sources subject to PSD and nonattainment NSR permitting, EPA has never re-evaluated its reliance on the major source permitting programs as sufficient to prevent future impairment of visibility. However, these rules, as revised in recent years, will likely allow significant increases[125] in actual emissions from existing sources to occur without any evaluation of the impacts on visibility and without even applying BACT or LAER, due to being exempt from PSD or nonattainment NSR permitting.

In summary, the PSD and nonattainment NSR rules as revised in 1992 and 2002 now exempt many modifications that would have previously been subject to major source permitting, including the visibility requirements of the PSD program and visibility NSR rules. Thus, while the rules still include vital provisions for the prevention of future visibility impairment, the PSD and visibility NSR rules are no longer adequate by themselves to ensure the prevention of future visibility impairment. In light of this, EPA should revise the Final Guidance to clarify that states may not solely rely on the PSD and visibility NSR programs to prevent future impairment of visibility. EPA must ensure that states specify requirements in their SIPs to prevent future visibility impairment from the new source growth in any state that may increase visibility-impairing pollution and thus affect Class I area visibility.

2. Minor, area, mobile, and other source emissions must be evaluated to prevent future, as well as remedy existing, impairment of visibility.

[122] 40 C.F.R. §52.21(o), (p)(1) and (2), and (q).
[123] 40 C.F.R. §51.307(b)(2) and (c).
[124] 67 Fed. Reg. 80,185, 80,186-89 (Dec 31, 2002) (also known as "NSR Reform" Rule).
[125] *See* Joseph Goffman, et al., EPA's Attack on New Source Review and Other Air Quality Protection Tools (Nov. 1, 2019), http://eelp.law.harvard.edu/wp-content/uploads/NSR-paper-EELP.pdf.

Although the Final Guidance mentions minor, area, mobile, and other emission sources, most of the discussion addresses major stationary sources. EPA should be more explicit in its expectation that states evaluate sources and source categories that are not major stationary sources as well, including the potential for growth in emissions from these sources. For example, given the increases in emissions from oil and gas development over the last 10 years,[126] it is clear that the existing SIPs and FIPs do not currently include adequate mechanisms for preventing visibility impairment from these sources as production ebbs and flows with economic conditions and other factors, such as deregulation and technology. EPA must revise the Final Guidance to clarify that states need to address these sources in the aggregate, rather than source-by-source.

There are several examples of rules and programs that may be necessary in a long-term strategy to prevent future impairment of visibility in Class I areas. EPA should revise the Final Guidance to direct states to consider these examples and include them where appropriate in SIPs.

a. Methods to address visibility-impairing emissions from oil and gas development

EPA should revise the Final Guidance to explicitly note that it expects states to review area sources like oil and gas, and should provide additional guidance on how to do so. Undoubtedly, this should begin with requiring states to collect better data on the emissions from oil and gas.

In many states, emissions from oil and gas development are a significant threat to visibility and air quality in Class I areas. Such development often occurs on federal lands that are near to or abut Class I areas For example, oil and gas development contributes to visibility impairment in public lands in Utah and Colorado where the NPS found that oil and gas development and leasing in the two states would "cause visibility impairment" at Dinosaur National Monument.[127] Additionally, NPS recently found impacts from oil and gas emissions at Carlsbad Caverns and San Pedro Parks Wilderness Class I areas, among others, based on 2008 emissions inventories—which do not capture more recent growth—and include only a portion of emissions from the production process.[128] Examples of Class I areas currently or potentially

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[126] "The U.S. Energy Information Administration ("EIA") reports that oil production growth in the United States has risen by about 3 million barrels per day (from 5.8 to 8.72 MMb/d) from January 2001 to July 2014 (EIA, 2014a). Natural gas production has increased from 53.74 to 70.46 billion cubic feet per day within this time period (EIA, 2014a). The trend is expected to continue with the number of oil and gas wells in the lower 48 states projected to increase by 84 percent between 2013 and 2040 (EIA, 2014b)." Thompson et al., Modeling to Evaluate Contribution of Oil and Gas Emissions to Air Pollution, 67 Journal of the Air & Waste Management Association Vol. 4, 445 (Sept. 2016), https://doi.org/10.1080/10962247.2016.1251508.

[127] Memorandum from Regional Director, Intermountain Region, National Park Service, to Planning and Environmental Coordinator, BLM 9 (2013); *see also* Memorandum from Superintendent, Dinosaur National Monument, National Park Service, to Field Office Manager, BLM Vernal Field Office 2 (Aug. 2017); Krish Vijayaraghavan et al., Ramboll Environ US Corporation, 2017); BLM, Colorado Air Resources Management Modeling Study (CARMMS): 2025 CAMx Modeling Results for the High, Low and Medium Oil and Gas Development Scenarios, 104-05 (Aug. 2017), https://www.blm.gov/documents/colorado/public-room/data.

[128] Thompson et al., *supra* note 126, at 456; *see also* Table C6, *available at* https://www.tandfonline.com/doi/suppl/10.1080/10962247.2016.1251508?scroll=top.

impacted by oil and gas emissions include: Theodore Roosevelt and Lostwoods (Bakken Shale in eastern Montana and North Dakota); Wind Cave and Badlands (Powder River Basin in northeast Wyoming); Bridger and Fitzpatrick Wilderness Areas (Pinedale Anticline and Jonah Fields in western Wyoming); Mesa Verde (North and South San Juan Basin); Carlsbad Caverns and Guadalupe Mountains (Permian Basin in southeastern New Mexico and western Texas); and Canyonlands and Arches (Uintah, Paradox, and Piceance Basins in Utah and Colorado).

Significant information is available to enable states and EPA to develop strategies to reduce visibility-impairing emissions from this significant source category. However, these prior analyses do not substitute for meaningful consideration of oil and gas emissions reductions sufficient to meet the Regional Haze Rule's "reasonable progress" mandate. NPCA's recent report, "Oil and Gas Sector Reasonable Progress Four-Factor Analysis for Five Source Categories" assesses emissions controls for the five primary sources of visibility-impairing (and health harming) pollution in the sector: gas-fired reciprocating internal combustion engines ("RICE"); diesel-fired RICE; gas-fired combustion turbines; gas-fired heater, boilers, and reboilers; and flaring and thermal incineration of excess gas and waste gas.[129] The controls and practices included in this document represent various requirements for sources across the country and should be considered by states with emissions from the oil and gas sector.

Resource Management Plans ("RMPs") or land use plans issued by federal agencies explain how the agency will manage areas of public land over a period of time, usually ten to fifteen years. RMPs and amendments to those plans are required to go through a public review process under the National Environmental Policy Act ("NEPA"), which must include an analysis of projected impacts to all resources, including air quality. Such plans would include projections of oil and gas development, among other land use projections, on federal lands. Unfortunately, numerous RMPs have not been revised for decades, and only a few consider the effect of emissions from the planning area. EPA should revise the Final Guidance to require that states consider RMPs and other land use plans in determining the appropriate measures to prevent future impairment of visibility to include in regional haze SIPs. However, if RMPs are outdated or fail to consider the effects of visibility-impairing pollution from development, EPA must also indicate that those RMPs not be relied upon.

Recent NEPA analyses conducted for projected oil and gas development in RMPs can be useful tools for obtaining data regarding anticipated growth in such emissions. However, neither NEPA assessments nor RMPs are tools for preventing future impairment from oil and gas development. First, if adverse impacts are projected, the federal agency may make recommendations on mitigation methods to avoid adverse impacts, but neither the federal agency nor the local or state air permitting agency are under any obligation to implement such mitigation measures. Second, the federal agency is often making projections of expected amounts of development and in the types and emission rates of emissions units utilized. Those projections do

[129] Vicki Stamper & Megan Williams, Nat'l Parks Conservation Ass'n, Oil and Gas Sector Reasonable Progress Four-Factor Analysis for Five Source Categories: Natural Gas-Fired Engines, Natural Gas-Fired Turbines, Diesel-Fired Engines, Natural Gas-Fired Heaters and Boilers, Flaring and Incineration (Mar. 6, 2020) ("NPCA Report").

not always reflect the level of development that actually occurs, or the specific emission units and emission rates that are utilized. The Colorado Air Resources Management Modeling Study is one example of the type of information which can be developed in conjunction with the RMP process.[130]

In developing long-term strategies, EPA should direct states to use available information such as county-level reported emissions data and RMP and site-specific NEPA analyses, and request additional information to round out and make inventories accurate. To aid in this data gathering, EPA should direct industry to produce emissions inventories and submit them to states alongside an evaluation of emissions-reduction strategies and control technologies for this significant source of visibility impairment. Further, EPA should revise the Final Guidance to explicitly advise states on creating and making publicly available oil and gas emissions data.

States with significant oil and/or gas development should be required to consider the adoption of emission control regulations for the oil and gas development industry to reduce visibility-impairing emissions from such development.[131] Many states already require measures to reduce emissions from the sector. For example, California has enacted extensive air pollution requirements for oil and gas production, processing, and storage.[132] Colorado has also adopted emission requirements for the oil and gas industry.[133] Pennsylvania has also revised the state's oil and gas drilling regulations.[134] While these regulations may not be sufficient as to visibility impairment from the sector's emissions, the regulations provide relevant examples of states' decisions to address threats to air quality that are not covered by federal major source permitting requirements. EPA should identify the source types and associated emission-reducing measures available in the sector and use them to develop guidance to specify EPA's expectations of states in assessing these sources and requiring emission reduction measures from them. EPA must reconsider and revise the Final Guidance to require states to apply these and other control measures in their regional haze SIPs.

b. Minor New Source Review permitting programs

A state's minor NSR permitting program can be a useful tool to impose emission limitations and otherwise ensure that new source growth occurs in a manner consistent with making reasonable progress towards the national visibility goal. EPA should revise the Final Guidance to direct states to model new or modified minor NSR sources for their impacts on visibility in Class I areas. States could thus determine if the source's emissions would be consistent with making reasonable progress towards the national visibility goal, similar to the requirement in 40 C.F.R. §51.307(c) of the visibility NSR rules. Such a provision would also be

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[130] *See* BLM, Colorado Air Resources Management Modeling Study (Aug. 2017), https://www.blm.gov/documents/colorado/public-room/data.
[131] NPCA Report at 7-10.
[132] California Air Resources Board, Oil & Natural Gas Production (last reviewed July 18, 2017), https://ww3.arb.ca.gov/regact/2016/oilandgas2016/oilandgas2016.htm.
[133] Colo. Regulation No. 7, Section XII, https://www.colorado.gov/pacific/cdphe/air/oil-and-gas-compliance.
[134] *See* Environmental Protection Performance Standards at Oil and Gas Well Sites, 46 Pa. B. 6431 (Oct. 8, 2016), http://www.pacodeandbulletin.gov/Display/pabull?file=/secure/pabulletin/data/vol46/46-41/1757.html.

consistent with section 7410(a)(2)(D)(i)(II) of the Clean Air Act, which requires SIPs to include adequate provisions prohibiting any source type from emitting any air pollutant which will interfere with measures to protect visibility. States could include criteria to ensure that the sources most likely to interfere with making reasonable progress are addressed, based on total emissions of visibility-impairing pollutants, distance to Class I areas, and/or other criteria focused on modifications at existing major sources that avoid PSD or nonattainment NSR review. EPA should instruct states to add such provisions to their minor NSR programs as necessary to ensure that their long-term strategies adequately prevent future impairment to visibility. Such provisions should also be incorporated and made enforceable through regional haze SIPs relying on such emission reductions to make reasonable progress.

States that decide to rely on minor NSR programs to prevent future impairment should be required to examine the relevant definitions and exemptions that exist in their programs to ensure that the types of sources that need to be addressed to prevent future impairment are indeed subject to the states' minor NSR programs. A state's minor NSR program also may need to be revised to include emissions from emitting units not typically covered under PSD permitting requirements, such as fugitive emissions.

Applicability at minor NSR sources should be based on projected changes in allowable or actual emissions from a baseline reflective of recent emissions. If a state is intending to rely on its minor NSR program to prevent future impairment of visibility, then the minor NSR program must be written in a manner to truly accomplish that intention. As other Clean Air Act programs fail to adequately integrate limits for new or modified sources, regional haze SIPs should be used directly for this purpose.

c. Provisions for other potential threats to visibility impairment

There are a number of source types other than those covered by a minor NSR permit program or oil and gas development that could potentially impair visibility. In recognition of this, EPA should revise its Final Guidance to recommend that states specifically include the analyses of these potential sources in their long-term strategies, and if necessary, adopt provisions to address them. For instance, if construction activities threaten future impairment, states should adopt control measures to mitigate air pollution at construction sites. As an example, the Sacramento Metropolitan Air Quality Management District applies air emissions requirements to construction sites.[135] California also has stricter mobile source emissions requirements (including for non-road engines) that apply under federal rules, and states with significant mobile source growth threatening future impairment could consider adopting such standards as their own.[136] EPA should encourage states to consider various measures to address

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[135] *See* Sacramento Metro. Air Quality Management Dist., CEQA Guide, Ch. 3: Construction-Generated Criteria Air Pollutant and Precursor Emissions (April 2019), http://www.airquality.org/LandUseTransportation/Documents/Ch3ConstructionFinal4-2019.pdf.

[136] Congress preempted states from setting emission standards for mobile sources, except that California could set its own standards with EPA's permission and other states could opt into the stricter California standards (generally for ozone SIP purposes). 42 U.S.C. § 7543(e)(2)(B)(i)-(ii).

potential future Class I visibility impairment, based on the recent or planned growth in new source emissions expected for the state, that could threaten future impairment of visibility in any Class I area.

Additionally, to the extent that states have limited information on such sources, EPA should require that states collect and submit actual emissions increase data on minor modifications at existing sources in order to gather more information on the extent of minor source growth and on new minor, area, and other source growth.

Visibility-impairing emissions need to be inventoried and modeled from many sectors in order to properly inform the next round of haze plans. Several states have started collecting and submitting oil and gas emissions data to be inventoried and modeled for purposes of regional haze. For instance, the Western Regional Air Partnership has started collecting from its oil and gas producing states emissions for their modeling inventory.[137] However, there are several states not in the western region of the country, such as Pennsylvania and Virginia, which are significant producers of oil and gas, and should also be collecting and submitting oil and gas emissions data.[138] Furthermore, as noted *supra* section III.H, there is no inventory of emissions from the agricultural sector; states should develop such inventories and submit them with their regional haze SIPs.

Emissions data from wood burning devices should be modeled. As EPA has explained, the smoke from these devices "contains harmful particle pollution, also known as fine particulate matter or PM2.5, along with other pollutants including carbon monoxide, volatile organic compounds (VOCs), black carbon, and air toxics such as benzene."[139] EPA has also confirmed that residential wood combustion "accounts for 44 percent of total stationary and mobile polycyclic organic matter (POM) emissions, nearly 25 percent of all area source air toxic cancer risks and 15 percent of noncancer respiratory effects."[140] Furthermore, wood burning devices are a significant source of heating for many communities near Class I areas that struggle with regional haze pollution problems. Wood burning devices materially contribute to the significant proportion of particulate matter (fine and course) and VOC emissions that come from residential wood combustion in Arizona, Massachusetts, Minnesota, Nevada, Washington and other states, adding to regional haze visibility problems in Class I areas around the country.

While the collection and evaluation of much of this data should inform the next round of haze plans, we note that for the oil and gas sector, this data is sufficiently available such that regulation of the sector is appropriate and much needed in this second round of regional haze

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[137] *See* Western Regional Air Partnership ("WRAP"), EGU Emissions Analysis Project, https://www.wrapair2.org/EGU.aspx.
[138] *See* U.S. Energy Info. Admin., Pennsylvania State Profile and Energy Estimates (last updated Aug. 15, 2019), https://www.eia.gov/state/?sid=PA; U.S. Energy Info. Admin., Virginia State Profile and Energy Estimates (last updated Sept. 15, 2019), https://www.eia.gov/state/?sid=VA.
[139] EPA, Fact Sheet: Overview of Final Updates to Air Emissions Requirements for New Residential Wood Heaters, at 1 (Feb 4, 2015), https://www.epa.gov/sites/production/files/2015-02/documents/20150204fs-overview.pdf.
[140] EPA, Strategies for Reducing Residential Wood Smoke, Publ'n No. EPA-456/B-13-001 at 4 (Mar. 2013), https://www.epa.gov/sites/production/files/documents/strategies.pdf.

planning. EPA should specify that in order for a state to satisfy the requirements of proposed 40 C.F.R. § 51.308(f), states must consider the cumulative impacts from minor and other source growth that may affect future visibility impairment. With this information, states can determine the number and types of new source growth and magnitude of emissions that may threaten future visibility impairment, which can then assist states in developing targeted measures to prevent future visibility impairment and address regional haze from these source types. Such measures should be required to be part of the long-term strategy of the regional haze SIP.

In summary, EPA must revise the Final Guidance to require long-term strategies to include measures to ensure the prevention of future visibility impairment, as well as the remedying of existing visibility impairment in Class I areas, in accordance with the national visibility goal of the Clean Air Act. While the PSD and visibility NSR programs have some effective provisions for ensuring that new and modified sources subject to those permitting requirements do not threaten future visibility impairment, those programs are not sufficient to fully address the statutory requirement of preventing future impairment to visibility. EPA should require states to evaluate the threats to future impairment to visibility in any Class I area and to adopt provisions within regional haze SIPs to minimize emissions from such sources, and otherwise ensure that new source growth occurs in a manner consistent with making reasonable progress towards the national visibility goal.

XII. Conclusion

The Conservation Organizations respectfully ask that EPA reconsider and revise the Final Guidance as mentioned above.

Sincerely,

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OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

July 8, 2021

MEMORANDUM

SUBJECT: Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period

FROM: Peter Tsirigotis
Director

Tsirigotis, Peter

Digitally signed by Tsirigotis, Peter
Date: 2021.07.08 14:44:35 -04'00'

TO: Regional Air Division Directors, Regions 1-10

This memorandum provides information on the Regional Haze second planning period in light of questions and information the Environmental Protection Agency (EPA) is receiving regarding State Implementation Plan (SIP) development. The purpose is to share more broadly the types of issues in draft SIPs being raised from EPA Regions and from other stakeholders and to offer feedback more broadly to help support SIP development, submittal, review, and action for the second planning period (also referred to as the second implementation period). The memorandum provides a good balance of flexibility and accountability for states and sources to ensure that the regional haze program will continue to improve visibility in our national parks and wilderness areas.

EPA promulgated revisions to the Regional Haze Rule (RHR) in 2017[1] and in August 2019 issued *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period* (August 2019 Guidance or Guidance).[2] Since that time, air agencies and other stakeholders including industry, conservation organizations, and Federal Land Managers (FLMs) have raised various questions regarding RHR requirements as part of their SIP development for the second planning period. EPA recognizes and appreciates the work of all stakeholders in developing and providing feedback on SIPs so far. With the July 31, 2021, SIP deadline rapidly approaching, some states have already submitted final SIPs to EPA; some are undergoing public notice and comment processes at the state level, as well as other types of engagement; and some are still in the development phase. This memorandum highlights key aspects of the RHR and August 2019 Guidance in the context of questions and information shared from states and EPA Regional offices during SIP development.

[1] "Protection of Visibility: Amendments to Requirements for State Plans," 82 FR 3078 (January 10, 2017).
[2] Available at *https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf*.

EPA is committed to supporting state efforts to develop SIPs that comply with the Clean Air Act (CAA) and RHR as we work together in partnership to prevent any future, and remedy any existing, impairment of visibility in mandatory Class I Federal areas – America's treasured national parks and wilderness areas. EPA intends the second planning period of the regional haze program to secure meaningful reductions in visibility impairing pollutants that build on the significant progress states have already achieved. There exist many opportunities for states to leverage both ongoing and upcoming emission reductions under other CAA programs; however, we also expect states to undertake rigorous reasonable progress analyses that identify further opportunities to advance the national visibility goal consistent with the statutory and regulatory requirements.

This memorandum does not change or substitute for provisions or requirements of the CAA or RHR, nor does it create any new requirements. Rather, this memorandum clarifies and provides further information on the existing statutory and regulatory requirements. EPA evaluates and acts on states' SIP submissions on a case-by-case basis. The Agency reviews each submission against the applicable requirements; the Agency's approval or disapproval of a state's submission is subject to judicial review in the appropriate U.S. Circuit Court of Appeal pursuant to CAA section 307(b)(1). This memorandum does not constitute or prejudge EPA action on any state's submission but rather clarifies our interpretation of the applicable statutory and regulatory requirements against which submissions will be evaluated in subsequent, separate actions.

Non-mandatory language such as "guidance," "recommend," and "may" in this memorandum is intended to describe EPA's non-binding recommendations, while mandatory terminology such as "must," "required," and "may not" is intended to describe legal requirements under the CAA or EPA regulations. Neither such language nor anything else in this memorandum is intended to or does establish legally binding requirements in and of itself, and no part of this memorandum has legally binding effect or represents the consummation of Agency decision making. It is, therefore, not a final agency action and is not judicially reviewable.

1. Background

The regulatory requirements for states' second planning period SIPs are codified at 40 CFR 51.308(f). The August 2019 Guidance provides a suggested process for meeting these requirements and outlines eight key regional haze SIP development steps.[3] This memorandum addresses specific issues related to several of these steps in response to stakeholder questions and issues arising in draft SIPs. Specifically, Section 2 of this memorandum discusses source selection, Section 3 discusses characterization of factors for emission control measures, and Section 4 discusses decisions on what control measures are necessary to make reasonable progress. Section 5 discusses topics that span multiple steps in the Guidance: consideration of visibility in making control determinations, consideration of the five additional factors, characterizing visibility impacts and benefits, use of the uniform rate of progress (URP) is not a safe harbor, the contents of the long-term strategy, setting of reasonable progress goals (RPGs), and environmental justice.

[3] *See* August 2019 Guidance at 5-6.

2. Selection of Sources for Analysis

In reviewing draft SIPs, EPA has observed that states are applying an array of source selection methods and are, in some instances, relying on multi-state evaluations. In this context, multi-state or regional evaluations involve consideration of sources across more than one state and rank those sources based on their relative visibility impact. Based on these initial SIP reviews, this section reiterates key aspects of source selection in order to support Regional offices in working collaboratively with states on this issue. Consistent with RHR section 51.08(f)(2)(i), SIPs must include a description of the criteria the state used to determine the sources or groups of sources it evaluated for controls that may be necessary to make reasonable progress. "Step 3" of the August 2019 Guidance describes the process by which states determine, or select, sources for subsequent control analysis using the four statutory factors in CAA section 169A(g)(1). Source selection is a critical step in states' analytical processes. All subsequent determinations of what constitutes reasonable progress flow from states' initial decisions regarding the universe of pollutants and sources they will consider for the second planning period. States cannot reasonably determine that they are making reasonable progress if they have not adequately considered the contributors to visibility impairment. Thus, while states have discretion to reasonably select sources, this analysis should be designed and conducted to ensure that source selection results in a set of pollutants and sources the evaluation of which has the potential to meaningfully reduce their contributions to visibility impairment.

2.1. Factors to Consider for Source Selection

While reviewing draft regional haze SIPs, EPA has found that some rely on source selection methodologies that result in selection of the largest regional contributors to visibility impairment across multiple states. While this approach may be permissible in some cases, it may not be reasonable for a particular state if it results in few or no sources in that state being selected. Under the RHR, each state has an obligation to submit a long-term strategy that addresses the regional haze visibility impairment resulting from emissions from within that state.[4] This obligation is not discharged simply because another state's contributions to visibility impairment may be greater.

States have discretion to choose any source selection threshold or methodology that is reasonable; however, whatever choices states make should be reasonably explained and produce a reasonable outcome. The RHR does not explicitly list factors that states must or may not consider when selecting sources for analysis, but the August 2019 Guidance identifies several factors that states may consider. A state that relies on a visibility (or proxy for visibility impact) threshold to select sources for four-factor analysis should set the threshold at a level that captures a meaningful portion of the state's total contribution to visibility impairment to Class I areas. In applying a source selection methodology, states should focus on the in-state contribution to visibility impairment and not decline to select sources based on the fact that there are larger out-of-state contributors. What is reasonable will depend on the specific circumstances. We generally think that a threshold that captures only a small portion of a state's contribution to visibility impairment in Class I areas is more likely to be unreasonable. Similarly, a threshold that excludes a state's largest visibility impairing sources from selection is more likely to be unreasonable.

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[4] *See* 40 CFR 51.308(f)(2).

The 2017 RHR recognized that, due to the nature of regional haze (visibility impairment that is caused by the emissions of air pollutants from numerous anthropogenic sources located over a wide geographic area), numerous and sometimes (relatively) smaller in-state sources may need to be selected and evaluated for control measures as part of the reasonable progress analysis. As stated in response to comments on the 2017 RHR, "[a] state should not fail to address its many relatively low-impact sources merely because it only has such sources and another state has even more low-impact sources and/or some high impact sources."[5] In a source-selection process that relies on multi-state rankings of sources, impacts from large out-of-state sources can exceed the contributions from relatively smaller, but still important in-state sources. States should not use that fact to ignore selecting the largest in-state sources. In general, states with larger sources that contribute more to visibility impairment should select more sources, and states with relatively small sources compared to their neighbors should nonetheless select their largest in-state sources.

As an example, and purely for purposes of illustration, a 2,500 tons per year (tpy) source may not be considered "high impact" by some states depending on state-specific circumstances or as compared to a 25,000 tpy source in a nearby state. However, a state should still select the 2,500 tpy source if it is among the largest sources of visibility impairment in the state. Importantly, the numbers are offered as an illustration and should not be construed as broadly applicable thresholds for source selection; the appropriate threshold for a state to use will generally depend on the sources in each state. Moreover, we are not suggesting that states should select sources that have inarguably negligible impacts on visibility. Additionally, states should be consistent in their source selection. Absent a persuasive reason, a state should not select some sources for analysis but decline to select other, similarly situated sources (*e.g.*, in terms of emissions, visibility impacts, feasibility of controls). EPA anticipates that this overall approach would be consistent with the RHR and the CAA.

Finally, given the interstate nature of regional haze, other states that also contribute at a given Class I area and FLMs play important roles in addressing visibility impairment. Pursuant to the RHR, states must, therefore, consider selecting sources identified by other states[6] or by FLMs.[7] A state receiving a request to select a particular source(s) should either perform a four-factor analysis on the source(s) or provide a well-reasoned explanation as to why it is choosing not to do so.[8]

2.2. Pollutants Considered for Source Selection and Control Strategy Analysis

Consistent with the first planning period, EPA generally expects that each state will analyze sulfur dioxide (SO_2) and nitrogen oxide (NOx) in selecting sources and determining control measures.[9] In nearly all Class I areas, the largest particulate matter (PM) components of anthropogenic visibility impairment are sulfate and nitrate, caused primarily by PM precursors SO_2 and NOx, respectively. A state that chooses not to consider at least these two pollutants in the

[5] Responses to Comments on Protection of Visibility: Amendments to Requirements for States Plans; Proposed Rule (81 FR 26942, May 4, 2016) at 87-88, available at *https://www.regulations.gov/document/EPA-HQ-OAR-2015-0531-0635*.
[6] *See* 40 CFR 51.308(f)(2)(ii).
[7] *See* 40 CFR 51.308(i)(2)-(3).
[8] *See* 40 CFR 51.308(f)(2)(ii), (i)(2)-(3).
[9] *See* August 2019 Guidance at 12.

second planning period should show why such consideration would be unreasonable, especially if the state considered both these pollutants in the first planning period. Regional offices are encouraged to work closely with states to ensure the bases for their decisions are sufficiently developed to demonstrate a reasonable analysis.

2.3. Sources that are Not Selected Based on Existing Effective Controls

The August 2019 Guidance provides that a source that otherwise would undergo four-factor analysis (*e.g.*, because it exceeds a threshold of emissions divided by distance or Q/d, visibility, or other source-selection threshold) may forgo a full four-factor analysis if it is already "effectively controlled."[10] While this flexibility has the potential to streamline states' planning processes, states that identify "effectively controlled" sources need to explain why it is reasonable to assume that a four-factor analysis would likely result in the conclusion that no further controls are reasonable.

The underlying rationale for the "effective controls" flexibility is that if a source's emissions are already well controlled, it is unlikely that further cost-effective reductions are available. A state relying on an "effective control" to avoid performing a four-factor analysis for a source should demonstrate why, for that source specifically, a four-factor analysis would not result in new controls and would, therefore, be a futile exercise. States should first assess whether the source in question already operates an "effective control" as described in the August 2019 Guidance.[11] They should further consider information specific to the source, including recent actual and projected emission rates, to determine if the source could reasonably attain a lower rate. It may be difficult for a state to demonstrate that a four-factor analysis is futile for a source just because it has an "effective control" if it has recently operated at a significantly lower emission rate. In that case, a four-factor analysis may identify a lower emission rate (*e.g.*, associated with more efficient use of the "effective existing controls") that may be reasonable and thus necessary for reasonable progress. If a source can achieve, or is achieving, a lower emission rate using its existing measures than the rate assumed for the "effective control," a state should further analyze the lower emission rate(s) as a potential control option.

2.4. States that Select No Sources for Four-Factor Analysis

EPA has noted that multiple draft regional haze SIPs selected no sources for four-factor analysis. Although the August 2019 Guidance implied that there may be circumstances in which this might be reasonable,[12] we expect such circumstances to be rare given that anthropogenic visibility impairment remains in all Class I areas and that all states contains sources of visibility impairing pollutants.[13] We reiterate that a state that brings no sources forward for analysis of

[10] *See* August 2019 Guidance at 22-25.
[11] *Id.*
[12] *See* August 2019 Guidance at 10.
[13] *Cf.* "Approval and Promulgation of Air Quality Implementation Plans; District of Columbia; Regional Haze State Implementation Plan for the Second Implementation Period and Reasonably Available Control Technology for Major Stationary Sources of Nitrogen Oxides; Technical Amendment," 86 FR 1793, 19805-07 (April 15, 2021) (explaining that EPA proposed to find the District of Columbia's decision to not conduct four-factor analyses for any sources reasonable because, *inter alia*, the District does not contain any point sources with large emissions of visibility impairing pollutants and the largest point source is already effectively controlled).

control measures must explain how doing so is consistent with the statutory and regulatory requirements for SIPs to contain the measures necessary to make reasonable progress. In this case, the state is not merely asserting that its sources need no further controls to make reasonable progress, but that even identifying sources to analyze is a futile exercise because it is obvious that a four-factor analysis would not result in any new controls. Bringing no sources forward for source selection without a thoroughly justified explanation of why it is reasonable to forgo a four-factor analysis is inconsistent with the statutory and regulatory requirements because, as discussed in Section 3, the determination of reasonable progress is based on the consideration of the four statutory factors.

3. Characterization of Factors for Emission Control Measures

States must evaluate and determine the emission reduction measures, or controls, for selected sources that are necessary to make reasonable progress by considering the four statutory factors (costs of compliance, time necessary for compliance, energy and non-air quality environmental impacts of compliance, and the remaining useful life of any existing source).[14] That is, a state must apply the four factors to its selected sources, either individually or as a group. In light of our review of draft SIPs and questions from states, we are sharing feedback here regarding three key aspects of the four-factor analysis: the structure of the reasonable progress analysis; what control options states should consider in a reasonable four-factor analysis; and what constitutes a reasonable grouping of sources for four-factor analysis.

3.1. Relationship Between Four-Factor Analysis, Long-Term Strategy, and Reasonable Progress Goals

Over the course of recent discussions with states and stakeholders, we have realized that there is still some confusion regarding the relationship between the four-factor analysis, the long-term strategy, and RPGs. We are, therefore, reiterating our explanation from the 2017 RHR revisions that the four statutory factors are used to determine the emission reduction measures that are necessary to make reasonable progress and must, therefore, be included in a state's long-term strategy.[15] Reasonable progress towards natural visibility conditions at any particular Class I area is achieved when all contributing states are implementing the measures in their long-term strategies. RPGs are the modeled result of the measures in states' long-term strategies, as well as other measures required under the CAA (that have compliance dates on or before the end of 2028).[16] RPGs cannot be determined before states have conducted their four-factor analyses and determined the control measures that are necessary to make reasonable progress.[17]

[14] 40 CFR 51.308(f)(2)(i).

[15] 40 CFR 51.308(f)(2)(i), (f)(2); *see also* 82 FR at 3090-96.

[16] 40 CFR 51.308(f)(3).

[17] The August 2019 Guidance allows for the possibility of post-modeling adjustments to the RPGs to account for the fact that final long-term strategy decisions for the state or for other states may not be known until late in the process, or even after SIPs are submitted. *See* August 2019 Guidance at 46-48. *See also*, 82 FR 3078, 3080 (January 10, 2017).

3.2. Control Options for Four-Factor Analysis

We are providing additional feedback about the control measures that states should include in four-factor analyses for their sources. The four factors are used to assess and choose between emission reduction measures for sources of visibility impairing pollutants. A reasonable four-factor analysis will consider the full range of potentially reasonable options for reducing emissions. The August 2019 Guidance lists examples of different types of control measures that states may consider in their four-factor analyses for sources.[18] In addition to add-on controls and other retrofits, the Guidance also lists emission reductions through improved work practices; upgrades or replacements for existing, less effective controls; and year-round operation of existing controls.

Similarly, in some cases, states may be able to achieve greater control efficiencies, and, therefore, lower emission rates, using their existing measures. Considering efficiency improvements for an existing control (*e.g.*, using additional reagent to increase the efficiency of an existing scrubber) as a potential measure is generally reasonable since in many cases such improvements may only involve additional operation and maintenance costs. States should generally include efficiency improvements for sources' existing measures as control options in their four-factor analyses in addition to other types of emission reduction measures. In rare instances, increasing the efficiency of a control measure might result in adverse energy or non-air quality environmental impacts. If this is the case, such impacts should generally be addressed in the context of a four-factor analysis, rather than be used as a reason to not analyze increased efficiency of the measure in the first instance. We generally expect that most adverse energy and non-air quality environmental impacts of compliance are best assessed as part of the cost-effectiveness calculation; only in unusual circumstances do we anticipate that such impacts will preclude selection of an otherwise cost-effective control.

In addition to efficiency improvements, as part of a four-factor analysis states should consider recent actual and projected emission rates to determine if the source could otherwise reasonably attain a lower rate with its existing measures. This is especially important when a source has already achieved or is achieving a lower emission rate using its existing measures than the rate assumed in the baseline for its four-factor analysis. That is, a state might have assumed a conservatively high baseline emission rate for a source in its four-factor analysis, but the source has actually achieved, either currently or in recent years, a lower rate through status quo implementation of its existing measures. In this case, we expect the state to at least analyze the lower rate as a potential control option. It would be difficult for a state to demonstrate that there are no cost-effective emission reductions available for a source that has recently operated at significantly lower emission rates compared to the four-factor analysis baseline. That is, a four-factor analysis may identify a lower emission rate that may be necessary for reasonable progress.

3.3. Reasonable Grouping of Sources for Four-Factor Analysis

We also are clarifying that, although states have flexibility to consider the four factors for groups of sources, the reasonableness of grouping sources in any particular instance will depend on the circumstances and the manner in which grouping is conducted. If it is feasible to establish and enforce different requirements for sources or subgroups of sources, and if relevant factors can

[18] *See* August 2019 Guidance at 29-30.

be quantified for those sources or subgroups, then states should make a separate reasonable progress determination for each source or subgroup. For example, where a control measure is highly cost effective, results in large emissions reductions, and is identified as important for addressing visibility impairment by virtue of a source having been selected for four-factor analysis, the state should generally not reject that control by grouping the source together with other sources without similarly reasonable controls and then claiming that no controls should be required across the entire group. If the control is reasonable for the source, the state should generally require it.

4. Decisions on What Control Measures are Necessary to Make Reasonable Progress

EPA has received multiple questions from states and stakeholders asking what to do when a four-factor analysis concludes that no new emission control measures are reasonable for a source. The August 2019 Guidance addresses how, once a state has characterized the four statutory factors for the selected sources, it makes decisions on what emission control measures are necessary to make reasonable progress for the second planning period.[19] If four-factor analyses evaluate a reasonable range of potential control options, we anticipate that in many cases states will find that new (*i.e.*, additional) measures are necessary to make reasonable progress. All new measures must be included in the SIP.[20]

However, there may be other cases where, after having conducted robust source selection and rigorous analysis of the four factors, states have not identified any new measures that are reasonable to require for a source. In such cases, states will have to address whether the source's existing measures are necessary to make reasonable progress. The August 2019 Guidance provides that, "[i]f a state determines that an in-place emission control at a source is a measure that is necessary to make reasonable progress and there is not already an enforceable emission limit corresponding to that control in the SIP, the state is required to adopt emission limits based on those controls as part of its long-term strategy in the SIP via the regional haze second planning period plan submission."[21]

4.1. Determining When Existing Measures are Necessary for Reasonable Progress

States and stakeholders have raised a number of questions related to determining when in-place (*i.e.*, "existing") measures at a source are necessary for reasonable progress. The four-factor analysis is used to determine the emission control measures that are necessary to make reasonable progress towards the national visibility goal. That goal has two prongs: the prevention of any future anthropogenic visibility impairment and the remedying of any existing anthropogenic visibility impairment.[22] Existing visibility impairment is remedied by reducing emissions from existing sources. Future visibility impairment is prevented by mitigating impacts from new sources and ensuring that existing sources do not increase their emissions in a manner inconsistent with reasonable progress. Thus, when the outcome of a four-factor analysis is a new measure, that measure is needed to remedy existing visibility impairment and is necessary to make reasonable progress. When the outcome of a four-factor analysis is that no new measures are reasonable for a

[19] *See* August 2019 Guidance at 36-45.
[20] CAA 169A(b)(2); 40 CFR 51.308(f)(2).
[21] August 2019 Guidance at 43.
[22] *See* CAA section 169A(a)(1).

source, the source's existing measures are generally needed to prevent future visibility impairment (*i.e.*, to prevent future emission increases) and thus necessary to make reasonable progress. Measures that are necessary to make reasonable progress must be included in the SIP.

However, there may be circumstances in which a source's existing measures are not necessary to make reasonable progress. Specifically, if a state can demonstrate that a source will continue to implement its existing measures and will not increase its emission rate, it may not be necessary to require those measures under the regional haze program in order to prevent future emission increases. In this case, a state may reasonably conclude that a source's existing measures are not necessary to make reasonable progress and thus do not need to be included in the SIP. A determination that a source's existing measures are not necessary to make reasonable progress should be supported by a robust technical demonstration. This empirical, weight-of-evidence demonstration should be based on data and information on (1) the source's past implementation of its existing measures and its historical emission rate, (2) the source's projected emissions and emission rate, and (3) any enforceable emissions limits or other requirements related to the source's existing measures.

Information on a source's past performance using its existing measures may help to inform the expected future operation of that source. If either a source's implementation of its existing measures or the emission rate achieved using those measures has not been consistent in the past, it is not reasonable to assume that the source's emission rate will remain consistent and will not increase in the future. To this end, states should include data for a representative historical period demonstrating that the source has consistently implemented its existing measures and has achieved, using those measures, a reasonably consistent emission rate.[23] For most sources, data from the most recent 5 years (if available) is sufficient to make this showing. Information pertinent to a source's implementation of its existing measures going forward is also critical to a state's demonstration. States should provide data and information on the source's projected emission rate (*e.g.*, for 2028), including assumptions and inputs to those projections. States should justify those assumptions and inputs and explain why it is reasonable to expect that the source's emission rate will not increase in the future.

The existence of an enforceable emission limit or other enforceable requirement (*e.g.*, a work practice standard or operational limit) reflecting a source's existing measures may also be evidence that the source will continue implementing those measures. A federally enforceable and permanent requirement provides the greatest certainty and, therefore, is the preferred and best evidence. EPA will consider these and other types of limits and operational requirements as part of its weight-of-evidence evaluation. To be relevant, the limit should reflect the emission rate the source is actually achieving with its existing measures. A limit that is significantly higher than the emission rate a source is actually achieving does not keep the source from increasing its rate in the future. States should provide information on any enforceable emission limits associated with sources' existing measures. States should also clearly identify the instrument in which the relevant limit(s) exist (by providing, *e.g.*, the applicable permit number and where it can be found) and

[23] The information on emission rates should be representative of the typical averaging time of enforceable limits for the source. Typical averaging times for regional haze SIP measures are 30-day rolling averages or 30-day boiler operating day averages, but could also be shorter-term averages, (*e.g.*, pounds/hour) or may be expressed in different units (*e.g.*, pounds/ton of product produced).

provide information on the specific permit provision(s) on which they are relying. If the instrument is not publicly available or readily accessible, a state should provide a copy of the instrument to EPA with its SIP submission.

States may also provide any additional information they believe demonstrates that a source will continue to implement its existing measures and that its emission rate will not increase in the future. EPA will evaluate states' demonstrations to determine if they adequately support a determination that a source's existing measures are not necessary to make reasonable progress.

4.2. Existing Effective Controls

As noted in Section 2.3, states may rely on "existing effective controls" to not select a source for a full four-factor analysis. In determining whether such controls are necessary to make reasonable progress, states should follow the same approach as for existing measures. A decision to forgo a full four-factor analysis based on a source's existing effective controls is equivalent to a determination that no new measures are necessary to make reasonable progress. In this scenario, existing effective controls are, therefore, generally necessary to make reasonable progress and thus must be adopted into the regulatory portion of the SIP. However, the state may provide a weight-of-evidence demonstration as described in Section 4.1 to justify that the existing effective control is not necessary for reasonable progress.

4.3. "On-the-Way" Measures and Shutdowns

States and stakeholders have also asked about how to treat so-called "on-the way" measures. Generally, on-the-way measures include situations in which measures have not yet been implemented and the associated emissions reductions have not yet occurred as of the SIP submission date. If a state is relying on an on-the-way measure to achieve future emission reductions that are needed to remedy existing visibility impairment, that measure is necessary to make reasonable progress. Anticipated source shutdowns could be considered the most stringent on-the-way measure,[24] and may be relied upon to forgo a four-factor analysis or shorten the remaining useful life of a source.[25] In general, there is less certainty that a future control measure or shutdown will be implemented and permanent, or that it will actually achieve the emission reductions that are necessary to make reasonable progress. Therefore, on-the-way measures, including anticipated shutdowns that are relied on to forgo a four-factor analysis or to shorten the remaining useful life of a source, are necessary to make reasonable progress and must be included in a SIP.

[24] The August 2019 Guidance provides two ways in which states may rely on anticipated shutdowns in the reasonable progress analysis: to forgo conducting a four-factor analysis for a source or to shorten the remaining useful life of a source for the purpose of a four-factor analysis. *See* August 2019 Guidance at 20 and 34, respectively.

[25] *See* August 2019 Guidance at 20, 34.

4.4. Ongoing Evaluation of the Adequacy of Existing Measures

A state's determination that an existing measure is not necessary to make reasonable progress depends on a well-supported demonstration about the future implementation of that measure. EPA anticipates conducting robust evaluations of these determinations not only when acting on the SIP submission, but also as the planning period moves forward.

There are several available tools for states and EPA to report and track emissions. First, the RHR contains a mechanism for states and EPA to evaluate whether existing SIP-based emissions limits are sufficient to achieve reasonable progress. States are required to submit periodic reports describing their progress towards the reasonable progress goals for each Class I area within the state and each Class I area outside the state that may be affected by emissions from within the state. For the second planning period, states' progress reports are due January 31, 2025.[26] As part of this report, states must assess whether their SIPs contain adequate enforceable emission limitations and other elements to ensure that their sources will achieve reasonable progress the second planning period. Additionally, 40 CFR 51.308(h) requires states, at the same time they submit their progress reports, to determine whether their SIPs are adequate to ensure reasonable progress. If a state determines that its SIP is inadequate to ensure reasonable progress due to emissions from sources within the state, the RHR requires that state to revise its SIP within 1 year to address the deficiencies.[27]

EPA expects to use states' progress reports, and the assessments required under 40 CFR 51.308(g)(6) and determinations under 40 CFR 51.308(h) in particular, as a check on whether sources are continuing to implement any existing measures a state determined were not necessary to make reasonable progress and, therefore, not required under the regional haze program. In addition, sources are required to report emissions data on an ongoing basis under several EPA programs, such as the Air Emissions Reporting Rule (40 CFR Appendix A to Part 51) and Continuous Emissions Monitoring (40 CFR Part 75). If at any point a source's emission rate increases to an extent that its existing SIP is inadequate to ensure reasonable progress, EPA has the authority to address such a scenario (*e.g.*, under CAA sections 110(k)(5) and (6)).

4.5. Form of Emission Limit

EPA has received several questions from states and stakeholders about establishing emission limits, with a specific focus on existing measures that are necessary to make reasonable progress and must be included in the SIP. This section provides feedback on what SIP-based emission limits, whether for new or existing measures, should reflect. In general, an emission limit reflecting a source's existing measures that are necessary to make reasonable progress should be in the form of the emission rate achieved when implementing those measures (*e.g.*, pounds per million British thermal units or lbs/MMBtu, pounds per hour or lbs/hr, or pounds per ton or lbs/ton of produced material). For either a new or existing measure, states will have considered a specific emissions rate that can be achieved through implementation of that measure.[28] We, therefore,

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[26] 40 CFR 51.308(g).
[27] 40 CFR 51.308(h)(4).
[28] As explained in section 3.2, if a source is able to achieve a lower emissions rate using its existing measure than the rate assumed in the baseline for its four-factor analysis, the state should consider that lower emissions rate as a potential control option.

expect that when a state that has determined a source's existing measures are necessary to make reasonable progress, it will effectively have determined that implementation of those measures *to achieve a particular emission rate* is necessary to make reasonable progress. The SIP-based emission limit for that source should correspond to the emission rate that was determined to be necessary to make reasonable progress.

Additionally, for the purpose of a four-factor analysis for a particular source, a state may have assumed significantly lower baseline emissions (total emissions by mass) due to a projected reduction in utilization or production. This issue has come up in some SIPs and has implications for both new and existing measures. As explained in the August 2019 Guidance, reasonable bases for projecting that future emissions will be significantly different than past emissions are enforceable requirements and energy efficiency, renewable energy, or other similar programs, where there is a documented commitment to participate and a verifiable basis for quantifying changes in future emissions. However, in some cases states may have projected significantly lower total emissions due to unenforceable utilization or production assumptions and those projections are dispositive of the four-factor analysis. For example, a state that rejected new controls solely based on cost effectiveness values that were higher due to low utilization assumptions. In this circumstance, an emission limit that requires compliance with only an emission rate may not be able to reasonably ensure that the source's future emissions will be consistent with the assumptions relied upon for the reasonable progress determination. EPA anticipates these circumstances will be rare. One option a state may consider in this case is to incorporate a utilization or production limit corresponding to the assumption in the four-factor analysis into the SIP. Although not required, this approach is one way for states to address circumstances in which a specific emission rate does not, by itself, represent the reasonable progress determination. That is, EPA would not require a state to lock-in the exact emission levels (tons of pollutant) a source assumed for the purpose of its four-factor analysis or the 2028 projected emission levels (tons of pollutant) assumed in air quality modeling analyses. An alternative approach would be to perform the four-factor analysis using recent historical utilization or production levels as the baseline. A revised four-factor analysis may show that cost-effective controls are available at the source's current or recent historical utilization or production.

5. Additional Issues Related to Assessing Control Measures

This section discusses the following additional issues, which span multiple steps as laid out in the August 2019 Guidance:

- Additional factors to evaluate emission controls (including visibility and the five "additional factors" listed in the RHR)
- Characterizing visibility impacts and benefits
- URP is not a safe harbor
- Contents of the long-term strategy and setting of RPGs
- Environmental justice considerations

5.1. Visibility as an Additional Factor

EPA has interpreted the CAA and RHR as allowing states to consider visibility alongside the four statutory factors when determining the emission reduction measures that are necessary to make reasonable progress. We have explained that:

> While the CAA lists the four reasonable progress factors, it is silent as to whether states or the EPA may consider other, additional factors. This final rule neither requires nor prohibits states from considering visibility when making reasonable progress determinations. . . . However, a state that elects to consider an additional factor such as visibility benefit must consider it in a reasonable way that does not undermine or nullify the role of the four statutory factors in determining what controls are necessary to make reasonable progress.[29]

Specifically, a state should not use visibility to summarily dismiss cost-effective potential controls. However, visibility benefits can be used alongside the four statutory factors when comparing multiple emission control options. For instance, the approach taken for Best Available Retrofit Technology (BART) determinations in the first planning period could be used as a model.[30] That is, for a source with multiple cost-effective controls, a state may balance visibility with cost effectiveness and other statutory factors in selecting a reasonable control. Another potentially reasonable approach might be for a state that identifies cost-effective new controls at a multitude of sources to choose to require controls at only a subset of those sources that constitute the vast majority of the visibility benefit. In this case, the state could rely on visibility benefits to prioritize which sources would receive new controls. By contrast, a state that has identified cost-effective controls for its sources but rejects most (or all) such cost-effective controls across those sources based on visibility benefits is likely to be improperly using visibility as an additional factor.

5.2. Consideration of the Five "Additional Factors"

We are aware that some states are using the five additional regulatory factors, in particular 40 CFR 51.308(f)(2)(iv)(A) and (E), to reject controls that are otherwise reasonable based on the four statutory factors. In the August 2019 Guidance, EPA provided that states may consider the five "additional factors" in section 51.308(f)(2)(iv) in making their emission control determinations.[31] However, a state should generally not reject cost-effective and otherwise reasonable controls merely because there have been emission reductions since the first planning period owing to other ongoing air pollution control programs or merely because visibility is otherwise projected to improve at Class I areas. More broadly, we do not think a state should rely on these two additional factors to summarily assert that the state has already made sufficient progress and, therefore, no sources need to be selected or no new controls are needed regardless of the outcome of four-factor analyses. Doing so would be similar in principle as relying on URP as a safe harbor, which we have consistently stated does not comport with the RHR, as noted in Section 5.4. We do think states can consider these factors in a more tailored manner, for instance in choosing between multiple control options when all are reasonable based on the four statutory factors.

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[29] Response to Comments on Protection of Visibility: Amendments to Requirements for State Plans; Proposed Rule at 186.
[30] *See* 40 CFR 51.308(e)(1)(ii)(A).
[31] *See* August 2019 Guidance at 21.

5.3. Characterizing Visibility Impacts/Benefits

We have observed that some draft SIPs are using modeled visibility benefits to justify rejecting otherwise cost-effective control measures. It is important that, where applicable, each state considers the magnitude of modeled visibility impacts or benefits[32] in the context of its own contribution to visibility impairment. That is, whether a particular visibility impact or change is "meaningful" should be assessed in the context of the individual state's contribution to visibility impairment, rather than total impairment at a Class I area. As stated in the RHR preamble:

> Regional haze is visibility impairment that is caused by the emission of air pollutants from numerous sources located over a wide geographic area. At any given Class I area, hundreds or even thousands of individual sources may contribute to regional haze. Thus, it would not be appropriate for a state to reject a control measure (or measures) because its effect on the RPG is subjectively assessed as not "meaningful." [33]

EPA recognizes the significant improvements in visibility that have already occurred in most Class I areas but notes that additional progress is needed to achieve the national goal set by Congress. Evaluation of control measures for relatively smaller sources (with commensurate smaller visibility benefits from each individual source) will be needed to continue making reasonable progress towards the national goal. This is true for the second planning period, as many of the largest individual visibility impairing sources have either already been controlled (under the RHR or other CAA or state programs) or have retired. To this end, EPA is reiterating that visibility thresholds used for BART and other analyses in the first planning period (*e.g.*, 0.5 deciviews) are, in most cases, not appropriate thresholds for selecting sources or evaluating the impact of controls for reasonable progress in the second planning period. This is the case for several reasons.

First, regional haze is caused by hundreds or thousands of individual sources and very few remaining sources (or even none of them) will individually have impacts as large as 0.5 deciviews or some other threshold that might be considered a "perceptible" or "meaningful" impact. However, these sources still contribute to visibility impairment and have a meaningful impact in the aggregate. Second, the magnitude of the previously recommended subject-to-BART threshold (0.5 deciviews) was closely tied to the specific modeling tools and metrics recommended in the BART Guidelines,[34] as well as to the purpose and structure of the BART provisions.[35] For the second planning period, most states that are both establishing RPGs and (where applicable) evaluating individual source or sector visibility impacts, are using photochemical models with a focus on visibility impacts averaged over the 20 percent most impaired days at each Class I area. The difference in technical tools as well as emissions assumptions and impact metrics make any comparison of the modeling for the second planning period to the previous BART modeling an "apples-to-oranges" analysis.

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[32] As explained in the August 2019 Guidance, modeled visibility impacts can be expressed in either inverse megameters (Mm^{-1}) or deciviews (dv). However, if visibility impacts are expressed in deciviews, the value should be calculated relative to natural conditions. *See* August 2019 Guidance page 16 and footnotes 36, 37, and 38.

[33] 82 FR at 3093.

[34] 40 CFR part 51 appendix Y, Guidelines for BART Determinations Under the Regional Haze Rule § III.

[35] *See also* August 2019 Guidance footnote 41.

The differences between approaches include the type and number of days considered for a single source analysis, the emissions used to represent a single source, and metrics used to express visibility impacts. In particular, the BART Guidelines recommended modeling the highest measured daily emissions for a source, using the same high emissions value for every day of the year, in conjunction with a 98th percentile visibility metric that focused on the days with the largest visibility impact *from the source*. In addition, BART modeling assessments used 3 consecutive years to capture meteorological regimes that would be most conducive to high source impacts at a given downwind receptor. That makes the BART modeling results particularly conservative compared to current photochemical modeling that generally uses actual hourly and daily emissions, and typically evaluates visibility impacts averaged over the 20 percent most impaired days for a single year (representing the days with the largest anthropogenic visibility impairment at the Class I area receptors, not the days with the largest visibility impacts from the source). In many cases, the difference in the form of the modeled emissions and the visibility impact metrics alone could account for BART Guideline modeling impacts that are an order of magnitude, or more, higher than typical photochemical modeling impacts averaged over the 20 percent most impaired days for a single year.

Additionally, the August 2019 Guidance discusses other metrics[36] that may be appropriate for evaluating visibility impacts from individual sources, and notes that modeling a single year of meteorology and evaluating impacts only on the 20 percent most impaired days may not fully capture visibility impacts from an individual source at a given Class I area. The Guidance suggests that other metrics such as the maximum daily impact over the year may be a more meaningful metric for examining individual source impacts.[37] If available, visibility impacts from individual sectors and sources can also be evaluated as a fraction of state and/or total U.S. anthropogenic visibility impairment at a Class I area. Evaluating a source's or sector's visibility impact as a fraction of *anthropogenic* impairment is preferable to calculating impacts relative to *total* impairment since anthropogenic impairment is directly relevant to determining what constitutes reasonable progress towards the national goal. As noted elsewhere, a source's visibility impact relative to a *state's* total contribution to visibility impairment is relevant to ensuring that a state is addressing its own contribution regardless of what other states are doing.

5.4. Uniform Rate of Progress is Not a "Safe Harbor"

EPA has reviewed several draft second planning period regional haze SIPs that conclude that additional controls, including potentially cost-effective and otherwise reasonable controls, are not needed because all of the Class I areas in the state (and those out-of-state areas affected by emissions from the state) are below their uniform rates of progress (URPs). The 2017 RHR preamble and the August 2019 Guidance clearly state that it is not appropriate to use the URP in this way, *i.e.,* as a "safe harbor." The URP is a planning metric used to gauge the amount of progress made thus far and the amount left to make. It is not based on consideration of the four statutory factors and, therefore, cannot answer the question of whether the amount of progress made in any particular implementation period is "reasonable progress." This concept was explained in the RHR preamble.[38] Therefore, states must select a reasonable number sources and

[36] *See* August 2019 Guidance at 35.
[37] *See* August 2019 Guidance at 15-16 and 35.
[38] 82 FR at 3099.

evaluate and determine emission reduction measures that are necessary to make reasonable progress by considering the four statutory factors.

5.5. Contents of the Long-term Strategy and Setting RPGs

EPA has observed that, in some instances, states are not clearly articulating what measures are necessary for reasonable progress and being submitted for inclusion in the regulatory portion of their SIPs. Pursuant to CAA section 169A(b)(2) and 40 CFR 51.308(f)(2), the measures that are necessary to make reasonable progress must be included in a state's long-term strategy. States should clearly identify in their SIP narratives the emission reduction measures they have determined are necessary to make reasonable progress, as well as the corresponding emission limits and supporting conditions to make those limits practicably enforceable[39] that will be included in the regulatory portion of their SIPs. We note that states may also in their discretion identify additional measures, beyond what is necessary to make reasonable progress, for inclusion in the long-term strategy. Such optional measures do not, however, satisfy a state's obligation to identify the measures that are necessary to make reasonable progress by considering the four statutory factors and include those measures in the long-term strategy.

5.6. Environmental Justice

EPA encourages states to consider whether there may be equity and environmental justice impacts when developing their regional haze strategies for the second planning period. This consideration could occur in different ways, including undertaking meaningful outreach to environmental justice communities; ensuring adequate opportunity for feedback on states' proposed strategies; and considering equity and environmental justice impacts as part of the technical analyses supporting the SIP, including source selection and four-factor analyses. For example, states could consider environmental justice when they consider the appropriate inclusivity of source selection and the suite of emissions control options that should be analyzed, and when they exercise their discretion in determining what is necessary to make reasonable progress towards the national visibility goal. In general, we encourage states to be aware of where sources of visibility impairing air pollutants are located and impacts, they may have on environmental justice communities. States have discretion to consider environmental justice in determining the measures that are necessary to make reasonable progress and formulating their long-term strategies, as long as such consideration is reasonable and not contrary to the regional haze requirements.

6. Conclusion

EPA appreciates all the efforts of stakeholders, states, and Regional offices to support development of second planning period SIPs that are consistent with the RHR and the CAA. This memorandum is intended to broadly share specific issues and information commonly arising during SIP development in an effort to continue to support development of approvable SIPs. We appreciate that Regional offices will continue to be engaged with states and provide feedback on these and other aspects of draft second planning period SIPs. Additional consultation and coordination requirements of the RHR provide states with important information and

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[39] *See* August 2019 Guidance at 42-43.

considerations from FLMs and other states relevant to the reasonable progress analysis. Regional offices are encouraged to urge states to consider that feedback and engage in timely and complete consultations to support development of approvable SIPs.

Please share this memorandum with your staff, as well as colleagues at state, local, and tribal air agencies. If states or stakeholders have state-specific questions, we encourage them to reach out to relevant Regional office contacts. If you have any questions concerning this memorandum, please contact Vera Kornylak, Associate Director of the Air Quality Policy Division at *kornylak.vera@epa.gov* or (919) 541-4067. This memorandum is posted on EPA's visibility website at: *https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation*.

May 12, 2021

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Re: Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans

Dear Chief Gore, Director Koerner, Chief Hays, Director Duff, Chief Fortenberry, Director Abraczinskas, Chief Thompson, Director Walker Owenby, Director Dowd, Director Crowder, and Director Rivera;

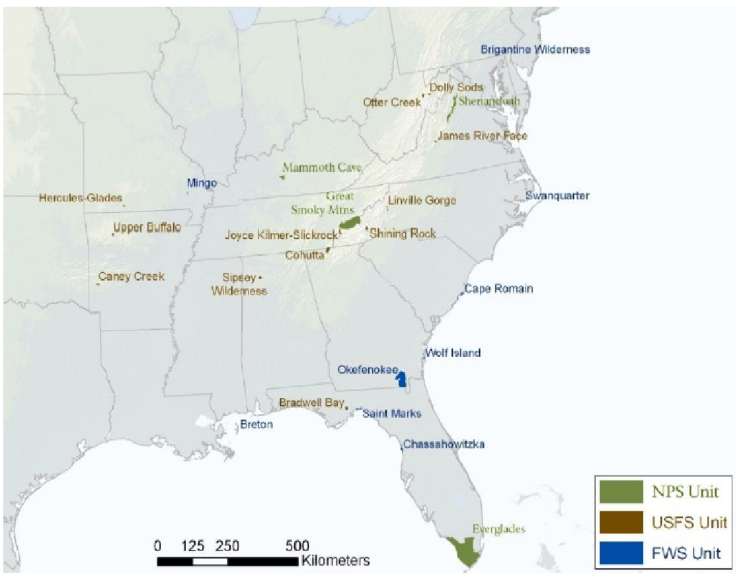
We write today to express our serious concerns with the path Southeastern states are following for the respective regional haze State Implementation Plan (SIP) planning processes. The Regional Haze Rule is the Clean Air Act's time-tested, effective program that requires federal and state agencies to evaluate measures to restore clear skies at Class I Areas around the country. In order to meet this requirement, state SIPs are due to the Environmental Protection Agency (EPA) in 2021 specifying the pollution reducing measures they will require to make progress towards natural visibility. We commissioned an expert modeler to better understand the VISTAS approach and found critical problems with the VISTAS model itself as well as the approach recommended to Southeastern states. Based on the assessment of the independent expert, separate NPCA analysis and information provided by states and federal land managers, we believe Southeastern states intend to exclude a number of sources that emit a significant level of visibility impairing pollution from review for pollution controls in their second-round regional haze plans.

We recognize the significant amount of work that all VISTAS states have put forth into the combined effort to share resources in planning for Regional Haze compliance and offer our concerns and input in the spirit of a shared goal toward protection of our nation's most treasured wild landscapes – our national parks and wilderness areas. Clean air in these places means that their unique and delicate ecosystems will continue to thrive, inspire and support all of us and the economies that depend on them, whether through recreation and adventure or retreat and introspection. Delivering clean air to these places can also mean achieving goals toward protecting our most vulnerable populations and efficiently achieving other regulatory challenges.

Introduction

The Visibility Improvement State and Tribal Association of the Southeast (VISTAS)[1] conducted an extensive visibility modeling effort (VISTAS II Comprehensive Air Quality Model with Extensions (CAMx) modeling),[2, 3] which was intended to assist each of your states in the development of the second-round regional haze SIPs. The specific goal of the modeling effort was to identify pollution sources negatively affecting Class I Area air quality, thus meriting evaluation through the Clean Air Act's (CAA) four-factor reasonable progress analysis to reduce visibility impairing pollution in the 18 national parks and wilderness areas located within the VISTAS region.

Figure I. Class I Areas Within the VISTAS Region.



The National Park Conservation Association (NPCA) commissioned an independent modeling expert, Howard Gebhart, to conduct a technical review of the VISTAS II CAMx modeling effort.[4] NPCA's review reveals that the VISTAS modeling

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[1] VISTAS is comprised of the following states, local air agency and Tribes: Alabama, Florida, Georgia, Kentucky, Mississippi, North Caroline, South Carolina, Tennessee, Virginia, and West Virginia, the Eastern Band of Cherokee Indians, and Knox County, Tennessee.

[2] VISTAS Regional Haze Program, *see generally*, https://www.metro4-sesarm.org/content/vistas-regional-haze-program; VISTAS Regional Haze Project, Regional Haze Modeling: Task 6, "Regional Haze Modeling for Southeastern VISTAS II Regional Haze Analysis Project Final Modeling Protocol Update and Addendum to the Approved Modeling Protocol for Task 6.1" (June 2018, Final - August 31, 2020), https://www.metro4-sesarm.org/content/task-6-air-quality-modeling ; *see also,* VISTAS Regional Haze Project Update (May 20, 2020), https://www.metro4-sesarm.org/content/vistas-haze-presentations.

[3] Commenters note that EPA's approval of regional haze modeling and SIP plans can only come after public notice and comment through the federal register process.

[4] See enclosed report, "Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans," (May 2021) ("Gebhart Report"), prepared by Mr. Howard Gebhart. Mr. Gebhart's Curriculum Vitae is enclosed.

effort suffers from numerous flaws and, should Southeastern states follow its parameters, will likely result in SIPs that will not be compliant with the Regional Haze Rule and Clean Air Act. If the Southeastern states are to only rely on the VISTAS II CAMx methodology, states will be ignoring the hundreds of industrial facilities and coal-fired power plants that are significant pollution sources identified by the National Park Service (NPS) and NPCA. Cognizant of the 2021 deadline for the states to submit the second round regional haze SIP to EPA, this letter concludes with a list of recommendations to resolve these flaws and asks Southeastern states to consider environmental justice intersections in their planning process.

1. *Summary of VISTAS Flawed Modeling Input and Methodology Used to Identify Sources*

NPCA's commissioned independent review reveals that the VISTAS modeling effort suffers from four serious flaws summarized in Table I and further discussed below.

Table 1. Summary of VISTAS II CAMx Modeling Flaws and Consequences.

	Flawed Modeling Inputs and Methods	Consequences of Reliance on VISTAS Inputs By States in Preparing SIPs
1	Inaccurately reflects sulfate concentrations in the Southeast U.S.	Would excuse heavy sulfur dioxide (SO_2) polluters from review.
2	Used Electric Generating Unit (EGU) emission profiles from 2011 to project the EGUs emissions in 2028, inaccurately assuming that EGUs will operate in 2028 as they did in 2011.	Would fail to identify EGUs that must be analyzed for emission reductions because the model results do not accurately reflect the actual/most recent EGUs' contributions to visibility impairment.
3	Used outdated monitoring data that does not represent the dramatic shift in nitrate contribution to visibility impairment in the Southeast over the last 5-10 years. This shift was not reflected in future predictions.	Would erroneously exclude problematic sources from review and avoid emission controls for large NO_X emitting sources because the modeling inputs failed to properly identify EGUs and other point sources with large NO_X emissions as contributing to CIA visibility impairment.
4	Used high thresholds and unnecessary filters to select sources to analyze for emission reducing measures.	Would result in an unreasonably low number of industrial sources selected by each state for an emission control reasonable progress four-factor analysis.

2. *VISTAS' High Threshold and Additional Methodology Excluded Polluting Facilities that Should be Addressed and Considered for Emission Reducing SIP Measures*

By relying on the flawed VISTAS modeling to select which polluting sources to review for emission reductions, the Southeastern states plan to ignore hundreds of significant emission sources. According to NPCA's analysis, the Southeastern states SIPs would

- Ignore 309 sources from consideration in their haze plans;
- Allow 343,426 tons of NO_X and 183,458 tons of SO_2 emissions to continue dirtying the air in our national parks and wilderness areas and communities;[5] and
- Ignore the fact that 60 of these sources are located in environmental justice communities of color and 89% of the 309 facilities are in communities living below the poverty line.[6]

Table 2. Comparison of the Number of Sources Selected by NPCA, NPS, and VISTAS in the Southeast Region for Reasonable Progress Four-Factor Analysis

	Number of Sources Identified By				
State	NPCA[7]	NPS	VISTAS[8]	State	Source Categories Identified by NPCA
AL	45	34	1	Not available (NA)[9]	Power Plants, Paper, Oil and Gas, Chemical, Iron and Steel

[5] Emissions data was obtained from EPA's 2017 National Emissions Inventory (NEI) and EPA's 2019 Air Markets Data Program (AMPD) for power plants.
[6] Demographic and economic characteristics obtained from the US Census Bureau's American Community Survey 5-year estimates for 2012-2016 at the county level.
[7] NPCA's analysis and a list of sources for each of the VISTAS' states was sent to each state in the fall of 2020 via letters; s*ee also,* https://www.npca.org/regionalhaze. NPCA's nationwide analysis included the sources on the tribal reservations, however, there are no sources located on the Eastern Band of Cherokee Indians Reservation.
[8] VISTAS Regional Haze Project Update, Stakeholder Briefing at 122 (May 20, 2020), https://www.metro4-sesarm.org/sites/default/files/VISTAS%20Pres%20Stakeholders%20Final%20200520.pdf.
[9] Alabama, and the other states similarly identified, have not made the source selection information available to the public.

FL	70	27	10	4	Cement, Paper, Fertilizer, Power Plants, Airports, Cane Sugar, Oil and Gas, Chemical
GA	34	31	3	NA	Power Plants, Paper, Cement, Oil and Gas, Airports, Glass
KY	29	34	2	NA	Power Plants, Lime, Cement, Oil and Gas, Iron and Steel
MS	16	8	0	NA	Power Plants, Oil and Gas, Paper, Iron and Steel, Airports
NC	25	20	3	3	Power Plants, Paper, Iron and Steel, Airports, Glass
SC	19	19	5	NA	Power Plants, Paper, Cement, Iron and Steel, Airports, Glass
TN	23	27	2	2	Power Plants, Paper, Cement, Iron and Steel, Oil and Gas, Airports, Glass
VA	30	35	2	2	Power Plants, Paper, Chemical, Cement, Oil and Gas, Lime, Airports.
WV	17	21	5	NA	Power Plants, Cement, Iron and Steel, Oil and Gas, Coal Mining, Paper
TOTAL	342	256	33	NR[10]	

3. *Detailed Discussion of the Flaws in VISTAS' Modeling Inputs and Methodology*

NPCA's independent analysis found that the VISTAS modeling inputs and methodology resulted in four serious issues, which are further explained below.

i. VISTAS' modeling results do not accurately reflect sulfate concentrations and would excuse heavy SO_2 polluters from review.

NPCA's expert found that the modeling inputs used by VISTAS from its 2011 baseline are outdated and do not account for the actual amount of sulfate that is polluting the Class I Areas in the Southeast. Specifically, the model is underpredicting sulfate concentrations by up to 32%.[11] The VISTAS II modeling results did not address

[10] This number is not relevant as less than half of the states have shared the source selections with the public.

[11] VISTAS failed to address and account for the large and significant sulfate and organic carbon underpredictions revealed in the Model Performance Evaluation (MPE) from the 2011 baseline CAMx modeling effort.

the known bias in sulfate underpredictions, which also affects other areas of the modeling analysis.

The sulfate error underpredictions were larger in the summer. This is inconsistent with what is known about sulfate extinction because during the summer it is the greatest contributor to visibility impairment. This underprediction is crucial because the model results are not accurately predicting the sulfate levels during the period when visibility is most problematic in the Class I Areas. This modeling error results in the exclusion of sources for SO_2 emission reduction evaluations. Unless the large sulfate underprediction is corrected, the VISTAS modeling results are not reliable and Southeastern states should not use the model results without otherwise accurately accounting for the known sulfate bias. Furthermore, the Regional Haze Rule requires that states use the most up-to-date pollution data available in their consideration of source selection. Therefore, VISTAS states ought to have considered 2014-2018 or 2015-2019 available data.

ii. Southeastern states modeling inputs used unreasonable emissions projections for 2028 emissions from the EGUs, which produced model results that do not accurately reflect the EGUs' contributions to visibility impairment, resulting in exclusion of EGUs that must be analyzed for emission reductions.

In order to estimate the expected emissions from EGUs in 2028, which is the end of the second regional haze planning period, VISTAS incorrectly projected the hourly, daily, and seasonal emissions using emission data profiles developed and used in 2011. VISTAS inaccurately assumed that EGUs will operate in 2028 as they did in 2011. Given the shifts in the electric utility industry over the last decade, many EGUs are being used to balance peak loads as opposed to meeting the normal baseline electric load on the grid as they were in years past. By projecting that 2011 emissions from EGUs would hold steady in 2028, the VISTAS emission projections failed to account for the dramatic shift in EGUs generation.[12]

Due to the erroneous emission projections from EGUs, the VISTAS modeling results did not accurately reflect the sources' contributions to Class I Area visibility impairment. The NPCA analysis identified 56 EGUs potentially affecting visibility in the southeast region, out of which 51 are coal-fired. In contrast, VISTAS identified only 14 EGUs. Therefore, VISTAS failed to select the appropriate number of EGU sources from this sector - outright ignoring 37 EGUs Southeastern states should consider. While many EGUs may be retired or operate at less capacity in the coming years, retirements and reduced capacity may only be relied upon if there are enforceable obligations in the state's haze SIP to ensure pollution reductions. Failing that, source reductions should not be counted in the 2028 projection nor should the source be excluded from a four-factor analysis. Because of the erroneous data input and lack of practically

[12] There are other emission issues with the less frequent use of the power plants (e.g., less efficiency, more pollution on startups and poorer operation of pollution control devices).

enforceable SIP emission limits, the states must not rely on the VISTAS approach for analyzing EGUs.

iii. Southeastern states use outdated monitoring data that does not represent the dramatic shift in nitrate contribution to visibility impairment, which erroneously excluded from review the sources emitting nitrogen oxides (NO_X).

The VISTAS modeling used monitoring data from the 2009-2013 period for analyzing visibility impacts in Class I Areas.[13] This approach is flawed because the nitrate *contribution to visibility impairment* have shifted dramatically since the 2009-2013 period in the southeast Class I Areas. According to recent observations (2014-2018), the nitrate contribution to visibility impairment in the Southeastern region has doubled and, in some areas, tripled as compared to the 2009-2013 period that VISTAS used. Since the future emissions modeled by VISTAS were based on a period when the nitrate *contribution to visibility impairment* were lower, the significant shift of nitrate was not accurately reflected in the future emission projections. The states must not use the VISTAS modeling results, which used outdated and erroneous nitrate *contribution to visibility impairment* not representative of current levels, which would exclude from review sources emitting NO_X, particularly coal-fired EGUs and point sources with large NO_X emissions. Following such an approach in the SIP would allow these significant polluters to increase nitrates harming Class I Areas.

iv. The VISTAS modeling methodology approach used high thresholds and additional unnecessary filters that resulted in an unreasonably low number of sources chosen for consideration of the four-factor reasonable progress analyses. The VISTAS analysis failed to consider all visibility impairing pollutants and failed to consider them together.

VISTAS' approach to select sources used two steps. First, VISTAS used a screening analysis (Area of Influence, AOI) to identify potential sources of visibility impairment impacting Class I Areas. Second, the sources identified using the AOI analysis were further screened and winnowed by the Particulate Matter Source Apportionment Technology (PSAT), which introduced additional errors.[14] Both screening methods use arbitrary and high thresholds that substantially restrict the number of sources analyzed. Instead of assessing a number closer to the 342 sources of concern identified by NPCA or the 256 sources identified by the National Park Service (NPS), VISTAS identified only 33 sources across all ten states. The use of the high and

[13] VISTAS erroneously used the 20% most-impaired days from 2009-2013 Interagency Monitoring of Protected Visual Environments (IMPROVE) measurement data for the 2028 model projection.
[14] VISTAS flawed PSAT "tagged" modeling approach contained the following errors: (1) relied on an outdated and inaccurate emission inventory; (2) provided incomplete information on source-specific contributions to visibility impairment; and (2) carried forward known the Model Performance Evaluation (MPE) deficiencies identified in 2011 without addressing them. The PSAT analysis was made for sulfate and nitrate contributions individually. In reality, these pollutants do not exist individually but mix in the atmosphere. Despite this fact, VISTAS did not calculate or evaluate the total impact of sulfate and nitrate on visibility.

improper thresholds results in too few sources being selected by states across the region. The omission of these sources is a major issue to ensuring states make reasonable progress on regional haze because many of the non-selected sources will continue to emit pollution without emission reduction measures that are intended to protect Class I Areas. The VISTAS approach, and ultimately the states' attempt to limit the number of sources subject to the four-factor emissions control analysis through a faulty methodology and the use of high thresholds is fundamentally flawed and contrary to congressional intent and EPA's Regional Haze regulations.

The Clean Air Act and Regional Haze Rule identify additional visibility impairing pollutants beyond sulfur dioxide and nitrogen oxide. However, VISTAS did not account for emissions beyond these two pollutants. The effect from other visibility impairing pollutants such as particulate matter (PM) and volatile organic compounds (VOCs) were not included in VISTAS' modeling effort, problematically omitting additional haze emitting sources from consideration. Moreover, the PSAT analysis evaluated sulfate and nitrate contributions separately.[15] However, these pollutants do not exist separately and their contributions to visibility impairment are additive. Despite this fact, VISTAS did not calculate or evaluate the combined total impact of sulfate and nitrate on visibility.

Recommendations and Conclusion

The ten Southeastern states must develop regional haze SIPs that are compliant with the Regional Haze Rule and Clean Air Act and actually make reasonable progress toward cleaner, less hazy skies in our Class I Areas. Where regional haze SIPs are found to be deficient, EPA will need to replace them with federal provisions. Given that it appears all Southeastern states will rely on the VISTAS model and approach, we provide the following recommendations with the aim of encouraging states to develop regional haze plans that adequately contribute towards the national goal of restoring natural visibility conditions across Class I Areas:

- Lower the threshold for source selection such that all Southeastern states evaluate sources that represent a significant level of their visibility impairing emissions under a four-factor analysis. The 2016 Proposed Regional Haze Guidance issued by EPA suggested states select sources that represent 80% of visibility impairing emissions, a target we believe is reasonable and achievable by states within the SIP development timeline.

- Account for actual and most recent emissions of SO_2 and NO_X, use them to inform which sources to evaluate for four-factor analyses and require practically enforceable reductions of these pollutants reflected in the SIP to help clean up air in Class I Areas in the Southeastern U.S.

[15] As explained in the Gebhart Report at 13 "[t]he PSAT modeling was limited to "tagging" of sulfate and nitrate and did not address the source attribution from other visibility precursor pollutants. Any source-specific visibility attribution based solely on the sulfate and nitrate modeling projections would underestimate the overall visibility impact of an individual source. An accurate assessment of the source-specific visibility impact must be based on the source attribution considering all visibility impairing pollutants."

- Conduct four-factor analyses for the 37 EGUs in the region and either make the planned retirement of coal units practically enforceable or require other emission reducing SIP measures.

We welcome the opportunity to discuss our concerns and recommendations with you and look forward to reviewing and commenting on your proposed SIPs in the near future.

Sincerely,

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Enclosures

TECO
TAMPA ELECTRIC
AN EMERA COMPANY

Big Bend Power Station

Location

Situated on Tampa Bay, Big Bend Power Station is located on Big Bend Road on nearly 1,500 acres in southeastern Hillsborough County, close to Apollo Beach.

Description

Big Bend Power Station has four coal-fired units with a combined output of more than 1,700 megawatts. The first unit began service in 1970; the second and third generating units were added in 1973 and 1976, respectively; and Unit Four was added in 1985. A natural gas- and fuel oil-fired peaking unit was installed in 2009 to provide additional power during periods of peak demand.

Technology

Big Bend Power Station meets strict environmental regulations through the use of flue gas desulfurization systems or "scrubbers," which remove sulfur dioxide produced when coal is burned.

The scrubber for Big Bend Unit Four began operation in 1984, and since 1995, has simultaneously scrubbed Unit Three as well. The scrubber for Big Bend Units One and Two began operation at the end of 1999. The scrubber system complies with standards set by the U.S. Clean Air Act Amendments of 1990, and removes 95 percent of sulfur dioxide from all four units.

Environment

By using a variety of proven technologies, Tampa Electric has continued to significantly reduce nitrogen oxides, particulate matter and sulfur dioxide emissions from Big Bend Power Station:

- Combustion modifications to all four units accounts for lower nitrogen oxides emissions. Nitrogen oxides emissions from Big Bend Power Station have been reduced by approximately 91 percent from 1998 emission levels through the installation of a Selective Catalytic Reduction system on each unit.
- Optimizing electrostatic precipitators to minimize emissions of particulate matter from the stacks was completed in 2004, resulting in a reduction of approximately 87 percent when compared to 1998 levels.
- Further reduction of sulfur dioxide emissions came as a result of investing more than $23 million in scrubber upgrades, resulting in a reduction of over 94 percent from 1998 levels.

Enhanced power reliability

The installation in 2009 of a new 60-megawatt natural gas- and fuel oil-fired peaking unit at Big Bend supports Tampa Electric's commitment to reliable power for its customers. In addition to being able to provide power during periods of peak customer demand, the peaking unit also can play a vital role if catastrophic weather causes the electric grid to lose power. With "black start" capability, power from the peaking unit can start the Big Bend's larger generating units in a blackout when power from the grid is not available. The units' "quick start" capability enables the company to bring them from off-line to full load status in 10 minutes, which provides a more economical way for the company to maintain operating reserves required to respond to system disruptions. Read more about the new peaking unit, part of a project that includes four additional peaking units at H.L. Culbreath Bayside Power Station in Tampa, in this news release.

Recyclable byproducts

During the scrubbing process, coal combustion gases are sprayed with a mixture of water and limestone. Sulfur oxides react with the spray to form gypsum. Tampa Electric recycles virtually all of its gypsum.

Our Power System
Reliability
About Your Rates
Power Generation
Bayside Power Station
Big Bend Power Station
Polk Power Station
Current Projects
Tree Trimming
Retail Tariff
About Your Meter
Rights of Way

Gypsum is used locally in wallboard (drywall) for construction, in cement and concrete for construction and in agriculture as a soil nutrient or fertilizer

Fly ash, a fine particulate material that results from the combustion of coal and is collected in the electrostatic precipitators in all four Big Bend Units, is used in the cement and concrete industries.

Slag, which is collected at the bottom of the furnace, is a hard, glass-like material with many reuses, including in cement. Its hard quality makes it valuable to use as a high-velocity blast material to clean ships, storage tanks and other large metal surfaces.

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF LOUISIANA

UNITED STATES OF AMERICA and LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY,	)	
Plaintiffs,	)	
v.	)	Civil Action No.
PCS NITROGEN FERTILIZER, L.P., AA SULFURIC, INC., and WHITE SPRINGS AGRICULTURAL CHEMICALS, INC.,	)	Judge
Defendants.	)	

CONSENT DECREE

TABLE OF CONTENTS

TABLE OF APPENDICES

A. SO_2 CEMS Plans

B. Nitric Acid SCR SEP

C. NOx CEMS Plan

D. Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695 issued to PCS Nitrogen Fertilizer, L.P. on March 5, 2012; Amended Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695A issued to PCS Nitrogen Fertilizer, L.P. on March 1, 2013; and Amended Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695B issued to PCS Nitrogen Fertilizer, L.P. on June 19, 2013.

E. Notices of Violation resolved by Consent Decree

CONSENT DECREE

Concurrently with the lodging of this Consent Decree, Plaintiff, the United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"), has filed a Complaint in this action seeking injunctive relief and civil penalties from the Defendants, PCS Nitrogen Fertilizer, L.P., AA Sulfuric, Inc., and White Springs Agricultural Chemicals, Inc. (collectively referred to herein as the "Defendants"), for alleged violations of the Clean Air Act (the "CAA" or "Act"), 42 U.S.C. §§ 7401 *et seq.*, with respect to emissions of sulfur dioxide ("SO_2") at the Defendants' sulfuric acid manufacturing facilities located in or near Geismar, Louisiana (the "Geismar Sulfuric Acid Plant") and White Springs, Hamilton County, Florida (the "White Springs Sulfuric Acid Plants"). The Louisiana Department of Environmental Quality ("LDEQ" or "Louisiana") is a co-Plaintiff in the Complaint and is seeking injunctive relief and civil penalties from Defendants PCS Nitrogen Fertilizer, L.P. and AA Sulfuric, Inc. at the Geismar Sulfuric Acid Plant;

WHEREAS, the Complaint alleges that the Defendants violated and/or continue to violate Section 165 of the CAA, 42 U.S.C. § 7475, the permitting requirements of CAA Subchapter V ("Title V"), 42 U.S.C. §§ 7661-7661f, regulations implementing those CAA provisions, and the federally enforceable State implementation plans ("SIPs") developed by Florida and Louisiana, both of which have been approved by EPA;

WHEREAS, the Complaint alleges that AA Sulfuric, Inc. (and/or its predecessors in interest) owns and PCS Nitrogen Fertilizer, L.P. (and/or its predecessors in interest) operates the Geismar Sulfuric Acid Plant, and that White Springs Agricultural Chemicals, Inc., owns and operates the White Springs Sulfuric Acid Plants;

WHEREAS, PCS Nitrogen Fertilizer, L.P. owns and operates a nitric acid manufacturing facility located at the same site as the Geismar Sulfuric Acid Plant (the "Geismar Nitric Acid Plant");

WHEREAS, the Complaint alleges that the Defendants and/or their predecessors in interest constructed or modified, and then operated, the Geismar Sulfuric Acid Plant and White Springs Sulfuric Acid Plants without obtaining the appropriate CAA New Source Review ("NSR") and Title V permits, without installing the Best Available Control Technology ("BACT"), without meeting applicable emission limits, and without complying with requirements for monitoring, recordkeeping and reporting, as required in the Act;

WHEREAS, PCS Phosphate Company, Inc. owns and operates sulfuric acid manufacturing facilities located in or near Aurora, Beaufort County, North Carolina (the "Aurora Sulfuric Acid Plants").

WHEREAS, PCS Phosphate Company, Inc. is not a party to the Complaint, but Defendants and PCS Phosphate Company, Inc. jointly enter into this Consent Decree as settling parties (collectively, the "Settling Parties") and shall be bound by the terms and obligations of this Consent Decree;

WHEREAS, as more specifically described in Section IV (Compliance Requirements), each Applicable Settling Party has agreed to install emission control technology or permanently shut down to reduce emissions of SO_2 at the Aurora Sulfuric Acid Plants, the Geismar Sulfuric Acid Plant, and the White Springs Sulfuric Acid Plants (collectively, the "Covered Sulfuric Acid Plants");

WHEREAS, EPA issued a notice of violation ("NOV") on June 26, 2008 and an amended NOV on June 20, 2011 with respect to the alleged CAA violations at the Defendants' Geismar Sulfuric Acid Plant;

WHEREAS, EPA issued a NOV on May 7, 2012 with respect to the alleged CAA violations at the Defendants' White Springs Sulfuric Acid Plants;

WHEREAS, EPA provided the Defendants, the State of Florida, and LDEQ with actual notice of the alleged violations, in accordance with Sections 113(a)(1) and (b) of the Clean Air Act, 42 U.S.C. §§ 7413(a)(1) and (b);

WHEREAS, the Defendants do not admit any liability to the United States or any State arising out of the acts or omissions alleged in the Complaint;

WHEREAS, the Parties agree that the United States' filing of the Complaint and entry into this Consent Decree constitute diligent prosecution by the United States, under Section 304(b)(1)(B) of the Clean Air Act, 42 U.S.C. § 7604(b)(1)(B), of all matters alleged in the Complaint and addressed by this Consent Decree through the date of lodging of this Consent Decree;

WHEREAS, the Parties recognize, and this Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith, will avoid litigation among the Parties, and that this Consent Decree is fair, reasonable, and in the public interest;

NOW, THEREFORE, before the taking of any testimony, without the adjudication or admission of any issue of fact or law except as provided in Section I, and with the consent of the Parties, IT IS HEREBY ADJUDGED, ORDERED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, and 1355, and Section 113(b) of the Clean Air Act, 42 U.S.C. § 7413(b), and over the Parties. This Court has supplemental jurisdiction over the State law claims asserted by Louisiana pursuant to 28 U.S.C. § 1367. This Court has jurisdiction over PCS Phosphate Company, Inc. and its obligations in this Consent Decree pursuant to the All Writs Act, 28 U.S.C. § 1651, and Fed. R. Civ. Proc. 19(a). Venue lies in this District pursuant to Section 113(b) of the Clean Air Act, 42 U.S.C. § 7413(b), and 28 U.S.C. §§ 1391(b) and (c) and 1395(a), because the violations alleged against the Geismar Sulfuric Acid Plant in the Complaint are alleged to have occurred in, and AA Sulfuric, Inc. and PCS Nitrogen Fertilizer, L.P. conduct business in, this judicial district. The Settling Parties consent to: a) this Court's subject matter jurisdiction over this Consent Decree and any action to enforce this Consent Decree, b) this Court's personal jurisdiction over them, and c) venue in this judicial district.

2. For purposes of this Consent Decree, the Defendants agree that the Complaint states claims upon which relief may be granted pursuant to Sections 165 and 502 of the Clean Air Act, 42 U.S.C. §§ 7475 and 7661a, and/or pursuant to State law.

3. Notice of the commencement of this action has been given to the States of Florida, Louisiana, and North Carolina as required by Section 113 of the Clean Air Act, 42 U.S.C. § 7413.

II. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon the United States, LDEQ, and upon the Settling Parties and any successors, assigns, or other entities or persons otherwise bound by law.

5. At least 30 Days prior to any transfer of ownership or operation of any of the Covered Sulfuric Acid Plants, the Applicable Settling Party shall provide a copy of this Consent Decree to the proposed transferee and shall simultaneously provide written notice of the prospective transfer, together with a copy of the proposed written agreement, to the United States and, for a transfer of the Geismar Sulfuric Acid Plant and/or Geismar Nitric Acid Plant, to LDEQ, in accordance with Section XVI of this Decree (Notices). Any attempt to transfer ownership or operation of any of the Covered Sulfuric Acid Plants without complying with this Paragraph constitutes a violation of this Decree. No such transfer, whether in compliance with the notice requirements of this Paragraph or otherwise, shall relieve the Applicable Settling Party of its obligation to ensure that the terms of the Decree are implemented with respect to the Covered Sulfuric Acid Plants, unless:

a. the transferee agrees in writing to undertake the obligations required by this Consent Decree and to be added as a Settling Party and, if the transferee is acquiring the Geismar Sulfuric Acid Plant or White Springs Sulfuric Acid Plants, a Defendant in this action for the purpose of being bound by the applicable terms of this Consent Decree;

b. the transferee and/or the Applicable Settling Party provide the United States and LDEQ (for a transfer of the Geismar Sulfuric Acid Plant and/or Geismar Nitric Acid Plant) with information sufficient to demonstrate that the transferee has the technical and financial means to comply with the obligations of this Consent Decree;

c. the United States and LDEQ (for a transfer of the Geismar Sulfuric Acid Plant and/or Geismar Nitric Acid Plant) consent in writing in a modification to the Consent Decree to substitute the transferee for the Applicable Settling Party with respect to the Consent Decree's obligations; and

d. the Court approves such substitution and enters the modification.

6. Each Settling Party shall: (a) provide a copy of this Consent Decree to its President, corporate General Counsel, corporate Director of the Environment, the Plant Manager for each Covered Sulfuric Acid Plant, the Chemical Operations Manager for each Covered Sulfuric Acid Plant, the Operations Superintendent for each Covered Sulfuric Acid Plant, and the Environmental Manager for each Covered Sulfuric Acid Plant, and shall ensure that its employees and contractors whose duties might reasonably include compliance with any provision of this Consent Decree are made aware of both the existence of the Consent Decree and specific requirements of the Consent Decree that fall within such person's duties; (b) place an electronic version of the Consent Decree on the corporate Safety Health & Environment website and internal websites for each Covered Sulfuric Acid Plant; and (c) post notice of lodging of the Consent Decree and the availability for review of the Consent Decree at a location at each Covered Sulfuric Acid Plant where legal notices are posted. Each Settling Party shall be responsible for ensuring that all of its employees and contractors involved in performing any work required by this Consent Decree perform such work in compliance with the requirements of this Consent Decree.

7. In any action to enforce this Consent Decree, the Settling Parties shall not raise as a defense the failure by any of their officers, directors, employees, agents, or contractors to take any actions necessary to comply with the provisions of this Consent Decree.

III. DEFINITIONS

8. Terms used in this Consent Decree that are defined in the Clean Air Act, or in federal and State regulations promulgated pursuant to the Clean Air Act, shall have the meaning assigned to them in the Clean Air Act or such regulations, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Consent Decree, the following definitions shall apply:

a. "Acid Mist" shall mean the pollutant sulfuric acid mist as measured by Method 8 of 40 C.F.R. Part 60, Appendix A consistent with 40 C.F.R. § 60.81(b).

b. "Applicable Settling Party" shall mean: (i) with respect to the Aurora Sulfuric Acid Plants, PCS Phosphate Company, Inc., (ii) with respect to the Geismar Nitric Acid Plant, PCS Nitrogen Fertilizer, L.P., (iii) with respect to the Geismar Sulfuric Acid Plant, AA Sulfuric, Inc. and PCS Nitrogen Fertilizer, L.P., and (iv) with respect to the White Springs Sulfuric Acid Plants, White Springs Agricultural Chemicals, Inc.

c. "Aurora Sulfuric Acid Plants" shall mean sulfuric acid production units 5, 6, and 7 that are owned and operated by PCS Phosphate Company, Inc. in Aurora, Beaufort County, North Carolina.

d. "CEMS" or "Continuous Emission Monitoring System" shall mean the total equipment, required under the CEMS Plans attached as Appendix A and Appendix C to this Consent Decree, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

e. "Complaint" shall mean the Complaint filed by the United States and LDEQ in this action.

f. "Consent Decree" or "Decree" shall mean this Consent Decree and all appendices attached hereto. In the event of any conflict between the text of this Consent Decree and any appendix, the text of this Consent Decree shall control.

g. "Covered Sulfuric Acid Plant" or "Covered Sulfuric Acid Plants" shall mean one or more of the following sulfuric acid production facilities that are subject to the Consent Decree: the Aurora Sulfuric Acid Plants, the Geismar Sulfuric Acid Plant, and the White Springs Sulfuric Acid Plants.

h. "Day" shall mean a calendar day unless expressly stated to be a working day. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal or State holiday, the period shall run until the close of business of the next working day.

i. "Defendants" shall mean PCS Nitrogen Fertilizer, L.P., AA Sulfuric, Inc., and White Springs Agricultural Chemicals, Inc.

j. "Effective Date" shall have the meaning given in Section XVII.

k. "Geismar Sulfuric Acid Plant" shall mean the sulfuric acid production plant owned by AA Sulfuric, Inc. and operated by PCS Nitrogen Fertilizer, L.P. in Geismar, Louisiana.

l. "Geismar Nitric Acid Plant" shall mean the nitric acid production plant owned and operated by PCS Nitrogen Fertilizer, L.P. in Geismar, Louisiana.

m. "LDEQ" shall mean the Louisiana Department of Environmental Quality and any of its successor departments or agencies.

n. "Long-Term NOx Limit" shall mean a 365-Day rolling average NOx emission limit expressed as pounds of NOx emitted per ton of 100% Nitric Acid Produced (lb/ton).

Compliance with the Long-Term NOx Limit shall be determined each Day and shall be calculated in accordance with the NOx CEMS Plan attached to this Consent Decree as Appendix C. The Long-Term Limit applies at all times, including periods of Startup, Shutdown, and Malfunction.

o. "Long-Term SO_2 Limit" shall mean a 365-Day rolling average sulfur dioxide emission limit expressed as pounds of sulfur dioxide emitted per ton ("lb/ton") of 100% Sulfuric Acid Produced. Compliance with the Long-Term SO_2 Limit shall be determined each Day and shall be calculated in accordance with the SO_2 CEMS Plan attached to this Consent Decree as Appendix A. The Long-Term SO_2 Limit applies at all times during all Operating Periods, including during periods of Startup, Shutdown, and Malfunction.

p. "Malfunction" shall mean, consistent with 40 C.F.R. § 60.2, any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner, but shall not include failures that are caused in whole or in part by poor maintenance or careless operation.

q. "Mass Cap" shall mean the maximum permissible amount of SO_2 emissions for the Geismar Sulfuric Acid Plant expressed in tons of SO_2 emitted during each 12-month period consisting of the most recently concluded month and the eleven months immediately preceding it. Compliance with the Mass Cap shall be calculated in accordance with the SO_2 CEMS Plan attached to this Consent Decree as Appendix A-2. In determining compliance with the Mass Cap, all SO_2 emissions from the Geismar Sulfuric Acid Plant, including emissions during times of Startup, Shutdown, and Malfunction, shall be counted.

r. "Month" shall mean a calendar month.

s. "NC DENR" shall mean the North Carolina Department of Environment and Natural Resources and any of its successor departments or agencies.

t. "Nitric Acid Train No. 4" shall mean the number four nitric acid production train at the Geismar Nitric Acid Plant.

u. "NOx" shall mean the pollutants collectively referred to as nitrogen oxides.

v. "NOx CEMS Plan" shall mean the CEMS Plan for Nitric Acid Train No. 4 attached in Appendix C.

w. "New Source Review" or "NSR" shall mean the PSD and Non-attainment NSR provisions in Part C and D of Subchapter I of the Clean Air Act, 42 U.S.C. §§ 7470-7492, 7501-7515, applicable federal regulations implementing such provisions of the CAA, and the corresponding provisions of federally enforceable SIPs.

x. "NSPS" shall mean the standards of performance for new stationary sources codified at 40 C.F.R. Part 60. General NSPS requirements are codified at 40 C.F.R. Part 60, Subpart A. NSPS requirements specifically for sulfuric acid plants are codified at 40 C.F.R. Part 60, Subpart H.

y. "100% Nitric Acid Produced" or "100% Nitric Acid Production Rate" shall mean the quantity of nitric acid product manufactured by Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant multiplied by the concentration of actual nitric acid in the product. For example, if Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant produces 100 tons of a 54% nitric acid product, this equals 54 tons of 100% Nitric Acid Produced."

z. "100% Sulfuric Acid Produced" shall mean the quantity of sulfuric acid that would be produced at a Covered Sulfuric Acid Plant multiplied by the concentration of actual sulfuric acid in the product. For example, if a Covered Sulfuric Acid Plant produces 100 tons of a 98% sulfuric acid product, this equals 98 tons of 100% Sulfuric Acid Produced.

aa. "Operating Periods" shall mean: (i) with respect to each of the Covered Sulfuric Acid Plants, all periods during which sulfur is being fed into the furnace at the Covered Sulfuric Acid Plant, and (ii) with respect to the Geismar Nitric Acid Plant, all periods when the facility is producing nitric acid and NOx is emitted. Operating Periods include all periods of Startup, Shutdown, and Malfunction.

bb. "Paragraph" shall mean a portion of this Consent Decree identified by an Arabic numeral.

cc. "Parties" shall mean the United States, LDEQ, and the Settling Parties.

dd. "Prevention of Significant Deterioration" or "PSD" shall mean the attainment area New Source Review program within the meaning of Part C of Subchapter I of the Clean Air Act, 42 U.S.C. §§ 7470-7492.

ee. "SCR" or "Selective Catalytic Reduction" shall mean a pollution control device that reacts ammonia (NH_3) with NO_X to form nitrogen (N_2) and water (H_2O) using a catalyst to speed the reaction for the reduction of NOx.

ff. "Section" shall mean a portion of this Consent Decree identified by a roman numeral.

gg. "Settling Party" or "Settling Parties" shall mean one or more of the Defendants and PCS Phosphate Company, Inc.

hh. "Short-Term NOx Limit" shall mean a 3-hour rolling average NOx emission limit expressed in terms of pounds of NOx emitted per ton of 100% Nitric Acid Produced (lb/ton). Compliance with the Short-Term NOx Limit shall be calculated in accordance with the

NOx CEMS Plan attached to this Consent Decree as Appendix C. The Short-Term NOx Limit does not apply during periods of Startup, Shutdown, or Malfunction.

ii. "Short-Term SO_2 Limit" shall mean a 3-hour rolling average SO_2 emission limit expressed in terms of pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). Compliance with the Short-Term SO_2 Limit shall be calculated in accordance with the SO_2 CEMS Plan attached to this Consent Decree as Appendix A. The Short-Term SO_2 Limit does not apply during periods of Startup, Shutdown, or Malfunction.

jj. "Shutdown" shall mean the cessation of operation of any of the Covered Sulfuric Acid Plants or the Geismar Nitric Acid Plant for any reason. With respect to each of the Covered Sulfuric Acid Plants, Shutdown occurs when the feed of elemental sulfur to the furnace ceases. With respect to the Geismar Nitric Acid Plant, Shutdown begins at the time the feed of ammonia to the facility ceases and ends either 3 hours later or after the feed of compressed air to the facility ceases, whichever occurs first.

kk. "SO_2" shall mean the pollutant sulfur dioxide.

ll. "SO_2 CEMS Plan" shall mean the CEMS Plans for the Covered Sulfuric Acid Plants attached in Appendix A.

mm. "Startup" shall mean: (i) with respect to each of the Covered Sulfuric Acid Plants, the period of time beginning when the feed of elemental sulfur to the furnace commences and ending no more than four hours later, and (ii) with respect to the Geismar Nitric Acid Plant, the process of initiating nitric acid production operations at the facility. Startup of the Geismar Nitric Acid Plant begins 1 hour prior to initiating the feed of ammonia to the facility, as determined by an ammonia flow meter or some other equivalent means (e.g., gauze temperature), and ends no more than 5 hours after initiating the feed of ammonia to the facility.

nn. "Title V Permit" shall mean a permit required by or issued pursuant to the requirements of 42 U.S.C. §§ 7661 - 7661f and the implementing regulations at 40 C.F.R. Part 70, or the corresponding SIP provisions.

oo. "Ton" or "Tons" shall mean short ton or short tons. One Ton equals 2,000 pounds.

pp. "United States" shall mean the United States of America, acting on behalf of EPA.

qq. "White Springs Sulfuric Acid Plants" shall mean sulfuric acid production units C, D, E, and F that are owned and operated by White Springs Agricultural Chemicals, Inc. in White Springs, Hamilton County, Florida.

IV. COMPLIANCE REQUIREMENTS

A. SO_2 Emission Limits, Mass Cap, and Compliance Schedules

9. By no later than the applicable compliance deadline specified in Table 1, the Applicable Settling Party shall comply with the following SO_2 emission limits at each Covered Sulfuric Acid Plant:

TABLE 1 – SO_2 Emissions Limits

Covered Sulfuric Acid Plant	Short-Term SO_2 Limit (lbs SO_2/ton 100% Sulfuric Acid Produced)	Long-Term SO_2 Limit (lbs SO_2/ton 100% Sulfuric Acid Produced)	Compliance Deadline
Geismar Sulfuric Acid Plant	1.5	See Paragraph 9.a	October 1, 2016
White Springs Sulfuric Acid Plant C	1.7	1.6	January 1, 2016
White Springs Sulfuric Acid Plant D	1.7	1.6	July 1, 2017

White Springs Sulfuric Acid Plant E	2.6	2.3	January 1, 2020
White Springs Sulfuric Acid Plant F	2.6	2.3	January 1, 2018
Aurora Sulfuric Acid Plant, Unit 5	3.2	2.5	January 1, 2020
Aurora Sulfuric Acid Plant, Unit 6	3.3	2.5	January 1, 2018
Aurora Sulfuric Acid Plant, Unit 7	3.0	1.75, see Paragraph 9.e	January 1, 2019

a. Mass Cap for Geismar Sulfuric Acid Plant. By no later than October 1, 2016, the Applicable Settling Party shall comply with a Mass Cap for SO_2 emissions of 451.59 tons SO_2/year at the Geismar Sulfuric Acid Plant.

b. For the Long-Term SO_2 Limits and the Mass Cap, the Applicable Settling Party shall commence monitoring by the applicable compliance deadline listed in Table 1, but shall have until one year following the compliance deadline to demonstrate compliance with the applicable Long-Term SO_2 Limit and Mass Cap (for the one year following the compliance deadline and then for each preceding 365-Day and 12-Month period thereafter). With respect to the Mass Cap, the Applicable Settling Party shall demonstrate compliance thereafter as of the last Day of each Month for the immediately preceding consecutive 12-Month period in the manner specified in the SO_2 CEMS Plan. With respect to the Long-Term SO_2 Limits, the Applicable Settling Party shall demonstrate compliance thereafter in the manner specified in the SO_2 CEMS Plan.

c. Startup limit: During any Startup of the Geismar Sulfuric Acid Plant, 500 parts per million (ppm) averaged over the four-hour Startup period.

d. The Applicable Settling Party, in its sole discretion, may achieve compliance with a SO_2 emissions limit required by this Paragraph by permanently shutting down and ceasing operations of the applicable Covered Sulfuric Acid Plant before the compliance deadline specified in Table 1. If a Settling Party elects to permanently shut down and cease operations at a Covered Sulfuric Acid Plant, the Settling Party must provide written notice of the proposed permanent shutdown to the United States and, for the Geismar Sulfuric Acid Plant, to LDEQ, in accordance with Section XVI of this Decree (Notices), by no later than the Effective Date with respect to a Covered Sulfuric Acid Plant that is already shut down at that time and no later than 90 Days before the shutdown for any other Covered Sulfuric Acid Plant. By no later than 30 Days after the Effective Date with respect to a Covered Sulfuric Acid Plant that permanently shuts down and ceases operations before the Effective Date, and no later than 30 Days after any other Covered Sulfuric Acid Plant permanently shuts down and ceases operations, the Settling Party must also:

i. File all necessary applications or submissions with EPA and the applicable State to permanently terminate any permit or other legal authorization for further operation of the Covered Sulfuric Acid Plant and to reflect the permanently shutdown status of the Covered Sulfuric Acid Plant. The Settling Party shall also file all necessary applications or submissions to amend the applicable State's air emissions inventories so that the Covered Sulfuric Acid Plant is removed from the emission inventories. All applications and submissions required by this sub-paragraph shall be made in accordance with all applicable federal, State, and local requirements; and

ii. To the extent applicable, permanently surrender all emission credits and allowances associated with the Covered Sulfuric Acid Plant from the accounts administered by EPA and the applicable State so that such credits and allowances can never be used thereafter to meet any compliance requirements under the CAA, a SIP, or this Consent Decree. In addition, notwithstanding Paragraph 48.a, the Settling Parties shall not use, sell, or trade any emission credits or reductions associated with the shutdown of a Covered Sulfuric Acid Plant or that would otherwise be considered a creditable contemporaneous emission reduction within the meaning of 40 C.F.R. § 52.21(b)(3) for any purpose. The requirements of this sub-paragraph are permanent and are not subject to any termination provision of this Consent Decree.

e. Demonstration Period for Aurora Sulfuric Acid Plant, Unit 7. The Applicable Settling Party shall have from January 1, 2019 until January 1, 2022 as a demonstration period for Aurora Sulfuric Acid Plant, Unit 7 ("Demonstration Period") to use advanced catalyst technology, at up to nominal production capacity, combined with appropriate ancillary equipment for managing temperature profiles and gas flow in the converters without consideration of add-on control technology, such as scrubbers ("Catalyst Technology"). During this Demonstration Period, the Applicable Settling Party shall operate the Aurora Sulfuric Acid Plant, Unit 7 to demonstrate that the Catalyst Technology is capable of complying with the Long-Term SO_2 Limit specified in Table 1. The Applicable Settling Party shall provide updated information regarding the status of the Demonstration Period in its semi-annual reports submitted pursuant to Section IX.

i. If the Applicable Settling Party determines through the Demonstration Period that it is technically infeasible to meet the Long-Term SO_2 Limit specified in Table 1 for Aurora Sulfuric Acid Plant, Unit 7 using the Catalyst Technology, the Applicable Settling Party may propose to EPA a less stringent Long-Term SO_2 Limit for that facility. However, the Applicable Settling Party must base its determination of technical infeasibility and the proposal for a less stringent Long-Term SO_2 Limit solely on the SO_2 emission rates and sulfuric acid production rates actually achieved during the Demonstration Period, in addition to the information required in the Technical Infeasibility Report described below. The Applicable Settling Party's proposal must be submitted no later than March 31, 2022; otherwise, the Applicable Settling Party must continue to comply with the Long-Term SO_2 Limit specified in Table 1. Any proposal submitted to EPA must include the following:

A. A proposed Long-Term SO_2 Limit that reflects the lowest achievable emission rate from the Aurora Sulfuric Acid Plant, Unit 7 using the Catalyst Technology. In no event may the proposed Long-Term SO_2 Limit be greater than 2.0 lbs SO_2/ton 100% Sulfuric Acid Produced; and

B. A written report ("Technical Infeasibility Report") that discusses the results of the Demonstration Period and justifies the proposed Long-Term SO_2 Limit. The Technical Infeasibility Report must include all evidence, data, and analysis supporting the Applicable Settling Party's conclusion that it is technically infeasible to meet a Long-Term SO_2 Limit of 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced at the Aurora Sulfuric Acid Plant, Unit 7 using the Catalyst Technology, including, but not limited to:

1) a detailed engineering analysis of why a Long-Term SO_2 Limit of 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced is technically infeasible at the Aurora Sulfuric Acid Plant, Unit 7 and why the proposed less stringent emission limit is the lowest achievable emission rate;

2) a description of the relevant events leading up to the Applicable Settling Party's determination that a Long-Term SO_2 Limit of 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced is technically infeasible and that the proposed less stringent emission limit is the lowest achievable emission rate, along with all related correspondence with technology vendors, contractors, or consultants and any supporting documentation, including any applicable manufacturer specifications or recommendations;

3) a description of all efforts taken by the Applicable Settling Party or its technology vendors, contractors, or consultants to achieve compliance with a Long-Term SO_2 Limit of 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced at the Aurora Sulfuric Acid Plant, Unit 7;

4) a description of all potential remedies considered by the Applicable Settling Party and/or its technology vendors, contractors, or consultants to bring the Aurora Sulfuric Acid Plant, Unit 7 into compliance with a Long-Term SO_2 Limit of 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced;

5) all CEMS data from the Demonstration Period; and

6) all sulfuric acid production data from the Demonstration Period.

ii. After an opportunity to review the Applicable Settling Party's proposal, EPA may request any other information EPA deems necessary in order to evaluate the Applicable Settling Party's proposal. If EPA requests additional information, the Applicable Settling Party will provide such information within thirty (30) days or such other period as agreed upon by the parties.

iii. EPA will evaluate the Applicable Settling Party's proposal and either: 1) approve the proposal or 2) disapprove the proposal and establish a Long-Term SO_2 Limit for Aurora Sulfuric Acid Plant, Unit 7 that shall not be greater than 2.0 lbs SO_2/ton 100% Sulfuric Acid Produced and shall not be less than 1.75 lbs SO_2/ton 100% Sulfuric Acid Produced. EPA will provide written notice of its decision to the Applicable Settling Party in accordance with Section XVI (Notices).

iv. The Applicable Settling Party shall comply with the Long-Term SO_2 Limit specified in Table 1 until EPA either approves the Applicable Settling Party's proposed Long-Term SO_2 Limit or EPA establishes a new Long-Term SO_2 Limit pursuant to sub-paragraph 9.e(iii), except that if EPA has not acted on the Applicable Settling Party's proposal more than 90 days after the later of its submission date or the date all information requested pursuant to sub-paragraph 9.e(ii) is submitted to EPA, the request shall be deemed disapproved and the Applicable Settling Party shall have the right to invoke Dispute Resolution under Section XII of the Consent Decree. If EPA establishes a new Long-Term SO_2 Limit, the Applicable Settling Party shall comply with that limit or invoke Dispute Resolution within 30 Days of receiving EPA's decision.

10. Any proposal to increase the Mass Cap for the Geismar Sulfuric Acid Plant must be agreed upon by the United States and LDEQ and submitted to the Court for approval as a modification of this Decree. Until such time as the Court approves such modification, the existing Mass Cap in this Decree (451.59 tons SO_2/year) shall remain in full force and effect.

B. <u>Acid Mist Emission Limits</u>

11. By no later than the Effective Date, the Applicable Settling Party shall comply with the NSPS, Subpart H sulfuric acid mist emission limitation of 0.15 lb/ton of 100% Sulfuric Acid Produced, as set forth at 40 C.F.R. § 60.83, at each Covered Sulfuric Acid Plant. Compliance with the Acid Mist limit shall be demonstrated using the performance test required by Paragraph 18 of this Consent Decree. The Acid Mist performance tests required under

Paragraph 18 may be undertaken at the same time as the performance tests for the SO_2 emission limits required under Paragraph 19 and scheduled under Paragraph 20.

C. <u>NSPS Applicability</u>

12. By no later than the Effective Date, the Aurora Sulfuric Acid Plants and White Springs Sulfuric Acid Plants shall be considered affected facilities for purposes of the NSPS, 40 C.F.R. Part 60, Subpart H. By no later than October 1, 2016, the Geismar Sulfuric Acid Plant shall be considered an affected facility for purposes of the NSPS, 40 C.F.R. Part 60, Subpart H. After the applicable date, each Covered Sulfuric Acid Plant shall comply with all applicable requirements for affected facilities under the NSPS, 40 C.F.R. Part 60, Subparts A and H, or with the requirements of this Consent Decree (if more stringent). Satisfactory compliance by the Applicable Settling Party with the notice and compliance demonstration obligations set forth in this Consent Decree shall be deemed to satisfy all applicable initial notification and compliance demonstration requirements of NSPS Subparts A and H.

13. <u>Best Practices</u>. At all times after the Effective Date of this Consent Decree, the Applicable Settling Party shall maintain and operate each Covered Sulfuric Acid Plant in accordance with 40 C.F.R. § 60.11(d).

D. <u>Emissions Monitoring</u>

14. <u>Installation, Certification, and Calibration</u>.

a. By no later than the applicable compliance deadline listed in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, the Applicable Settling Party shall certify and calibrate the CEMS at each Covered Sulfuric Acid Plant and install any necessary additional equipment so that the CEMS is capable of directly measuring the

SO_2 emission rate, which, pursuant to the SO_2 CEMS Plan, shall be expressed as lb/ton of 100% Sulfuric Acid Produced (the "SO_2 CEMS").

b. By no later than the applicable compliance deadline listed in Table 1 of Paragraph 9, the Applicable Settling Party shall install a product mass flow meter at each of the Aurora Sulfuric Acid Plants and White Springs Sulfuric Acid Plants that directly measures the flow of sulfuric acid, as produced, with an accuracy of +/- 0.5%. The measured flow will then be converted to a 100% sulfuric acid basis.

15. Continuous Operation of SO_2 CEMS and Minimization of SO_2 CEMS Downtime. After the applicable compliance deadline listed in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, and except during SO_2 CEMS breakdowns, repairs, calibration checks, and zero span adjustments, the SO_2 CEMS maintained by the Applicable Settling Party at each Covered Sulfuric Acid Plant shall be in continuous operation during all Operating Periods and Shutdowns to demonstrate compliance with the SO_2 emission limits established in Subsection IV.A of this Consent Decree. The Applicable Settling Party shall take all steps necessary to minimize SO_2 CEMS breakdowns and downtime. These steps shall include, but are not limited to, operating and maintaining the SO_2 CEMS in accordance with good air pollution control practices and maintaining an on-site inventory of spare parts or other supplies necessary to make prompt repairs to the SO_2 CEMS and associated equipment.

16. SO_2 CEMS Plan. By no later than the applicable compliance deadline listed in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, the Applicable Settling Party shall implement the SO_2 CEMS Plan attached as Appendix A for the applicable Covered Sulfuric Acid Plant. The SO_2 CEMS Plan describes how the Applicable Settling Party shall monitor compliance with the SO_2 emission limits established in Subsection IV.A of this Consent

Decree, including the methodology that the Applicable Settling Party shall use to demonstrate compliance in the event of SO_2 CEMS downtime lasting longer than 24 hours. The monitoring methods specified in the SO_2 CEMS Plan have been approved as appropriate alternative monitoring methods for purposes of NSPS, pursuant to 40 C.F.R. § 60.13(i).

E. Performance Testing

17. By no later than the applicable compliance deadline listed in Table 1 of Paragraph 9, the Applicable Settling Party shall complete the performance tests required in this Subsection IV.E. at each Covered Sulfuric Acid Plant.

18. Acid Mist. The Applicable Settling Party shall conduct a performance test at each Covered Sulfuric Acid Plant measuring the emission rate of Acid Mist in accordance with the applicable requirements of 40 C.F.R. Part 60, Appendix A, Reference Method 8, or an alternative method approved by EPA. These performance tests shall be used to demonstrate compliance with the Acid Mist emission limit established in Paragraph 11 and may serve as the NSPS performance test required under 40 C.F.R. § 60.8. The Applicable Settling Party shall take all steps necessary to ensure accurate measurements of 100% Sulfuric Acid Production during each test run and shall include in the test protocol all measurements to be taken during the test to ensure accurate measurements of the sulfuric acid produced during each test run.

19. SO_2 Emission Limits. The Applicable Settling Party shall conduct a performance test at each Covered Sulfuric Acid Plant measuring the emission rate of SO_2 in accordance with the applicable requirements of 40 C.F.R. Part 60, Appendix A, Reference Method 8, and Part 60, Appendix B, Performance Specification 2. This test shall consist of at least nine reference method test runs and may serve as the SO_2 CEMS relative accuracy test required under Performance Specification 2. If applicable, this test may also serve as the NSPS

performance test required under 40 C.F.R. § 60.8. The Applicable Settling Party shall take all steps necessary to ensure accurate measurements of the sulfuric acid produced during each test run.

20. Advance Notification. By no later than 30 Days before any performance test required by this Section IV.E is conducted, the Applicable Settling Party shall provide notice to EPA and LDEQ (for performance tests at the Geismar Sulfuric Acid Plant), in the manner set forth in Section XVI (Notices), of its intent to conduct such testing; provided that, if a performance test must be rescheduled, notice of the rescheduled performance test may be given less than 30 Days, but in no case less than 7 Days, in advance of it. This notification must include the scheduled date of the test(s), an emissions test protocol, a description of the planned operating rate and operating conditions, and the procedures that will be used to measure 100% Sulfuric Acid Production. If EPA and/or LDEQ (for the Geismar Sulfuric Acid Plant) requires any adjustment of the testing protocol or operating conditions, the Applicable Settling Party shall either make such adjustments and conduct the performance test in conformity with EPA's and/or LDEQ's requirements or the Applicable Settling Party shall submit the issue(s) for Dispute Resolution pursuant to Section XII of this Consent Decree.

21. Report of Results. By no later than 60 Days after conducting a performance test required under this Subsection IV.E, the Applicable Settling Party shall submit to EPA and the LDEQ (for performance tests at the Geismar Sulfuric Acid Plant), in the manner set forth in Section XVI (Notices), a report documenting the results of the performance tests.

F. Operation and Maintenance Plans

22. By no later than six months before the applicable compliance deadline listed in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, the Applicable Settling

Party shall prepare and submit to EPA and LDEQ (for the Geismar Sulfuric Acid Plant) in the manner set forth in Section XVI (Notices), an Operation and Maintenance Plan (O & M Plan) for each Covered Sulfuric Acid Plant. The O & M Plan shall describe the operating and maintenance procedures necessary to: (i) minimize the frequency of Shutdowns resulting from operating and/or maintenance practices that are not in accordance with 40 C.F.R. § 60.11(d) (thereby reducing the number of Startups); and (ii) maintain and operate each Covered Sulfuric Acid Plant, including associated air pollution control equipment, in accordance with 40 C.F.R. § 60.11(d).

23. EPA and/or LDEQ (for the Geismar Sulfuric Acid Plant) may provide comments and/or recommendations with respect to the O & M Plan. If EPA and/or LDEQ provide written comments and/or recommendations about the O & M Plan, within 45 Days after receiving such comments and/or recommendations, the Applicable Settling Party shall either: (a) alter and implement the submission consistent with EPA's and/or LDEQ's written comments and/or recommendations, or (b) submit the matter for Dispute Resolution under Section XII of the Consent Decree.

24. By no later than the applicable compliance deadline listed in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, the Applicable Settling Party shall implement the O & M Plan, provided that the O & M Plan implemented by the Applicable Settling Party need not include elements that specifically respond to EPA's and/or LDEQ's comments until the process for responding to or disputing such comments has been completed in accordance with Paragraph 23. All other elements of the O & M Plan shall be implemented. At least once every three years, the Applicable Settling Party shall review the O & M Plan for each Covered Sulfuric Acid Plant and update it as necessary.

G. <u>LDEQ Compliance Order</u>

25. PCS Nitrogen Fertilizer, L.P. shall comply with the Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695 issued to PCS Nitrogen Fertilizer, L.P. on March 5, 2012, and as administratively amended on March 1, 2013 (Enforcement Tracking No. AE-CN-10-00695A) and again on June 19, 2013 (Enforcement Tracking No. AE-CN-10-00695B). These orders are attached hereto in Appendix D.

V. SUPPLEMENTAL ENVIRONMENTAL PROJECT

26. PCS Nitrogen Fertilizer, L.P. shall perform a Supplemental Environmental Project (the "Nitric Acid SCR SEP") to install a SCR for Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant in accordance with all provisions of this Section and Appendix B of this Consent Decree. The purpose of the Nitric Acid SCR SEP shall be to reduce emissions of NOx and ammonia from Nitric Acid Train No. 4. The Nitric Acid SCR SEP shall be completed within 24 Months after the Effective Date of this Consent Decree in accordance with the schedule set forth in Appendix B.

27. PCS Nitrogen Fertilizer, L.P. is responsible for the satisfactory completion of the Nitric Acid SCR SEP in accordance with the requirements of this Decree. PCS Nitrogen Fertilizer, L.P. may use contractors or consultants in planning and implementing the Nitric Acid SCR SEP.

28. With regard to the Nitric Acid SCR SEP, PCS Nitrogen Fertilizer, L.P., on behalf of the Settling Parties, certifies the truth and accuracy of each of the following:

a. that all cost information provided to EPA in connection with EPA's approval of the Nitric Acid SCR SEP is complete and accurate as of the date provided and that PCS Nitrogen Fertilizer, L.P. in good faith estimates that the cost to implement the Nitric Acid SCR SEP is at least $2,500,000;

b. that, as of the date of executing this Decree, neither PCS Nitrogen Fertilizer, L.P. nor any of the other Settling Parties are required to perform or develop the Nitric Acid SCR SEP by any federal, State, or local law or regulation, and is not required to perform or develop the Nitric Acid SCR SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;

c. that the Nitric Acid SCR SEP is not a project that PCS Nitrogen Fertilizer, L.P. was planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this Decree;

d. that none of the Settling Parties have received, and will not receive, credit for the Nitric Acid SCR SEP in any other enforcement action;

e. that none of the Settling Parties will receive any reimbursement for any portion of the cost to implement the Nitric Acid SCR SEP as set forth in Paragraph 28.a from any other person; and

f. that none of the Settling Parties are a party to any open federal financial assistance transaction that is funding or could be used to fund the same activity as the Nitric Acid SCR SEP. PCS Nitrogen Fertilizer, L.P., on behalf of the Settling Parties, further certifies that, to the best of its knowledge and belief after reasonable inquiry, there is no open federal financial assistance transaction that is funding or could be used to fund the same activity as the Nitric Acid SCR SEP, nor has the same activity been described in an unsuccessful federal financial assistance transaction proposal submitted to EPA within two years of the Settling Parties' signature date of this Consent Decree (unless the project was barred from funding as statutorily ineligible). For purposes of this certification, the term "open federal financial assistance transaction" refers to a grant, cooperative agreement, loan, federally guaranteed loan guarantee, or other mechanism for providing federal financial assistance for which the performance period has not yet expired.

29. <u>SEP Completion Report</u>. Within 30 Days after the date set for completion of the Nitric Acid SCR SEP, PCS Nitrogen Fertilizer, L.P. shall submit a SEP Completion Report to the United States and LDEQ, in accordance with Section XVI of this Consent Decree (Notices). The SEP Completion Report shall contain the following information:

a. a detailed description of the Nitric Acid SCR SEP as implemented;

b. a description of any problems encountered in completing the Nitric Acid SCR SEP and the solutions thereto;

c. an itemized list of all eligible costs expended in performing the Nitric Acid SCR SEP;

d. a certification that the Nitric Acid SCR SEP has been fully implemented pursuant to the provisions of this Decree; and

e. a description of the environmental and public health benefits resulting from implementation of the Nitric Acid SCR SEP (with a quantification of the benefits and pollutant reductions, if feasible).

30. EPA may, in its sole discretion, require information in addition to that described in the preceding Paragraph, in order to evaluate the SEP Completion Report.

31. After receiving the SEP Completion Report, the United States shall notify PCS Nitrogen Fertilizer, L.P. whether or not PCS Nitrogen Fertilizer, L.P. has satisfactorily completed the Nitric Acid SCR SEP. If PCS Nitrogen Fertilizer, L.P. has not completed the

Nitric Acid SCR SEP in accordance with this Consent Decree, stipulated penalties may be assessed under Section X of this Consent Decree.

32. Disputes concerning the satisfactory performance of the Nitric Acid SCR SEP and the amount of eligible SEP costs may be resolved under Section XII of this Decree (Dispute Resolution). No other disputes arising under this Section shall be subject to Dispute Resolution.

33. Each submission required under this Section shall be signed by an official with knowledge of the Nitric Acid SCR SEP and shall bear the certification language set forth in Paragraph 53.

34. Any public statement, whether oral or written, in print, film, or other media, made by any of the Settling Parties making reference to the Nitric Acid SCR SEP under this Decree shall include the following language: "This project was undertaken in connection with the settlement of an enforcement action, *United States, et al. v. PCS Nitrogen Fertilizer, L.P., et al*., taken on behalf of the U.S. Environmental Protection Agency under the Clean Air Act."

35. For federal income tax purposes, none of the Settling Parties will either capitalize into inventory or basis or deduct any costs or expenditures incurred in performing the Nitric Acid SCR SEP.

VI. CIVIL PENALTY

36. Within 30 Days after the Effective Date of this Consent Decree, the Settling Parties shall pay the following amounts as a civil penalty, together with interest accruing from the date on which the Consent Decree is lodged with the Court, at the rate specified in 28 U.S.C. § 1961 as of the date of lodging:

a. $ 950,000 to the United States, and

b. $350,000 to LDEQ.

37. The Settling Parties shall pay the civil penalty due to the United States by FedWire Electronic Funds Transfer (EFT) to the U.S. Department of Justice in accordance with written instructions to be provided to the Settling Parties, following lodging of the Consent Decree, by the Financial Litigation Unit of the U.S. Attorney's Office for the Middle District of Louisiana, Russell B. Long Federal Building, 777 Florida Street, Suite 208, Baton Rouge, LA 70801. At the time of payment, the Settling Parties shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter which shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United States, et al. v. PCS Nitrogen Fertilizer, L.P., et al*. The transmittal letter shall reference the civil action number and DOJ case number 90-7-1-08209/1, and shall be sent to the United States in accordance with Section XVI of this Decree (Notices); by email to acctsreceivable.CINWD@epa.gov; and by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

38. The Settling Parties shall not deduct any penalties paid under this Decree pursuant to this Section or Section X (Stipulated Penalties) in calculating their federal, State, or local income tax.

39. The Settling Parties shall pay the civil penalty due to LDEQ by bank check made payable to the Louisiana Department of Environmental Quality and sent to: Accountant Administrator, Financial Services Division, LDEQ, P.O. Box 4303, Baton Rouge, Louisiana 70821-4303.

VII. PERMITS

40. Permits Prior to Construction or Installation. The Applicable Settling Party shall obtain all required federal, State, and local permits necessary for performing any compliance obligation under this Consent Decree and the SEP, including, without limitation, permits for the construction of pollution control technology and the installation of equipment at each Covered Sulfuric Acid Plant and the Geismar Nitric Acid Plant. The Applicable Settling Party may seek relief under the provisions of Section XI (Force Majeure) of this Consent Decree for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation if the Applicable Settling Party has submitted timely and complete applications and has taken all other actions necessary to obtain such permit(s) or approval(s). If an Applicable Settling Party fails to submit a timely permit application, the Applicable Settling Party shall be barred from asserting a claim under Section XI (Force Majeure) of the Consent Decree that is based on delays in receiving necessary permits.

41. Applications for Permits Incorporating Emissions Limits and Standards.

a. Geismar Sulfuric and Nitric Acid Plants. By no later than one year after the Effective Date and except as provided by Paragraph 9.d, the Applicable Settling Party shall complete and submit to LDEQ's consolidated preconstruction and Title V CAA permitting program, appropriate applications to incorporate the following requirements into a federally enforceable permit(s) for the Geismar Sulfuric Acid Plant and the Geismar Nitric Acid Plant, as applicable, such that the following requirements: (i) become and remain "applicable requirements" as that term is defined in 40 C.F.R. § 70.2; (ii) are incorporated into federally enforceable Title V permits for the Geismar Sulfuric

Acid Plant and the Geismar Nitric Acid Plant, as applicable, and (iii) survive the termination of this Consent Decree:

i. The SO_2 Startup Limit established in Section IV.A;

ii. The Short-Term and Long-Term NOx Limits established in the SEP;

iii. The Acid Mist emission limit established in Section IV.B of this Consent Decree;

iv. A requirement that the SO_2, NOx, and Acid Mist emission and startup limits described in this Paragraph, as well as the Short-Term SO_2 Limit and Mass Cap established in Table 1 of Section IV.A of this Consent Decree (both of which are currently reflected in LDEQ Permit No. 2247-V3), shall not be relaxed;

v. The applicability of 40 C.F.R. Part 60, Subparts A and H, and all requirements therein, to the Geismar Sulfuric Acid Plant; and

vi. The monitoring requirements established in the SO_2 CEMS Plan and the NOx CEMS Plan.

b. Aurora and White Springs Sulfuric Acid Plants. By no later than one year before the applicable compliance deadline for each of the Aurora Sulfuric Acid Plants and the White Springs Sulfuric Acid Plants and except as provided by Paragraph 9.d, the Applicable Settling Party shall complete and submit appropriate applications to the preconstruction (or other non-Title V permit) and Title V CAA permitting programs of the NC DENR's Division of Air Quality, Permitting Section (for the Aurora Sulfuric Acid Plants) or to the State of Florida's, Florida Department of Environmental Protection, Northeast District (for the White Springs Sulfuric Acid Plants). These applications shall apply to incorporate the following requirements into a federally enforceable permit(s) for each of the Aurora Sulfuric Acid Plants and the White Springs Sulfuric Acid Plants such that the following requirements: (i) become and remain "applicable requirements" as that term is defined in 40 C.F.R. § 70.2; (ii) are incorporated into federally enforceable Title V permits for the Aurora Sulfuric Acid Plants and the White Springs Sulfuric Acid Plants, and (iii) survive the termination of this Consent Decree:

i. The Short-Term and Long-Term SO_2 Emissions Limits established in Table 1 of Section IV.A;

ii. The Acid Mist emission limits established in Section IV.B of this Consent Decree;

iii. A requirement that the Short-Term SO_2 Emissions Limit, Long-Term SO_2 Emissions Limit, and Acid Mist emission limit established in Section IV.A and IV.B of this Consent Decree shall not be relaxed;

iv. The applicability of 40 C.F.R. Part 60, Subparts A and H, and all requirements therein, to the Aurora Sulfuric Acid Plants and the White Springs Sulfuric Acid Plants; and

v. The monitoring requirements established in the SO_2 CEMS Plan.

42. This Consent Decree shall not terminate until the requirements set forth in Paragraph 41 are incorporated into Title V operating permits for each Covered Sulfuric Acid Plant and the Geismar Nitric Acid Plant.

43. Following submission of the complete permit applications, the Applicable Settling Party shall cooperate with the NC DENR and the State of Florida by promptly

submitting all available information that either State agency seeks following its receipt of the permit materials.

44. Requirements incorporated into Title V operating permits or other operating permits pursuant to Paragraph 41 shall survive termination of this Consent Decree.

45. The permit applications and process of incorporating the requirements of this Consent Decree and SEP into Title V Permits shall be in accordance with State Title V rules, including applicable administrative amendment provisions of such rules.

46. For any permit applications required by this Section VII that are filed after the Effective Date of this Consent Decree, the Applicable Settling Party shall submit to EPA and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) in the manner set forth in Section XVI (Notices), a copy of each application, as well as a copy of any permit proposed as a result of such application, to allow for timely participation in any public comment process. If, as of the Effective Date, the Applicable Settling Party already has received any permit necessary to implement the requirements of this Consent Decree, then no later than 30 Days after the Effective Date, the Applicable Settling Party shall submit copies of such permits to EPA and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) in the manner set forth in Section XVI (Notices). EPA and/or LDEQ may excuse in writing all or part of the latter submissions if copies of such permits have already been submitted prior to the Effective Date.

VIII. EMISSION CREDIT GENERATION

47. The Settling Parties shall not use, purchase, or otherwise obtain any SO_2, NOx, or Acid Mist emission credits or offsets in order to comply with any requirements of the Consent Decree or the SEP. The Settling Parties shall not use any SO_2, NOx, or Acid Mist

emission reductions or credits resulting from any projects conducted pursuant to this Consent Decree, including the SEP, for the purpose of obtaining netting credits in any PSD and/or minor NSR permit or permit proceeding, or for the purpose of obtaining offsets in any non-attainment NSR permit or permit proceeding. However, the use of past actual emissions from the Geismar Sulfuric Acid Plant for baseline years 2004 - 2005 or the Geismar Nitric Acid Plant for baseline years 2004 - 2005 in order to obtain minor NSR permits for construction of modifications to achieve the emissions limits specified in Section IV.A and the SEP in this Consent Decree shall not be considered the use of emissions reductions or credits for purposes of this Section.

48. The Settling Parties shall not sell or trade any SO_2, NOx, or Acid Mist emission reductions or credits resulting from any projects conducted pursuant to this Consent Decree, including the SEP. However, subject to the requirements of Paragraph 9.d regarding permanently shutting down a Covered Sulfuric Acid Plant, nothing in this Consent Decree is intended to prohibit the Applicable Settling Party from:

a. Using netting reductions that are covered by this Decree to the extent that the proposed netting reductions represent the difference between the emission limits set forth in this Consent Decree and more stringent emission limits that an Applicable Settling Party may elect to accept for any Covered Sulfuric Acid Plant or Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant in a permitting process;

b. Using netting reductions from units that are not subject to an emission limitation under this Consent Decree; and

c. Using netting reductions for any pollutants other than SO_2, NOx, or Acid Mist.

IX. REPORTING REQUIREMENTS

49. Each Applicable Settling Party shall submit an individual semi-annual report to EPA and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) that documents the Applicable Settling Party's progress toward compliance with the requirements set forth in Section IV (Compliance Requirements) and Section V (Supplemental Environmental Project). Each Applicable Settling Party shall submit the report by no later than March 1 and September 1 of each year, with the first semi-annual report due on the first submittal date that is more than seven months after the Effective Date. The report due on March 1 shall contain all information required by this Section from July 1 through December 31 of the preceding year. The report due on September 1 shall contain all information required by this Section from the preceding January 1 through June 30 of the current year. Each semi-annual report shall contain the following information:

a. The status of work performed and progress made toward implementing the requirements of Sections IV and V;

b. Any significant modifications to previously submitted design specifications of any pollution control system, or to monitoring equipment, required to comply with the requirements of Sections IV and V;

c. Any significant problems encountered or anticipated in complying with the requirements of Sections IV and V;

d. A description of any non-compliance with the requirements of this Consent Decree and an explanation of the likely cause of the non-compliance and the remedial steps taken, or to be taken, to prevent or minimize such non-compliance, and to mitigate any adverse environmental harm;

e. A summary of the SO_2, NOx, and Acid Mist performance testing data collected pursuant to Section IV.E to demonstrate compliance with the requirements of this Consent Decree;

f. In the first report submitted after the applicable compliance deadline specified in Table 1 of Paragraph 9 for each Covered Sulfuric Acid Plant, and in each report thereafter, a tabulation of each Covered Sulfuric Acid Plant's 3-hour rolling average SO_2 emission rate expressed in terms of pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton);

g. In the first report submitted 24 months after the Effective Date, and in each report thereafter, a tabulation of the 3-hour rolling average and 365-Day rolling average NOx emission rates for Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant expressed as pounds of NOx emitted per ton of 100% Nitric Acid Produced (lb/ton);

h. In the first report submitted after October 2016, and in each report thereafter, the actual monthly emissions of SO_2 and Acid Mist from the Geismar Sulfuric Acid Plant, measured in accordance with the SO_2 CEMS Plan, and, in the first report submitted 24 months after the Effective Date, and in each report thereafter, the actual monthly emissions of NOx from Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant, measured in accordance with the NOx CEMS Plan;

i. In the first report submitted after the applicable compliance deadline specified in Table 1 of Paragraph 9 for each of the Aurora Sulfuric Acid Plants and White Springs Sulfuric Acid Plants, and in each report thereafter, individual tabulations of each of the Aurora Sulfuric Acid Plants' and White Springs Sulfuric Acid Plants' 365-Day rolling average SO_2 emission rate (expressed in terms of pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton)) measured in accordance with the SO_2 CEMS Plan;

j. On and after the applicable compliance dates for the Short-Term SO_2 Limits, a listing and description of all periods of Startup, Shutdown, and Malfunction for each Covered Sulfuric Acid Plant, including the quantity of SO_2 emitted during such periods and the causes of any Malfunctions. Each report submitted after October 1, 2016 shall provide a listing and description of all periods of Startup, Shutdown, and Malfunction for Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant, including the quantity of NOx emitted during such periods and the causes of any Malfunctions;

k. On and after the applicable compliance dates for Short-Term SO_2 Limits, all information required to be reported by the SO_2 CEMS Plan. In each report submitted 24 months after the Effective Date, all information required to be reported by the NOx CEMS Plan;

l. In the first report submitted after the respective applicable deadlines specified in Paragraphs 14 and 26, and in each report thereafter, a listing of the dates and times of each period during which either the SO_2 CEMS or NOx CEMS (or both) was inoperative, except for zero and span checks, and an explanation of the nature of the system repairs or adjustments made;

m. The status of permit applications and a summary of all permitting activity pertaining to compliance with this Consent Decree;

n. In the copy of the report submitted to EPA, a copy of all reports that were submitted only to LDEQ and that pertain to compliance with this Consent Decree;

o. After submitting the O&M Plan specified in Paragraph 22 of this Consent Decree, a description of any changes or updates made to such Plan;

p. An accounting of all emissions credits, reductions, and allowances surrendered, retired, or otherwise not used pursuant to Paragraph 9.d, including copies of any transfer forms submitted to EPA or a State; and

q. Copies of any written notices of any permanent shutdown of a Covered Sulfuric Acid Plant required by Paragraph 9.d.

50. Notification of Potential Non-Compliance. If a Settling Party violates, or has reason to believe that it may violate, any requirement of this Consent Decree, the Settling Party shall notify the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) of such violation and its likely duration, in writing, within ten (10) working Days of the Day the Settling Party first becomes aware of the violation, with an explanation of the violation's likely cause and of the remedial steps taken, or to be taken, to prevent or minimize such violation and to mitigate any adverse effects of the violation. If the cause of a violation cannot be fully explained at the time the report is due, the Settling Party shall so state in the report. The Settling Party shall investigate the cause of the violation and shall then submit an amendment to the report, including a full explanation of the cause of the violation, within 30 Days of the Day the Settling Party becomes aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves the Settling Parties of their obligation to provide the notice required by Section XI of this Consent Decree (Force Majeure).

51. Imminent Threat. Whenever any violation of this Consent Decree or of any applicable permits or any other event affecting a Settling Party's performance under this Consent Decree, or the performance of any Covered Sulfuric Acid Plant or the Geismar Nitric Acid Plant, may pose an immediate threat to the public health or welfare or the environment, the Settling Party shall notify EPA and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar

Nitric Acid Plant) orally or by electronic or facsimile transmission as soon as possible, but no later than 24 hours after the Settling Party first knew of the violation or event. This procedure is in addition to the requirements set forth in the preceding Paragraph.

52. All reports shall be submitted to the persons designated in Section XVI of this Consent Decree (Notices).

53. Each report submitted by a Settling Party under this Section shall be signed by an official of that party and shall include the following certification:

> I certify under penalty of law that this document and all attachments were prepared either by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my personal knowledge or my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

This certification requirement does not apply to emergency or similar notifications where compliance would be impractical.

54. Except as provided in Paragraph 12 (with respect to the NSPS notification and compliance demonstration requirements) and Paragraph 16 (with respect to approval of alternative NSPS monitoring methods) of the Consent Decree, and except as provided in Paragraph 5 of Appendix B (with respect to approval of alternative monitoring methods for the NOx CEMS Plan), the reporting requirements of this Consent Decree do not relieve the Settling Parties of any reporting obligations required by the Clean Air Act or implementing regulations, or by any other federal, State, or local law, regulation, permit, or other requirement.

55. Any information provided pursuant to this Consent Decree may be used by the United States in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law.

X. STIPULATED PENALTIES

56. The Applicable Settling Party shall be liable for stipulated penalties to the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) for violations of this Consent Decree as specified below, unless excused under Section XI (Force Majeure). A violation includes failing to perform any obligation required by the terms of this Decree, including any work plan or schedule approved under this Consent Decree, according to all applicable requirements of this Consent Decree and within the specified time schedules established by or approved under this Consent Decree.

57. Late Payment of Civil Penalty. If the Settling Parties fail to pay the civil penalty required to be paid under Section VI of this Decree (Civil Penalty) when due, the Settling Parties shall pay a stipulated penalty of $1,000 per Day for each Day that the payment is late.

58. Short-Term SO_2 Limit. For each violation of the Short-Term SO_2 Limit in any non-overlapping 3-hour period:

Percentage Over the Limit	Penalty per Violation
1 - 50%	$250
51 - 100%	$500
Over 100%	$750

Where a violation of the Short-Term SO_2 Limit also violates the NSPS SO_2 Limit, the provisions of this stipulated penalty paragraph shall apply.

59. Long-Term SO_2 Limits. For each violation of the Long-Term SO_2 Limit:

Period of Noncompliance	Penalty per Day
1st - 14th Day	$1500
15th - 30th Day	$2000
31st Day and each Day thereafter	$2500

60. Mass Cap. For each violation of the Mass Cap required in Paragraph 9.a., a stipulated penalty of $150,000 per violation shall accrue. A Mass Cap violation may occur only one time per Month and only when the sum of the SO_2 emitted in the immediately preceding 12 Months exceeds the Mass Cap.

61. Acid Mist Emission Limits For each violation of the sulfuric acid mist emission limitation of 0.15 lb/ton of 100% Sulfuric Acid Produced, a stipulated penalty shall accrue as follows:

Percentage Over the Limit	Penalty per Violation
1 - 50%	$250
51 - 100%	$500
Over 100%	$750

62. Opacity Limits in the NSPS. For each violation of the opacity requirements of 40 C.F.R. § 60.83(a)(2), as demonstrated by a Method 9 reference test, $40 per six (6) minute average reading in excess of the limit, up to a maximum of $2,000 per Day.

63. Emissions Monitoring.

a. For each violation of any of the requirements of Section IV.D or the SO_2 CEMS Plan:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$1,000
15th - 30th Day	$1,500

31st Day and each Day thereafter	$2,000

b. For each day during which a Covered Sulfuric Acid Plant is "out of control," as determined by the verification RATA testing required by the SO_2 CEMS Plan in Appendix A:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$1500
15th - 30th Day	$2000
31st Day and each Day thereafter	$2500

64. Performance Testing. For each violation of any of the requirements of Section IV.E:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$1,000
15th - 30th Day	$1,500
31st Day and each Day thereafter	$2,000

65. Operation and Maintenance Plans. For failure to prepare and submit to EPA and LDEQ (for the Geismar Sulfuric Acid Plant) an O & M Plan as required by Section IV.F:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$150
15th - 30th Day	$250
31st Day and each Day thereafter	$500

66. Permitting Requirements. For each violation of any of the requirements of Section VII:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$1,000

15th - 30th Day	$1,500
31st Day and each Day thereafter	$2,000

67. Reporting Requirements. For each violation of any of the reporting requirements of Section IX of this Consent Decree:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$150
15th - 30th Day	$250
31st Day and each Day thereafter	$500

68. Supplemental Environmental Project. For violations of the Nitric Acid SCR SEP required under Section V, stipulated penalties shall accrue as follows:

a. If PCS Nitrogen Fertilizer, L.P. fails to satisfactorily complete the SEP in accordance with the requirements and deadlines set forth in Section V and Appendix B, PCS Nitrogen Fertilizer, L.P. shall pay stipulated penalties for each Day for which it fails to satisfactorily complete the SEP, as follows:

Period of Noncompliance	Penalty per violation per Day
1st through 30th Day	$1,000
31st through 60th Day	$3,500
Beyond 60th Day	$5,000

b. For each violation of the Short-Term NOx Limit in any non-overlapping 3-hour period, PCS Nitrogen Fertilizer, L.P. shall pay stipulated penalties, as follows:

Percentage Over the Limit	Penalty per Violation
1 - 50%	$250
51 - 100%	$500
Over 100%	$750

c. For each violation of the Long-Term NOx Limit, PCS Nitrogen Fertilizer, L.P. shall pay stipulated penalties, as follows:

Period of Noncompliance	Penalty per Day
1st - 14th Day	$1,000
15th - 30th Day	$1,500
31st Day and each Day thereafter	$2,000

69. All Others. For each failure to comply with any requirement of this Consent Decree not specifically referenced:

Period of Noncompliance	Penalty per violation per Day
1st - 14th Day	$150
15th - 30th Day	$250
31st Day and each Day thereafter	$500

70. Stipulated penalties under this Section shall begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and shall continue to accrue until performance is satisfactorily completed or until the violation ceases. Stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

71. The Applicable Settling Party shall pay any stipulated penalty to the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) within 30 Days of receiving a written demand by the United States or LDEQ. The United States and LDEQ may seek stipulated penalties under this Section. Where both the United States and LDEQ seek stipulated penalties for the same violation of the Consent Decree, the Applicable Settling Party shall pay 50 percent to the United States and 50 percent to LDEQ. The United States and LDEQ will consult with each other prior to making a demand for stipulated penalties. The Plaintiff making a demand for payment of a stipulated penalty to the Applicable Settling Party shall simultaneously send a copy of the demand to the other Plaintiff. Where only one

Plaintiff demands stipulated penalties for a violation, it shall make the demand on its own behalf, and the Applicable Settling Party shall pay the full amount of the stipulated penalties due for the violation to that Plaintiff, and the Applicable Settling Party shall not be liable for additional stipulated penalties to the other Plaintiff for that violation.

72. After consulting with each other, the United States and LDEQ may each, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due to it under this Consent Decree.

73. Stipulated penalties shall continue to accrue as provided in Paragraph 70, during any Dispute Resolution, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA or LDEQ that is not appealed to the Court, the Applicable Settling Party shall pay accrued penalties determined to be owing, together with interest, to the United States and/or LDEQ within 30 Days of the effective date of the agreement or the receipt of EPA's or LDEQ's decision or order.

b. If the dispute is appealed to the Court and the United States or LDEQ prevails in whole or in part, the Applicable Settling Party shall pay all accrued penalties determined by the Court to be owing, together with interest, within 60 Days of receiving the Court's decision or order, except as provided in subparagraph c, below.

c. If any Party appeals the District Court's decision, the Applicable Settling Party shall pay all accrued penalties determined to be owing, together with interest, within 15 Days of receiving the final appellate court decision.

74. The Applicable Settling Party shall pay all stipulated penalties due to the United States and/or LDEQ in the manner set forth in Section VI (Civil Penalty) of this Consent Decree.

75. If the Applicable Settling Party fails to pay stipulated penalties according to the terms of this Consent Decree, the Applicable Settling Party shall be liable for interest on such penalties, as provided in 28 U.S.C. § 1961, accruing as of the date payment became due. Nothing in this Paragraph shall be construed to limit the United States or LDEQ from seeking any remedy otherwise provided by law for the Applicable Settling Party's failure to pay any stipulated penalties.

76. Subject to the provisions of Section XIV of this Consent Decree (Effect of Settlement/Reservation of Rights), the stipulated penalties provided for in this Consent Decree shall be in addition to any other rights, remedies, or sanctions available to the United States for a Settling Party's violation of this Consent Decree or applicable law. Where a violation of this Consent Decree is also a violation of the Clean Air Act or the State Implementation Plans of Florida, Louisiana, or North Carolina, the Applicable Settling Party shall be allowed a credit, for any stipulated penalties paid, against any statutory penalties imposed for such violation.

XI. FORCE MAJEURE

77. "Force Majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of an Applicable Settling Party, of any entity controlled by the Applicable Settling Party, or of the Applicable Settling Party's contractors, that delays or prevents the performance of any obligation under this Consent Decree despite the Applicable Settling Party's best efforts to fulfill the obligation. The requirement that the Applicable Settling Party exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential Force Majeure event and best efforts to address the effects of any such event: (a) as it is occurring and (b) after it has occurred to prevent or minimize any resulting delay and to mitigate any adverse effect to the greatest extent possible. "Force

Majeure" does not include the Settling Parties' financial inability to perform any obligation under this Consent Decree.

78. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a Force Majeure event, the Applicable Settling Party shall provide notice orally or by electronic or facsimile transmission to EPA and LDEQ (for the Geismar Sulfuric Acid Plant or Geismar Nitric Acid Plant), within 72 hours of when any Settling Party first knew that the event might cause a delay. Within seven Days thereafter, the Settling Party shall provide in writing to EPA and LDEQ (for the Geismar Sulfuric Acid Plant or Geismar Nitric Acid Plant) an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay and to mitigate any adverse effects from the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay and to mitigate any adverse effects from the delay; the Settling Party's rationale for attributing such delay to a Force Majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of the Settling Party, such event may cause or contribute to an endangerment to public health, welfare or the environment. Failure to comply with the above requirements shall preclude any of the Settling Parties from asserting any claim of Force Majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. A Settling Party shall be deemed to know of any circumstance of which the Settling Party, any entity controlled by the Settling Party, or the Settling Party's contractors knew or should have known. A Settling Party shall include with any notice all available documentation supporting the claim that the delay was attributable to a Force Majeure.

79. If EPA, after a reasonable opportunity for review and comment by LDEQ (for the Geismar Sulfuric Acid Plant or Geismar Nitric Acid Plant), agrees that the delay or anticipated delay is attributable to a Force Majeure event, the time for performance of the obligations under this Consent Decree that are affected by the Force Majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the Force Majeure event shall not, of itself, extend the time for performance of any other obligation. EPA will notify the Settling Party in writing of the length of the extension, if any, for performance of the obligations affected by the Force Majeure event.

80. If EPA, after a reasonable opportunity for review and comment by LDEQ (for the Geismar Sulfuric Acid Plant or Geismar Nitric Acid Plant), does not agree that the delay or anticipated delay has been or will be caused by a Force Majeure event, EPA will notify the Settling Party in writing of its decision.

81. If a Settling Party elects to invoke the dispute resolution procedures set forth in Section XII (Dispute Resolution), it shall do so no later than 15 Days after receipt of EPA's notice. In any such proceeding, the Settling Party shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a Force Majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay or violation, and that the Settling Party complied with the requirements of Paragraphs 77 and 78, above. If the Settling Party carries this burden, the delay at issue shall be deemed not to be a violation by the Settling Party of the affected obligation of this Consent Decree identified to EPA and the Court.

82. Notwithstanding any other provision of this Consent Decree, this Court shall not draw any inferences nor establish any presumptions adverse to any Party as a result of a Settling Party serving a Force Majeure notice or the Parties' inability to reach agreement with respect to the claim of Force Majeure.

83. In appropriate circumstances, as part of the resolution of any matter submitted to this Court under this Section XII (Dispute Resolution), the Parties involved in the dispute may agree to, or the Court may order, an extension or modification of the schedule for completing the work under the Consent Decree to account for the delay in the work that occurred as a result of any Force Majeure Event claimed by the Settling Party that is agreed to by the United States or approved by this Court. The Settling Party shall be liable for stipulated penalties for any failure thereafter to complete the work in accordance with the extended or modified schedule.

XII. DISPUTE RESOLUTION

84. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. A Settling Party's failure to seek resolution of a dispute under this Section shall preclude the Settling Party from raising any such issue as a defense to an action by the United States to enforce any obligation of the Settling Party arising under this Decree.

85. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree shall first be the subject of informal negotiations. The dispute shall be considered to have arisen when a Settling Party sends the United States a written Notice of Dispute. Such Notice of Dispute shall clearly state the matter in dispute. The period of informal

negotiations shall not exceed 30 Days from the date the dispute arises, unless that period is modified by written agreement. If the Parties cannot resolve a dispute by informal negotiations, then the position advanced by the United States shall be considered binding unless, within 30 Days after the conclusion of the informal negotiation period, the Settling Party invokes formal dispute resolution procedures as set forth below.

86. Formal Dispute Resolution. A Settling Party shall invoke formal dispute resolution procedures, within the time period provided in the preceding Paragraph, by serving on the United States and LDEQ (for the Geismar Sulfuric Acid Plant or Geismar Nitric Acid Plant) a written Statement of Position regarding the matter in dispute. The Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting the Settling Party's position and any supporting documentation relied upon by the Settling Party.

87. The United States shall serve its Statement of Position within 45 Days of receipt of the Settling Party's Statement of Position. The United States' Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by the United States. The United States' Statement of Position shall be binding on the Settling Party, unless the Settling Party files a motion for judicial review of the dispute in accordance with the following Paragraph.

88. The Settling Party may seek judicial review of the dispute by filing with the Court and serving on the United States, in accordance with Section XVI of this Consent Decree (Notices), a motion requesting judicial resolution of the dispute. The motion must be filed within 10 Days of receipt of the United States' Statement of Position pursuant to the preceding Paragraph. The motion shall contain a written statement of the Settling Party's position on the matter in dispute, including any supporting factual data, analysis, opinion, or

documentation, and shall set forth the relief requested and any schedule within which the dispute must be resolved for orderly implementation of the Consent Decree.

89. The United States shall respond to the Settling Party's motion within the time period allowed by the Local Rules of this Court. The Settling Party may file a reply memorandum, to the extent permitted by the Local Rules.

90. Standard of Review. Except as otherwise provided in this Consent Decree, in any dispute brought under this Section, the Settling Party shall bear the burden of demonstrating that its position complies with this Consent Decree and the Clean Air Act. The Court shall decide the dispute based upon applicable principles of law. The United States reserves the right to argue that its position is reviewable only on the administrative record and must be upheld unless arbitrary and capricious or otherwise not in accordance with the law.

91. The invocation of dispute resolution procedures under this Section shall not, by itself, extend, postpone, or affect in any way any obligation of the Settling Parties under this Consent Decree, unless and until final resolution of the dispute so provides. Stipulated penalties with respect to the disputed matter shall continue to accrue from the first Day of noncompliance, but payment shall be stayed pending resolution of the dispute as provided in Paragraph 73. If the Settling Party does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section X (Stipulated Penalties).

XIII. INFORMATION COLLECTION AND RETENTION

92. The United States, LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant), and their representatives, including attorneys, contractors, and consultants, shall have the right of entry into the Covered Sulfuric Acid Plants and the Geismar Nitric Acid Plant, at all reasonable times, upon presentation of credentials, to:

a. monitor the progress of activities required under this Consent Decree;

b. verify any data or information submitted to the United States or LDEQ in accordance with the terms of this Consent Decree;

c. obtain samples and, upon request, splits of any samples taken by a Settling Party or its representatives, contractors, or consultants;

d. obtain documentary evidence, including photographs and similar data; and

e. assess the Settling Parties' compliance with this Consent Decree.

93. Notwithstanding Section XX (Termination), until five years after the termination of this Consent Decree, each Settling Party shall retain, and shall instruct their contractors and agents to preserve, all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in its or its contractors' or agents' possession or control, or that come into its or its contractors' or agents' possession or control, and that relate in any manner to the Settling Parties' performance of their obligations under this Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, upon request by the United States or LDEQ, the Settling Parties shall provide copies of any documents, records, or other information required to be maintained under this Paragraph.

94. At the conclusion of the information-retention period provided in the preceding Paragraph, each Settling Party shall notify the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) at least 90 Days prior to the destruction of any documents, records, or other information subject to the requirements of the

preceding Paragraph and, upon request by the United States or LDEQ, a Settling Party shall deliver any such documents, records, or other information to EPA or LDEQ.

95. A Settling Party may assert that certain documents, records, or other information required to be provided to the United States or LDEQ pursuant to this Section XIII is privileged under the attorney-client privilege or any other privilege recognized by federal law. If a Settling Party asserts such a privilege, it shall provide the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of each author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by the Settling Party. However, no documents, records, or other information created or generated pursuant to the requirements of this Consent Decree shall be withheld on grounds of privilege.

96. A Settling Party may also assert that information required to be provided under this Consent Decree is protected as Confidential Business Information (CBI) under 40 C.F.R. Part 2. As to any information that a Settling Party seeks to protect as CBI, the Settling Party shall follow the procedures set forth in 40 C.F.R. Part 2.

97. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States or LDEQ pursuant to applicable federal or State laws, regulations, or permits, nor does it limit or affect any duty or obligation of the Settling Parties to maintain documents, records, or other information imposed by applicable federal or State laws, regulations, or permits.

XIV. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

98. This Consent Decree resolves the civil claims of the United States and LDEQ for the violations alleged in the Complaint filed in this action through the date the Consent Decree is lodged with the Court. This Consent Decree also resolves the civil claims of: a) the United States and LDEQ for the violations at the Geismar Sulfuric Acid Plant as alleged in the June 26, 2008 NOV and June 20, 2011 amended NOV issued to AA Sulfuric, Inc. and PCS Nitrogen Fertilizer, L.P., and b) the United States for the violations at the White Springs Sulfuric Acid Plants alleged in the May 7, 2012 NOV issued to White Springs Agricultural Chemical, Inc. These NOVs are attached in Appendix E.

99. Entry of this Consent Decree also resolves the civil liability of the Settling Parties to the United States and LDEQ with respect to emissions of SO_2 and sulfuric acid mist for the following claims arising from any construction or modification commenced at the Covered Sulfuric Acid Plants prior to the lodging of this Consent Decree:

a. Claims based on Part C of Subchapter I of the Clean Air Act, 42 U.S.C. §§ 7470-7479, and the regulations promulgated at 40 C.F.R. § 52.21;

b. Claims based on Section 111(e) of the Clean Air Act, 42 U.S.C. § 7411(e) and the regulations promulgated thereunder at Subparts A and H of 40 C.F.R. Part 60;

c. Claims based on Sections 502(a) and 504(a) of Title V of the Clean Air Act, 42 U.S.C. §§ 7661a(a) and 7661c(a), but only to the extent that such claims are based on the Settling Parties' failure to obtain a permit that reflects applicable requirements imposed under Part C of Subchapter I; and

d. Claims based on the following provisions of the federally approved and enforceable SIPs for:

i. The State of Florida: Florida Administrative Code (FAC) Sections 62-204.800(8)(b)(12), 62-210.300(1)(a) and (b) and 62-210.300(2), 62-210.350(1); 62-212.300 and 62-212.400; and , 62-213.205, , 62-213.400, 62-213.420 and;

ii. The State of Louisiana: LAC 33:III.501.C, LAC 33:III.507.B and 507.D.2.b-c, LAC 33:III.509, LAC 33:III.517, and, insofar as it incorporates by reference NSPS Subparts A and H as Louisiana regulations, LAC 33:III.3003; and

iii. The State of North Carolina: Title 15A NCAC 2D.0524(a) and .0530, 15A NCAC 2Q.0203-0206, and 15A NCAC 2Q.0501(c)-(f), .0507(a)-(b) and (f), and .0508.

Claims based on the Part 70 operating permit requirements or the consolidated pre-construction and operating permit requirements of these three SIPs are resolved only to the extent that such claims are based on the Settling Parties' failure to obtain a permit that reflects applicable requirements imposed under the SIPs' Prevention of Significant Deterioration provisions.

100. Entry of this Consent Decree also resolves all civil penalty liability of PCS Nitrogen Fertilizer, L.P to LDEQ for the violations identified in the Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695 issued to PCS Nitrogen Fertilizer, L.P. on March 5, 2012, as it was administratively amended on March 1, 2013 (Enforcement Tracking No. AE-CN-10-00695A) and again on June 19, 2013 (Enforcement Tracking No. AE-CN-10-00695B). Entry of this Consent Decree furthermore resolves all civil liability of PCS Nitrogen Fertilizer, L.P and AA Sulfuric, Inc. to LDEQ for violations of LAC

33:III.207, LAC 33:III.209, LAC 33:III.211, LAC 33:III.217, and LAC 33:III.219 arising from the claims resolved in Paragraphs 99(a)-(d).

101. The United States and LDEQ reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree. This Consent Decree shall not be construed to limit the rights of the United States or LDEQ to obtain penalties or injunctive relief under the CAA or implementing regulations, or under other federal or State laws, regulations, or permit conditions, except as expressly specified in Paragraphs 98 - 100. The United States and LDEQ further reserve all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, any of the Covered Sulfuric Acid Plants, whether related to the violations addressed in this Consent Decree or otherwise.

102. In any subsequent administrative or judicial proceeding initiated by the United States or LDEQ for injunctive relief, civil penalties, other appropriate relief relating to a Covered Sulfuric Acid Plant or the Settling Parties' violations, the Settling Parties shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States or LDEQ in the subsequent proceeding were or should have been brought in the instant case, except with respect to claims that have been specifically resolved pursuant to Paragraphs 98 - 100 of this Section.

103. This Consent Decree is not a permit, or a modification of any permit, under any federal, State, or local laws or regulations. The Settling Parties are responsible for achieving and maintaining compliance with all applicable federal, State, and local laws, regulations, and permits; and the Settling Parties' compliance with this Consent Decree shall be

no defense to any action commenced pursuant to any such laws, regulations, or permits, except as set forth herein. The United States and LDEQ do not, by their consent to the entry of this Consent Decree, warrant or aver in any manner that the Settling Parties' compliance with any aspect of this Consent Decree will result in compliance with provisions of the Clean Air Act, or with any other provisions of federal, State, or local laws, regulations, or permits.

104. This Consent Decree does not limit or affect the rights of the Settling Parties or of the United States or LDEQ against any third parties that are not party to this Consent Decree, nor does it limit the rights of third parties that are not party to this Consent Decree, against the Settling Parties, except as otherwise provided by law.

105. This Consent Decree shall not be construed to create rights in, or grant any cause of action to, any third party that is not a party to this Consent Decree.

XV. COSTS

106. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States and LDEQ shall be entitled to collect the costs (including attorneys' fees) incurred in any action necessary to collect any portion of the civil penalty or any stipulated penalties due but not paid by the Settling Parties.

XVI. NOTICES

107. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and addressed as follows:

<u>As to the United States</u>:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Box 7611 Ben Franklin Station
Washington, DC 20044-7611
Re: DOJ No. 90-7-1-08209/1

<u>As to EPA OECA</u>:

Air Enforcement Division Director
U.S. Environmental Protection Agency
Office of Civil Enforcement
1200 Pennsylvania Ave, NW
Mail Code: 2242A
Washington, DC 20460

and

Sarah Marshall
U.S. Environmental Protection Agency
Region 5
AE-17J
77 West Jackson. Blvd.
Chicago, IL 60604
Marshall.Sarah@epa.gov

<u>As to EPA Region 6</u>:

Associate Director
Air Toxics Inspection and Coordination Branch
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue, Suite 1200
Mailcode 6EN-A
Dallas, TX 75202

<u>As to EPA Region 4:</u>

Beverly Banister
Division Director
Air, Pesticides and Toxics Management Division
61 Forsyth Street
Atlanta, Georgia 30303

Todd Groendyke
South Air Enforcement Section
Air, Pesticides, and Toxics Management Division
61 Forsyth Street
Atlanta, Georgia 30303

and

Rosalyn Hughes
South Air Enforcement Section
Air, Pesticides, and Toxics Management Division
61 Forsyth Street
Atlanta, Georgia 30303

As to LDEQ:

Celena J. Cage
Administrator, Enforcement Division
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P. O. Box 4312
Baton Rouge, Louisiana 70821-4312

and

Perry Theriot, Attorney Supervisor Office of the Secretary, Legal Division
Louisiana Department of Environmental Quality
P. O. Box 4302
Baton Rouge, Louisiana 70821-4302

As to the Settling Parties:

PCS Administration (USA), Inc.
1101 Skokie Boulevard, Suite 400
Northbrook, Illinois 60062
Telephone: (847) 849-4200
Facsimile: (847) 849-4663
Attention: Legal Counsel

PCS Nitrogen Fertilizer, L.P.
3115 Highway 30
Geismar, LA 70734
Telephone: (225) 621-1500
Facsimile: (225) 621-1504
Attention: General Manager

White Springs Agricultural Chemicals, Inc.
P. O. Box 300
White Springs, FL 32096
Telephone: (386) 397-8101
Attention: General Manager

PCS Phosphate Company, Inc.
1530 NC Hwy 306 South
Aurora, NC 27806
Telephone: (252) 322-4111
Facsimile: (252) 322-8061
Attention: General Manager

and

Charles T. Wehland
Jones Day
77 West Wacker Drive, Suite 3500
Chicago, Illinois 60601-1692
Telephone: (312) 782-3939
Facsimile: (312) 782-8585

108. Any Party may, by written notice to the other Parties, change its designated notice recipient or notice address provided above.

109. Notices submitted pursuant to this Section shall be deemed submitted upon mailing, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XVII. EFFECTIVE DATE

110. The Effective Date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court; provided, however, that the Settling Parties hereby

agree that they shall be bound to perform duties scheduled to occur prior to the Effective Date as set forth herein. In the event the United States withdraws or withholds consent to this Consent Decree before entry, or the Court declines to enter the Consent Decree, then the preceding requirement to perform duties scheduled to occur before the Effective Date shall terminate.

XVIII. RETENTION OF JURISDICTION

111. The Court shall retain jurisdiction over this case until termination of this Consent Decree, for the purpose of: (i) resolving disputes arising under this Decree pursuant to Section XII (Dispute Resolution), (ii) entering orders modifying this Decree pursuant to Section XIX (Modification), or (iii) effectuating or enforcing compliance with the terms of this Decree.

XIX. MODIFICATION

112. Except as provided in Paragraph 108, the terms of this Consent Decree, including any attached appendices, may be modified only by a subsequent written agreement signed by all the Parties. Where the modification constitutes a material change to this Decree, it shall be effective only upon approval by the Court.

113. Any disputes concerning modification of this Consent Decree shall be resolved pursuant to Section XII of this Decree (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 90, the Party seeking the modification bears the burden of demonstrating that it is entitled to the requested modification in accordance with Federal Rule of Civil Procedure 60(b).

XX. TERMINATION

114. Except for the surviving requirements of Paragraphs 9.d.ii and 48, permitting requirements of Paragraph 41, and information retention requirements of Paragraph 93, after an Applicable Settling Party has completed the requirements of Section IV (Compliance

Requirements) for all sulfuric acid production units subject to the Decree at its Covered Sulfuric Acid Plant and Section V (Supplemental Environmental Project) of this Decree, has thereafter maintained continuous satisfactory compliance with this Consent Decree and the applicable Title V Permit for all sulfuric acid production units subject to the Decree at its Covered Sulfuric Acid Plant for a period of one year, has complied with all other requirements of this Consent Decree, including the permitting requirements of Section VII, and has paid the civil penalty and any accrued stipulated penalties as required by this Consent Decree, the Applicable Settling Party may serve upon the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) a Request for Termination with respect to all sulfuric acid production units at the Covered Sulfuric Acid Plant owned and operated by the Applicable Settling Party, stating that the Applicable Settling Party has satisfied those requirements, together with all necessary supporting documentation.

115. Following receipt by the United States and LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) of a Settling Party's Request for Termination, the Parties shall confer informally concerning the request and any disagreement that the Parties may have as to whether the Settling Party has satisfactorily complied with the requirements for termination of this Consent Decree with respect to the Covered Sulfuric Acid Plant owned and operated by the Settling Party. If the United States after consultation with LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) agrees that the Decree may be terminated, the Parties shall submit, for the Court's approval, a joint stipulation terminating the Decree with respect to the Covered Sulfuric Acid Plant owned and operated by the Settling Party.

116. If the United States after consultation with LDEQ (for the Geismar Sulfuric Acid Plant and Geismar Nitric Acid Plant) does not agree that the Decree may be terminated, a Settling Party may invoke Dispute Resolution under Section XII of this Decree. However, the Settling Party shall not seek Dispute Resolution of any dispute regarding termination until 90 Days after service of its Request for Termination.

XXI. <u>PUBLIC PARTICIPATION</u>

117. This Consent Decree shall be lodged with the Court for a period of not less than 30 Days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. The Settling Parties consent to entry of this Consent Decree without further notice and agree not to withdraw from or oppose entry of this Consent Decree by the Court or to challenge any provision of the Consent Decree, unless the United States has notified the Settling Parties and LDEQ in writing that it no longer supports entry of the Decree.

118. The Parties agree and acknowledge that final approval by LDEQ and entry of this Consent Decree are subject to the requirements of La. R.S. 30:2050.7, which provides for: (a) public notice of this Consent Decree in the newspaper of general circulation and the official journal of the parish in which the Geismar Sulfuric Acid Plant is located, (b) an opportunity for public comment and consideration of any comments received, and (c) concurrence by the State Attorney General. LDEQ reserves the right to withdraw or withhold consent if the comments regarding this Consent Decree disclose facts or considerations which indicate that this Consent Decree is inappropriate, improper, or inadequate.

XXII. SIGNATORIES/SERVICE

119. Each undersigned representative of the Settling Parties, LDEQ, and the Acting Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document.

120. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis. The Settling Parties agree to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XXIII. INTEGRATION

121. This Consent Decree constitutes the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Consent Decree and supersedes all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. Other than deliverables that are subsequently submitted and approved pursuant to this Consent Decree, no other document, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Consent Decree or the settlement it represents, nor shall it be used in construing the terms of this Consent Decree.

XXIV. APPENDICES

122. The following appendices are attached to and incorporated as part of this Consent Decree:

"Appendix A (A-1 – A-3)" contains the CEMS Plans for SO_2 Emissions at the Covered Sulfuric Acid Plants,

"Appendix B" is the Nitric Acid SCR SEP,

"Appendix C" is the CEMS Plan for NOx Emissions, and

"Appendix D" are the Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695 issued to PCS Nitrogen Fertilizer, L.P. on March 5, 2012, Amended Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695A issued to PCS Nitrogen Fertilizer, L.P. on March 1, 2013; and Amended Consolidated Compliance Order & Notice of Potential Penalty, Enforcement Tracking No. AE-CN-10-00695B issued to PCS Nitrogen Fertilizer, L.P. on June 19, 2013; and

"Appendix E" is the set of NOVs resolved by the Consent Decree.

XXV. <u>FINAL JUDGMENT</u>

123. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court as to the United States, LDEQ, and the Settling Parties. The Court finds no just reason for delay and therefore enters this judgment as a final judgment pursuant to Fed. R. Civ. P. 58.

DATED this ___________ day of _____________________, 2014.

____

UNITED STATES DISTRICT JUDGE
MIDDLE DISTRICT OF LOUISIANA

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR THE UNITED STATES OF AMERICA

[redacted]

SAM HIRSCH
Acting Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice

[redacted]

STEVEN D. SHERMER
Senior Attorney
(*Designated Trial Attorney Pursuant to L.R. 11.2)*
DAVID MCILWAIN
Trial Attorney
Environmental Enforcement Section
Environment and Natural Resources Division
United States Department of Justice
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Washington, D.C. 20044-7611
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Steven.Shermer@usdoj.gov

J. WALTER GREEN
United States Attorney
Middle District of Louisiana

/s/ Susan C. Amundson
Susan C. Amundson, LBN 22710
Assistant United States Attorney
777 Florida Street, Suite 208
Baton Rouge, Louisiana 70801
Telephone: (225) 389-0443
Fax: (225) 389-0561
E-mail: susan.amundson@usdoj.gov

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

[redacted]

CYNTHIA GILES
Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue
Washington, D.C. 20460

[redacted]

for SUSAN SHINKMAN
Director, Office of Civil Enforcement
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

[redacted]

for PHILLIP A. BROOKS
Director, Air Enforcement Division
Office of Civil Enforcement
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

[redacted]

MELANIE SHEPHERDSON
Attorney-Advisor
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 4

[redacted]

HEATHER MCTEER TONEY SEP 29 2014
Regional Administrator
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

[redacted]

MARLENE J. TUCKER
Associate Regional Counsel
U.S. Environmental Protection Agency, Region 4
Office of Environmental Accountability
61 Forsyth Street
Atlanta, Georgia 30303

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 6

[redacted]

JOHN BLEVINS
Division Director
Compliance Assurance and Enforcement Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave.
Dallas, TX 75202-2733

[redacted]

CARLOS A. ZEQUEIRA-BRINSFIELD
Senior Assistant Regional Counsel
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue (6RC)
Dallas, Texas 75202-2733

Subject to the notice and comment provisions of La. R.S. 30 § 2050.7 and 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR THE LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

[redacted]

CHERYL SONNIER NOLAN
Assistant Secretary
Office of Environmental Compliance
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THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR PCS NITROGEN FERTILIZER, L.P.

[redacted]

RAEF SULLY
President, PCS Nitrogen Fertilizer Operations, Inc.,
(On behalf of and as General Partner of PCS
Nitrogen Fertilizer, L.P.)

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR AA SULFURIC, INC.

[redacted]

____

RAEF SULLY
President, AA Sulfuric, Inc.

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR WHITE SPRINGS AGRICULTURAL CHEMICALS, INC.

[redacted]

PAUL DEKOK
President
White Springs Agricultural Chemicals, Inc.

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. PCS Nitrogen Fertilizer, L.P. et al.* (M.D. La.).

FOR PCS PHOSPHATE COMPANY, INC.

[redacted]

PAUL DEKOK
President, PCS Phosphate Company, Inc.

APPENDIX A

Appendix A consists of Appendix A-1 for the Aurora Sulfuric Acid Plants, Appendix A-2 for the Geismar Sulfuric Acid Plant, and Appendix A-3 for the White Springs Sulfuric Acid Plants. Any references to Appendix A in the Consent Decree shall be read, as appropriate, to refer to all three sub-appendices collectively or to refer to the part or the appendix that is specific to a particular Covered Sulfuric Acid Plant.

APPENDIX A-1

CEMS Plan for SO_2 Emissions
PCS Phosphate Company, Inc., Aurora, NC
Sulfur Burning Sulfuric Acid Plants

Principle

This CEMS Plan is the mechanism for determining compliance with the SO_2 emission limits in Section IV.A of the Consent Decree for the Aurora Sulfuric Acid Plants. The methodology described in this CEMS Plan will provide a continuous real-time indication of compliance with the emission limits established in the Consent Decree for the Aurora Sulfuric Acid Plants by determining the emission rate in terms of pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced ("lb/ton"). The system will utilize the following analyzers: one to measure stack SO_2 concentration, one to measure stack oxygen ("O_2") concentration, and one to measure the 100% Sulfuric Acid Production Rate. From these data, the SO_2 emission rate, expressed as lb/ton, will be directly calculated using Equations 1 and 2 below.

Equation 1:

$$E_{\frac{lb}{ton}} = \frac{Cs \cdot S}{(0.264 - 0.0126 \cdot \%O_2 - 7.61 \cdot Cs)}$$

Equation 2:

$$M_{SO_2 Stack} = E_{\frac{lb}{ton}} \cdot P_{H_2SO_4}$$

Where:

$P_{H_2SO_4}$ = 100% Sulfuric Acid Production, tons per unit of time

$M_{SO_2 Stack}$ = Mass SO_2 stack emission rate, lb per unit of time

$\%O_2$ = Stack O_2 concentration, percent by volume dry basis

Cs = Stack SO_2 concentration, lb/DSCF (to convert parts per million by volume, dry basis (ppmvd) to lb/DSCF, multiply by 1.661×10^{-7})

$E_{\frac{lb}{ton}}$ = lb SO_2 per ton 100% Sulfuric Acid Produced

S = the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or State regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. The terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

Emissions monitoring will be done using an O_2 analyzer at the exit stack and an SO_2 analyzer at the exit stack. Except for any analyzer downtime, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), and any other period specified in Paragraph 15 of the Consent Decree, PCS Phosphate Company, Inc. (PCS Phosphate) will conduct monitoring at each Aurora Sulfuric Acid Plant during all Operating Periods.

- At least once every 15 minutes, the analyzers will measure the stack SO_2 concentration (lb/DSCF or ppmvd) and the stack O_2 concentration (percent by volume).

- During routine calibration checks and adjustments of any analyzer, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating, a like-kind replacement (*i.e*. a redundant analyzer) may be used as a substitute.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater and no redundant analyzer is available, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once every three hours, while the relevant Aurora Sulfuric Acid Plant is operating. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

    - O_2 in the exit stack gas will be sampled and analyzed at least once every three hours, while the relevant Aurora Sulfuric Acid Plant is operating. Sampling will be conducted by Orsat test or other method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, PCS Phosphate will either: (i) follow the requirements set forth for a 24-hour or greater period of downtime to fill in the data gaps; or (ii) use the data recorded for the 3-hour average immediately preceding the affected analyzer's(s') stoppage to fill in the data gap.

Emissions Calculations

1-Hour Average

At the top of each hour, the CEMS will maintain an array of the 15-minute average measurements of each of the monitored parameters collected for that hour (or partial hour, in the case of a Shutdown) and perform the calculation specified in Equation 3.

Equation 3:

$$E_{1hravg} = \frac{\overline{Cs} \cdot S}{\left(0.264 - 0.0126 \cdot \overline{\%O_2} - 7.61 \cdot \overline{Cs}\right)}$$

Where:

$\overline{\%O_2}$ = Stack O_2 concentration, percent by volume dry basis, arithmetic average of hourly measurements

$\overline{Cs}$ = Stack SO_2 concentration, lb/DSCF, arithmetic average of hourly measurements

S = the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;

E_{1hravg} = 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

3-Hour Rolling Average

At the top of each hour, the CEMS will calculate the 3-hour rolling average SO_2 emission rate (E_{3hravg}) by maintaining an array of the three most recently calculated values of E_{1hravg} and performing the calculation specified in Equation 4.

Equation 4

$$E_{3hravg} = \frac{\sum_i^3 E_{1hravg\,i}}{3}$$

$E_{1hravg\,i}$ = 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced for hour *i*

E_{3hravg} = 3-hour rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions

The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated for each Aurora Sulfuric Acid Plant using the hourly values of E_{1hravg}, the measured 100% Sulfuric Acid Production rate, and Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_i^n \left(E_{1hravg\,i} \cdot P_{H_2SO_4Hour\,i}\right)$$

Where:

$E_{1hravg\,i}$ = 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced during hour *i*

$P_{H_2SO_4Hour\,i}$ = 100% Sulfuric Acid Produced during hour *i*, tons

M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb

n = Number of operating hours in the day

365-Day Rolling Average

For the purposes of calculating a 365-day rolling average lb/ton SO_2 emission rate, the system will maintain an array of M_{SO_2Day} and $P_{TonsH_2O_4}$ each day for 365 days. Every day, the system will add the values from that day to the array and exclude the readings from the oldest day.

The 365-day rolling average lb/ton SO_2 emission rate ($E_{365-Day\,Avg}$) will be calculated for each Aurora Sulfuric Acid Plant using Equation 6:

Equation 6:

$$E_{365-Day\,Avg} = \frac{\sum_i^n M_{SO_2 Day\,i}}{\sum_i^n P_{H_2SO_4 Day\,i}}$$

Where:

$M_{SO_2 Day\,i}$ = Mass emissions of SO_2 during a calendar day *i*, lb

$P_{H_2SO_4 Day\,i}$ = 100% Sulfuric Acid Produced during day *i*, tons

$E_{365-Day\,Avg}$ = 365-day rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Rounding of Numbers Resulting from Calculations

Upon completion of the calculations, the final numbers will be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth

$E_{365-Day\,Avg}$: Rounded to the nearest hundredth

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables: $Cs, \%O_2$, and $P_{H_2SO_4}$

Rounding of the variables identified as $Cs, \%O_2$, and $P_{H_2SO_4}$ in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Nothing in this CEMS Plan shall preclude the use of other credible evidence or information, as authorized under Section 113 of the Clean Air Act and 40 C.F.R. §§ 60.11(g) and 61.12, to determine whether an Aurora Sulfuric Acid Plant is, or would have been, in compliance with the SO_2 Emissions Limits required by Section IV.A of the Consent Decree if the appropriate performance or compliance test had been performed.

Short-Term SO_2 Limits

The Short-Term SO_2 Limits do not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, PCS Phosphate will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} for each Aurora Sulfuric Acid Plant does not exceed the applicable Short-Term SO_2 Limit listed in Table 1 in Paragraph 9 of the Consent Decree. If PCS Phosphate contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of an applicable Short-Term SO_2 Limit, after the period of the Malfunction(s) end(s), PCS Phosphate will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS SO_2 Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, PCS Phosphate will be in compliance with the NSPS SO_2 Limit if E_{3hravg} does not exceed 4.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If PCS Phosphate contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), PCS Phosphate will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Long-Term SO_2 Limits

The Long-Term SO_2 Limits include periods of Startup, Shutdown, and Malfunction. The Aurora Sulfuric Acid Plants will be in compliance with the Long-Term SO_2 Limits if $E_{365-Day\ Avg}$ does not exceed the applicable Long-Term SO_2 Limit listed in Table 1 in Paragraph 9 of the Consent Decree (measured as lbs of SO_2 per ton of 100% Sulfuric Acid Produced).

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

PCS Phosphate will retain all data generated by its SO_2 analyzers, O_2 analyzers, and production rate analyzers including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Aurora Sulfuric Acid Plants in accordance with Section XIII of the Consent Decree.

Analyzer Specifications

The analyzers will meet the following specifications:

Table 1

Parameter	**Location**	**Range**
SO_2, parts per million, dry basis (to convert to lb/DSCF, multiply by 1.661×10^{-7})	Stack	Dual range: Normal: 0 –1,000 ppm SO_2 SSM: 0 –10,000 ppm SO_2
O_2, percent, dry basis	Stack	Single range: 0 – 20.9 % O_2

Each SO_2 and O_2 CEMS will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, Performance Specifications 2, 3, and 6 in 40 C.F.R. Part 60, Appendix B, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

RATA Requirements

After the Effective Date, pursuant to 40 C.F.R. Part 60, Appendix F, Procedure 1, 5.1.1, PCS Phosphate shall conduct a Relative Accuracy Test Audit (RATA) at least once every four calendar quarters at each Aurora Sulfuric Acid Plant.

RATAs will be performed to determine the relative accuracy of the equipment, methods, and procedures required by this CEMS Plan. In addition to all other applicable procedures required by 40 C.F.R. Part 60, Appendix F, Procedure 1, 5.1.1, RATA testing will compare the concentrations of SO_2 and O_2, as measured by the CEMS installed or operated as part of the Consent Decree, with the concentrations of SO_2 and O_2 measured during the RATA testing. In addition, RATA testing will compare the pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced, as calculated by Equation 1, with the pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced calculated during the RATA testing pursuant to 40 C.F.R. § 60.85.

Beginning with the initial RATA under this CEMS Plan, and thereafter for every triennial RATA (*i.e*., year 1, 4, 7, etc.), PCS Phosphate will utilize the reference methods and procedures specified in 40 C.F.R. § 60.85(b) to generate the Reference Method (RM) values for calculating the relative accuracy. In intervening years (*i.e.*, year 2, 3, 5, 6, etc.) PCS Phosphate may use the alternative method at 40 C.F.R. § 60.85(c) to calculate the RM values.

For each RATA performed, stack flow shall be measured using Method 2, 2F, 2G, or 2H, or a combination thereof.

If a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) is deemed to be "out of control" pursuant to 40 C.F.R. Part 60, Appendix F, Procedure 1, § 5.2, PCS Phosphate shall take all necessary corrective actions required by that procedure, including performing a follow-up ("verification") RATA meeting the requirements of this CEMS Plan. All necessary corrective actions and the verification RATA shall be completed within 30 days after the initial RATA testing. If the verification RATA determines that a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) remains out of control, PCS Phosphate shall take all necessary corrective actions to eliminate the problem, including, but not limited to, submitting, for EPA review and approval, a revised SO_2 CEMS Plan that considers: a) installation of direct stack flow meters and b) a monitoring methodology that accurately measures emissions of SO_2/ton of 100% Sulfuric Acid Produced, but is not based on the S-Factor.

If the verification RATA determines that a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) remains out of control, PCS Phosphate shall also be subject to stipulated penalties as set forth in Section X, Paragraph 63.b of the Consent Decree.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, PCS Phosphate also will comply with all of the requirements of the NSPS relating to monitoring except that, pursuant to 40 C.F.R. § 60.13(i), this CEMS Plan will supersede the following provisions of 40 C.F.R. Part 60, Subpart H:

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this PCS Phosphate will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS SO_2 Limit.

APPENDIX A-2

CEMS Plan for SO_2 Emissions
PCS Nitrogen Fertilizer, L.P., Geismar, LA
Sulfur Burning Sulfuric Acid Plant

Principle

This CEMS Plan is the mechanism for determining compliance with the SO_2 emission limits in Section IV.A of the Consent Decree for the Geismar Sulfuric Acid Plant. The methodology described in this CEMS Plan will provide a continuous real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate both in terms of pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced ("lb/ton"). The system will utilize three analyzers: one to measure stack SO_2 concentration, one to measure stack oxygen ("O_2") concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2 Stack} = Q_{Stack} \cdot Cs$$

Equation 2:

$$P_{TonsH_2SO_4} = \frac{Q_{Stack} \cdot (0.264 - 0.0126 \cdot \%O_2 - 7.61 \cdot Cs)}{S}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2 Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot Cs \cdot S}{Q_{Stack} \cdot (0.264 - 0.0126 \cdot \%O_2 - 7.61 \cdot Cs)}$$

Where:

$P_{TonsH_2SO_4}$ = 100% Sulfuric Acid Production, tons per unit of time

$M_{SO_2 Stack}$ = Mass SO_2 stack emission rate, lb per unit of time

Q_{Stack} = Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time

$\%O_2$ = Stack O_2 concentration, percent by volume dry basis

Cs = Stack SO_2 concentration, lb/DSCF (to convert parts per million by volume, dry basis (ppmvd) to lb/DSCF, multiply by 1.661×10^{-7})

$E_{lbs/ton}$ = lb SO_2 per ton 100% Sulfuric Acid Produced

S = the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process and the fact that the ratio of oxygen to nitrogen of the incoming air is fixed. The lb/ton equation (Equation 3) is the ratio of the mass SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain continuous information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or State regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. The terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

Emissions monitoring will be done using an O_2 analyzer at the exit stack, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer downtime, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), and any other period specified in Paragraph 15 of the Consent Decree, PCS Nitrogen Fertilizer, L.P. ("PCS Nitrogen") will conduct monitoring at the Geismar Sulfuric Acid Plant during all Operating Periods.

- At least once every 15 minutes, the analyzers will measure the stack SO_2 concentration (lb/DSCF or ppmvd), the stack O_2 concentration (percent by volume), and the volumetric flow rate (DSCF per minute).

- During routine calibration checks and adjustments of any analyzer, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating, a like-kind replacement (*i.e*. a redundant analyzer) may be used as a substitute.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater and no redundant analyzer is available, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once every three hours, while the Geismar Sulfuric Acid Plant is operating. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

    - O_2 in the exit stack gas will be sampled and analyzed at least once every three hours, while the Geismar Sulfuric Acid Plant is operating. Sampling will be conducted by Orsat test or other method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

    - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours PCS Nitrogen will either: (i) follow the requirements set forth for a 24-hour or greater period of downtime to fill in the data gaps; or (ii) use the data recorded for the 3-hour average immediately preceding the affected analyzer's(s') stoppage to fill in the data gap.

Emissions Calculations

Rolling 3-Hour Average

For purposes of calculating a rolling 3-hour average, the CEMS will maintain an array of the 12 most recent 15-minute average measurements of each of the three monitored parameters. Every 15 minutes, it will add the most recent readings to the array and exclude the oldest readings.

The rolling 3-hour average lb/ton SO_2 emission rate (E_{3hravg}) will then be calculated every 15 minutes using Equation 4.

Equation 4:

$$E_{3hravg} = \frac{S \cdot \sum_{i=1}^{12} Q_{Stack\ i} \cdot Cs_i}{\sum_{i=1}^{12} Q_{Stack\ i} \cdot \left(0.264 - 0.0126 \cdot \%O_{2_i} - 7.61 \cdot Cs_i\right)}$$

Where:

$\%O_{2i}$ = Stack O_2 concentration, percent by volume dry basis at measurement "*i*"

Cs_i = Stack SO_2 concentration, lb/DSCF at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, DSCF per minute at measurement "*i*"

S = the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions

The daily mass SO_2 emissions ($M_{SO_2 Day}$) (which are based on a calendar day) will be calculated for the Geismar Sulfuric Acid Plants using Equation 5.

Equation 5:

$$M_{SO_2 Day} = \sum_{i=1}^{n} Q_{Stack\ i} \cdot Cs_i \cdot 15\,\text{min}$$

Where:

Cs_i = Stack SO_2 concentration, lb/DSCF at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, DSCF per minute at measurement "*i*"

$M_{SO_2 Day}$ = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurement intervals in a given calendar day

12-Month Rolling Sum Mass SO_2 Emissions

The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated for the Geismar Sulfuric Acid Plant by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2 Day\ j}$$

Where:

$M_{SO_2 Day\ j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number of days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers Resulting from Calculations

Upon completion of the calculations, the final numbers will be rounded as follows:

E_{3hravg} : Rounded to the nearest tenth.
$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of the variables identified as Cs , $\%O_2$, and Q_{Stack} in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term SO_2 Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods where the Geismar Sulfuric Acid Plant, PCS Nitrogen will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} for the Geismar Sulfuric Acid Plant does not exceed the applicable Short-Term SO_2 Limit listed in Table 1 in Paragraph 9 of the Consent Decree. If PCS Nitrogen contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of an applicable Short-Term SO_2 Limit, after the period of the Malfunction(s) end(s), PCS Nitrogen will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, PCS Nitrogen will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If PCS Nitrogen contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), PCS Nitrogen will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Mass Cap for SO_2

The Applicable Settling Parties will be in compliance with the Mass Cap for the Geismar Sulfuric Acid Plant if the 12-month rolling sum ($M_{SO_2 12 Mo\ Sum}$) is 451.59 tons (902,000 lbs) of SO_2 or less.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

PCS Nitrogen will retain all data generated by its SO_2 analyzers, O_2 analyzers, and stack flow analyzers, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Geismar Sulfuric Acid Plants in accordance with Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, parts per million, dry basis (to convert to lb/DSCF, multiply by 1.661×10^{-7})	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
O_2, percent, dry basis	Stack	Single range: 0 – 20.9 % O_2
Volumetric flow rate, DSCFM	Stack	15 to 125% of the maximum expected volumetric flow rate

Each SO_2 and O_2 CEMS and the flow rate CERMS will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specifications 2 and 6, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, PCS Nitrogen also will comply with all of the requirements of the NSPS relating to monitoring except that, pursuant to 40 C.F.R. § 60.13(i), this CEMS Plan will supersede the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, PCS Nitrogen will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, PCS Nitrogen will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX A-3

CEMS Plan for SO_2 Emissions
White Springs Agricultural Chemicals, Inc., White Springs, FL
Sulfur Burning Sulfuric Acid Plants

Principle

This CEMS Plan is the mechanism for determining compliance with the SO_2 emission limits in Section IV.A of the Consent Decree for the White Springs Sulfuric Acid Plants. The methodology described in this CEMS Plan will provide a continuous real-time indication of compliance with the emission limits established in the Consent Decree for the White Springs Sulfuric Acid Plants by determining the emission rate in terms of pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced ("lb/ton"). The system will utilize the following analyzers: one to measure stack SO_2 concentration, one to measure stack oxygen ("O_2") concentration, and one to measure the 100% Sulfuric Acid Production Rate. From these data, the SO_2 emission rate, expressed as lb/ton, will be directly calculated using Equations 1 and 2 below.

Equation 1:

$$E_{\frac{lb}{ton}} = \frac{Cs \cdot S}{(0.264 - 0.0126 \cdot \%O_2 - 7.61 \cdot Cs)}$$

Equation 2:

$$M_{SO_2\,Stack} = E_{\frac{lb}{ton}} \cdot P_{H_2SO_4}$$

Where:

$P_{H_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
$M_{SO_2\,Stack}$	= Mass SO_2 stack emission rate, lb per unit of time
$\%O_2$	= Stack O_2 concentration, percent by volume dry basis
Cs	= Stack SO_2 concentration, lb/DSCF (to convert parts per million by volume, dry basis (ppmvd) to lb/DSCF, multiply by 1.661×10^{-7})
$E_{\frac{lb}{ton}}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
S	= the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or State regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. The terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

Emissions monitoring will be done using an O_2 analyzer at the exit stack and an SO_2 analyzer at the exit stack. Except for any analyzer downtime, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), and any other period specified in Paragraph 15 of the Consent Decree, White Springs Agricultural Chemicals, Inc. (WSAC) will conduct monitoring at each White Springs Sulfuric Acid Plant during all Operating Periods.

- At least once every 15 minutes, the analyzers will measure the stack SO_2 concentration (lb/DSCF or ppmvd) and the stack O_2 concentration (percent by volume).

- During routine calibration checks and adjustments of any analyzer, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating, a like-kind replacement (*i.e*. a redundant analyzer) may be used as a substitute.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater and no redundant analyzer is available, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once every three hours, while the relevant White Springs Sulfuric Acid Plant is operating. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

    - O_2 in the exit stack gas will be sampled and analyzed at least once every three hours, while the relevant White Springs Sulfuric Acid Plant is operating. Sampling will be conducted by Orsat test or other method (*e.g.*, portable analyzer). The most recent 3-hour average reading will be substituted for the four 15-minute average measurements that would otherwise be utilized if the analyzer were operating normally.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, WSAC will either: (i) follow the requirements set forth for a 24-hour or greater period of downtime to fill in the data gaps; or (ii) use the data recorded for the 3-hour average immediately preceding the affected analyzer's(s') stoppage to fill in the data gap.

Emissions Calculations

1-Hour Average

At the top of each hour, the CEMS will maintain an array of the 15-minute average measurements of each of the monitored parameters collected for that hour (or partial hour, in the case of a Shutdown) and perform the calculation specified in Equation 3.

Equation 3:

$$E_{1hravg} = \frac{\overline{Cs} \cdot S}{(0.264 - 0.0126 \cdot \overline{\%O_2} - 7.61 \cdot \overline{Cs})}$$

Where:

$\overline{\%O_2}$	= Stack O_2 concentration, percent by volume dry basis, arithmetic average of hourly measurements
$\overline{Cs}$	= Stack SO_2 concentration, lb/DSCF, arithmetic average of hourly measurements
S	= the acid production rate factor, 11,800 DSCF/Ton of 100% Sulfuric Acid Produced;
E_{1hravg}	= 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

3-Hour Rolling Average

At the top of each hour, the CEMS will calculate the 3-hour rolling average SO_2 emission rate (E_{3hravg}) by maintaining an array of the three most recently calculated values of E_{1hravg} and performing the calculation specified in Equation 4.

Equation 4:

$$E_{3hravg} = \frac{\sum_{i}^{3} E_{1hravg\ i}}{3}$$

$E_{1hravg\ i}$ = 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced for hour *i*

E_{3hravg} = 3-hour rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions

The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated for each White Springs Sulfuric Acid Plant using the hourly values of E_{1hravg}, the hourly measurements of the 100% Sulfuric Acid Production rate, and Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_{i}^{n} \left(E_{1hravg\ i} \cdot P_{H_2SO_4Hour\ i}\right)$$

Where:

$E_{1hravg\ i}$ = 1-hour average lb SO_2 per ton 100% Sulfuric Acid Produced during hour *i*
$P_{H_2SO_4Hour\ i}$ = 100% Sulfuric Acid Produced during hour *i*, tons
M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb
n = Number of operating hours (or partial operating hours) in the day

365-Day Rolling Average

For the purposes of calculating a 365-day rolling average lb/ton SO_2 emission rate, the system will maintain an array of M_{SO_2Day} and $P_{TonsH_2O_4}$ each day for 365 days. Every day, the system will add the values from that day to the array and exclude the readings from the oldest day.

The 365-day rolling average lb/ton SO_2 emission rate ($E_{365-Day\ Avg}$) will be calculated for each White Springs Sulfuric Acid Plant using Equation 6:

Equation 6:

$$E_{365-Day\ Avg} = \frac{\sum_{i}^{n} M_{SO_2Day\ i}}{\sum_{i}^{n} P_{H_2SO_4Day\ i}}$$

Where:

$M_{SO_2Day\ i}$ = Mass emissions of SO_2 during a calendar day *i*, lb
$P_{H_2SO_4Day\ i}$ = 100% Sulfuric Acid Produced during day *i*, tons
$E_{365-Day\ Avg}$ = 365-day rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Rounding of Numbers Resulting from Calculations

Upon completion of the calculations, the final numbers will be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth
$E_{365-Day\ Avg}$: Rounded to the nearest hundredth

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables: $Cs, \%O_2$, and $P_{H_2SO_4}$

Rounding of the variables identified as $Cs, \%O_2$, and $P_{H_2SO_4}$ in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Nothing in this CEMS Plan shall preclude the use of other credible evidence or information, as authorized under Section 113 of the Clean Air Act and 40 C.F.R. §§ 60.11(g) and 61.12, to determine whether a White Springs Sulfuric Acid Plant is, or would have been, in compliance with the SO_2 Emissions Limits required by Section IV.A of the Consent Decree if the appropriate performance or compliance test had been performed.

Short-Term SO_2 Limits

The Short-Term SO_2 Limits do not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, WSAC will be in compliance with the Short-Term SO_2 Consent Decree Limits if E_{3hravg} for each White Springs Sulfuric Acid Plant does not exceed the applicable Short-Term SO_2 Limit listed in Table 1 in Paragraph 9 of the Consent Decree. If WSAC contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of an applicable Short-Term SO_2 Limit, after the period of the Malfunction(s) end(s), WSAC will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s). Nothing in this CEMS Plan shall preclude the use, including the exclusive use, of other credible evidence or information, relevant to whether a White Springs Sulfuric Acid Plant is, or would have been, in compliance with the Short-Term SO_2 Limits.

NSPS SO_2 Limits

The NSPS SO_2 Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, WSAC will be in compliance with the NSPS SO_2 Limit if E_{3hravg} does not exceed 4.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If WSAC contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), WSAC will recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s). Nothing in this CEMS Plan shall preclude the use, including the exclusive use, of other credible evidence or information, relevant to whether a White Springs Sulfuric Acid Plant is, or would have been, in compliance with the NSPS SO_2 Limit.

Long-Term SO_2 Limits

The Long-Term SO_2 Limits include periods of Startup, Shutdown, and Malfunction. The White Springs Sulfuric Acid Plants will be in compliance with the Long-Term SO_2 Limits if $E_{365-Day\ Avg}$ does not exceed the applicable Long-Term SO_2 Limit listed in Table 1 in Paragraph 9 of the Consent Decree (measured as lbs of SO_2 per ton of 100% Sulfuric Acid Produced).

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

WSAC will retain all data generated by its SO_2 analyzers, O_2 analyzers, and production rate analyzers including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the White Springs Sulfuric Acid Plants in accordance with Section XIII of the Consent Decree.

Analyzer Specifications

The analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, parts per million, dry basis (to convert to lb/DSCF, multiply by 1.661×10^{-7})	Stack	Dual range: Normal: 0 – 1,000 ppm SO_2 SSM: 0 – 10,000 ppm SO_2
O_2, percent, dry basis	Stack	Single range: 0 – 20.9 % O_2

Each SO_2 and O_2 CEMS will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, Performance Specifications 2, 3, and 6 in 40 C.F.R. Part 60, Appendix B, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

RATA Requirements

After the Effective Date, pursuant to 40 C.F.R. Part 60, Appendix F, Procedure 1, 5.1.1, WSAC shall conduct a Relative Accuracy Test Audit (RATA) at least once every four calendar quarters at each White Springs Sulfuric Acid Plant.

RATAs will be performed to determine the relative accuracy of the equipment, methods, and procedures required by this CEMS Plan. In addition to all other applicable procedures required by 40 C.F.R. Part 60, Appendix F, Procedure 1, 5.1.1, RATA testing will compare the concentrations of SO_2 and O_2, as measured by the CEMS installed or operated as part of the Consent Decree, with the concentrations of SO_2 and O_2 measured during the RATA testing. In addition, RATA testing will compare the pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced, as calculated by Equation 1, with the pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced calculated during the RATA testing pursuant to 40 C.F.R. § 60.85.

Beginning with the initial RATA under this CEMS Plan, and thereafter for every triennial RATA (*i.e.*, year 1, 4, 7, etc.), WSAC will utilize the reference methods and procedures specified in 40 C.F.R. § 60.85(b) to generate the Reference Method (RM) values for calculating the relative accuracy. In intervening years (*i.e.*, year 2, 3, 5, 6, etc.) WSAC may use the alternative method at 40 C.F.R. § 60.85(c) to calculate the RM values.

For each RATA performed, stack flow shall be measured using Method 2, 2F, 2G, or 2H, or a combination thereof.

If a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) is deemed to be "out of control" pursuant to 40 C.F.R. Part 60, Appendix F, Procedure 1, § 5.2, WSAC shall take all necessary corrective actions required by that procedure, including performing a follow-up ("verification") RATA meeting the requirements of this CEMS Plan. All necessary corrective actions and the verification RATA shall be completed within 30 days after the initial RATA testing. If the verification RATA determines that a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) remains out of control, WSAC shall take all necessary corrective actions to eliminate the problem, including, but not limited to, submitting, for EPA review and approval, a revised SO_2 CEMS Plan that considers: a) installation of direct stack flow meters and b) a monitoring methodology that accurately measures emissions of SO_2/ton of 100% Sulfuric Acid Produced, but is not based on the S-Factor .

If the verification RATA determines that a CEMS or the measurement of pounds of SO_2 emissions/ton of 100% Sulfuric Acid Produced (as calculated by Equation 1) remains out of control, WSAC shall also be subject to stipulated penalties as set forth in Section X, Paragraph 63.b of the Consent Decree.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, WSAC also will comply with all of the requirements of the NSPS relating to monitoring except that, pursuant to 40 C.F.R. § 60.13(i), this CEMS Plan will supersede the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, WSAC will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this WSAC will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS SO_2 Limit.

APPENDIX B – Nitric Acid SCR SEP

PCS Nitrogen Fertilizer, L.P. shall perform the Nitric Acid SCR SEP required by Section V of the Consent Decree in accordance with that Section and the following requirements:

A. NO_x Emission Limits and Schedule of Compliance

1. Installation of SCR. By no later than 24 months after the Effective Date, PCS Nitrogen Fertilizer, L.P. shall install a SCR for Nitric Acid Train No. 4 at the Geismar Nitric Acid Plant. During all Operating Periods, except Startup, the SCR shall be operated in conjunction with the existing non-selective catalytic reduction (NSCR) equipment.

2. NOx Emission Limits.

a. Short-Term NO_x Limit. By no later than 24 months after the Effective Date, PCS Nitrogen Fertilizer, L.P. shall comply with a 1.0 lb/ton Short-Term NO_x Limit at Nitric Acid Train No. 4.

b. Long-Term NO_x Limit. By no later than 24 months after the Effective Date, PCS Nitrogen Fertilizer, L.P. shall commence monitoring its NO_x emissions from Nitric Acid Train No. 4 in accordance with the NOx CEMS Plan. By no later than 36 months after the Effective Date and for all periods thereafter, PCS Nitrogen Fertilizer, L.P. shall comply with a 0.60 lb/ton Long-Term NO_x Limit at Nitric Acid Train No. 4.

B. Emissions Monitoring

3. Installation, Certification, and Calibration. By no later than 24 months after the Effective Date, PCS Nitrogen Fertilizer, L.P. shall certify and calibrate the CEMS on Nitric Acid Train No. 4 and install any necessary equipment so that the CEMS meets the requirements of this Paragraph (the "NOx CEMS"). The NOx CEMS shall include both a NO_x Analyzer capable of measuring the NO_x concentration and a Stack Flowmeter that measures volumetric flow rate.

Except as may be specified in the applicable NOx CEMS Plan in Attachment C of this Consent Decree, the NO_x Stack Analyzer shall comply with 40 C.F.R. Part 60, Appendix B, Performance Specification 2 and the quality assurance/quality control requirements specified in 40 C.F.R. Part 60, Appendix F, Procedure 1. The Stack Flowmeter shall comply with 40 C.F.R. Part 60, Appendix B, Performance Specification 6.

4. Continuous Operation of NOx CEMS and Minimization of NOx CEMS Downtime. By no later than 24 months after the Effective Date, and except during periods of NOx CEMS breakdowns, analyzer malfunctions, repairs, and required quality assurance or quality control activities (including calibration checks and required zero and span adjustments), the NOx CEMS at Nitric Acid Train No. 4 shall be in continuous operation during all Operating Periods to demonstrate compliance with the NO_x emission limits established in Paragraph 2 of this Appendix B. PCS Nitrogen Fertilizer, L.P. shall take all necessary steps to minimize NOx CEMS breakdowns and minimize NOx CEMS downtime. These steps shall include, but are not limited to, operating and maintaining the NOx CEMS in accordance with good air pollution control practices and maintaining an on-site inventory of spare parts or other supplies necessary to make prompt repairs to the NOx CEMS and associated equipment.

5. NO_x CEMS Plan. By no later than 24 months after the Effective Date, PCS Nitrogen Fertilizer, L.P. shall implement the NOx CEMS Plan for Nitric Acid Train No. 4 in Appendix C. The NOx CEMS Plan describes how PCS Nitrogen Fertilizer, L.P. shall monitor compliance with the NO_x emission limits for Nitric Acid Train No. 4, including the methodology that PCS Nitrogen Fertilizer, L.P. shall use to demonstrate compliance in the event of NOx CEMS downtime. EPA and LDEQ have approved the monitoring methods specified in the NOx

CEMS Plan as appropriate alternative monitoring methods for purposes of NSPS, Subparts A and G, pursuant to 40 C.F.R. § 60.13(i).

6. Applicable Consent Decree Requirements. PCS Nitrogen Fertilizer, L.P. shall comply with all other applicable requirements of the Consent Decree with respect to the Nitric Acid SCR SEP, including, but not limited to, those in Section VII (Permits), Section VIII (Emission Credit Generation), and Section IX (Reporting).

APPENDIX C

CEMS Plan for NO_x Emissions
PCS Nitrogen, L.P., Geismar, LA
Nitric Acid Train No. 4 SEP

Principle

This CEMS Plan is the mechanism for determining compliance with the Short-Term NO_x Limit and Long-Term NO_x Limit applicable to Nitric Acid Train No. 4 as specified in the Consent Decree and the Nitric Acid SCR SEP. The methodology described in this CEMS Plan will provide a continuous indication of compliance with the above-referenced NO_x emission limits established in the Consent Decree and the Nitric Acid SCR SEP by accurately determining the emission rate in terms of pounds of NO_x emitted per ton of 100% Nitric Acid Produced (lb/ton) as a rolling 3-hour average and a rolling 365-Day average. The CEMS will utilize equipment to measure stack NO_x concentration, the stack volumetric flow rate, and the 100% Nitric Acid Production Rate. From this data, real-time, accurate, and quality controlled measurements of the mass NO_x emission rate per unit of production can be obtained.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or State regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. The terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein. The following definitions specifically apply for purposes of this CEMS Plan:

- "Minimum measurement period" shall mean the designated period of time that the stack flowmeter and the NOx Stack Analyzer will record a valid reading. This discrete period, such as every minute, will be the same for both meters.

- "NOx Stack Analyzer" shall mean that portion of the CEMS that senses NO_x and generates an output proportional to the NO_x concentration.

- "One-hour period" and "1-hour period" shall mean any 60-minute period commencing on the hour.

- "Stack Flowmeter" shall mean that portion of the CEMS that senses the volumetric flow rate and generates an output proportional to that flow rate.

- "Standard Cubic Foot (SCF)" shall mean a cubic foot of a substance measured at 68° Fahrenheit and 14.696 pounds per square inch absolute pressure.

Emissions Monitoring

Emissions monitoring under this CEMS Plan will be done using a NOx Stack Analyzer and a Stack Flowmeter on Nitric Acid Train No. 4. Except for periods of CEMS breakdowns, analyzer malfunctions, repairs, and required quality assurance or quality control activities (including calibration checks and required zero and span adjustments), PCS Nitrogen Fertilizer, L.P. will conduct continuous monitoring pursuant to this CEMS Plan at Nitric Acid Train No. 4 during all Operating Periods as follows:

- At least once every 15 minutes, the NOx Stack Analyzer will measure the stack NO_x concentration, in parts per million by volume, dry basis (ppmvd) and the Stack Flowmeter will measure the volumetric flow rate in dry standard cubic feet per minute (DSCFM).[1]

- For every 1-hour period (60-minute period commencing on the hour), the CEMS will take the arithmetic average of all valid NOx Stack Analyzer readings to determine the emission rate during the previous 1-hour period. This data will be used to calculate the 3-hour average NO_x emission rate. At least one valid measurement of the NOx Stack Analyzer for each 15-minute quadrant of the hour when the CEMS is in operation must be used to make this calculation.

<u>Backup Monitoring Procedure for Long-Term NO_x Limit</u>

In the event that the NOx Stack Analyzer and/or Stack Flowmeter is/are not available or is/are out-of-control, PCS Nitrogen Fertilizer, L.P. will implement the backup monitoring procedure specified below. The resulting data will be used to calculate the 365-Day average NO_x emission rate.

- Other than as specified below for a CEMS outage or out-of-control period less than 24 consecutive hours, PCS Nitrogen Fertilizer, L.P. will comply with the following requirements to fill in data gaps in the array:
  - Exit stack gas will be sampled and analyzed for NO_x at least once every three (3) hours, during all Operating Periods. Sampling will be conducted by making physical measurements of the NO_x concentration in the gas stream to the main stack using alternative/non-CEMS methods (*e.g.*, through the use of a portable analyzer/detector or non-certified NOx Stack Analyzer). The reading obtained will be substituted for the 180 (or less) one-minute measurements that would otherwise be utilized if the CEMS were operating normally. Alternatively, PCS

[1] For the purposes of the calculations under this CEMS Plan, as-is volumetric flow rate measurements will be assumed to be dry. However, PCS Nitrogen Fertilizer, L.P. may adjust for any moisture contained in the stack gas if Nitric Acid Train No. 4 is equipped with a continuous moisture analyzer.

Nitrogen Fertilizer, L.P. may conduct the required sampling and analysis using a redundant certified NO_x analyzer.

- Stack volumetric flow rate and 100% Nitric Acid Production Rate will be estimated using engineering judgment.

- The data generated during required quality assurance or quality control activities (including calibration checks and required zero and span adjustments) of the CEMS and Stack Flowmeter shall be excluded from the hourly arithmetic average. PCS Nitrogen Fertilizer, L.P. may use the average hourly value from the last valid reading directly prior to these periods to fill in the data gaps.

- If the CEMS or Stack Flowmeter is not operating for a period of less than 24 consecutive hours due to breakdowns, malfunctions, repairs, or out-of-control period of the same, PCS Nitrogen Fertilizer, L.P. may use the previous Day average value recorded for each to fill in the data gaps.

Production Data

Following each Day at Nitric Acid Train No. 4, PCS Nitrogen Fertilizer, L.P. will record the quantity of nitric acid produced during that Day and the average strength of the nitric acid produced during that Day. From this information, PCS Nitrogen Fertilizer, L.P. will calculate the 100% Nitric Acid Produced for that Day, in units of tons per Day.

Conversion Factor

Within 60 days after achieving the maximum production rate at which Nitric Acid Train No. 4 will be operated, but not later than 180 days after initial startup, PCS Nitrogen Fertilizer, L.P. shall perform a performance test on Nitric Acid Train No. 4 and the SCR in accordance with 40 C.F.R. § 60.8. During the performance test, and any performance test thereafter, for Nitric Acid Train No. 4, PCS Nitrogen Fertilizer, L.P. will develop a conversion factor, in units of lb/ton of 100% Nitric Acid Produced per ppmvd consistent with 40 C.F.R. § 60.73(b).

Emissions Calculations

Rolling 3-Hour Average

Compliance with the Short-Term NO_x Limit shall be based on a rolling 3-hour average (rolled hourly). For purposes of calculating a rolling 3-hour average NO_x emission rate, the CEMS will maintain an array of the 3 most recent and contiguous 1-hour period average measurements of stack NO_x concentration while Nitric Acid Train No. 4 was operating. Every hour while Nitric Acid Train No. 4 was operating, the CEMS will add the most recent 1-hour period average measurement to the array and exclude the oldest 1-hour period average measurement. Data generated using the backup monitoring procedure, specified above, need not be included in this calculation.

The rolling 3-hour average lb/ton NO_x emission rate (E_{3hravg}) will be calculated every hour using Equation 1.

Equation 1:

$$E_{3Hravg} = \frac{\mathrm{K} \cdot \sum_{i=1}^{3} \cdot C_{NOx\, i}}{3}$$

Where:

$C_{NOx\, i}$ = Arithmetic average of all measurements of stack NO_x concentration, parts per million by volume, dry basis (ppmvd) during a 1-hour period "*i*" while Nitric Acid Train No. 4 is operating**.**

K = Conversion factor determined during most recent NO_x performance test or RATA (lb/ton of 100% Nitric Acid Produced per ppm).

E_{3Hravg} = 3-hour average lb NO_x per ton 100% Nitric Acid Produced.

Rolling 365-Day Average

Compliance with the Long-Term NO_x Limit shall be based on a rolling 365-Day average (rolled daily) for each day that Nitric Acid Train No. 4 is operating. For the purposes of calculating the 365-Day average NO_x emission rate each operating Day at Nitric Acid Train No. 4, PCS Nitrogen Fertilizer, L.P. will maintain an array of the mass emissions (lb/Day) of NO_x (calculated using Equation 2) and the 100% Nitric Acid Produced for that operating Day (tons/Day) and the preceding 364 operating Days. Each subsequent operating Day, the data from that operating Day will be added to the array, and the data from the oldest operating Day will be excluded.

For the purposes of calculating daily mass emission rate, the CEMS will maintain an array with a measurement for each minimum measurement period of the NO_x concentration (ppmvd) at the exit stack and each measurement of volumetric flow rate (DSCFM) of the exit stack over each operating Day. In the event that the CEMS and/or Stack Flowmeter is/are not available, PCS Nitrogen Fertilizer, L.P. will use the backup monitoring procedure, specified above, to fill in the data gaps.

Following each operating Day, the daily NO_x mass emissions will be calculated using Equation 2.

Equation 2:

$$M_{NO_x Day} = 1.193 \times 10^{-7} \cdot \sum_{i=1}^{n} Q_{Stack\ i} \cdot C_{NOx\ i}$$

Where:

$C_{NOx\ i}$ = Each average measurement of stack NO_x concentration (not greater than 15 minutes), ppmvd, for a unit of time during the Operating Period in a Day "*i*"

$Q_{Stack\ i}$ = Each average measurement of stack volumetric flow rate, DSCFM, for a corresponding unit of time during the Operating Period in a Day "*i*"

1.193×10^{-7} = Conversion factor in units of pounds per standard cubic foot (lb/SCF) NO_x per ppm

$M_{NO_x Day}$ = Mass emissions of NO_x during a Day (lbs)

n = Number of minimum measurements during Operating Periods in a Day

Following each operating Day, the NO_x emission rate as lb/ton, averaged over a rolling 365-Day period ($E_{365-Day\ Avg}$) will be calculated using Equation 3.

Equation 3:

$$E_{365-Day\ Avg} = \frac{\sum_{d=1}^{365} M_{NO_x Day\ d}}{\sum_{d=1}^{365} P_d}$$

Where:

$M_{NO_x Day\ d}$ = Mass emissions of NO_x during a Day "*d*" (lbs)

P_d = 100% Nitric Acid Produced during a Day "*d*" (tons)

$E_{365-Day\ Avg}$ = 365-Day rolling average lb NO_x per ton of 100% Nitric Acid Produced

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg} : Rounded to the nearest tenth.

$E_{365-Day\ Avg}$: Rounded to the nearest hundredth.

The values for E_{3hravg} and $E_{365\text{-Day Avg}}$ shall be truncated to the hundredth place and the thousandth place, respectively. For the last digit, "5"-"9" shall be rounded up, and the numbers "1"-"4" shall be rounded down. Thus, "1.051" for the for E_{3hravg} shall be truncated to 1.05 and rounded to "1.1", and "1.049" shall be truncated to 1.04 and rounded to "1.0".

Compliance with Nitric Acid SCR SEP NO_x Limits

Short-Term NO_x Limit

The Short-Term NO_x Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods at Nitric Acid Train No. 4, PCS Nitrogen Fertilizer, L.P. will be in compliance with the Short-Term NO_x Limit specified in the Consent Decree if E_{3hravg} does not exceed 1.0 lb of NO_x per ton of 100% Nitric Acid Produced. If PCS Nitrogen Fertilizer, L.P. contends that any 3-hour rolling average emission rate is in excess of 1.0 lb/ton due to the inclusion of hours of Startup, Shutdown or Malfunction in the 3-hour period, PCS Nitrogen Fertilizer, L.P. shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Startup, Shutdown or Malfunction(s). Nothing in this CEMS Plan shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether Nitric Acid Train No. 4 would have been in compliance with the Short-Term Limit if the appropriate performance test or compliance procedure had been performed.

Long-Term NO_x Limit

PCS Nitrogen Fertilizer, L.P. will be in compliance with the Long-Term NO_x Limit specified in the Consent Decree if $E_{365-Day\ Avg}$ does not exceed 0.60 lbs. lb of NO_x per ton of 100% Nitric Acid Produced. The Long-Term NO_x Limit applies at all times, including during periods of Startup, Shutdown, or Malfunction.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

PCS Nitrogen Fertilizer, L.P. will retain all data generated by the NO_x Stack Analyzer and Stack Flowmeter, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") at Nitric Acid Train No. 4 in accordance with Appendix F of 40 C.F.R. Part 60.

Analyzer Specifications

The NOx Stack Analyzer and the Stack Flowmeter required under this CEMS Plan at Nitric Acid Train No. 4 will meet the following specifications:

Table 1

Analyzer	**Parameter**	**Location**	**Span Value**
NOx Stack Analyzer	NO_x, ppm by volume, dry basis	Stack	Dual range: Normal: 0 – 100 ppm NO_x SSM: 0 – 5000 ppm NO_x
Stack Flowmeter	Volumetric flow rate, SCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The NOx Stack Analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1. It should be noted, however, that the daily drift test requirement at 40 C.F.R. § 60.13(d) and the requirements of Appendix F apply only to the normal range of the NOx Stack Analyzer. The SSM range of the NOx Stack Analyzer will be evaluated at least once each calendar quarter to verify accuracy.

The Stack Flowmeter will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 (PS 6) and will be evaluated at least once each calendar quarter in accordance with Section 8.1 of PS 6, except during the quarter when the PS 6 RATA is conducted. On an annual basis a RATA of the stack flow meter must be completed to verify accuracy. In addition to the reference methods described in Section 8.2.2 of PS 6, 40 CFR 60, Appendix B, Methods 2F, 2G and 2H may be utilized to demonstrate accuracy.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart G

In addition to the requirements in this CEMS Plan, PCS Nitrogen Fertilizer, L.P. also will comply with all of the requirements of the NSPS relating to monitoring at Nitric Acid Train No. 4 except that, pursuant to 40 C.F.R. § 60.13(i), this CEMS Plan will supersede the following provisions of 40 C.F.R. Part 60, Subpart G:

- The requirement at 40 C.F.R. § 60.73(a) that the NOx Stack Analyzer have a span value of 500 ppm. In lieu of this, PCS Nitrogen Fertilizer, L.P. will utilize the span values specified in Table 1 of this CEMS Plan; and

- The requirement at 40 C.F.R. § 60.73(a) that pollutant gas mixtures under Performance Specification 2 and for calibration checks under 40 C.F.R. § 60.13(d) be nitrogen dioxide (NO_2). PCS Nitrogen Fertilizer, L.P. will use calibration gases containing NO and/or NO_2 as appropriate to assure accuracy of the NOx Stack Analyzer except where verified reference cells are used in accordance with Performance Specification 2.

Appendix D – LDEQ Compliance Orders Resolved by Consent Decree

BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL COMPLIANCE

March 5, 2012

CERTIFIED MAIL (7004 2510 0005 5763 9587)
RETURN RECEIPT REQUESTED

PCS NITROGEN FERTILIZER, L.P.
c/o Corporation Service Company
Agent of Service
320 Somerulos Street
Baton Rouge, LA 70802

RE: CONSOLIDATED COMPLIANCE ORDER
& NOTICE OF POTENTIAL PENALTY
ENFORCEMENT TRACKING NO. AE-CN-10-00695
AGENCY INTEREST NO. 3732

Dear Sir:

Pursuant to the Louisiana Environmental Quality Act (La. R.S. 30:2001, et seq.), the attached **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is hereby served on **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** for the violations described therein.

Compliance is expected within the maximum time period established by each part of the **COMPLIANCE ORDER**. The violations cited in the **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** could result in the issuance of a civil penalty or other appropriate legal actions.

Any questions concerning this action should be directed to Mark E. Brown at (225) 219-3782.

Sincerely,

Celena J. Cage
Administrator
Enforcement Division

CJC/MEB/meb
Alt ID Nos. 2240, 2241, 2247, 2276
Attachment

c: PCS Nitrogen Fertilizer, L.P.
John Hewson
10886 La. Hwy 75
Geismar, LA 70734

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF ENVIRONMENTAL COMPLIANCE

IN THE MATTER OF	*	
	*	
PCS NITROGEN FERTILIZER, L.P.	*	ENFORCEMENT TRACKING NO.
ASCENSION PARISH	*	
ALT ID NOS. 2240, 2241, 2247, 2276	*	AE-CN-10-00695
	*	
	*	AGENCY INTEREST NO.
PROCEEDINGS UNDER THE LOUISIANA	*	
ENVIRONMENTAL QUALITY ACT,	*	3732
La. R.S. 30:2001, ET SEQ.	*	

CONSOLIDATED

COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY

The following **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is issued to **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** by the Louisiana Department of Environmental Quality (the Department), under the authority granted by the Louisiana Environmental Quality Act (the Act), La. R.S. 30:2001, et seq., and particularly by La. R.S. 30:2025(C), 30:2050.2 and 30:2050.3(B).

FINDINGS OF FACT

I.

The Respondent owns and/or operates a fertilizer facility producing three different mineral acids as well as ammonia production and derived reaction products. The Nitrate Group is comprised of three Nitric Acid lines, currently operating under Title V Permit No. 2240-V6, issued on or about November 15, 2010. The Ammonia Group is comprised of four related operations, currently operating under Title V Permit No. 2241-V2, issued on or about June 16, 2009. The Sulfate Group consists of one Sulfuric Acid line, currently operating under Title V Permit No. 2247-V1, issued on or about March 26, 2008. The Phosphate Group consists of one Phosphoric Acid line, currently operating under Title V Permit No. 2276-V1, issued on or about May 3, 2010.

II.

On or about February 2, 2010, and on or about March 19, 2010, Air Quality inspections were performed to determine the degree of compliance with the Act and the Air Quality Regulations. On or about January 15, 2012, a file review of the facility was performed to determine the degree of compliance with the Act and the Air Regulations.

While the investigation by the Department is not yet complete, the following violations were noted during the course of the inspections and file review:

A. In correspondence dated March 31, 2009, the Respondent submitted the facility's 2008 Annual Compliance Certification for the Nitrate Group for the period encompassing January 1, 2008 through December 31, 2008, for Title V Permit No. 2240-V4, issued on or about November 26, 2007. The certification listed the following exceedances, in pounds per hour (lb/hr) of NO_x for Nitric Acid Train No. 4 (EQT0007) and for Nitric Acid Train No. 5 (EQT0009):

Emission source	**Date deviation began**	**Duration, hrs**	**NO_x emitted, lb/hr**	**NO_x permitted, lb/hr**
Train No. 4	8/15/08	1.0	**160.6**	135.4
	8/23/08	1.5	**313.7**	
	10/27/08	4.75	**222.9**	
	10/27/08	1.0	**237.2**	
	10/30/08	13.0	**220.4**	
	10/31/08	3.0	**137.5**	
	12/02/08	1.0	**177.4**	
	12/12/08	1.0	**165.9**	
	12/15/08	2.0	**153.3**	
	12/18/08	1.0	**157.3**	
Train No. 5	1/3/2008	0.5	**194.4**	181.9
	9/23/2008	1.0	**262.2**	

Each failure to demonstrate compliance with the limits of the permit for emission of NO_x is a violation of Title V Permit No. 2240-V4, LAC 33:III.501.C.4, La. R. S. 30:2057(A)(1) and 2057(A)(2).

B. In correspondence dated August 24, 2009, the Respondent submitted the facility's 2009 First Semiannual Monitoring Report for the Nitrate Group for the period encompassing January 1, 2009 through June 30, 2009 for Title V Permit No. 2240-V4, issued on or about November 26, 2007. The report stated that on or about May 7, 2009, during maintenance on Nitric Acid Train No. 5 (EQT0009), a one-hour excursion of NO_x occurred at a rate of 198.8 lb/hr. The permit limit of NO_x is 181.9 lb/hr. The failure to demonstrate compliance with the limits of the permit for emission of NO_x is a violation Title V Permit No. 2240-V4, LAC 33:III.501.C.4 and La. R. S. 30:2057(A)(1) and 2057(A)(2).

C. In correspondence dated March 30, 2010, the Respondent submitted the facility's 2009 Annual Compliance Certification for the Nitrate Group for the period encompassing January 1, 2009 through August 25, 2009, for Title V Permit No. 2240-V4, issued on or about November 26, 2007, and the period encompassing August 26, 2009 through December 31, 2009 for Title V Permit No. 2240-V5, issued on or about August 26, 2009. The following deviations or violations reported were:

Emission Source	Duration of Deviation	Title V Permit	Deviation
Fume scrubber 308 (EQT0014)	2/1/2009 – 8/25/2009	Permit No. 2240-V4	Log sheet documentation missing
	8/26/2009 – 8/31/2009	Permit No. 2240-V5	

Each failure to maintain records of operating data for Fume Scrubber 308 is a violation of Specific Requirement 43 of Title V Permit No. 2240-V4, Specific Requirement 43 of Title V Permit No. 2240-V5, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

D. In correspondence dated March 30, 2010, the Respondent submitted the facility's 2009 Annual Compliance Certification for the Nitrate Group for the period encompassing January 1, 2009 through August 25, 2009, for Title V Permit No. 2240-V4, issued on or about November 26, 2007, and the period encompassing August 26, 2009 through December 31, 2009 for Title V Permit No. 2240-V5, issued on or about August 26, 2009. The following deviations or violations reported were:

Emission Source	Duration of Deviation	Title V Permit	Deviation
Fume scrubber (EQT0133) for Nos. 3 & 4 Nitric Acid Tanks	6/16/2009 – 8/25/2009	Permit No. 2240-V4	Scrubber flow was not maintained above 5.0 gallons per minute
	8/26/2009 – 12/31/2009	Permit No. 2240-V5	

Each failure to control the proper water flow to the fume scrubber for Nos. 3 & 4 Nitric Acid Tanks is a violation of Specific Requirement 43 of Title V Permit No. 2240-V4, Specific Requirement 75 of Title V Permit No. 2240-V5, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

E. In correspondence dated September 29, 2010, the Respondent submitted the facility's 2010 First Semiannual Monitoring Report for the Nitrate Group for the period encompassing January 1, 2010 through June 30, 2010 for Title V Permit No. 2240-V4, issued on or about August 26, 2009. The report listed NO_x

exceedances of both the 3-hour average in lb/ton nitric acid produced and the one hour limit in lb/hr for the following Nitric Acid trains:

Acid Train	Date	Duration	NO_x emitted	Permit limit
Train No. 3	6/15/10	1 hour	**151.04** lb/hr	81.25 lb/hr
Train No.4	2/1/10	1 hour	**278.3** lb/hr	135.42 lb/hr
	2/6/10		**387.7** lb/hr	
	2/12/10		**254.9** lb/hr	
	2/12/10	Two 3-hr avgs	**9.74** lb/ton	6.5 lb/ton
	2/13/10	2 hours	**245.0** lb/hr	135.42 lb/hr
	2/13/10	Two 3-hr avgs	**6.97** lb/ton	6.5 lb/ton
	2/27/10		**11.54** lb/ton	
	3/9/10	1 hour	**180.8** lb/hr	135.42 lb/hr
	3/17/10		**139.8** lb/hr	135.42 lb/hr
	4/22/10	Three 3-hr avgs	**8.1** lb/ton	6.5 lb/ton
Train No.5	4/30/10	1 hour	**224.7** lb/hr	200.02 lb/hr

Each failure to demonstrate compliance with the limits of the permit for emission of NO_x is a violation of Title V Permit No. 2240-V5, LAC 33:III.501.C.4, La. R. S. 30:2057(A)(1) and 2057(A)(2).

F. In correspondence dated June 6, 2008, the Respondent stated that on or about May 31, 2008, overpressure developed in an ammonia (NH_3) transfer line and caused a pressure relief manway in the transfer line to lift, resulting in an unpermitted release of 2,638 pounds of NH_3. The Respondent reported that the relief remained open for 4.5 hours; the tank depressurized to atmospheric pressure over the course of two minutes, 23 seconds. The pressure relief manway in the NH_3 line is not a permitted emission source. The failure to prevent an unpermitted release of NH_3 into the atmosphere is a violation of LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1), and 3:2057(A)(2).

G. In correspondence dated June 8, 2010, the Respondent notified the Department of the results of testing conducted in April 2010 for NH_3 emissions on Nitric Acid Train No. 4 (EQT0007). Train No. 4 first entered service in 1996. The April 2010 testing for NH_3 was the first conducted on Train No. 4 since the train entered service. The correspondence dated June 8, 2010 stated that the permit limit for NH_3 of 13.06 lb/hr (maximum) was estimated by engineering calculations for the application for Title V Permit No. 2240-V5. The April 2010 test results indicated an NH_3 emission level of 132.2 lb/hr, which exceeded the permit. The failure to demonstrate compliance with the limits of the permit for emission of NH_3 is a violation of Title V Permit No. 2240-V5, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

H. In correspondence dated September 4, 2009, the Respondent stated that on or about August 31, 2009, the vent on the Ammonia Storage Tank lifted and did not reseat, causing a release of NH_3. The unpermitted release occurred during transfer from a ship at the unloading facility. The Respondent reported that the vent remained open for 2.0 hours; the tank depressurized to atmospheric pressure over the course of two minutes, 42 seconds. The unpermitted volume released was 1,896 pounds. The failure to prevent an unpermitted release of NH_3 into the atmosphere is a violation of LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1), and 3:2057(A)(2).

I. In correspondence dated March 30, 2010, the Respondent submitted the facility's 2009 Annual Compliance Certification for the Ammonia Group for the period encompassing January 1, 2009 through December 31, 2009 for Title V Permit No. 2241-V1, issued on or about May 31, 2006, and Title V Permit No. 2241-V2, issued on or about June 16, 2009. The following deviations or violations reported were:

<table>
<tr><th>Emission Source</th><th>Deviation began</th><th>Deviation ended</th><th>Event</th></tr>
<tr><td>Ammonia Plant Process Flare (EQT002)</td><td>1/1/2009</td><td>9/22/2009</td><td rowspan="2">Daily observation of flame was not recorded</td></tr>
<tr><td>Ammonia Plant Storage Flare (EQT109)</td><td>1/1/2009</td><td>9/22/2009</td></tr>
<tr><th>Emission Source</th><th>Deviation began</th><th>Deviation ended</th><th>Event</th></tr>
<tr><td>FUG016</td><td>1/1/2009</td><td>12/31/2009</td><td>Fugitive NH_3 emission from urea plant exceeded</td></tr>
</table>

Each failure to record daily observations of the flames of the flares is a violation of Specific Requirement No. 9 and Specific Requirement No. 56, respectively, of Title V Permit No. 2241-V1, and Specific Requirement No. 5 and Specific Requirement No. 49, respectively, of Title V Permit No. 2241-V2, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

J. In correspondence dated June 8, 2010, the Respondent reported that on or about June 2, 2010, an unpermitted release of 756 pounds of NH_3 occurred when the relief valve on an NH_3 storage tank vented for 2.5 minutes to relieve high pressure in the tank. The failure to prevent an unpermitted release of NH_3 into the atmosphere is a violation of LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1), and 3:2057(A)(2).

K. In correspondence dated December 3, 2008, the Respondent submitted the following results of stack testing conducted September 25, 2008 on the Phosphoric Acid Plant Fume Scrubber (EQT074). The testing was conducted to determine the level of Total Fluorides (TF) emitted from the scrubber, with and without, water flow. In correspondence dated September 12, 2008, the Department granted an Exemption to Test to the facility with a condition requiring that no emission limit would be exceeded during the test. Results of the testing are:

Fume Scrubber (EQT074)	Permit Limits TF, lb/hr	Test Results TF, lb/hr
TF with water flow	0.007(avg)/0.010(max)	0.0023
TF without water flow	0.007(avg)/0.010(max)	**0.0844**
Load, tph	30.1(avg)/33.3(max)	33.0 (99% of max)

The failure to meet the permit limit for emission of TF during the testing period is a violation of Title V Permit No. 2276-V0, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1), and 30:2057(A)(2).

L. In correspondence dated August 10, 2009, the Respondent reported the use of an unpermitted 174 horsepower (hp) diesel-fired portable water pump. At the time of the report, the engine had operated for 319 hours. The failure to receive approval prior to the installation of any emission source which will, or ultimately may, result in emission of air contaminants is a violation of LAC 33:III.501.C.1, and La. R.S. 30:2057(A)(2).

M. In correspondence dated January 5, 2010, the Respondent submitted the facility's 2009 Second Semiannual Subpart AA Report for the Phosphate Group for the period encompassing July 1, 2009 through December 31, 2009, for Title V Permit No. 2276-V0, issued on or about August 10, 2007. The report stated that the South Attack Pre-scrubber flow meter was out of service for the period encompassing October 29, 2009, through November 16, 2009. Each day of failure to use installed air pollution control devices is a violation of LAC 33:III.905.A, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1), and 30:2057(A)(2).

N. In correspondence dated March 30, 2010, the Respondent submitted the facility's 2009 Annual Compliance Certification for the Phosphate Group for the period encompassing January 1, 2009 through December 31, 2009, for Title V Permit No. 2276-V0, issued on or about August 10, 2007. The certification listed the following excess emissions of Hydrogen Fluoride (HF), Particulate Matter (PM_{10}), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO), and Volatile Organic Compounds (VOC):

Identifier	Emission Source	Permit Limit, per year	Actual Emissions in 2009
GRP025	Phosphoric Acid Area	0.15 tons HF	**0.670** tons HF
EQT063	Diesel Compressor AC-191	0.01 tons PM_{10}	**0.051** tons PM_{10}
		0.01 tons SO_2	**0.048** tons SO_2
		0.01 tons NO_x	**0.722** tons NO_x
		0.01 tons CO	**0.156** tons CO
		0.01 tons VOC	**0.059** tons VOC

Each failure to demonstrate compliance with the limits of the permit for emission of HF is a violation of Specific Requirement 109 of Title V Permit No. 2276-V0, issued on or about August 10, 2007, LAC 33:III.501.C.4 and La. R. S. 30:2057(A)(1) and 30:2057 (A)(2). Each failure to demonstrate compliance with the limits of the permit for emission of the criteria pollutants listed is a violation of Title V Permit No. 2276-V0, LAC 33:III.501.C.4 and La. R. S. 30:2057(A)(1) and 30:2057 (A)(2).

COMPLIANCE ORDER

Based on the foregoing, the Respondent is **hereby ordered**:

I.

To immediately take, upon receipt of this **COMPLIANCE ORDER**, any and all steps necessary to achieve and maintain compliance with all current Title V Permits and comply with the Air Quality Regulations and the Act.

II.

To submit to the Enforcement Division, within ninety (90) days after receipt of this **COMPLIANCE ORDER**, a written report showing revised ammonia yearly emissions from Nitric Acid Train No. 4 (EQT0007) since it was put in service in 1996, until the report date.

III.

To submit to the Enforcement Division, within thirty (30) days after receipt of this **COMPLIANCE ORDER**, a written report that includes a detailed description of the circumstances surrounding the cited violations and actions taken or to be taken to achieve compliance with the Order Portion of this **COMPLIANCE ORDER**. This report and all other reports or information required to be submitted to the Enforcement Division by this **COMPLIANCE ORDER** shall be submitted to:

Office of Environmental Compliance
Post Office Box 4312
Baton Rouge, Louisiana 70821-4312
Attn: Mark E. Brown
Re: Enforcement Tracking No. AE-CN-10-00695
Agency Interest No. 3732

THE RESPONDENT SHALL FURTHER BE ON NOTICE THAT:

I.

The Respondent has a right to an adjudicatory hearing on a disputed issue of material fact or of law arising from this **COMPLIANCE ORDER**. This right may be exercised by filing a written request with the Secretary no later than thirty (30) days after receipt of this **COMPLIANCE ORDER**.

II.

The request for an adjudicatory hearing shall specify the provisions of the **COMPLIANCE ORDER** on which the hearing is requested and shall briefly describe the basis for the request. This request should reference the Enforcement Tracking Number and Agency Interest Number, which are located in the upper right-hand corner of the first page of this document and should be directed to the following:

Department of Environmental Quality
Office of the Secretary
Post Office Box 4302
Baton Rouge, Louisiana 70821-4302
Attn: Hearings Clerk, Legal Division
Re: Enforcement Tracking No. AE-CN-10-00695
Agency Interest No. 3732

III.

Upon the Respondent's timely filing a request for a hearing, a hearing on the disputed issue of material fact or of law regarding this **COMPLIANCE ORDER** may be scheduled by the Secretary of the Department. The hearing shall be governed by the Act, the Administrative Procedure Act (La. R.S. 49:950, et seq.), and the Department's Rules of Procedure. The Department may amend or supplement this **COMPLIANCE ORDER** prior to the hearing, after providing sufficient notice and an opportunity for the preparation of a defense for the hearing.

IV.

This **COMPLIANCE ORDER** shall become a final enforcement action unless the request for hearing is timely filed. Failure to timely request a hearing constitutes a waiver of the Respondent's right to a hearing on a disputed issue of material fact or of law under Section 2050.4 of the Act for the violations described herein.

V.

The Respondent's failure to request a hearing or to file an appeal or the Respondent's withdrawal of a request for hearing on this **COMPLIANCE ORDER** shall not preclude the Respondent from contesting the findings of facts in any subsequent penalty action addressing the same violations, although the Respondent is estopped from objecting to this **COMPLIANCE ORDER** becoming a permanent part of its compliance history.

VI.

Civil penalties of not more than twenty-seven thousand five hundred dollars ($27,500) for each day of violation for the violations described herein may be assessed. For violations which occurred on August 15, 2004, or after, civil penalties of not more than thirty-two thousand five hundred dollars ($32,500) may be assessed for each day of violation. The Respondent's failure or refusal to comply with this **COMPLIANCE ORDER** and the provisions herein will subject the Respondent to possible enforcement procedures under La. R.S. 30:2025, which could result in the assessment of a civil penalty in an amount of not more than fifty thousand dollars ($50,000) for each day of continued violation or noncompliance.

VII.

For each violation described herein, the Department reserves the right to seek civil penalties in any manner allowed by law, and nothing herein shall be construed to preclude the right to seek such penalties.

NOTICE OF POTENTIAL PENALTY

I.

Pursuant to La. R.S. 30:2050.3(B), you are hereby notified that the issuance of a penalty assessment is being considered for the violations described herein. Written comments may be filed regarding the violations and the contemplated penalty. If you elect to submit comments, it is requested that they be submitted within ten (10) days of receipt of this notice.

II.

Prior to the issuance of additional appropriate enforcement action(s), you may request a meeting with the Department to present any mitigating circumstances concerning the violations. If you would like to have such a meeting, please contact Mark E. Brown at (225) 219-3782 within ten (10) days of receipt of this **NOTICE OF POTENTIAL PENALTY**.

III.

The Department is required by La. R.S. 30:2025(E)(3)(a) to consider the gross revenues of the Respondent and the monetary benefits of noncompliance to determine whether a penalty will be assessed and the amount of such penalty. Please forward the Respondent's most current annual gross revenue statement along with a statement of the monetary benefits of noncompliance for the cited violations to the above named contact person within ten (10) days of receipt of this **NOTICE OF POTENTIAL PENALTY**. Include with your statement of monetary benefits the method(s) you utilized to arrive at the sum. If you assert that no monetary benefits have been gained, you are to fully justify that statement.

IV.

This **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is effective upon receipt.

Baton Rouge, Louisiana, this 05 day of March, 2012.

Cheryl Sonnier Nolan
Assistant Secretary
Office of Environmental Compliance

Copies of a request for a hearing and/or related correspondence should be sent to:

Louisiana Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
P.O. Box 4312
Baton Rouge, LA 70821-4312
Attention: Mark E. Brown

BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF ENVIRONMENTAL COMPLIANCE

March 1, 2013

CERTIFIED MAIL 7004 2510 0005 5763 9969
RETURN RECEIPT REQUESTED

PCS NITROGEN FERTILIZER, L.P.
c/o Corporation Service Company
Agent of Service
320 Somerulos Street
Baton Rouge, LA 70802

RE: AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY
ENFORCEMENT TRACKING NO. AE-CN-10-00695A
AGENCY INTEREST NOS. 3732, 173682

Dear Sir:

Pursuant to the Louisiana Environmental Quality Act (La. R.S. 30:2001, et seq.), the attached **AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is hereby served on **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** for the violations described therein.

Any questions concerning this action should be directed to Mark E. Brown at (225) 219-3782.

Sincerely,

Celena J. Cage
Administrator
Enforcement Division

CSN/MEB/meb
Alt ID No. 0180-00046, 0880-00198

c: PCS Nitrogen Fertilizer, L.P.
Cecil Hopper
10886 La. Hwy 75
Geismar, LA 70734

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF ENVIRONMENTAL COMPLIANCE

IN THE MATTER OF	*	
	*	
PCS NITROGEN FERTILIZER, L.P.	*	**ENFORCEMENT TRACKING NO.**
ASCENSION PARISH	*	
ALT ID NOS. 0180-00046, 0180-00198	*	**AE-CN-10-00695A**
	*	
	*	**AGENCY INTEREST NOS.**
	*	
PROCEEDINGS UNDER THE LOUISIANA	*	**3732, 173682**
ENVIRONMENTAL QUALITY ACT,	*	
La. R.S. 30:2001, ET SEQ.	*	

AMENDED CONSOLIDATED COMPLIANCE ORDER &
NOTICE OF POTENTIAL PENALTY

The Louisiana Department of Environmental Quality (the Department) hereby amends the **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695** issued to **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** on March 5, 2012, in the above-captioned matter as follows:

I.

The Department hereby amends paragraph I of the Findings of Fact portion of **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695** to read as follows:

"I.

The Respondent (Agency Interest No. 3732) owns and/or operates a fertilizer facility producing three different mineral acids as well as ammonia production and derived reaction products. The Nitrate Group is comprised of three Nitric Acid lines, currently operating under Title V Permit No. 2240-V6 issued on or about November 15, 2010. The Ammonia Group is comprised of four related operations which have operated under Title V Permit No. 2241-V2 issued on or about June 16, 2009, and Title V Permit No. 2241-V3 issued on or about May 26, 2011. The Ammonia Group currently operates under Title V Permit No. 2241-V4 issued on or about May 11, 2012. The Phosphate Group consists of one Phosphoric Acid line which has operated under Title V Permit No. 2276-V1 issued on or about

May 3, 2010 and administratively amended on or about June 8, 2010. The Phosphate Group currently operates under Title V Permit No. 2276-V2, issued on or about January 31, 2012. The Sulfate Group consists of one Sulfuric Acid line which has operated under Title V Permit No. 2247-V1 issued on or about March 26, 2008. The Department received a Notification of Change of Ownership Form (NOC-1) on April 29, 2010, from AA Sulfuric Corporation (Agency Interest No. 173682). The form indicated a new owner for the Sulfuric Acid Plant which was listed as AA Sulfuric Corporation. However, it also indicated that there was no change in the operator, and that attached information was provided to explain the previous owner. The explanation provided is as follows: "AA Sulfuric Corporation is a corporation that was created in 1984 to hold legal title to the Geismar sulfuric acid plant at the Geismar facility. Since that time, the sulfuric acid plant has been owned by AA Sulfuric but operated by other companies, including PCS Nitrogen Fertilizer, LP since at least 1997. The purpose of this filing is to correct the record to show AA Sulfuric as the owner on the relevant permits. PCS Nitrogen Fertilizer LP has been and will continue to be the operator of the plant with responsibility for permitting and compliance." Additionally, in the NOC-1 form, AA Sulfuric Corporation requested the transfer of Title V Permit No. 2247-V1 to them. Title V Permit No. 2247-V2 was issued on or about September 29, 2010, and on or about June 1, 2011, Title V Permit No. 2247-V3 was issued to AA Sulfuric Corporation (Agency Interest No. 173682), under which the Sulfuric Acid Plant currently operates."

II.

The Department hereby adds paragraph III to the Findings of Fact portion of **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695**, which shall read as follows:

"III.

On or about January 15, 2013, a file review of the Respondent's Nitrate Group, Phosphate Group, Ammonia Group, and Sulfate Group was performed to determine the degree of compliance with the Act and the Air Quality Regulations.

While the investigation by the Department is not yet complete, the following violations were noted during the course of the file review:

A. In correspondence dated March 24, 2011, the Respondent submitted the Nitrate Group's 2010 Second Semiannual Monitoring Report for the period encompassing July 1, 2010 through December 31, 2010. The Report listed exceedances of the permitted 3-hour averages for NO_x for Nitric Acid Train 3 (EQT004) and Nitric Acid Train 4 (EQT007) but failed to report the amount of NO_x emitted during the excursions. The failure to submit a complete Semiannual Monitoring Report is a violation of Part 70 General Condition M of Title V Permit No. 2240-V5, and of Title V Permit No. 2240-V6, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

B. The Respondent failed to request an exemption, or submit a written report within seven calendar days for the excess emissions reported in Paragraph III.A of the Findings of Fact of this Compliance Order. Each failure to timely submit a written report for the excess emissions is a violation of Specific Requirement 16 of Title V Permit No. 2240-V5, Specific Requirement 15 of Title V Permit No. 2240-V6, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

C. In correspondence dated September 27, 2011, the Respondent submitted the Nitrate Group's 2011 First Semiannual Monitoring Report for the period encompassing January 1, 2011 through June 30, 2011. In correspondence dated March 31, 2012, the Respondent submitted the Nitrate Group's 2011 Second Semiannual Monitoring Report for the period encompassing July 1, 2011 through December 31, 2011. The violation, SR violated, and relevant Title V Permit, are shown in Table A:

TABLE A

Emission Source	Deviation Began	Deviation Ended	Violation	SR and Permit
Fume Scrubber 03G-119 (EQT0012)	1/1/11	6/30/11	Scrubber liquid flows were not recorded on 146 shifts of 362 shifts in the recording period	SR 37 2240-V6
	7/1/11	12/31/11	Scrubber liquid flows were not recorded on 14 shifts of 366 shifts in the recording period	
Fume Scrubber 218 (EQT0013)	7/1/11	12/31/11	Scrubber liquid flows were not recorded on 14 occasions of 366 recording occasions in the recording period	SR 39 2240-V6
Fume Scrubber 308 (EQT0014)	7/1/11	12/31/11	Scrubber liquid flows were not recorded on 14 shifts of 366 shifts in the recording period	SR 43 2240-V6
Nos. 3 & 4 Nitric Acid Tanks Fume Scrubber (EQT0133)	1/1/11	6/30/11	Scrubber liquid flows were not recorded on 164 shifts of 362 shifts in the recording period	SR 75 2240-V6
	7/1/11	12/31/11	Scrubber liquid flows were not recorded on 17 shifts of 366 shifts in the recording period	SR 75 2240-V6
Nitric Acid Train 4 (EQT007)	11/21/11 for 4 hours		NO_x levels neither monitored nor recorded	SR 24 – monitor SR 25 – record 2240-V6
Nitric Acid Train 5 (EQT009)	8/4/11 for 4 hours		NO_x levels not recorded	SR 29 2240-V6

TABLE A

Emission Source	Deviation Began	Deviation Ended	Violation	SR and Permit
Utility Boiler No. 2 (EQT0016)	8/4/11 for 4 hours		Failure to continuously record oxygen flow by CMS	SR 47 2240-V6
			Failure to continuously record fuel flow by CMS	SR 51 2240-V6
			Failure to continuously record steam flow by CMS	SR 53 2240-V6

Each failure to monitor and/or record monitoring data is a violation of the SR listed of the relevant Title V Permit, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

D. In correspondence dated September 27, 2011, the Respondent submitted the Nitrate Group's 2011 First Semiannual Monitoring Report for the period encompassing January 1, 2011 through June 30, 2011. In correspondence dated March 31, 2012, the Respondent submitted the Nitrate Group's 2011 Second Semiannual Monitoring Report for the period encompassing July 1, 2011 through December 31, 2011. The Reports listed exceedances of the permitted 3-hour averages for NO_x for Nitric Acid Train 3 (EQT004) and Nitric Acid Train 4 (EQT007) but failed to report the amount of NO_x emitted during the excursions. The failure to submit a complete Semiannual Monitoring Report is a violation of Part 70 General Condition M of Title V Permit No. 2240-V5, and of Title V Permit No. 2240-V6, LAC 33:III.501.C.4, and La. R. S. 30:2057(A)(2).

E. The Respondent failed to request an exemption, or submit a written report within seven (7) calendar days, for the startup with excess emissions on October 25, 2011. The failure to submit a written report for excess emissions is a violation of Specific Requirement 15 of Title V Permit No. 2240-V6, LAC 33:III.501.C.4, and La. R. S. 30:2057(A)(2).

F. In correspondence dated September 22, 2011, the Respondent submitted the Ammonia Group's 2011 First Semiannual Monitoring Report for the period encompassing January 1, 2011 through June 30, 2011. In correspondence dated March 29, 2012 the Respondent submitted the Ammonia Group's 2011 Second Semiannual Monitoring Report for the period encompassing July 1, 2011 through December 31, 2011. Each violation and Specific Requirement (SR) violated is shown in Table B:

TABLE B

Emission Source	Deviation Began	Deviation Ended	Violation	SR and Permit
Ammonia Plant Process Flare (EQT 0002)	1/1/11	6/30/11	Daily observations of flame were not recorded on four occasions during 181 occasions during the recording period	SR 5 2241-V2 SR 6 2241-V3
Ammonia Plant Storage Flare (EQT 0109)	1/1/11	6/30/11	Daily observations of flame were not recorded on four occasions during 181 occasions during the recording period	SR 49 2241-V2 SR 50 2241-V3
Ammonia Plant Storage Flare (EQT 0109)	7/1/11	12/31/11	Daily observations of flame were not recorded on four occasions during 184 occasions during the recording period	SR 6 2241-V3
Ammonia Plant Process Flare (EQT 0002)	7/1/11	12/31/11	Daily observations of flame were not recorded on four occasions during 184 occasions during the recording period	SR 50 2241-V3

Each failure to record daily observations of the flames of the flares is a violation of the SR listed of Title V Permit No. 2241-V2, Title V Permit No. 2241-V3, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

G. In correspondence dated June 22, 2011, the Respondent reported that on or about June 16, 2011, an unpermitted release of 2,630.5 pounds of ammonia occurred due to a piping failure within the urea plant. The failure to prevent an unpermitted release of ammonia into the atmosphere is a violation of LAC 33:III.905.A, LAC 33:III.501.C4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

H. In correspondence dated July 19, 2010, the Respondent submitted the Phosphate Group's 2010 First Semiannual Subpart AA Report for the period encompassing January 1, 2010 through May 2, 2010 for Title V Permit No. 2276-V0 and for the period encompassing May 3, 2010 through June 30, 2010 for Title V Permit No.

2276-V1. In correspondence dated January 19, 2011, the Respondent submitted the Phosphate Group's 2010 Second Semiannual Subpart AA Report for the period encompassing July 1, 2010 through December 31, 2010 for Title V Permit No. 2276-V1. Violations for the Phosphoric Acid Plant Fume Scrubber (EQT074, PPA-2) and the SR violated are shown in Table C:

TABLE C

Emission Source	Duration of Deviation	Violation	Specific Requirement
1st Stage Filter Scrubber	3/17/10 and 3/19/10	Scrubber flow was not maintained (>= 56.4 and <= 182.8 gal/min)	SR 37 2276-V0 AA
2nd Stage Filter Scrubber	2/17/10, 3/19/10, 8/10/10, 8/30/10	Scrubber flow was not maintained (>= 70.7 and <= 173.7 gal/min)	SR 39 2276-V0 AA SR 32 2276-V1 AA
North Attack Pre-Scrubber	1/4/10 – 1/5/10, 1/22/10, 2/10/10, 4/13/10, 5/8/10 – 5/9/10, 5/12/10, 9/30/10, 12/19/10	Scrubber flow was not maintained (>= 75.3 and <= 634.7 gal/min)	SR 40 2276-V0 AA SR 29 2276-V1 SR 28 2276-V1 AA
South Attack Pre-Scrubber	1/13/10, 6/19/10 – 6/21/10, 9/30/10, 11/26/10, 12/18/10	Scrubber flow was not maintained (>= 52.0 and <= 424.9 gal/min)	SR 36 2276-V0 AA SR 34 2276-V1 SR 24 2276-V1 AA

Each failure to control the proper water flow for each scrubber, on each day, is a violation of the SR listed of the relevant permit, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

I. In correspondence dated July 19, 2010, the Respondent submitted the Phosphate Group's 2010 First Semiannual Subpart AA Report for the period encompassing January 1, 2010 through May 2, 2010 for Title V Permit No. 2276-V0 and for the period encompassing May 3, 2010 through June 30, 2010 for Title V Permit No. 2276-V1. In correspondence dated January 19, 2011, the Respondent submitted the Phosphate Group's 2010 Second Semiannual Subpart AA Report for the period encompassing July 1, 2010 through December 31, 2010 for Title V Permit No. 2276-V1. Violations of pressure differential for the Phosphoric Acid Plant Fume Scrubber (EQT074, PPA-2) and the SR violated are shown in Table D:

TABLE D

Emission Source	Duration of Deviation	Violation	SR and Permit
2nd Stage Attack Scrubber	2/3/10, 3/23/10	Pressure differential was not maintained >= 0.3 and <= 3.3 inches	SR 28 2276-V0 AA

TABLE D

Emission Source	Duration of Deviation	Violation	SR and Permit
	8/13/10, 9/30/10	Pressure differential was not maintained >= 0.3 and <= 3.3 inches	SR 27 2276-V1 AA

Each failure to control the proper pressure differential is a violation of the SR listed of the Title V Permit listed, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

J. In correspondences dated March 24, 2011, and March 28, 2012, the Respondent submitted the Phosphate Group's 2010 Title V Annual Compliance Certification for the period encompassing January 1, 2010 through December 31, 2010, and the 2011 Title V Annual Compliance Certification for the period encompassing January 1, 2011 through December 31, 2011, respectively. The Certifications revealed the exceedances listed in Table F for the emission sources listed in Table E:

Table E

ARE 00006	PGS-1 Inactive Clear Well System
GRP 025	Phosphoric Acid Process Area
EQT 062	PGS-3 Portable Diesel Pumps
EQT 063	PGS-4 Diesel Fired Air Compressor
EQT 064	PGS-5 Stack 1 Diesel Pump
EQT 072	PPA-14 Sand Blasting Area Compressor
EQT 074	Phosphoric Acid Plant Fume Scrubber
EQT 075	Phosphoric Acid Plant Cooling Tower
EQT 078	PPA-7 Filtrate Sump

Exceedances of permit limits for Hydrofluoric Acid (HF), Total Fluorides (Fluorides), Particulate Matter (PM_{10}), Sulfur Dioxide (SO_2), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), and Volatile Organic Compounds (VOC), are listed in Table F:

Table F

<table>
<tr><th colspan="9">Quantity emitted in tons per year</th></tr>
<tr><th>Year</th><th>Pollutant</th><th>ARE 0006</th><th>EQT 062</th><th>EQT 063</th><th>EQT 064</th><th>EQT 072</th><th>EQT 074</th><th>EQT 078</th></tr>
<tr><td></td><td>HF limit 2276-V0 AA</td><td rowspan="2">0.26</td><td></td><td></td><td></td><td></td><td></td><td>Not permitted</td></tr>
<tr><td></td><td>HF limit 2276-V1 & -V1AA</td><td></td><td></td><td></td><td></td><td></td><td>< 0.010</td></tr>
<tr><td>2010</td><td>HF actual</td><td>0.29</td><td></td><td></td><td></td><td></td><td></td><td>0.061</td></tr>
</table>

Table F

<table>
<tr><th colspan="9">Quantity emitted in tons per year</th></tr>
<tr><th>Year</th><th>Pollutant</th><th>ARE 0006</th><th>EQT 062</th><th>EQT 063</th><th>EQT 064</th><th>EQT 072</th><th>EQT 074</th><th>EQT 078</th></tr>
<tr><td></td><td>Fluorides limit 2276-V0 AA</td><td>0.40</td><td></td><td></td><td></td><td></td><td></td><td>< 0.010</td></tr>
<tr><td></td><td>Fluorides limit 2276-V1 & -V1AA</td><td>0.78</td><td></td><td></td><td></td><td></td><td></td><td>< 0.010</td></tr>
<tr><td>2010</td><td>Fluorides actual</td><td>0.87</td><td></td><td></td><td></td><td></td><td></td><td>0.174</td></tr>
<tr><td></td><td>PM_{10} limit 2276-V0 AA, -V1, & -V1AA</td><td></td><td>0.410</td><td>0.010</td><td>0.01</td><td>0.060</td><td></td><td></td></tr>
<tr><td>2010</td><td>PM_{10} actual</td><td></td><td>1.070</td><td>0.764</td><td>0.03</td><td>0.474</td><td></td><td></td></tr>
<tr><td></td><td>SO_2 limit 2276-V0 AA</td><td rowspan="2"></td><td>0.130</td><td rowspan="2">0.010</td><td rowspan="2">0.01</td><td rowspan="2">0.060</td><td></td><td></td></tr>
<tr><td></td><td>SO_2 limit 2276-V1 & -V1AA</td><td>0.380</td><td></td><td></td></tr>
<tr><td>2010</td><td>SO_2 actual</td><td></td><td>0.997</td><td>0.165</td><td>0.02</td><td>0.441</td><td></td><td></td></tr>
<tr><td></td><td>NO_x limit 2276-V1 & -V1AA</td><td></td><td>5.800</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2010</td><td>NO_x actual</td><td></td><td>15.078</td><td>0.051</td><td>0.35</td><td>6.674</td><td></td><td></td></tr>
<tr><td></td><td>CO limit 2276-V0 AA</td><td></td><td>0.420</td><td rowspan="2">0.010</td><td rowspan="2">0.04</td><td rowspan="2">0.190</td><td></td><td></td></tr>
<tr><td></td><td>CO limit 2276-V1 & -V1AA</td><td></td><td>1.250</td><td></td><td></td></tr>
<tr><td>2010</td><td>CO actual</td><td></td><td>3.249</td><td>0.054</td><td>0.08</td><td>1.438</td><td></td><td></td></tr>
<tr><td></td><td>VOC limit 2276-V0 AA</td><td></td><td rowspan="2">0.47</td><td rowspan="2">0.010</td><td rowspan="2">0.02</td><td rowspan="2">0.070</td><td></td><td></td></tr>
<tr><td></td><td>VOC limit 2276-V1 & -V1AA</td><td></td><td></td><td></td></tr>
</table>

Table F

Quantity emitted in tons per year								
Year	Pollutant	ARE 0006	EQT 062	EQT 063	EQT 064	EQT 072	EQT 074	EQT 078
2010	**VOC actual**		**1.223**	**0.062**	**0.03**	**0.541**		
	HF limit 2276-V1	0.26					0.01	
2011	**HF actual**	**0.29**					**0.02**	
	Fluorides limit 2276-V1	0.78					0.01	
2011	**Fluorides actual**	**0.87**					**0.06**	
	PM_{10} limit 2276-V1			0.010				
2011	**PM_{10} actual**			**0.336**				
	SO_2 limit 2276-V1		0.380	0.010				
2011	**SO_2 actual**		**0.386**	**0.072**				
	NO_x limit 2276-V1		5.800	0.010				
2011	**NO_x actual**		**5.836**	**0.022**				
	CO limit 2276-V1		1.25	0.010				
2011	**CO actual**		**1.26**	**0.024**				
	VOC limit 2276-V1			0.010				
2011	**VOC actual**			**0.026**				

Each failure to maintain each pollutant below the permitted level is a violation of the relevant Permit, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

K. In correspondences dated July 28, 2011, the Respondent submitted the Phosphate Group's 2011 First Semiannual Subpart AA Report for the period encompassing January 1, 2011 through June 30, 2011. In correspondence dated January 30, 2012, the Respondent submitted the Phosphate Group's 2011 Second Semiannual Subpart AA Report for the period encompassing July 1, 2011 through December 31, 2011. Violations of scrubber flow and differential in inches of water column (w.c.) for the Phosphoric Acid Plant Fume Scrubber (EQT074, PPA-2) and the SR violated are shown in Table G:

TABLE G

Instrument	Duration of Deviation	Violation	SR and Permit
2nd Stage Attack Scrubber	8/31/11, 11/7/11 – 11/15/11	Scrubber flow was not maintained (>= 88.3 and <= 186.2 gal/min)	SR 22 2276-V1AA
North 1st Stage Attack Scrubber	8/31/11, 11/7/11 – 11/15/11	Scrubber flow was not maintained (>= 44.5 and <= 138.8 gal/min)	SR 23 2276-V1AA
South Attack Pre-Scrubber	3/23/11, 5/3/11, 5/12/11, 6/3/11, 6/8/11, 8/11/11, 8/31/11, 11/7/11 – 11/15/11, 12/19/11 – 12/20/11, 12/24/11, 12/31/11	Scrubber flow was not maintained (>= 52.0 and <= 424.9 gal/min)	SR 24 2276-V1AA
North Attack Pre-Scrubber	3/6/11, 5/12/11 – 5/13/11, 7/14/11, 8/1/11 – 8/2/11, 8/31/11, 11/7/11 – 11/15/11	Scrubber flow was not maintained (>= 75.4 and <= 634.7 gal/min)	SR 30 2276-V1AA
2nd Stage Filter Scrubber	3/5/11, 3/16/11, 3/18/11 – 3/19/11, 5/10/11, 8/31/11, 11/7/11 – 11/15/11	Scrubber flow was not maintained (>= 70.7 and <= 173.7 gal/min)	SR 32 2276-V1AA
South 1st Stage Attack Scrubber	2/27/11, 3/7/11 - 3/25/11, 3/28/11, 4/22/11 – 4/23/11, 5/31/11, 6/6/11 – 6/8/11, 11/7/11 – 11/15/11	Scrubber flow was not maintained (>= 63.5 and <= 186.8 gal/min)	SR 33 2276-V1AA
3rd Stage Attack Scrubber	2/24/11, 8/31/11, 11/7/11 – 11/15/11, 12/9/11	Scrubber flow was not maintained (>= 91.7 and <= 207.3 gal/min)	SR 36 2276-V1AA
1st Stage Filter Scrubber	8/31/11, 11/7/11 – 11/15/11, 12/9/11	Scrubber flow was not maintained (>= 56.4 and <= 182.8 gal/min)	SR 37 2276-V1AA
3rd Stage Attack Scrubber	7/1/11 – 7/21/11, 7/28/11 –11/16/11, 12/22/11 – 12/24/11, 12/26/11	Pressure differential was not maintained (>= 1.0 and <= 2.5 inches)	SR 26 2276-V1AA

TABLE G

Instrument	Duration of Deviation	Violation	SR and Permit
2nd Stage Attack Scrubber	1/22/11, 2/22/11, 3/16/11, 4/28/11, 6/3/11, 7/29/11, 9/16/11, 11/7/11 – 11/15/11	Pressure differential was not maintained (>= 0.3 and <= 3.3 inches)	SR 27 2276-V1AA
North Attack Pre-Scrubber	3/16/11, 5/25/11, 6/20/11, 8/10/11 – 8/11/11, 9/2/11, 10/15/11 – 10/16/11, 11/5/11 – 11/15/11, 12/15/11	Pressure differential was not maintained (>= 0.1 and <= 6.5 inches)	SR 28 2276-V1AA
South 1st Stage Attack Scrubber	5/31/11, 6/30/11, 11/7/11 – 11/15/11, 12/26/11, 12/23/11 – 12/25/11	Pressure differential was not maintained (>= 0.3 and <= 6.8 inches)	SR 34 2276-V1AA

Each failure to control the proper water flow and/or pressure differential for each scrubber on each day is a violation of the SR listed of the permit listed, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

L. In correspondence dated March 29, 2012, the Respondent submitted the Phosphate Group's 2011 Annual Compliance Certification for the period encompassing January 1, 2011 through December 31, 2011 for Title V Permit No. 2276-V1. The Certification stated that the Respondent submitted a 30-day notification of stack testing of the Phosphoric Acid Process Area (UNF 0004). The failure to submit a notification at least 60 days in advance of stack testing is a violation of Specific Requirement 98 of Title V Permit No. 2276-V1, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

M. In correspondences dated March 24, 2011, the Respondent submitted the Sulfate Group's 2010 First Semiannual Monitoring Report for the period encompassing January 1, 2010 through June 30, 2010, and 2010 Second Semiannual Monitoring Report for the period encompassing July 1, 2010 through December 31, 2010. In correspondence dated September 20, 2011, the Respondent submitted the Sulfate Group's 2011 First Semiannual Monitoring Report for the period encompassing January 1, 2011 through June 30, 2011. Violations included in the Reports are shown in Table H:

TABLE H

Emission Source	Deviation Began	Deviation Ended	Violation	SR and Permit
Oleum Storage Tank #1 Seal Pot (EQT0045)	1/1/10	6/30/10	Visual monitoring of emissions from the Oleum seal pot was not recorded on 17 shifts during 366 shifts in the monitoring period	SR 14 2247-V1
Oleum Storage Tank #2 Seal Pot (EQT0046)	1/1/10	6/30/10	Visual monitoring of emissions from the Oleum seal pot was not recorded on 17 shifts during 366 shifts in the monitoring period	SR 18 2247-V1
Oleum Storage Tank #1 Seal Pot (EQT0045)	7/1/10	12/31/10	Visual monitoring of emissions from the Oleum seal pot not recorded on 8 shifts during 366 shifts in the monitoring period	SR 14 2247-V1 SR 9 2247-V2
Oleum Storage Tank #2 Seal Pot (EQT0046)	7/1/10	12/31/10	Visual monitoring of emissions from the Oleum seal pot not recorded on 8 shifts during 365 shifts in the monitoring period	SR 18 2247-V1 SR 14 2247-V2
Oleum Storage Tank #1 Seal Pot (EQT0045)	1/1/11	6/30/11	Visual monitoring of emissions from the Oleum seal pot not recorded on 10 shifts during 365 shifts in the monitoring period	SR 9 2247-V2 SR 9 2247-V3
Oleum Storage Tank #2 Seal Pot (EQT0046)	1/1/11	6/30/11	Visual monitoring of emissions from the Oleum seal pot not recorded on 10 shifts during 365 shifts in the monitoring period	SR 14 2247-V2 SR 14 2247-V3
Oleum Storage Tank #1 Seal Pot (EQT0045)	1/1/11	6/30/11	Replacement of the contents of the Oleum seal pot was not conducted twice-weekly during 6 non-consecutive weeks of the 24-week reporting period	SR 8 2247-V2 SR 10 2247-V3
Oleum Storage Tank #2 Seal Pot (EQT0046)	1/1/11	6/30/11	Replacement of the contents of the Oleum seal pot was not conducted twice-weekly during 6 non-consecutive weeks of the 24-week reporting period	SR 12 2247-V2 SR 13 2247-V3

Each failure to record monitoring of emissions from the oleum tank seal pots on each day is a violation of the SR listed of the relevant permit, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2). Each failure to twice-weekly replace the contents of each oleum tank seal pot is a violation of the SR listed of the relevant permit, LAC 33:III.501.C.4, La. R.S. 30:2057(A)(1) and 30:2057(A)(2).

N. In correspondence dated March 24, 2011, the Respondent submitted the Sulfate Group's 2010 First Semiannual Monitoring Report for the period encompassing January 1, 2010 through June 30, 2010. The Respondent failed to submit the Report by the required September 30, 2010 due date. The failure to timely submit the Semiannual Monitoring Report is a violation of Part 70 General Condition K of Title V Permit No. 2247-V1, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2).

O. The Respondent failed to submit the Sulfate Group's 2010 Annual Compliance Certification for the period encompassing January 1, 2010 through December 31, 2010. The failure to submit the Annual Compliance Certification is a violation of Part 70 General Condition M of Title V Permit Nos. 2247-V1 and 2247-V2, LAC 33:III.501.C.4, and La. R.S. 30:2057(A)(2)."

III.

The Department hereby adds paragraphs IV and V to the Order portion of **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695**, which shall read as follows:

"IV.

To submit to the Emissions Reporting and Inventory Center (ERIC), within sixty (60) days after receipt of this **COMPLIANCE ORDER**, revised ammonia Emission Inventory (EI) reports for Nitric Acid Train No. 4 (EQT0007) for the years 2006 through 2009, if such reports have not been submitted to date. To submit revised ammonia EI reports for Nitric Acid Train No. 4 (EQT0007) for the years 1996 through 2005 within sixty (60) days of the ERIC system becoming available to receive them, if such reports have not been submitted to date. To submit to the Enforcement Division, a copy of the cover letter for each ERIC submission.

V.

To submit to the Enforcement Division, within sixty (60) days after receipt of this **COMPLIANCE ORDER**, amended Nitrate Group 2010 Second Semiannual and 2011 First Semiannual Monitoring Reports, showing the actual tons of NO_x emitted during the excursion periods."

IV.

The Department incorporates all of the remainder of the original **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695**, as if reiterated herein.

V.

This **AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is effective upon receipt.

Baton Rouge, Louisiana, this 01 day of March, 2013.

Cheryl Sonnier Nolan
Assistant Secretary
Office of Environmental Compliance

Copies of a request for a hearing and/or related correspondence should be sent to:

Louisiana Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
Post Office Box 4312
Baton Rouge, LA 70821-4312
Attention: Mark E. Brown

BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

State of Louisiana
DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL COMPLIANCE

June 19, 2013

CERTIFIED MAIL (7004 2510 0006 3853 0437)
RETURN RECEIPT REQUESTED

PCS NITROGEN FERTILIZER, L.P.
c/o Corporation Service Company
Agent of Service
320 Somerulos Street
Baton Rouge, LA 70802

RE: AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY
ENFORCEMENT TRACKING NO. AE-CN-10-00695B
AGENCY INTEREST NOS. 3732, 173682

Dear Sir:

Pursuant to the Louisiana Environmental Quality Act (La. R.S. 30:2001, et seq.), the attached **AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is hereby served on **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** for the violations described therein.

Any questions concerning this action should be directed to Mark E. Brown at (225) 219-3782.

Sincerely,

Celena J. Cage
Administrator
Enforcement Division

CSN/MEB/meb
Alt ID No. 0180-00046, 0180-00198

c: PCS Nitrogen Fertilizer, L.P.
Cecil Hopper
10886 La. Hwy 75
Geismar, LA 70734

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF ENVIRONMENTAL COMPLIANCE

IN THE MATTER OF	*	
	*	
PCS NITROGEN FERTILIZER, L.P.	*	**ENFORCEMENT TRACKING NO.**
ASCENSION PARISH	*	
ALT ID NOS. 0180-00046, 0180-00198	*	**AE-CN-10-00695B**
	*	
	*	**AGENCY INTEREST NOS.**
	*	
PROCEEDINGS UNDER THE LOUISIANA	*	**3732, 173682**
ENVIRONMENTAL QUALITY ACT,	*	
La. R.S. 30:2001, ET SEQ.	*	

<u>AMENDED CONSOLIDATED COMPLIANCE ORDER &</u>
<u>NOTICE OF POTENTIAL PENALTY</u>

The Louisiana Department of Environmental Quality (the Department) hereby amends the **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695A** issued to **PCS NITROGEN FERTILIZER, L.P. (RESPONDENT)** on or about March 1, 2013 in the above-captioned matter as follows:

I.

The Department hereby removes sub-paragraph N and sub-paragraph O of Paragraph II of the Findings of Fact.

II.

The Department incorporates all of the remainder of the original **CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY, ENFORCEMENT TRACKING NO. AE-CN-10-00695A** and **AGENCY INTEREST NOS. 3732** and **173682,** as if reiterated herein.

IV.

This **AMENDED CONSOLIDATED COMPLIANCE ORDER & NOTICE OF POTENTIAL PENALTY** is effective upon receipt.

Baton Rouge, Louisiana, this 19 day of June, 2013.

Cheryl Sonnier Nolan
Assistant Secretary
Office of Environmental Compliance

Copies of a request for a hearing and/or related correspondence should be sent to:

Louisiana Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
Post Office Box 4312
Baton Rouge, LA 70821-4312
Attention: Mark E. Brown

Copies of a request for a hearing and/or related correspondence should be sent to:

Louisiana Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
Post Office Box 4312
Baton Rouge, LA 70821-4312
Attention: Mark E. Brown

Appendix E – Notices of Violation Resolved by Consent Decree

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 Ross Avenue
Dallas, Texas 75202-2733

CERTIFIED MAIL – RETURN RECEIPT REQUESTED: 7003 0500 0003 0866 2024

Hanson Leonard
General Manager
PCS Nitrogen Fertilizer, L.P.
P.O. Box 307
Geismar, LA 70734

Subject: Notice and Finding of Violations

Dear Mr. Leonard:

Enclosed is a Notice and Finding of Violations (Notice) issued to PCS Nitrogen Fertilizer, L.P. (PCS Nitrogen) pursuant to Section 113(a)(1) and (a)(3) of the Clean Air Act, 42 U.S.C. §§ 7413(a)(1) and (a)(3). In the Notice, the Environmental Protection Agency is notifying PCS Nitrogen of violations of the Prevention of Significant Deterioration requirements and New Source Review permitting requirements of the Louisiana State Implementation Plan, and the Title V permitting requirements at its Geismar Plant in Ascension Parish, Texas.

Please note the opportunity to confer outlined in the Notice. As indicated in the Notice, any request to confer should be directed to Carlos Zequeira-Brinsfield, Senior Enforcement Counsel, at (214) 665-8053.

Sincerely,

John Blevins
Director
Compliance Assurance and
Enforcement Division

Enclosure

cc: Ms. Peggy M. Hatch
Assistant Secretary
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P.O. Box 4312
Baton Rouge, LA 70821-4312

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6

IN THE MATTER OF:	)	
	)	
PCS Nitrogen Fertilizer, L.P. Geismar, LA	)	**NOTICE OF VIOLATION**
	)	
Proceedings Pursuant to Section 113(a)(1) and (a)(3) of the Clean Air Act, 42 U.S.C. § 7413(a)(1) and (a)(3)	)	
	)	

NOTICE AND FINDING OF VIOLATIONS

This Notice and Finding of Violations (Notice) is issued to PCS Nitrogen Fertilizer, L.P. (PCS Nitrogen) for violations of the Clean Air Act (CAA or the Act), 42 U.S.C. § 7401 *et seq*., at its Geismar sulfuric acid plant. Specifically, PCS Nitrogen has violated the Prevention of Significant Deterioration (PSD) permitting requirements in the Louisiana State Implementation Plan (SIP), the Federal New Source Performance Standards (NSPS) for Sulfuric Acid Plants, and the Title V permitting requirements at it Geismar sulfuric acid plant.

This Notice is issued pursuant to Section 113(a)(1) and (a)(3) of the CAA, 42 U.S.C. § 7413(a)(1) and (a)(3). The authority to issue this Notice has been delegated to the Regional Administrator of EPA Region 6, and re-delegated to the Director, Compliance Assurance and Enforcement Division, EPA Region 6.

A. STATUTORY AND REGULATORY BACKGROUND

National Standards of Performance for Sulfuric Acid Plants

1. Section 111(e) of the Act provides that after the effective date of a standard of performance promulgated under this section, it is unlawful for any owner or operator of any new source to operate such source in violation of that standard.

2. EPA proposed the NSPS for Sulfuric acid plants on August 17, 1971. 36 Fed. Reg. 15704.

3. A modified stationary source must comply with all applicable standards within 180 days from the completion of any physical or operational change. 40 C.F.R. § 60.14(g).

4. An affected facility under the NSPS for Sulfuric Acid Plants, 40 C.F.R. Part 60, Subpart H (40 C.F.R. §§ 60.80-60.85), is any sulfuric acid production unit constructed, reconstructed, or modified after August 17, 1971.

5. 40 C.F.R. § 60.82 prohibits any affected sulfuric acid plant to emit SO_2 in excess of 2 kilograms per metric ton of acid produced (kg/metric ton) (4 pounds per ton of acid produced (lbs/ton)), the production being expressed as 100 percent sulfuric acid.

6. 40 C.F.R. § 60.83 prohibits any affected sulfuric acid plant to emit sulfuric acid mist in excess of 0.075 kilograms per metric ton of acid produced (kg/metric ton) (0.15 pounds per ton of acid produced (lbs/ton)), the production being expressed as 100 percent sulfuric acid.

Prevention of Significant Deterioration

7. Part C of Title I of the CAA (Sections 160 through 169) establishes the federal Prevention of Significant Deterioration (PSD) permitting program and requires each state to include a PSD program as part of its SIP.

8. Specifically, Section 165(a) of the CAA prohibits a major stationary source from constructing a major emitting facility without first obtaining a PSD permit and installing the best available control technology (BACT) if the source is located in an area which has achieved the National Ambient Air Quality Standards (NAAQS) for that pollutant.

9. On June 19, 1978, EPA established regulations implementing the federal PSD program at 40 C.F.R. § 52.21 and requirements for SIP Approved programs at 40 C.F.R. § 52.166. 43 Fed. Reg. 26403 (June 19, 1978). The PSD regulations were revised on August 7, 1980 (45 Fed. Reg. 52676). Subsequent to 1980, the PSD regulations have been revised.

10. EPA approved the State of Louisiana PSD Program into the federally enforceable SIP effective May 26, 1987. 40 C.F.R. § 52.970 and 52 Fed. Reg. 13671 (April 24, 1987).

11. Louisiana's PSD program is located in Louisiana Administrative Code (LAC) 33:III.509. These rules mirror the federal PSD regulations codified in 40 C.F.R. §52.21 in the July 1, 2000 revision of the Code of Federal Regulations.

12. The Louisiana SIP at LAC 33:III.509.I prohibits the construction of any new major stationary source or any major modification without a permit which states that the source or modification would meet the requirements of LAC 33:III.509.J through R. LAC 33:III.509.J through M requires that a source subject to PSD regulations undergo a control technology review, install BACT, and conduct air quality modeling.

13. LAC 33:III.509.J requires the owner or operator of a new major stationary source or major modification to apply BACT for each pollutant that experienced a significant net emission increase as a result of a physical or operational change to that source.

14. Violations of the federally approved Louisiana PSD program are federally enforceable pursuant to Section 113 of the Act.

Requirements for Title V Operating

15. Title V of the Act, Sections 501 through 507, and its implementing regulations at 40 C.F.R. Part 70, establish an operating permit program for certain sources, including "major sources". The purpose of Title V is to ensure that all "applicable requirements" for compliance with the Act, including PSD and NSPS requirements, are collected in one place.

16. Section 502(a) of the Act and its implementing regulations at 40 C.F.R. Part 70, as well as the Louisiana Title V permit requirements, state that it is unlawful for any person to violate any requirement of a permit issued under Title V, or to operate an affected source except in compliance with a permit issued by a permitting authority under Title V.

17. Section 502(f) and 40 C.F.R. § 70.6(a) requires all operating permits issued under Title V to include enforceable emission limitations and such other conditions as are necessary to assure compliance with "applicable requirements" of the Act and the requirements of the applicable SIP. "Applicable requirement," defined at 40 C.F.R § 70.2, includes any applicable PSD requirements and any applicable NSPS requirements.

18. 40 C.F.R. § 70.5(a) requires any owner or operator of a source subject to the Title V program to submit a timely and complete permit application that contains information sufficient to determine the applicability of any applicable requirements (including any requirement to meet BACT pursuant to PSD and to comply with NSPS), certifies compliance with all applicable requirements, provides information that maybe necessary to determine the applicability of other applicable requirements of the Act and contains a compliance plan for all applicable requirements for which the source is not in compliance.

19. 40 C.F.R. § 70.5(b) requires any applicant who fails to submit any relevant fact or who has submitted incorrect information in a permit application to promptly submit such supplementary facts or corrected information upon becoming aware of such failure or incorrect submittal.

20. EPA fully approved the Louisiana Title V program, effective October 12, 1995. *See* 60 Fed. Reg. 47296 (September 12, 1995). Louisiana's Title V permit requirements are codified at LAC 33:III.507.

B. FACTUAL BACKGROUND

21. PCS Nitrogen owns and operates a Sulfuric acid plant at Geismar, Louisiana.

22. PCS Nitrogen Fertilizer, L.P., is a partnership with domicile in the State of Delaware and is registered to do business in the State of Louisiana.

23. PCS Nitrogen owns and operates its Sulfuric Acid Plant (the Facility), which is a portion of the Geismar Agricultural Nitrogen & Phosphate Plant, located in Ascension and Iberville Parishes, Louisiana. At all times relevant to this action, PCS Nitrogen has been and continues to be the owner and/or operator of the Facility within the meaning of Section 112(a)(9) of the CAA, 42 U.S.C. § 7412(a)(9).

24. Defendant is a "person" within the meaning of Section 302(e) of the Act, 42 U.S.C. § 7602(e).

25. The PCS Nitrogen Geismar facility meets the definition of "sulfuric acid production unit" in 40 C.F.R. § 60.81.

26. The PCS Nitrogen Geismar facility meets the definition of "major stationary source" in 40 C.F.R. § 52.21(b)(1)(i)(a), because it is a sulfuric acid plant that has the potential to emit in excess of 100 tons of SO_2 per year.

27. On or about October 1995, PCS Nitrogen began a project to replace the converter with a new oversized converter. The original converter was sized for a production capacity of 1450 tons per day (TPD); the new converter was sized for a production capacity of at least 1700 TPD for a single absorption process.

28. As a result of the converter replacement, the 100% sulfuric acid production capacity of the sulfuric acid plant increased from 1670 tons per day to at least 1720 tons per day.

29. As a result of the converter replacement the SO_2 emission rate to the atmosphere increased from 2048 lbs/hr before the 1995 project to at least 2109 lbs/hr after the project.

30. Emissions of SO_2 increased from 8261 tons per year in the 24 month period preceding the converter replacement to a PTE of 10,157.38 tons per year after the converter replacement. This constitutes an actual-to-potential increase of 1896.38 tons per year.

31. Between 1995 and 2003, a series of component replacements were conducted at the Geismar facility which, in aggregate, extended its useful life. The sum of the capital expenditures for the component replacements was $11,503,000.

32. The most recent stack test conducted June 7, 2005 showed the sulfuric acid plant to be emitting approximately 30.5 lbs of SO_2 per ton of 100% acid produced.

33. The PCS Nitrogen Geismar facility is subject to Title V of the CAA (Sections 502 and 503) because it is a major source (as defined in Section 501(2) of the CAA) with the potential to emit more than 100 tons of SO_2 per year. PCS Nitrogen became subject to the requirements of Title V on October 12, 1995.

34. PCS Nitrogen submitted its initial Title V permit application to the Louisiana Department of Environmental Quality (LDEQ) on October 15, 1996. An application

reconciliation was submitted in June 2001. This permit application and the revision stated that the sulfuric acid plant was grandfathered from the provisions of NSPS Subpart H.

35. As of the date of this NOV, PCS Nitrogen is operating its facility in Geismar, Louisiana.

C. FINDING OF VIOLATIONS

Violation No.1 – Failing to Obtain a PSD Permit Prior to Making a Major Modification

36. Paragraphs 1 – 35 are realleged and incorporated by reference.

37. As a result of the converter replacement, the potential to emit off the sulfuric acid plant increased beyond the significance level for SO_2. Therefore, the converter replacement caused a significant net emission increase of SO_2.

38. Because the sulfuric acid plant converter replacement caused a significant net emission increase of SO_2 at a major stationary source, the project was a "major modification," as defined in the Louisiana SIP at LAC 33:III.509.B, triggering the requirement to (1) obtain a PSD permit, (2) apply BACT on the sulfuric acid plant, and (3) demonstrate that the proposed change did not cause a significant deterioration in air quality in accordance with LAC 33:III.509.J through R, and Sections 110 and 165 of the Act.

39. PCS Nitrogen's failure to apply for a PSD Permit and apply BACT for SO_2 to the sulfuric acid plant constitutes a violation of the Louisiana SIP at LAC 33:III.509.I (PSD), which was promulgated pursuant to Sections 110 and 165 of the Act, 42 U.S.C. §§ 7410 and 7475.

Violation No. 2 – Emissions of Sulfur Dioxide Greater Than 2 kg per metric ton (4 lbs/ton) of Acid Produced

40. Paragraphs 1 – 39 are realleged and incorporated by reference.

41. The converter replacement increased the hourly emission rate of SO_2 and sulfuric acid mist. Therefore, the project triggered the NSPS "modification" provisions in 40 C.F.R. § 60.14 for SO_2 and sulfuric acid mist. As a result, the sulfuric acid plant is subject to the standards for SO_2 in 40 C.F.R. Part 60 Subpart H (40 C.F.R. §§ 60.80-85).

42. Additionally, the general provisions to NSPS (40 C.F.R. §§ 60.1-60.19) define "reconstruction" as "the replacement of components of an existing facility to the extent that…the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable and entirely new facility." 40 C.F.R. § 60.15(b).

43. Between 1995 and 2003, a series of component replacements were conducted at the Facility which, in aggregate, extended its useful life. The sum of the capital expenditures for the

component replacements was $11,503,000.The fixed capital cost that would have been required to construct a comparable 1600 tons per day sulfuric acid plant in 1995 was $20,000,000. The sum of the capital expenditures for the component replacements between 1995 and 2005 exceeds 50 percent of the fixed capital cost that would be required to construct a comparable and entirely new facility. This meets the definition of reconstruction, thus making the Facility subject to the standards for SO_2 and sulfuric acid mist in 40 C.F.R. Part 60 Subpart H (40 C.F.R. §§ 60.80-85).

44. The sulfuric acid plant routinely emits more than the NSPS standard for SO_2 of 2 kilograms per metric ton of acid produced (kg/metric ton)(4 lbs/ton) at 40 C.F.R. § 60.82.

45. PCS Nitrogen's emissions of greater than 2 kg/metric ton (4 lbs/ton) of SO_2 while operating the sulfuric acid plant violate 40 C.F.R. § 60.82, a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411.

Violation No. 3 – Emissions of Sulfuric Acid Mist Greater Than 0.075 kg per metric ton (0.15 lbs/ton) of Acid Produced

46. Paragraphs 1 – 45 are realleged and incorporated by reference.

47. The sulfuric acid plant has emitted more than the NSPS standard for standard sulfuric acid mist of 0.075 kilograms per metric ton of acid produced (kg/metric ton)(0.15 lbs/ton) at 40 C.F.R. § 60.83.

48. PCS Nitrogen's emissions of greater than 0.075 kg/metric ton (0.15 lbs/ton) of sulfuric acid mist while operating the sulfuric acid plant violate 40 C.F.R. § 60.83 a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411.

Violation No. 4 – Failing to Conduct Performance Test(s) within 180 days of startup

49. Paragraphs 1 – 48 are realleged and incorporated by reference.

50. In a CAA Section 114 Information Request dated March 27, 2006, EPA requested that PCS Nitrogen submit documentation of all emission test runs, emissions characterizations, or emissions studies, conducted or attempted at the sulfuric acid plant since January 1, 1980, including information relevant to operating parameters measured during these tests/studies, such as production rate and stack gas flow rates.

51. Information submitted by PCS Nitrogen on June 21, 2006, in response to the CAA Section 114 Information Request dated March 27, 2006, failed to show that a performance test was conducted within 180 days of startup.

52. By failing to conduct a performance test within 180 days of initial startup PCS Nitrogen violated 40 C.F.R. § 60.8(a), a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411

Violation No. 5 – Failing to Submit Complete Permit Application for a Title V Operating Permit

53. Paragraphs 1 – 52 are realleged and incorporated by reference.

54. PCS Nitrogen submitted a Title V permit application for the source on October 15, 1996. The application did not identify NSPS and PSD as applicable requirement to the source, did not certify compliance with NSPS and PSD requirements, and did not contain a compliance plan for NSPS or PSD requirements.

55. In June 2001, PCS Nitrogen submitted a Title V permit application reconciliation. The application did not identify NSPS and PSD as applicable requirement to the source, did not certify compliance with NSPS and PSD requirements, and did not contain a compliance plan for NSPS or PSD requirements.

56. The Title V permit for the source, which was issued to PCS Nitrogen on March 14, 2006, does not list NSPS and PSD as applicable requirements and does not contain a compliance plan for NSPS and PSD.

57. Therefore PCS Nitrogen's failure violates Title V permitting requirements at Section 502(a) and 504 (a) of the Act [42 U.S.C. §§ 7661a(a) & c(a)], 40 C.F.R. § 70.5, and LAC 33:III.507.B.2 and LAC 33:III.517.B.1.

D. ENFORCEMENT

Section 113(a)(1) of the Act, 42 U.S.C. § 7413(a)(1), provides that at any time after the expiration of 30 days following the date of the issuance of a Notice of Violation, the Administrator may, without regard to the period of violation, issue an order requiring compliance with the requirements of the state implementation plan or permit, issue an administrative penalty order pursuant to Section 113(d), or bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties.

Section 113(a)(3) of the Act, 42 U.S.C. § 7413(a)(3), provides in part that if the Administrator finds that a person has violated, or is in violation of Title V of the Act, including a requirement or prohibition of any rule, plan, order, waiver, or permit promulgated, issued, or approved under Title V, the Administrator may issue an administrative penalty order under Section 113(d), issue an order requiring compliance with such requirement or prohibition, or bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties.

E. OPPORTUNITY FOR CONFERENCE

PCS Nitrogen may, upon request, confer with EPA. The conference will enable PCS Nitrogen to present evidence bearing on the finding of violations, on the nature of the violations, and on any efforts it may have taken or proposes to take to achieve compliance. PCS Nitrogen has a right to be represented by counsel. A request for a conference must be made within ten (10) days of receipt of this Notice, and the request for a conference or other inquiries concerning the Notice should be made in writing to:

Carlos Zequeira-Brinsfield
Assistant Regional Counsel (6RC-EA)
U. S. EPA - Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

If you have any questions, please feel free to call Mr. Zequeira-Brinsfield at (214) 665-8053.

F. EFFECTIVE DATE

This Notice shall become effective immediately upon issuance.

Dated: 6-26-08

John Blevins
Director
Compliance Assurance and Enforcement Division
U.S. EPA - Region 6

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 Ross Avenue
Dallas, Texas 75202-2733

June 20, 2011

CERTIFIED MAIL – RETURN RECEIPT REQUESTED: 7010 1060 0002 1872 0054

Charles T. Wehland, Esq.
Jones Day
77 West Wacker
Chicago, IL 60601-1692

Subject: Notice and Finding of Violations

Dear Mr. Wehland:

Enclosed is an Amended Notice and Finding of Violations (Notice) issued to AA Sulfuric Corporation (AA Sulfuric) and PCS Nitrogen Fertilizer, L.P. (PCS Nitrogen) pursuant to Section 113(a)(1) and (a)(3) of the Clean Air Act, 42 U.S.C. §§ 7413(a)(1) and (a)(3). In the Notice, the Environmental Protection Agency (EPA) is notifying AA Sulfuric and PCS Nitrogen of violations of the Prevention of Significant Deterioration requirements and New Source Review permitting requirements of the Louisiana State Implementation Plan, and the Title V permitting requirements at its Geismar Plant located in Ascension and Iberville Parish, Louisiana. PCS Nitrogen was previously notified of these violations in the Notice issued on June 26, 2008.

Please note the opportunity to confer outlined in the Notice. As indicated in the Notice, any request to confer should be directed to Carlos Zequeira, Senior Enforcement Counsel. Mr. Zequeira can be reached at (214) 665-8053.

Sincerely,

John Blevins
Director
Compliance Assurance and
Enforcement Division

Enclosure

cc: PCS Nitrogen Fertilizer
c/o Corporation Service Company (Certified Number: 7007 1490 0004 0562 9897)

Celena Cage, Administrator
Louisana Department of Environmental Quality

Identical Letter Sent to:

Bryan Andries, President, Director
AA Sulfuric Corporation
3115 Highway 30
Geismar, LA 70734

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 Ross Avenue
Dallas, Texas 75202-2733

June 20, 2011

CERTIFIED MAIL – RETURN RECEIPT REQUESTED: 7011 0110 0001 3590 7435

Bryan Andries, President
AA Sulfuric Corporation
3115 Highway 30
Geismar, LA 70734

Subject: Amended Notice and Finding of Violations

Dear Mr. Andries:

Enclosed is an Amended Notice and Finding of Violations (Notice) issued to AA Sulfuric Corporation (AA Sulfuric) and PCS Nitrogen Fertilizer, L.P. (PCS Nitrogen) pursuant to Section 113(a)(1) and (a)(3) of the Clean Air Act, 42 U.S.C. §§ 7413(a)(1) and (a)(3). In the Notice, the Environmental Protection Agency (EPA) is notifying AA Sulfuric and PCS Nitrogen of violations of the Prevention of Significant Deterioration requirements and New Source Review permitting requirements of the Louisiana State Implementation Plan, and the Title V permitting requirements at its Geismar Plant located in Ascension and Iberville Parish, Louisiana. PCS Nitrogen was previously notified of these violations in the Notice issued on June 26, 2008.

Please note the opportunity to confer outlined in the Notice. As indicated in the Notice, any request to confer should be directed to Carlos Zequeira, Senior Enforcement Counsel. Mr. Zequeira can be reached at (214) 665-8053.

Sincerely,

John Blevins
Director
Compliance Assurance and
Enforcement Division

Enclosure

cc: AA Sulfuric Corporation
c/o Corporation Service Company (Certified Number: 7007 1490 0004 0562 9880)

Celena Cage, Administrator
Louisana Department of Environmental Quality

Identical Letter Sent to:

Charles T. Wehland, Esq.
Jones Day
77 West Wacker
Chicago, IL 60601-1692

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6

IN THE MATTER OF: AA Sulfuric Corporation and PCS Nitrogen Fertilizer, L.P. Geismar, LA Proceedings Pursuant to Section 113(a)(1) and (a)(3) of the Clean Air Act, 42 U.S.C. § 7413(a)(1) and (a)(3)	))))))))))))	**AMENDED NOTICE OF VIOLATION**

AMENDED NOTICE AND FINDING OF VIOLATIONS

This Amended Notice and Finding of Violations (Notice) is issued to AA Sulfuric Corporation (AA Sulfuric) and PCS Nitrogen Fertilizer, L.P. (PCS Nitrogen) for violations of the Clean Air Act ("CAA" or "the Act"), 42 U.S.C. § 7401 *et seq*., at the Geismar sulfuric acid plant. Specifically, AA Sulfuric and PCS Nitrogen have violated the Prevention of Significant Deterioration (PSD) permitting requirements in the Louisiana State Implementation Plan (SIP), the Federal New Source Performance Standards (NSPS) for Sulfuric Acid Plants, and the Title V permitting requirements at the Geismar sulfuric acid plant.

This Notice is issued pursuant to Section 113(a)(1) and (a)(3) of the CAA, 42 U.S.C. § 7413(a)(1) and (a)(3). Section 113(a) of the Act requires the Administrator of the United States Environmental Protection Agency (EPA) to notify any person in violation of a State Implementation Plan (SIP) or permit of the violations. The authority to issue this Notice has been delegated to the Regional Administrator of EPA Region 6, and re-delegated to the Director, Compliance Assurance and Enforcement Division, EPA Region 6.

A Notice and Finding of Violations issued to PCS Nitrogen on June 26, 2008 regarding the same violations at the Geismar sulfuric acid plant is incorporated herein by reference.

A. STATUTORY AND REGULATORY BACKGROUND

1. The Clean Air Act is designed to protect and enhance the quality of the nation's air so as to promote the public health and welfare and the productive capacity of its population. Section 101(b)(1) of the Act, 42 U.S.C. § 7401(b)(1).

The National Ambient Air Quality Standards

2. Section 108(a) of the Act, 42 U.S.C. § 7408(a), requires the Administrator of EPA to identify and prepare air quality criteria for each air pollutant, emissions of which may endanger public health or welfare, and the presence of which results from numerous or diverse mobile or stationary sources. For each such "criteria" pollutant, Section 109 of the Act, 42 U.S.C. § 7409, requires EPA to promulgate national ambient air quality standards ("NAAQS") requisite to protect the public health and welfare.

3. Pursuant to Sections 108 and 109, 42 U.S.C. §§ 7408 and 7409, EPA has identified SO_2 as a criteria pollutant, and has promulgated NAAQS for such pollutant. 40 C.F.R.§§ 50.4 and 50.5.

4. Under Section 107(d) of the Act, 42 U.S.C. § 7407(d), each state is required to designate those areas within its boundaries where the air quality is better or worse than the NAAQS for each criteria pollutant, or where the air quality cannot be classified due to insufficient data. An area that meets the NAAQS for a particular pollutant is termed an "attainment" area with respect to such pollutant. An area that does not meet the NAAQS for a particular pollutant is termed a "nonattainment" area with respect to such pollutant.

5. An area that cannot be classified as either "attainment" or "nonattainment" with respect to a particular pollutant due to insufficient data is termed "unclassifiable" with respect to such pollutant.

6. At all times relevant to this Notice, Ascension and Iberville Parishes, the area in which the Facility is located, have been classified as attainment for SO_2.

Prevention of Significant Deterioration

7. Part C of Title I of the CAA (Sections 160 through 169) establishes the federal Prevention of Significant Deterioration (PSD) permitting program and requires each state to include a PSD program as part of its SIP.

8. Specifically, Section 165(a) of the CAA prohibits a major stationary source from constructing a major emitting facility without first obtaining a PSD permit and installing the best available control technology (BACT) if the source is located in an area which has achieved the NAAQS for that pollutant.

9. On June 19, 1978, EPA established regulations implementing the federal PSD program at 40 C.F.R. § 52.21 and requirements for SIP Approved programs at 40 C.F.R. § 52.166.

43 Fed. Reg. 26403 (June 19, 1978). The PSD regulations were revised on August 7, 1980 (45 Fed. Reg. 52676). Subsequent to 1980, the PSD regulations have been revised.

10. EPA approved the State of Louisiana PSD Program into the federally enforceable SIP effective May 26, 1987. 40 C.F.R. § 52.970 and 52 Fed. Reg. 13671 (April 24, 1987).

11. Louisiana's PSD program is located in Louisiana Administrative Code (LAC) 33:III.509. These rules mirror the federal PSD regulations codified in 40 C.F.R. §52.21.

12. The Louisiana SIP at LAC 33:III.509.I prohibits the construction of any new major stationary source or any major modification without a permit which states that the source or modification would meet the requirements of LAC 33:III.509.J through R. LAC 33:III.509.J through M requires that a source subject to PSD regulations undergo a control technology review, install BACT, and conduct air quality modeling.

13. LAC 33:III.509.J requires the owner or operator of a new major stationary source or major modification to apply BACT for each pollutant that experienced a significant net emission increase as a result of a physical or operational change to that source.

14. Violations of the federally approved Louisiana PSD program are federally enforceable pursuant to Section 113 of the Act.

National Standards of Performance for Sulfuric Acid Plants

15. Section 111(e) of the Act provides that after the effective date of a standard of performance promulgated under this section, it is unlawful for any owner or operator of any new source to operate such source in violation of that standard.

16. EPA promulgated the National Standards of Performance for Sulfuric Acid Plants (NSPS) on December 23, 1971. 36 Fed. Reg. 24877.

17. A modified stationary source must comply with all applicable standards within 180 days from the completion of any physical or operational change. 40 C.F.R. § 60.14(g).

18. An affected facility under the NSPS for Sulfuric Acid Plants, codified at 40 C.F.R. Part 60, Subpart H (40 C.F.R. §§ 60.80-60.85), is any sulfuric acid production unit constructed, reconstructed, or modified after August 17, 1971.

19. 40 C.F.R. § 60.82 prohibits any affected sulfuric acid plant from emitting SO_2 in excess of 2 kilograms per metric ton of acid produced (kg/metric ton) (4 pounds per ton of acid produced (lbs/ton), the production being expressed as 100 percent sulfuric acid.

20. 40 C.F.R. § 60.83 prohibits any affected sulfuric acid plant from emitting sulfuric acid mist in excess of 0.075 kilograms per metric ton of acid produced (kg/metric ton) (0.15 pounds per ton of acid produced (lbs/ton)), the production being expressed as 100 percent sulfuric acid.

Requirements for Title V Operating

21. Title V of the Act, found in CAA Sections 501 through 507, 42 U.S.C. §§ 7661 through 7661f, and its implementing regulations at 40 C.F.R. Part 70, establish an operating permit program for certain sources, including "major sources". The purpose of Title V is to ensure that all "applicable requirements" for compliance with the Act, including PSD and NSPS requirements, are collected in one place.

22. Section 502(a) of the Act and its implementing regulations at 40 C.F.R. Part 70, as well as the Louisiana Title V permit requirements, state that it is unlawful for any person to violate any requirement of a permit issued under Title V, or to operate an affected source except in compliance with a permit issued by a permitting authority under Title V.

23. Section 502(f) and 40 C.F.R. § 70.6(a) require all operating permits issued under Title V to include enforceable emission limitations and such other conditions as are necessary to assure compliance with "applicable requirements" of the Act and the requirements of the applicable SIP. "Applicable requirement," defined at 40 C.F.R § 70.2, includes any applicable PSD requirements and any applicable NSPS requirements.

24. 40 C.F.R. § 70.5(a) requires any owner or operator of a source subject to the Title V program to submit a timely and complete permit application that contains information sufficient to determine the applicability of any applicable requirements (including any requirement to meet BACT pursuant to PSD and to comply with NSPS), certifies compliance with all applicable requirements, provides information that may be necessary to determine the applicability of other applicable requirements of the Act and contains a compliance plan for all applicable requirements for which the source is not in compliance.

25. 40 C.F.R. § 70.5(b) requires any applicant who fails to submit any relevant fact or who has submitted incorrect information in a permit application to promptly submit such supplementary facts or corrected information upon becoming aware of such failure or incorrect submittal.

26. EPA fully approved the Louisiana Title V program, effective October 12, 1995. *See* 60 Fed. Reg. 47296 (September 12, 1995). Louisiana's Title V permit requirements are codified at LAC 33:III., Chapter 5.

B. FACTUAL BACKGROUND

27. AA Sulfuric owns a sulfuric acid plant at Geismar, Louisiana which is operated by PCS Nitrogen.

28. AA Sulfuric Corporation is a Louisiana corporation that is registered to do business in the State of Louisiana. PCS Nitrogen is a partnership domiciled in Delaware and registered to do business in Louisiana.

29. The sulfuric acid plant owned by AA Sulfuric and operated by PCS Nitrogen (the Facility) is a portion of the Geismar Agricultural Nitrogen & Phosphate Plant and is located in Ascension and Iberville Parishes, Louisiana. At all times relevant to this action, AA Sulfuric has been and continues to be the owner of the Facility within the meaning of Section 111(a)(5) of the CAA, 42 U.S.C. § 7411(a)(5). In addition, at all times relevant to this action, PCS Nitrogen has been and continues to be the operator of the Facility within the meaning of Section 111(a)(5) of the CAA, 42 U.S.C. § 7411(a)(5).

30. Defendants are both "persons" within the meaning of Section 302(e) of the Act, 42 U.S.C. § 7602(e).

31. The Facility meets the definition of "sulfuric acid production unit" in 40 C.F.R. § 60.81.

32. The Facility meets the definition of "major stationary source" in 40 C.F.R. § 52.21(b)(1)(i)(a), because it is a sulfuric acid plant that has the potential to emit in excess of 100 tons of SO_2 per year.

33. On or about October 1995, AA Sulfuric and PCS Nitrogen began a project to replace the sulfuric acid converter at the Facility with a new oversized converter. The original converter was sized for a production capacity of approximately 1,450 tons per day (TPD); the new converter was sized for a production capacity of at least 1,700 TPD for a single absorption process.

34. As a result of the converter replacement, the 100% sulfuric acid production capacity of the sulfuric acid plant increased from 1,670 tons per day to at least 1,720 tons per day.

35. As a result of the converter replacement, the SO_2 emission rate to the atmosphere increased from 2,048 lbs/hr before the 1995 project to at least 2,109 lbs/hr after the project.

36. Emissions of SO_2 increased from 8,261 tons per year in the 24 month period preceding the converter replacement to a PTE of 10,153 tons per year after the converter replacement. This constitutes an actual-to-potential increase of 1,892 tons per year.

37. Between 1995 and 2003, a series of component replacements were conducted at the Geismar facility which, in aggregate, extended its useful life. The sum of the capital expenditures for the component replacements was $11,503,000.

38. The most recent stack test conducted June 7, 2005, showed the sulfuric acid plant to be emitting approximately 30.5 lbs of SO_2 per ton of 100% acid produced.

39. The Facility is subject to Title V of the CAA (Sections 502 and 503) because it is a major source (as defined in Section 501(2) of the CAA) with the potential to emit more than 100 tons of SO_2 per year. Louisiana's Title V program is located in LAC 33:III., Chapter 5.

40. PCS Nitrogen submitted its initial Title V permit application to the Louisiana Department of Environmental Quality (LDEQ) on October 15, 1996. An application reconciliation was submitted in June 2001. This permit application and the revision stated that the sulfuric acid plant was grandfathered from the provisions of NSPS Subpart H.

41. As of the date of this Notice, PCS Nitrogen is operating the Facility and AA Sulfuric owns it.

C. FINDING OF VIOLATIONS

Violation No.1 – Failing to Obtain a PSD Permit Prior to Making a Major Modification

42. Paragraphs 1 through 41 are realleged and incorporated by reference.

43. As a result of the converter replacement, the potential to emit of the sulfuric acid plant increased beyond the significance level for SO_2. Therefore, the converter replacement caused a significant net emission increase of SO_2.

44. Because the sulfuric acid plant converter replacement caused a significant net emission increase of SO_2 at a major stationary source, the project was a "major modification," as defined in the Louisiana SIP at LAC 33:III.509.B, triggering the requirement to (1) obtain a PSD permit, (2) apply BACT on the sulfuric acid plant, and (3) demonstrate that the proposed change did not cause a significant deterioration in air quality in accordance with LAC 33:III.509.J through R, and Sections 110 and 165 of the Act.

45. AA Sulfuric's and PCS Nitrogen's failure to apply for a PSD Permit and apply BACT for SO_2 to the sulfuric acid plant constitutes a violation of the Louisiana SIP, specifically LAC 33:III.501(C) and 509.I and R, which was promulgated pursuant to Sections 110 and 165 of the Act, 42 U.S.C. §§ 7410 and 7475.

Violation No. 2 – Emissions of Sulfur Dioxide Greater than 2 kg per metric ton (4 lbs/ton) of Acid Produced

46. Paragraphs 1 through 45 are realleged and incorporated by reference.

47. The converter replacement increased the hourly emission rate of SO_2 and sulfuric acid mist. Therefore, the project triggered the NSPS "modification" provisions in 40 C.F.R. § 60.14 for SO_2 and sulfuric acid mist. As a result, the sulfuric acid plant is subject to the standards for SO_2 in 40 C.F.R. Part 60 Subpart H (40 C.F.R. §§ 60.80-85).

48. Additionally, the general provisions to NSPS (40 C.F.R. §§ 60.1-60.19) define "reconstruction" as "the replacement of components of an existing facility to the extent that…the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable and entirely new facility." 40 C.F.R. § 60.15(b).

49. Between 1995 and 2003, a series of component replacements were conducted at the Facility which, in aggregate, extended its useful life. The sum of the capital expenditures for the component replacements was $11,503,000. The fixed capital cost that would have been required to construct a comparable 1600 tons per day sulfuric acid plant in 1995 was $20,000,000. The sum of the capital expenditures for the component replacements between 1995 and 2005 exceeds 50 percent of the fixed capital cost that would be required to construct a comparable and entirely new facility. This meets the definition of reconstruction, thus making the Facility subject to the standards for SO_2 and sulfuric acid mist in 40 C.F.R. Part 60 Subpart H (40 C.F.R. §§ 60.80-85).

50. The sulfuric acid plant routinely emits more than the NSPS standard for SO_2 of 2 kilograms per metric ton of acid produced (kg/metric ton)(4 lbs/ton) at 40 C.F.R. § 60.82.

51. AA Sulfuric's and PCS Nitrogen's emissions of greater than 2 kg/metric ton (4 lbs/ton) of SO_2 at the sulfuric acid plant violate 40 C.F.R. § 60.82, a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411.

Violation No. 3 – Emissions of Sulfuric Acid Mist Greater than 0.075 kg per metric ton (0.15 lbs/ton) of Acid Produced

52. Paragraphs 1 through 51 are realleged and incorporated by reference.

53. The sulfuric acid plant has emitted more than the NSPS standard for standard sulfuric acid mist of 0.075 kilograms per metric ton of acid produced (kg/metric ton)(0.15 lbs/ton) at 40 C.F.R. § 60.83.

54. AA Sulfuric's and PCS Nitrogen's emissions of greater than 0.075 kg/metric ton (0.15 lbs/ton) of sulfuric acid mist at the sulfuric acid plant violate 40 C.F.R. § 60.83, a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411.

Violation No. 4 – Failing to Conduct Performance Test(s) within 180 days of Startup

55. Paragraphs 1 through 54 are realleged and incorporated by reference.

56. In a CAA Section 114 Information Request dated March 27, 2006, EPA requested that PCS Nitrogen submit documentation of all emission test runs, emissions characterizations, or emissions studies, conducted or attempted at the sulfuric acid plant since January 1, 1980, including information relevant to operating parameters measured during these tests/studies, such as production rate and stack gas flow rates.

57. Information submitted by PCS Nitrogen on June 21, 2006, in response to the CAA Section 114 Information Request dated March 27, 2006, failed to show that a performance test was conducted within 180 days of startup.

58. By failing to conduct a performance test within 180 days of initial startup, AA Sulfuric and PCS Nitrogen violated 40 C.F.R. § 60.8(a), a regulation promulgated pursuant to Section 111 of the Act, 42 U.S.C. § 7411.

Violation No. 5 – Failing to Submit Complete Permit Application for a Title V Operating Permit

59. Paragraphs 1 through 58 are realleged and incorporated by reference.

60. PCS Nitrogen submitted a Title V permit application for the source on October 15, 1996. The application did not identify NSPS and PSD as applicable requirement to the source, did not certify compliance with NSPS and PSD requirements, and did not contain a compliance plan for NSPS or PSD requirements.

61. In June 2001, PCS Nitrogen submitted a Title V permit application reconciliation. The application did not identify NSPS and PSD as applicable requirement to the source, did not certify compliance with NSPS and PSD requirements, and did not contain a compliance plan for NSPS or PSD requirements.

62. The Title V permit for the source, which was issued to PCS Nitrogen on March 14, 2006, does not list NSPS and PSD as applicable requirements and does not contain a compliance plan for NSPS and PSD.

63. By failing to identify NSPS and PSD as applicable requirements, failing to certify compliance with NSPS and PSD requirements, and failing to submit a compliance plan for NSPS and PSD requirements in the Title V permit application, AA Sulfuric and PCS Nitrogen are in violation of Title V permitting requirements found in Section 502(a) and 504 (a) of the Act [42 U.S.C. §§ 7661a(a) and c(a)], 40 C.F.R. §§ 70.1(b), 70.5, 70.6, 70.7(b), and LAC 33:III.501(C), 507.B.2 and LAC 33:III.517.B.1.

D. ENFORCEMENT

Section 113(a)(1) of the Act, 42 U.S.C. § 7413(a)(1), provides that at any time after the expiration of 30 days following the date of the issuance of a Notice of Violation, the Administrator may, without regard to the period of violation, issue an order requiring compliance with the requirements of the state implementation plan or permit, issue an administrative penalty order pursuant to Section 113(d), or bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties.

Section 113(a)(3) of the Act, 42 U.S.C. § 7413(a)(3), provides in part that if the Administrator finds that a person has violated, or is in violation of Title V of the Act, including a requirement or prohibition of any rule, plan, order, waiver, or permit promulgated, issued, or approved under Title V, the Administrator may issue an administrative penalty order under Section 113(d), issue an order requiring compliance with such requirement or prohibition, or bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties.

E. OPPORTUNITY FOR CONFERENCE

AA Sulfuric and PCS Nitrogen may, upon request, confer with EPA. The conference will enable AA Sulfuric and PCS Nitrogen to present evidence bearing on the finding of violations, on the nature of the violations, and on any efforts it may have taken or proposes to take to achieve compliance. AA Sulfuric and PCS Nitrogen have a right to be represented by counsel. A request for a conference must be made within ten (10) days of receipt of this Notice, and the request for a conference or other inquiries concerning the Notice should be made in writing to:

Carlos Zequeira
Assistant Regional Counsel (6RC-EA)
U. S. EPA - Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

If you have any questions, please feel free to call Carlos Zequeira at (214) 665-8053.

F. EFFECTIVE DATE

This Notice shall become effective immediately upon issuance.

Dated: 6/20/11

John Blevins
Director
Compliance Assurance and
Enforcement Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 07 2012

UNITED PARCEL SERVICE
E-MAIL VERIFICATION REQUESTED

Charles T. Wehland, Esq.
Jones Day
77 West Wacker
Chicago, Illinois 60601

Re: Notice of Violation and Opportunity to Show Cause

Dear Mr. Wehland:

Enclosed is a Notice of Violation (NOV) issued to White Springs Agricultural Chemicals, Inc. (White Springs), under Section 113(a) of the Clean Air Act (CAA), 42 U.S.C. § 7413(a). In this NOV, the U.S. Environmental Protection Agency, EPA Region 4 notifies White Springs of violations of the CAA requirements for the Prevention of Significant Deterioration, 42 U.S.C. §§ 7470 – 7479, title V, 42 U.S.C. §§ 7661a and 7661b, and violations of the Florida State Implementation Plan at its facility located at 15843 S.E. 78th Street, White Springs, Florida.

Please note that the NOV requests that you contact EPA within **seven (7) days** of receipt of this letter to schedule a conference for the week of May 21, 2012. Questions should be directed to Ms. Marlene J. Tucker, Associate Regional Counsel at 404 562-9536 or by e-mail at tucker.marlene@epa.gov.

Sincerely,

Douglas Neeley for

Beverly H. Banister
Director
Air, Pesticides and Toxics
Management Division

Enclosure

cc : Karin Torain (w/enclosure)
PotashCorp

Brian Accardo (w/enclosure)
Division of Air Resource Management
Florida Department of Environmental Protection

United States Environmental Protection Agency
Region 4 - Atlanta, Georgia

In the matter of: **White Springs Agricultural Chemicals, Inc.** White Springs, Florida	Clean Air Act Notice of Violation

NOTICE OF VIOLATION

This Notice of Violation (NOV) is issued pursuant to Section 113 of the Clean Air Act (CAA or the Act), as amended, 42 U.S.C. § 7413, to White Springs Agricultural Chemicals, Inc. (hereinafter referred to as "White Springs", "Company", or "Respondent"), for violations of the CAA and the Florida State Implementation Plan at its facility located at 15843 S.E. 78th Street, White Springs, Florida (the Facility). Section 113 requires the Administrator of the United States Environmental Protection Agency (EPA) to notify a person that has violated a requirement of the applicable state implementation plan (SIP) or permit of such finding of the violation. The authority to issue NOVs has been delegated to the Director of the Air, Pesticides, and Toxics Management Division, EPA, Region 4.

STATUTORY AND REGULATORY BACKGROUND

1. The CAA is designed to protect and enhance the quality of the nation's air so as to promote the public health and welfare and the productive capacity of its population. Section 101(b)(1) of the Act, 42 U.S.C. § 7401(b)(1).

A. The National Ambient Air Quality Standards

2. Section 108(a) of the Act, 42 U.S.C. § 7408(a), requires the Administrator of EPA to identify and prepare air quality criteria for each air pollutant, emissions of which may endanger public health or welfare, and the presence of which results from numerous or diverse mobile or stationary sources. For each such "criteria" pollutant, Section 109 of the Act, 42 U.S.C. § 7409, requires EPA to promulgate national ambient air quality standards (NAAQS) requisite to protect the public health and welfare.

3. Pursuant to Section 109, 42 U.S.C. § 7409, EPA has identified sulfur dioxide (SO_2), carbon monoxide, lead, nitrogen dioxide, ozone, and particulate matter as criteria pollutants, and has promulgated NAAQS for such pollutants. 40 C.F.R. Part 50.

4. Under Section 107(d) of the Act, 42 U.S.C. § 7407(d), each state is required to designate those areas within its boundaries where the air quality is better or worse than the NAAQS for each criteria pollutant, or where the air quality cannot be classified due to insufficient data. An area that meets the NAAQS for a particular pollutant is termed an "attainment" area with respect to such pollutant. An area that does not meet the NAAQS for a particular pollutant is termed a "nonattainment" area with respect to such pollutant.

5. An area that cannot be classified as either "attainment" or "nonattainment" with respect to a particular pollutant due to insufficient data is termed "unclassifiable" with respect to such pollutant.

6. At all times relevant to this NOV, Hamilton County, the area in which the Facility is located, has been classified as attainment for SO_2.

B. Prevention of Significant Deterioration

7. Part C of Title I of the Act, 42 U.S.C. §§ 7470-7492, sets forth requirements for the prevention of significant deterioration of air quality in those areas designated as either attainment or unclassifiable for purposes of meeting the NAAQS standards. These requirements are designed to protect public health and welfare, to assure that economic growth will occur in a manner consistent with the preservation of existing clean air resources, and to assure that any decision to permit increased air pollution is made only after careful evaluation of all the consequences of such a decision and after public participation in the decision making process. 42 U.S.C. § 7470. These provisions are referred to herein as the "PSD program." The PSD program (which applies in attainment or unclassifiable areas), along with the nonattainment area requirements are each a part of what is referred to as "New Source Review" or the "New Source Review program" (NSR).

8. Section 165(a) of the Act, 42 U.S.C. § 7475(a), among other things, prohibits the construction and operation of a "major emitting facility" in an area designated as attainment or unclassifiable unless a permit has been issued that comports with the requirements of Section 165, including that the facility is subject to the best available control technology (BACT) for each pollutant subject to regulation under the Act that is emitted from the facility.

9. Section 169(1) of the Act, 42 U.S.C. § 7479(1), designates sulfuric acid plants which emit or have the potential to emit one hundred tons per year or more of any pollutant to be "major emitting facilities."

10. Section 169(2)(C) of the Act, 42 U.S.C. § 7479(2)(C), defines "construction" to include "modification" (as defined in Section 111(a) of the Act). "Modification" is defined in Section 111(a) of the Act, 42 U.S.C. § 7411(a), to be "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."

11. Sections 110(a) and 161 of the Act, 42 U.S.C. §§ 7410(a) and 7471, require each state to adopt, and submit to EPA for approval, a SIP that contains emission limitations and such other measures as may be necessary to prevent significant deterioration of air quality in areas designated as attainment or unclassifiable.

12. EPA has promulgated two largely identical sets of regulations to implement the PSD program. One set, found at 40 C.F.R. § 52.21, contains EPA's own federal PSD program, which applies in areas without a SIP-approved PSD program. The other set of regulations, found at 40 CFR § 51.166, contains requirements that state PSD programs must meet to be approved as part of a SIP.

13. Florida administers a SIP-approved PSD program, which is governed by its PSD and permitting rules in Florida Administrative Code (F.A.C.) Chapters 62-210, formerly 17-210, and 62-212, formerly 17-212.

14. The Florida PSD regulations were originally approved by EPA into the Florida SIP on December 22, 1983, as Chapter 17-2. (48 Fed. Reg. 52713). EPA has since approved several amendments to the PSD portion and general permitting requirements of Florida's SIP. Effective December 12, 1994, Florida's air pollution rules formerly found in F.A.C. 17-2 were recodified and relevant chapters were relocated to Chapter 17-210 (Stationary Sources General Requirements), and Chapter 17-212 (Stationary Sources Preconstruction Review). (59 Fed. Reg. 52916).

15. Effective August 16, 1999, the PSD portion and general permitting requirements of Florida's SIP were recodified again, this time to 62-210 and 62-212. (64 Fed. Reg. 32346). This revision also relocated the definitions that applied to Florida's PSD program to F.A.C. 62-210.200. More recent amendments to incorporate the NSR reform regulations into the Florida SIP, became effective on July 28, 2008. (73 Fed. Reg. 36435). A list of Florida regulations incorporated into Florida's SIP is provided at 40 CFR § 52.520.

16. The relevant Florida PSD and general permitting regulations formerly found in Chapters 17-210 (Stationary Sources General Requirements); 17-212 (Stationary Sources Preconstruction Review); 62-210 (Stationary Sources General Requirements) and 62-212 (Stationary Sources Preconstruction Review) were incorporated into and were a part of the Florida SIP at the time of the modifications at issue in this case (referenced in Appendix A). All citations to such regulations herein, refer to the regulations as incorporated into and part of the Florida SIP applicable at the time of each modification alleged herein.

17. At all relevant times, the PSD regulations applied to any modification of a major facility in an area designated as attainment or unclassifiable, that would result in a significant net emissions increase.

18. Under the PSD regulations a proposed modification to a "major facility" is subject to preconstruction review requirements if [1] the facility to be modified would be subject to preconstruction review requirements if it were itself a proposed new facility; and [2] the modification would result in a significant net emissions increase of any pollutant regulated under the Act. F.A.C.17-212.400(2)(d)4.a and 62-212.400(2)(d)4.a.

19. Under the PSD regulations, a proposed new sulfuric acid plant would be subject to preconstruction review requirements if it would have the potential to emit 100 tons per year or more of any pollutant regulated under the Act. F.A.C. 17-212.400(2)(e)2 [Table 212.400-2] and 62-212.400(d)2.b [Table 212.400-2].

20. Under the PSD regulations, a "major facility" is any facility which emits, or has the potential to emit 100 tons per year or more of any pollutant, or five tons per year or more of lead, or 30 tons per year or more of acrylonitrile. F.A.C. 17-210.200(40) and 62-210.200(173).

21. Under the PSD regulations, a "modification" is any physical change in, change in the method of operation of, or addition to a facility which would increase the actual emissions of any air pollutant, including any not previously emitted from the facility. F.A.C. 17-210.200(46) and 62-210.200(185).

22. The PSD regulations define "actual emissions" as the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal operation. In addition, for any emissions unit that has not begun normal operations on the particular date, actual emissions shall equal the potential to emit of the unit on that date. F.A.C. 17-212.200(2) and 62-210.200(12).

23. The PSD regulations define "potential emissions" or "potential to emit" as the maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable. F.A.C. 17-212.200(57) and 62-210.200(225).

24. Under the PSD regulations, a "significant net emissions increase" of a pollutant regulated under the Act is a net emissions increase equal to or greater than the applicable significant emission rate listed in Table 212.400-2 at F.A.C. 17-212.400(2)(e)2 and 62-212.400(e)2. The rate listed in Table 212.400-2 for SO_2 is 40 tons per year.

25. Under the PSD regulations, a "net emissions increase" results when the sum of all of the contemporaneous creditable increases and decreases in the actual emissions of the facility, including the increase in emissions of the modification itself and any increases and decreases in quantifiable fugitive emissions, is greater than zero. F.A.C. 17-212.400(2)e and 62-212.400(2)e.

26. Under the PSD regulations, "construction" means the act of performing on-site fabrication, erection, installation or modification of an emission unit or facility of a permanent nature, including but not limited to, installation of foundations or building supports, laying of underground pipe work or electrical conduit; and fabrication or installation of permanent storage structures, component parts of an emission unit or facility, associated support equipment, or utility connections. F.A.C. 17-212.200(21) and 62-210.200(85).

27. No owner or operator of a facility or modification subject to the preconstruction review requirements of the Florida PSD regulations shall begin construction prior to obtaining a permit to construct that complies with all the provisions of F.A.C. 17-212.400 (PSD), 62-212.400 (PSD), 17-210.300 (Permits Required) and 62-210.300 (Permits Required), including implementation of BACT for each pollutant subject to regulation; performance of preconstruction air quality monitoring analysis; performance of an ambient impact analysis; and a demonstration that the modification will not cause or contribute to a violation of the NAAQS, among other things. F.A.C. 17-212.400(5) and (6), and 62-212.400(5), (6) and (7).

28. The owner or operator of any emissions unit which emits or can reasonably be expected to emit any air pollutant shall obtain an

appropriate permit prior to beginning construction, modification, or initial or continued operation. F.A.C. 17-210.300 and 62-210.300.

29. Any construction permit issued under the PSD regulations shall contain all of the conditions and provisions necessary to ensure that the construction and operation of the facility or modification shall be in compliance with the requirements of the PSD regulations. F.A.C. 17-212.400(6)(a), 62-212.400(7)(a), 17-210.300(1) and 62-210.300(1).

30. Any operation permit issued for a facility or modification shall include all operating conditions and provisions necessary to ensure compliance with the PSD regulations. F.A.C. 17-212.400(6)(b), 62-212.400(7)(b), 17-210.300(2) and 62-210.300.

31. Upon expiration of the air operation permit for any existing facility or emissions unit, subsequent to construction or modification and demonstration of initial compliance with the conditions of the construction permit for any new or modified facility or emissions unit, or as otherwise provided, the owner or operator of such facility or emissions unit shall obtain a renewal air operation permit, an initial air operation permit, or an administrative permit, whichever is appropriate, in accordance with applicable requirements. F.A.C. 17-210.300(2) and 62-210.300.

C. Title V Program

1. Federal Title V Requirements

32. Section 502(a) of the CAA, 42 U.S.C. § 7661a(a), provides that no major source or certain other sources may operate without a Title V permit after the effective date of any permit program approved or promulgated under Title V of the Act. EPA first promulgated regulations governing the minimum elements for state operating permit programs on July 21, 1992. (57 Fed. Reg. 32295); *See also,* 40 C.F.R. Part 70,F.A.C. 17-213.400 and 62-213.400.

33. Section 503 of the CAA, 42 U.S.C. § 7661b, sets forth the requirements to submit a timely, accurate, and complete application for a permit, including information required to be submitted with the application. *See also,* F.A.C. 17-213.420 and 62-213.420.

34. Section 504(a) of the CAA, 42 U.S.C. § 7661c(a), requires that each Title V permit include enforceable emission limitations and standards, a schedule of compliance, and other conditions necessary to assure compliance with applicable requirements, including those contained in a state implementation plan. 42 U.S.C. § 7661c(a).

35. 40 C.F.R. § 70.1(b) provides that: "All sources subject to these regulations shall have a permit to operate that assures compliance by the source with all applicable requirements." *See also,* F.A.C. 17-213.400 and 62-213.400.

36. 40 C.F.R § 70.2 defines "applicable requirement" to include "(1) Any standard or other requirement provided for in the applicable implementation plan approved or promulgated by EPA through rulemaking under Title I of the Act that implements the relevant requirements of the Act, including revisions to that plan promulgated in part 52 of this chapter ...." *See also,* F.A.C. 17-210.200 and 62-210.200(29).

37. 40 C.F.R. § 70.7(b) provides that no source subject to 40 C.F.R. Part 70 requirements may operate without a permit as specified in the Act. *See also*, F.A.C. 17-213.400 and 62-213.400.

38. 40 C.F.R. § 70.5(a) and (c) require timely and complete permit applications for Title V permits with required information that must be submitted and 40 C.F.R. § 70.6 specifies required permit content. *See also*, F.A.C.17-213.420, 62-213.420, 17-213.440 and 62-213.440.

39. 40 C.F.R. § 70.5(b) provides that: "Any applicant who fails to submit any relevant facts or who has submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application but prior to release of a draft permit." *See also*, F.A.C.17-213.420, 62-213.420, 17-213.440 and 62-213.440.

2. Florida's Title V Requirements

40. Florida's Title V program received final interim approval by EPA on September 25, 1995, and became effective on October 25, 1995. (*See* 60 Fed. Reg. 49343), and was granted final full approval by EPA on October 31, 2001. (*See* 66 Fed. Reg. 49837). *See also*, 40 C.F.R. Part 70, Appendix A. Applications were due on October 25, 1996, from Florida sources subject to Title V following EPA's interim approval of Florida's Title V program.

41. The Florida regulations governing the Title V permitting program are codified at F.A.C. 62-213 (Operation Permit for Major Sources of Air Pollution), and are federally enforceable pursuant to Section 113(a)(3).

42. All Title V sources are subject to the air operation permit requirements of F.A.C. 17-213.400 and 62-213.400.

43. A Title V source is a major source of air pollution. F.A.C.17-210.200, 62-210.200(175) and 62-210.200(188).

44. A major source of air pollution includes, among other things, a sulfuric acid plant that emits or has the potential to emit 100 tons per year or more of any regulated air pollutant. F.A.C. 17-212.200(4) and 62-210.200(173).

45. F.A.C. 17-213.420 (1) (a) and 62-213.420(1)(a) require sources to submit timely and complete permit applications for Title V permits with required information and F.A.C.17-213.420(3) and 62-213.420(3) specify required permit application content.

46. F.A.C. 17-213.420(1)(b)3 and 62-213.420(1)(b)3 require sources to submit additional information to supplement or correct an application promptly after becoming aware that an application contains incorrect or incomplete information.

47. F.A.C. 17-213.400 and 62.-213.400 state that no Title V source "shall make any changes in its operation without first applying for and receiving a permit revision" if the change constitutes a modification, or violates any applicable requirement, among other things.

FACTUAL FINDINGS

48. White Springs owns and operates four sulfuric acid plants (Plants C, D, E and F) at its facility located in White Springs, Florida (Facility).

49. White Springs is a Delaware corporation doing business in the state of Florida, and is a wholly owned subsidiary of Potash Corporation of Sakatchewan, Inc. (PCS), a Canadian company. White Springs is hereinafter referred to as "Respondent."

50. Respondent is a "person" within the meaning of Sections 113(a) and 502 of the CAA, 42 U.S.C. §§ 7413(a) and 7661a, and as defined in Section 302(e) of the CAA, 42 U.S.C. § 7602(e).

51. Respondent produces sulfuric acid at the Facility by burning elemental sulfur, converting the resulting sulfur dioxide into sulfur trioxide, and absorbing it into recirculating sulfuric acid solution.

52. Respondent uses the sulfuric acid to manufacture phosphoric acid which is ultimately used in the fertilizer and animal feed products.

53. The Facility is a "major source," a "major facility" and a "major emitting facility" because it belongs to one of the 28 named source categories and has the potential to emit more than 100 tons per year of SO_2, a regulated air pollutant. 42 U.S.C. § 7479(1); and F.A.C. 17-210.200(34) and 62-210.200(173).

54. At all times relevant to this NOV, Hanover County, the area in which the Facility is located, has been designated as either attainment or unclassifiable for all criteria pollutants. *See also* 40 C.F.R. § 81.310.

55. The Facility currently operates under a Title V Permit (Number: V-0470002), that was issued by FDEP on June 4, 2007, and expires on June 4, 2012.

56. By an information request letter issued pursuant to the authority of Section 114 of the Act, 42 U.S.C. § 7414, dated May 28, 2008, EPA required PCS to submit specific information regarding all its nitric and sulfuric acid plants in the United States including the White Springs Facility.

57. PCS responded to EPA's initial Section 114 information request on behalf of the Respondent on August 11, 2008. On June 15, 2010, EPA sent a second Section 114 information request to the Respondent. Respondent replied to the second information request with two separate submittals on July 2, and July 21, 2010.

PARAGRAPHS 58-73 MOVED TO APPENDIX A
APPENDIX A CONTAINS INFORMATION CLAIMED TO BE CONFIDENTIAL BUSINESS INFORMATION, AND IS BEING TREATED AS SUCH UNTIL A FINAL DETERMINATION IS MADE

FINDING OF VIOLATIONS

74. Upon review of the information provided by Respondent, and as described herein including, in Appendix A, EPA Region 4 has concluded that Respondent conducted capital projects on the four sulfuric acid units at the Facility which resulted in significant net emissions increases in SO_2.

75. The activities described in Appendix A are major modifications that resulted in a significant net emissions increases of SO_2 within the meaning of the CAA and F.A.C.17-212.400(2)(e)2, 62-212.400.2(e)2, 17-2.200(46) and 62-210.200(185). Respondent failed to apply for or obtain a PSD permit prior to commencing construction of such activities in violation of F.A.C. 17-210.300(1), 62-210.300(1), 17-212.400(5)(a)2 and 62-212.400(5)(a)2. Respondent failed to obtain an operating permit including all operating conditions and provisions necessary to ensure compliance with PSD, in violation of F.A.C. 17-210.300, 62-210.300, 17-12.400(6)(b)

and 62-212.400(7)(b). Respondent violated and continues to violate Section 165(a) of the Act, 42 U.S.C. § 7475(a), F.A.C. 17-212.400(5) and (6), 62-212.400(5), (6) and (7), 17-210.300 and 62-210.300, by commencing construction of, and continuing to operate a major modification at its White Springs Facility without applying for and obtaining a PSD permit. Respondent did not install BACT for the control of SO_2, and continues to operate its White Springs Facility without an operating permit containing all applicable requirements including BACT. White Springs violated and continues to violate the provisions cited in this paragraph, by failing to install and operate BACT for SO_2.

76. Since 1996, Respondent has failed to submit a timely, accurate, and complete Title V permit application for its White Springs Facility with information pertaining to the modifications identified in Appendix A and with information concerning all applicable requirements, including, but not limited to, the requirement to apply, install, and operate BACT for SO_2 at the White Springs Facility. Respondent also failed to supplement or correct the Title V permit applications for this Facility in violation of Sections 502, 503, and 504 of the Act, 42 U.S.C. §§ 7661a, 7661b and 7661c; the regulations at 40 C.F.R. Part 70, including, but not limited to, 40 C.F.R. §§ 70.1(b), 70.5, 70.6, and 70.7(b); and the Florida Title V provisions at F.A.C.17-213.400 and 62-213.400; F.A.C. 17-213.420 and 62-213.420; and F.A.C. 17-213.440 and 62-213.440.

ENFORCEMENT PROVISIONS

77. Sections 113(a)(1) and (3) of the Act, 42 U.S.C. § 7413(a)(1) and (3), provide that the Administrator may bring a civil action in accordance with Section 113(b) of the Act, 42 U.S.C. § 7413(b), whenever, on the basis of any information available to the Administrator, the Administrator finds that any person has violated or is in violation of any requirement or prohibition of, inter alia, the PSD requirements of Section 165(a) of the Act, 42 U.S.C. § 7475(a); Title V of the Act, 42 U.S.C. §§ 7661-7661f, or any rule or permit issued thereunder; or the PSD provisions of the Florida SIP. *See also*, 40 C.F.R. § 52.23.

78. Section 113(b) of the Act, 42 U.S.C. § 7413(b), authorizes the Administrator to initiate a judicial enforcement action for a permanent or temporary injunction, and/or for a civil penalty of up to $25,000 per day for each violation occurring on or before January 30, 1997; up to $27,500 per day for each such violation occurring on or after January 31, 1997 and up to and including March 15, 2004; up to $32,500 per day for each such violation occurring on or after March 16, 2004 through January 12, 2009; and up to $37,500 per day for each such violation occurring on or after January 13, 2009, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2461, as amended by

31 U.S.C. § 3701, 40 C.F.R. § 19.4, and 74 Fed. Reg. 626 (Jan. 7, 2009), against any person whenever such person has violated, or is in violation of, *inter alia*, the requirements or prohibitions described in the preceding paragraph.

79. Section 167 of the Act, 42 U.S.C. § 7477, authorizes the Administrator to initiate an action for injunctive relief, as necessary to prevent the construction, modification or operation of a major emitting facility which does not conform to the PSD requirements in Part C of the Act.

OPPORTUNITY FOR CONFERENCE

Respondent is hereby offered an opportunity for a conference with EPA. The conference will enable Respondent to present evidence bearing on the violations, on the nature of the violations, and on any efforts it may have taken or proposes to take to achieve compliance. Respondent has the right to be represented by legal counsel.

A request for a conference must be made within seven (7) days of receipt of this Notice, and should be made in writing and addressed to:

Marlene J. Tucker
Associate Regional Counsel
Office of Regional Counsel, Region 4
U.S. Environmental Protection Agency
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, Georgia 30303

If you have any questions, please feel free to call Ms. Marlene J. Tucker, at (404) 562-9536.

Douglas Neeley for
Beverly H. Banister
Director
Air, Pesticides, and Toxics
Management Division

5/7/12
Date

Water-Quality Assessment of Southern Florida: An Overview of Available Information on Surface- and Ground-Water Quality and Ecology

By Kim H. Haag, Ronald L. Miller, Laura A. Bradner, and David S. McCulloch

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U.S. Geological Survey

Water-Resources Investigations Report 96-4177

Prepared as part of the
National Water-Quality Assessment Program

Tallahassee, Florida
1996

FOREWORD

The mission of the U.S. Geological Survey (USGS) is to assess the quantity and quality of the earth resources of the Nation and to provide information that will assist resource managers and policymakers at Federal, State, and local levels in making sound decisions. Assessment of water-quality conditions and trends is an important part of this overall mission.

One of the greatest challenges faced by water-resources scientists is acquiring reliable information that will guide the use and protection of the Nation's water resources. That challenge is being addressed by Federal, State, interstate, and local water-resource agencies and by many academic institutions. These organizations are collecting water-quality data for a host of purposes that includes: compliance with permits and water-supply standards; development of remediation plans for a specific contamination problem; operational decisions on industrial, wastewater, or water-supply facilities; and research on factors that affect water quality. An additional need for water-quality information is to provide a basis on which regional and national-level policy decisions can be based. Wise decisions must be based on sound information. As a society we need to know whether certain types of water-quality problems are isolated or ubiquitous, whether there are significant differences in conditions among regions, whether the conditions are changing over time, and why these conditions change from place to place and over time. The information can be used to help determine the efficacy of existing water-quality policies and to help analysts determine the need for and likely consequences of new policies.

To address these needs, the Congress appropriated funds in 1986 for the USGS to begin a pilot program in seven project areas to develop and refine the National Water-Quality Assessment (NAWQA) Program. In 1991, the USGS began full implementation of the program. The NAWQA Program builds upon an existing base of water-quality studies of the USGS, as well as those of other Federal, State, and local agencies. The objectives of the NAWQA Program are to:

- Describe current water-quality conditions for a large part of the Nation's freshwater streams, rivers, and aquifers.
- Describe how water quality is changing over time.
- Improve understanding of the primary natural and human factors that affect water-quality conditions.

This information will help support the development and evaluation of management, regulatory, and monitoring decisions by other Federal, State, and local agencies to protect, use, and enhance water resources.

The goals of the NAWQA Program are being achieved through ongoing and proposed investigations of 60 of the Nation's most important river basins and aquifer systems, which are referred to as study units. These study units are distributed throughout the Nation and cover a diversity of hydrogeologic settings. More than two-thirds of the Nation's freshwater use occurs within the 60 study units and more than two-thirds of the people served by public water-supply systems live within their boundaries.

National synthesis of data analysis, based on aggregation of comparable information obtained from the study units, is a major component of the program. This effort focuses on selected water-quality topics using nationally consistent information. Comparative studies will explain differences and similarities in observed water-quality conditions among study areas and will identify changes and trends and their causes. The first topics addressed by the national synthesis are pesticides, nutrients, volatile organic compounds, and aquatic biology. Discussions on these and other water-quality topics will be published in periodic summaries of the quality of the Nation's ground and surface water as the information becomes available.

This report is an element of the comprehensive body of information developed as part of the NAWQA Program. The program depends heavily on the advice, cooperation, and information from many Federal, State, interstate, Tribal, and local agencies and the public. The assistance and suggestions of all are greatly appreciated.

Robert M. Hirsch
Chief Hydrologist

CONTENTS

FIGURES

Tables

CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATIONS

Multiply	By	To obtain
square meter (m^2)	0.0002471	acre
hectare (ha)	2.471	acre
square kilometer (km^2)	247.1	acre
cubic meter (m^3)	35.31	cubic foot
meter (m)	3.281	foot
meter per second (m/s)	3.281	foot per second
liter (L)	0.2642	gallon
centimeter (cm)	0.3937	inch
centimeter per year (cm/yr)	0.3937	inch per year
centimeters per kilometer (cm/km)	0.6239	inch per mile
kilometer (km)	0.6214	mile
kilometer per day (km/d)	0.6214	mile per day
kilogram	2.2046	pound
square kilometer (km^2)	0.3861	square mile
megagram (Mg)	1.016	ton

Degrees Celsius (˚C) may be converted to degrees Fahrenheit (˚F) by use of the following equation: ˚F = (9/5)(˚C) + 32

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Abbreviated water-quality units used in this report: Chemical concentrations and water temperatures are given in metric units. Chemical concentration is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as weight (milligrams) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter. For concentrations less than 7,000 mg/L, the numerical value is the same as the concentration in parts per million.

ADDITIONAL ABBREVIATIONS

BCNP	Big Cypress National Preserve
BNRP	Broward County Department of Natural Resource Protection
DERM	Dade County Environmental Resource Management
EAA	Everglades Agricultural Area
ENP	Everglades National Park
FDEP	Florida Department of Environmental Protection
FGFWFC	Florida Game and Freshwater Fish Commission
LEC	Lower East Coast
NPS	National Park Service
SFWMD	South Florida Water Management District
STA	Stormwater Treatment Area
SWFWMD	Southwest Florida Water Management District
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCA	Water Conservation Area

CHEMICAL ABBREVIATIONS

BHC	hexachlorocyclohexane
DDE	1' (2,2-dichloroethenylidene)bis[4-chlorobenzene]
DDT	1' 92,2,2-trichloroethenylidene)bis[4-chlorobenzene]
EBDC	ethylenebisdithiocarbamates
EDB	ethylene dibromide
MSMA	monosodium methanearsonate
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyl
VOC	volatile orcanic carbon
ppm	parts per million
ppb	parts per billion
pCI/L	picocuries per liter
µg/L	micrograms per liter
mg/L	milligrams per liter
<	less than
>	greater than

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Gordon P. Eaton, Director

For additional information write to:

District Chief
U.S. Geological Survey
Suite 3015
227 N. Bronough Street
Tallahassee, FL 32301

Copies of this report can be purchased from:

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225

Water-Quality Assessment of Southern Florida: An Overview of Available Information on Surface- and Ground-Water Quality and Ecology

By Kim H. Haag, Ronald L. Miller, Laura A. Bradner, *and* David S. McCulloch

Abstract

This report summarizes water-quality conditions, issues of concern, and management efforts underway in southern Florida. The report is designed to provide a conceptual framework for the Southern Florida National Water Quality Assessment (NAWQA) study that began in 1994. The report makes reference to the most important water-quality literature pertaining to southern Florida, to water-quality studies that are underway or planned, and to topics which are of high priority in the study unit. These topics include: the availability and suitability of water for competing demands; nutrient enrichment of the Everglades; transport, degradation, and effects of pesticides; and the sources and cycling of mercury in the ecosystem.

The report also includes a retrospective analysis and conceptual presentation of nutrient loading, which is a high priority for the national NAWQA Program and for regional water-quality managers. Nutrient contributions from point and nonpoint sources are estimated for nine basins in the study area and are discussed in relation to land use. Fertilizer is the dominant source of phosphorus in eight basins and the dominant source of nitrogen in at least five basins. Atmospheric sources of nitrogen contribute more than 20 percent of the total nitrogen input to all basins and are the dominant source of nitrogen input to Lake Okeechobee and the Everglades.

Nutrient loads are also estimated in selected canal and river outflows in southern Florida to provide a spatial overview of the magnitude of nutrient loading to coastal waters. Annual phosphorus loads from the Peace River are the highest in the study unit; annual phosphorus loads from the Caloosahatchee River and the major Palm Beach canals are also high, compared to other parts of southern Florida. Estimated annual loads of phosphorus from parts of the Big Cypress Basin and the S-12 water-control structures of the Tamiami Canal are low compared with estimated phosphorus loads in outflows in the northern part of the study unit. Annual nitrogen loads in southern Florida were highest in outflows from the Caloosahatchee River Basin and the major Palm Beach canals. Nitrogen loads in outflows from parts of the Big Cypress subbasin were lower than those estimated to the north.

INTRODUCTION

The Southern Florida National Water Quality Assessment (NAWQA) study unit encompasses about 50,500 km^2. It is part of a regional ecosystem which includes coastal waters between Charlotte Harbor on the Gulf of Mexico and the St. Lucie River on the Atlantic Ocean and the lands that drain into these waters (fig. 1). The elevation in the study unit ranges from about 90 m above sea level to sea level along the coast. The climate is subtropical and humid with mean temperatures ranging from about 15° C in the winter to about 27° C in summer (Florida Department of Natural Resources, 1974; Duever and others, 1994). Average annual rainfall ranges from 100 to 1,075 cm, and more than half of the rainfall occurs in the wet season from June through September (Thomas, 1974).

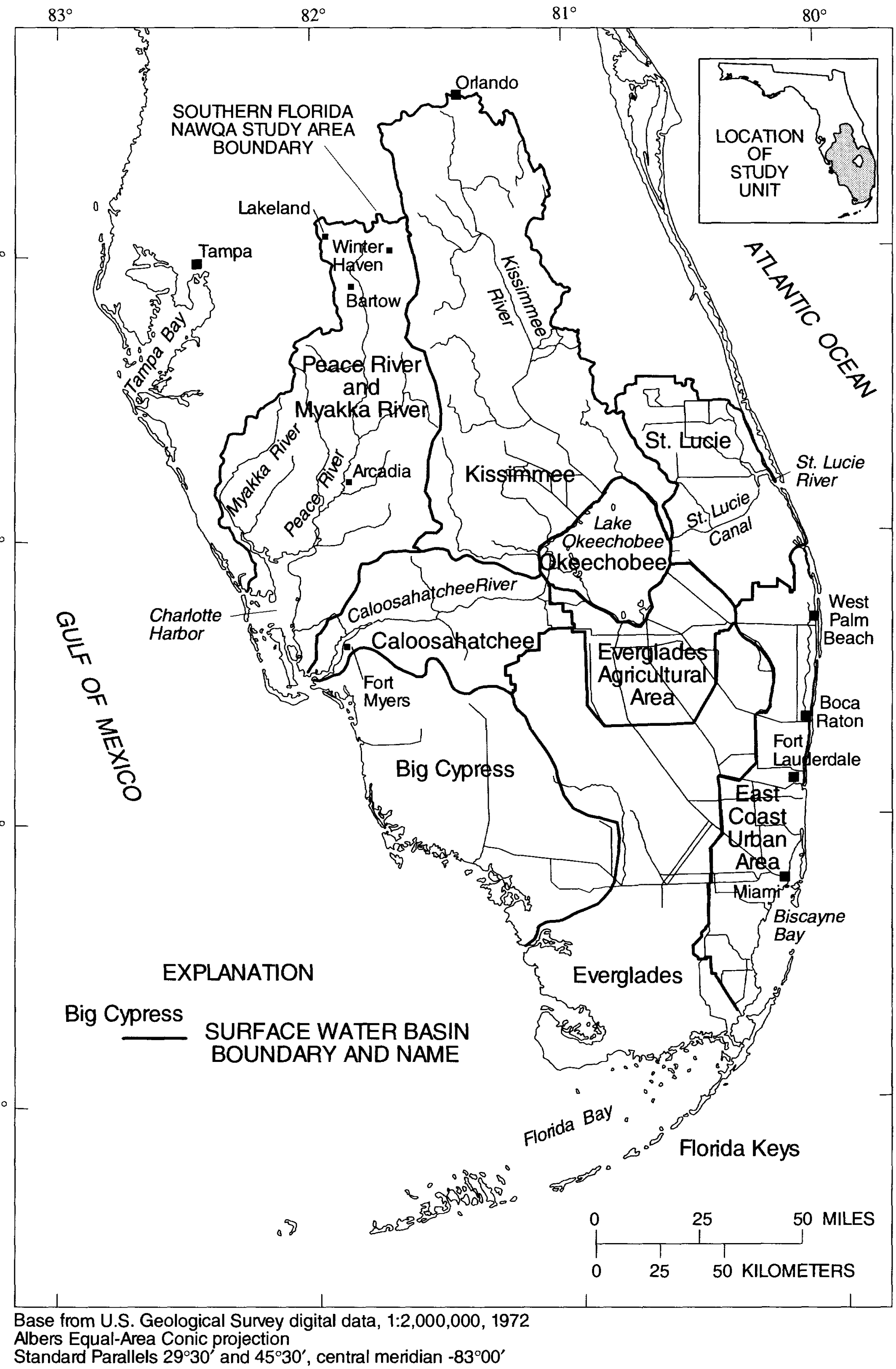


Figure 1. Surface-water basins in southern Florida.

Southern Florida is underlain by shallow-marine carbonate sediments that contain three major aquifers systems—the surficial, intermediate, and Floridan. Wetlands are a predominant feature of the landscape and are maintained as a result of abundant rainfall and the absence of surface relief. Wetlands in the northern part of the study unit are drained by several large rivers that include the Kissimmee, Peace, Myakka, and Caloosahatchee Rivers. In the southern part of the study unit, much of the land is inundated during the wet season, and water moves by sheetflow toward the coast. The Everglades is a vast freshwater marsh originally covering about 10,000 km^2 and extending from the southern edge of Lake Okeechobee south to Florida Bay. The Everglades Basin has an almost imperceptible slope to the south, averaging less than 3 cm/km. The Big Cypress Basin to the west of the Everglades is on slightly higher ground. The land surface is relatively flat with numerous, low limestone outcrops and depressions. Water in the Big Cypress Basin drains to the south and southwest through cypress strands into the coastal mangrove forest. The Florida Keys is a series of low limestone islands extending 225 km southwest of the mainland. The physiography, climate, geology, and hydrology of the south Florida region are described more fully by McPherson and Halley (1996).

The ecosystem in southern Florida has undergone significant alteration over the past century, principally in response to the demands of a growing population. Activities included extensive drainage and development. When the initial alterations began, understanding and appreciation of the value and function of wetlands was very limited. Once the effects of drainage and development became evident and began to affect the environment, efforts turned towards restoration. Initial data-gathering efforts focused on studies of water supply, water use, and flood prevention. During the 1970's, an awareness of the importance of water-quality and habitat protection emerged. Of particular interest are the effects of pesticides, trace elements, and excess nutrients on water quality and aquatic ecology. Among the most active agencies gathering data in southern Florida are the Florida Department of Environmental Protection (FDEP), the Florida Game and Freshwater Fish Commission (FGFWFC), the National Biological Service (NBS), the National Park Service (NPS), the National Atmospheric and Oceanic Administration (NOAA), the South Florida Water Management District (SFWMD), the Southwest Florida Water Management District (SWFWMD), the U.S. Geological Survey (USGS), the U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Environmental Protection Agency (USEPA). Other organizations which actively study water quality in southern Florida include several county governments, Duke University, the Florida Institute of Technology, Florida International University, Louisiana State University, the University of Florida, and the University of Miami. Numerous individuals have also published information relevant to water quality and ecology in southern Florida.

The study of surface- and ground-water quality and aquatic ecology in the southern Florida ecosystem has a long history. The amount of available data is tremendous and a brief summary of all available water-quality and ecological data is beyond the scope of this report. For example, the SFWMD alone operates 26 major water-quality monitoring programs that incorporate 984 sampling stations. Much of the retrospective data available through 1994 was collected by mission-oriented agencies to address strictly defined regulatory issues, answer specific questions in the context of resource utilization, or provide guidance for resource management within a single watershed. Although these data have unquestioned utility, they often cannot be used to answer questions which involve multiple watersheds or address more complex water-quality issues. Among the most important water-quality questions being addressed in southern Florida in the 1990's are:

- What is the availability and suitability of water for competing demands?
- What key components of the hydrologic system are needed to support a diverse, self-sustaining ecosystem?
- How does atmospheric deposition influence surface-water quality?
- Are contaminants from human activities widespread, and do they adversely affect ecosystems?
- What are the processes that transform and transport nutrients?
- What are the origins and pathways for the cycling of mercury in the ecosystem?

There are several important, broadly based, environmental programs now underway in southern Florida that address these and related questions (South Florida Water Management District, 1995). Everglades water-quality litigation was filed by the Federal Government in 1988 and resolved by a negotiated State-Federal settlement agreement in 1991. One goal of the settlement was to establish long-term limits on phosphorus concentrations for the Arthur R. Marshall Loxahatchee National Wildlife Refuge and the Everglades National Park.

In 1993, the South Florida Ecosystem Restoration Task Force was formed to initiate an interagency effort to reestablish and maintain the ecosystem integrity of southern Florida. The Task Force is composed of Federal and State agencies involved in Everglades restoration. In 1994, Florida passed the Everglades Forever Act to initiate restoration of the Everglades and Florida Bay. The area identified for restoration and protection by the act is called the Everglades Protection Area and is comprised of the Everglades National Park (ENP) and the Water Conservation Areas (WCAs): WCA-1 (the Arthur R. Marshall Loxahatchee National Wildlife Refuge), WCA-2, and WCA-3 (fig. 2). The Everglades Protection Area encompasses a total of about 810,000 ha. Two major components of the act are:

- The Everglades Construction Project, which will entail construction of more than 16,200 ha of wetlands called Stormwater Treatment Areas (STAs) designed to remove nutrients (specifically phosphorus) and other contaminants from agricultural stormwater runoff from the Everglades Agricultural Area (EAA); and
- Implementation of on-farm Best Management Practices for reduction of nutrient loads from the EAA, which produces about 45 percent of the phosphorus load to the Everglades.

The Everglades Water Quality Model is being developed and tested by the SFWMD in support of the act and to evaluate the efficacy of the Everglades Nutrient Removal Project (South Florida Water Management District, 1995).

In 1993, the USEPA initiated a program of research, monitoring, and regulatory efforts to determine the sources, extent, transport, transformation, and pathways of mercury in southern Florida ecosystems. This initiative is a part of the USEPA Regional Environmental Monitoring and Assessment Program (U.S. Environmental Protection Agency, 1993). Since 1995, the USGS has provided multidisciplinary hydrologic, cartographic, and geologic data that relate to the mainland of southern Florida, Florida Bay, and the Florida Keys and Reef ecosystems, as a part of the USGS South Florida Ecosystem Program (U.S. Geological Survey, 1995).

A recent consensus has emerged that agencies and individuals must go beyond a mere assessment and understanding of the southern Florida environment and begin to protect the remaining natural system and restore some watersheds to predevelopment water-quality conditions and patterns of hydrologic function. The USGS is committed to providing scientific information that will contribute to the protection and restoration effort in southern Florida (McPherson and Halley, 1996).

Purpose and Scope

This report was written as part of the retrospective analysis of existing data and information for the Southern Florida NAWQA. Surface-water quality, ground-water quality, and aquatic ecology are closely related in southern Florida and are difficult to discuss separately. Nevertheless, they are covered in separate sections of this report to be consistent with other reports of the national NAWQA Program. The report briefly: (1) summarizes relevant published water-quality and ecological information pertaining to southern Florida; (2) describes selected regional conditions, trends, and issues of importance to surface- and ground-water quality and ecology; (3) suggests possible relations of water quality and ecology to natural and human factors; (4) indicates what types of water-quality and ecological data are lacking; and (5) presents a conceptual description of nutrient loading in surface waters of southern Florida. The report will be used to help develop a study plan for the Southern Florida NAWQA and to provide information to the NAWQA National Synthesis Team for incorporation into the nationwide synthesis of water-quality information.

SURFACE-WATER QUALITY IN SOUTHERN FLORIDA

Many factors influence surface-water quality in the watersheds of southern Florida. A short description of historical conditions and a summary of the major alterations which have occurred as a result of human activities in south Florida are presented. A brief overview of available surface-water-quality data and a brief discussion of important water-quality issues is presented in this report to provide a framework for the study design of the NAWQA Program in the Southern Florida study unit.

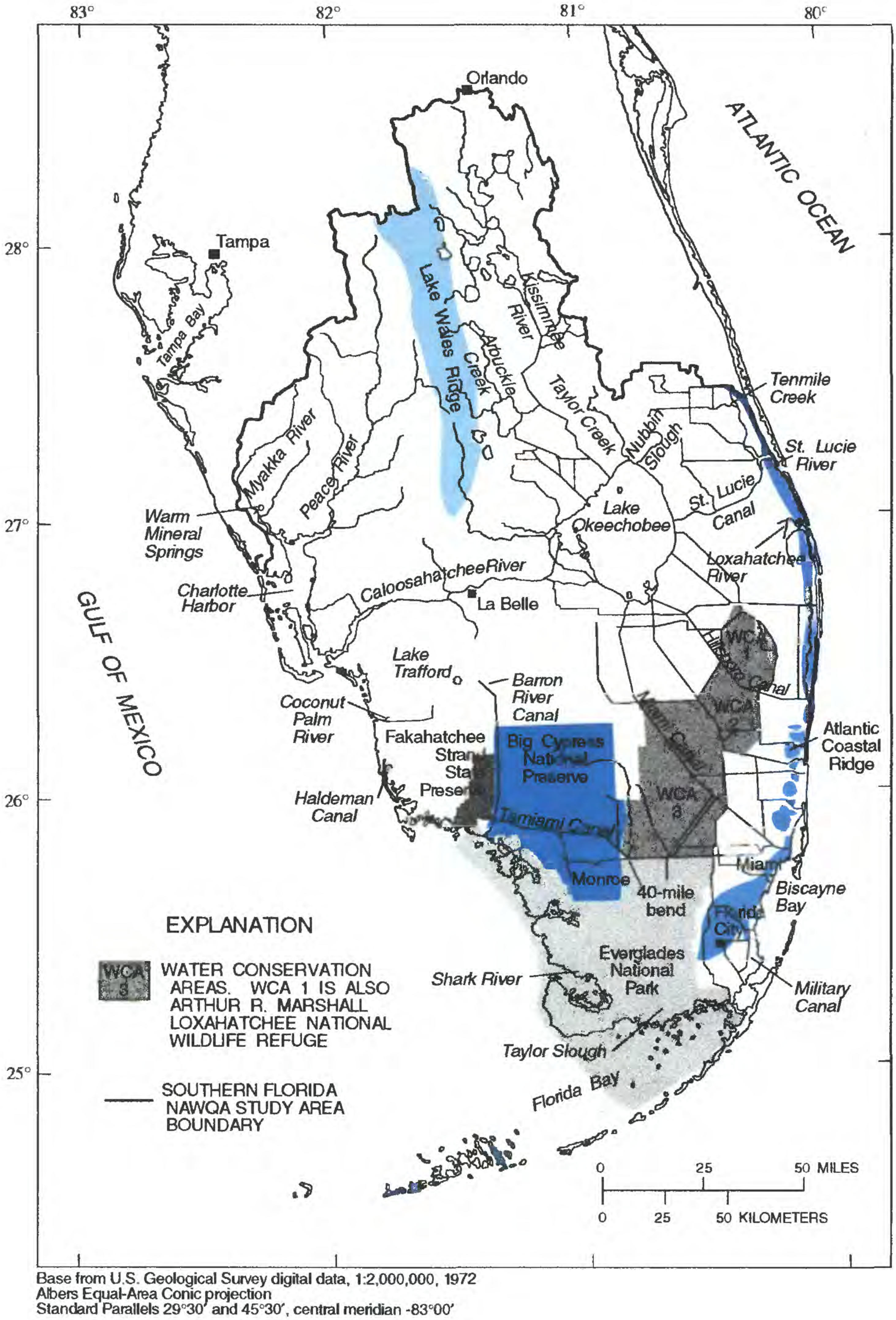


Figure 2. Major canals, control structures, and other hydrologic features in southern Florida.

Overview of Surface-Water Quality and Hydrology

Historically, southern Florida was characterized by large areas of wetlands that were drained by numerous, small coastal streams and several large rivers. The Peace, Myakka, and Caloosahatchee Rivers drained the northwestern parts of the study area and emptied into Charlotte Harbor and the Gulf of Mexico. The Kissimmee River meandered through the central part of the study area and drained into Lake Okeechobee. Most of the land south of Lake Okeechobee was wetlands, including the Everglades and Big Cypress Swamp, where surface water moved slowly by sheetflow to the south and southwest into Florida Bay and the Gulf of Mexico (Davis, 1943). During high-water periods, surface and ground water also spilled and seeped into coastal waters of the Atlantic Ocean, including Biscayne Bay (Parker, 1974). Seasonal flows of freshwater created salinity conditions which supported highly productive estuarine and marine fisheries (Lindall, 1973). Much surface water was lost through evapotranspiration and returned to the system between June and October as rainfall. Water levels in the Everglades fluctuated seasonally over several meters during years with normal rainfall.

Historically, the Everglades was a low-nutrient system where ecosystem productivity was primarily limited by phosphorus. The algae and vascular plants that comprise the marsh ecosystem developed under conditions of low nutrient inputs that are characteristic of pristine rainfall (Davis, 1994). Nutrient inputs from rainfall were so rapidly taken up by the extensive marsh vegetation that nutrient concentrations in surface waters were very low. Nutrient loading to coastal waters was dispersed over broad areas by sheetflow.

Southern Florida has been greatly altered by construction of drainage canals, agriculture, and urban development. Construction of drainage canals began in the 1800's and continued into the 1960's. The St. Lucie and the Caloosahatchee Rivers were connected to Lake Okeechobee; both rivers were enlarged and channelized to carry water to the coast. The Kissimmee River was straightened and channelized to eliminate seasonal flooding on the river's flood plain. Several large canals, including the West Palm Beach, Hillsboro, North New River, and Miami Canals were dug to carry water from Lake Okeechobee to the Atlantic Ocean. A levee was built around the south rim of Lake Okeechobee to prevent spillage of water to the northern Everglades.

Drainage lowered the water table by as much as 2.0 m and resulted in severe fires, land subsidence, and saltwater intrusion. Subsequently, regional water management efforts were modified and redesigned to lessen these severe effects, to provide flood protection for continued urban and agricultural development, and to ensure an adequate water supply for urban growth. A complex system of canals, levees, pumps, and water-control structures was eventually completed.

In the northern Everglades about 324,000 ha was converted to agriculture and designated as the Everglades Agricultural Area (EAA) (fig. 1). Principal crops are sugarcane and winter vegetables. More than 360,000 ha of additional land in the northern Everglades was converted to shallow impoundments (the WCAs) to provide flood protection during the wet season and water supply during the dry season (Cooper and Roy, 1991).

Parts of the southern Everglades and the Big Cypress still retain some of the predevelopment surface-water characteristics. These areas include the ENP and the Big Cypress National Preserve (BCNP). In general, water management has lowered water levels and reduced the frequency and duration of inundation in the Everglades.

Surface-water basins are often ill-defined in parts of southern Florida because of low relief, a lack of distinct drainage divides, and the interconnection of canals. However, for the purposes of this report the Southern Florida study unit is divided into 10 major surface-water basins that differ in their surface-water and land-use characteristics (fig. 1). They are: the Myakka River and Peace River Basin; the Caloosahatchee River Basin; the Big Cypress Basin; the St. Lucie River Basin; the Kissimmee River Basin; Lake Okeechobee; the Everglades; the Everglades Agricultural Area; the East Coast Urban Area; and the Florida Keys. The Florida Keys do not have significant freshwater features and, therefore, are not discussed further in this section of the report.

The Myakka River and Peace River Basins in the northwestern part of the study unit are drained by small rivers that have not been channelized. Water quality in the Myakka River is generally good, and parts of the river have been designated as an Outstanding Florida Water (Livingston, 1991). Natural ground-water inputs are negligible in the Myakka River Basin, and river flow in the dry season is often comprised solely of highly mineralized ground water originating as runoff from irrigated farmland (Livingston, 1991). Rainwater runoff is typically acidic and low in total mineral content in this part of Florida. Rangeland and agricultural land use are significant sources of nutrients. There is little urban influence within the watershed. Phosphate mining occurs in the headwaters and both sulfate and phosphorus concentrations are reported to have increased from 1963-85 in surface waters (Hammett, 1990). Water quality in the Peace River is extensively influenced by land use and other human activities. The Peace River has its headwaters in areas with rich phosphate deposits, and the discharge of wastewater by the phosphate mining and fertilizer industries is the most significant influence on water quality in the basin (Lewelling and Wylie, 1993). The annual discharge of the Peace River at Arcadia has shown a significant long-term decline during 1931-85, which is not attributable solely to deficient rainfall (Hammett, 1990) but may be associated with increased pumpage of ground water. The surface-water data indicate that there were long-term increasing trends during 1957-85 for total organic nitrogen, chloride, sulfate, and dissolved-solids concentrations, and decreasing trends for total phosphorus and orthophosphorus concentrations (Hammett, 1990).

The Caloosahatchee River has been highly modified by channelization and the construction of locks and water-control structures (Livingston and Fernald, 1991), which now control the flow and stage of the river. Water quality in the Caloosahatchee River and its tributaries is influenced primarily by low relief, discharge from Lake Okeechobee, and land use (Drew and Schomer, 1984). During 1978-80, inflow from Lake Okeechobee contributed 55 percent of the total flow in the Caloosahatchee River, 62 percent of the total nitrogen, and 64 percent of the chloride (Miller and others, 1982). The principal types of land use in the eastern part of the basin are cattle, citrus, and vegetable production. Land uses in the western part of the basin are agriculture and urban. Increases in agricultural and urban land uses in the Caloosahatchee River Basin are causing significant changes in water quality.

The Big Cypress Basin consists of numerous sloughs and cypress-dominated strands where water flows southwest and discharges to the Gulf of Mexico. Agriculture is prevalent in the northern part of the basin; Native American lands also are present in the northern part of the basin. In the southern part of the basin, most of the land is undeveloped and publicly owned. Water-quality studies in the 1970's indicated that surface water was uncontaminated in remote undrained parts of the Big Cypress Basin, but the studies indicated that in other parts of the basin human activities had degraded surface-water quality (McPherson, 1974; Duever, 1984). Nitrogen concentrations were low (0.03–0.10 mg/L) in this basin compared to concentrations in the urban canals of southern Florida (Klein and others, 1970). There is generally a lack of recent water-quality data in the Big Cypress Basin, although the BCNP began a water-sampling program in the 1980's. Collier County Environmental Services Division (1994) identified some trace elements (chromium, silver, lead, and zinc) in bed-sediment samples at concentrations which are indicative of human influences.

Principal surface-water features in the St. Lucie Basin include wetlands, the St. Lucie Canal, the St. Lucie River, and several smaller streams and canals. Agriculture and wetlands are the two principal types of land cover in the basin; agricultural activities are mainly improved pasture and citrus production. Water quality in the St. Lucie Canal was reported to be similar to water quality in Lake Okeechobee (Parker and others, 1955), which the canal periodically drains. Stormwater inflow influences dissolved-oxygen, suspended-sediment, and nutrient concentrations in canals throughout the basin (Graves and Strom, 1992). Large, sporadic freshwater discharges from canals have had a detrimental effect on biota in the St. Lucie Estuary (Haunert and Startzman, 1985; Haunert, 1988; Steward and others, 1993).

Surface-water chemistry varies spatially and temporally in the Kissimmee River, Lake Okeechobee, and Everglades Basins. The pH is neutral to slightly basic, and dominant ions are calcium and bicarbonate. Much of the surface water is highly buffered due to contact with periphytic marl, limestone, calcareous sand, or fossilized deposits. WCA-1 and some deep peat ponds are more acidic than surface waters in contact with limestone deposits. Dissolved-solids concentrations and conductivity are often high, and dissolved-oxygen concentrations are typically low. Nutrient retention is high in the marshes of the Everglades, as a result of tight cycling between the plant community and the sediments (Steward and Ornes, 1975). Phosphorus concentrations are low and this element is considered to be the limiting nutrient for plant growth. Total phosphorus concentrations ranged from 0.03 to 0.25 mg/L during 1973-78 in streams of the Kissimmee River Basin (Federico, 1982) and were generally less than concentrations measured in rainfall. Canal waters in agricultural areas of the EAA contain high nutrient concentrations. For example, average concentrations of total phosphorus at 144 sites in the EAA during 1990-92 ranged from 0.10 to 1.32 mg/L. Water quality in some northern parts of the WCA's are affected by canal waters that drain the EAA and other farm lands. Total nitrogen and phosphorus concentrations in parts of WCA-2 and WCA-3 that receive canal inflows from the EAA are among the highest in southern Florida (Germain, 1994). Interior marshlands of WCA-1 are unaffected by high nutrient concentrations, although peripheral wetlands are affected by canal inflows. Nutrient concentrations in the southern Everglades, including the ENP, are naturally low (Waller, 1975; Waller and Earle, 1975). At nine sites in the interior of the ENP, mean total phosphorus concentrations ranged from 0.01 to 0.06 mg/L during 1986-93 and mean total nitrogen concentrations ranged from less than 0.01 to 2.5 mg/L (Germain, 1994).

The East Coast Urban area includes slightly higher land along the Atlantic Coastal Ridge from Loxahatchee River to the Florida Keys. The East Coast Urban area is home to almost 5 million people and includes high-density residential, commercial and industrial land uses. Water-quality characteristics and nutrient loadings in the basin have been studied in the past (Lutz, 1977a; Dickson, 1980), and the Biscayne Bay SWIM Plan (South Florida Water Management District, 1994a) summarizes results of studies carried out in the southern part of the basin since 1984. Contamination of Biscayne Bay comes principally from the Miami Canal and other canals. Water quality in these urban canals is adversely affected by agricultural and urban runoff, and sewage effluent (Florida Department of Environmental Regulation, 1988). Dissolved-oxygen concentrations are frequently less than 4.0 mg/L in the canals and streams in the basin. Nonpoint source pollution from lawn and landscape fertilizer and pesticides, automobile emissions, seepage from landfills, septic tanks, and disposal wells, and construction runoff is significant in the basin.

Issues of Regional Importance to Surface-Water Quality

Surface water in southern Florida comprises a complex, intensively regulated system of wetlands, lakes, canals, and rivers. Watersheds are not well-defined, and discharge in some streams and canals may cease or be reversed at certain times of the year when back-pumping is used to manage local water levels and regional water supply. The quality of surface water has been and continues to be profoundly influenced by altered patterns of water flow, atmospheric deposition, runoff from agriculture and livestock operations, phosphate mining, urban runoff, municipal wastewater discharge, and other human activities.

Altered Patterns of Water Flow

Widespread canal construction and drainage manipulation throughout southern Florida have inexorably changed the spatial and temporal patterns of water flow. These hydrologic alterations can have complex, and sometimes subtle but pervasive, effects on water quality.

The Kissimmee River was channelized for flood control between 1962 and 1971, resulting in increased depth, altered patterns of flow, and increased sedimentation. The elimination of flood plains resulted in a lower basin retention time for many constituents and a subsequently higher nutrient input to Lake Okeechobee (Loftin and others, 1990a, b). Restoration of the Kissimmee River to ameliorate the environmental effects of channelization is underway as a joint project of the USACE, the SFWMD, the FGFWFC, and the USFWS (Carroll and Banner, 1991; U.S. Army Corps of Engineers, 1991; South Florida Water Management District, 1991, 1993). A demonstration project involving 19.5 km of river was initiated in the mid-1980's and the resulting data will be used to guide full-scale restoration efforts. Thus far, the capacity of the wetlands to filter sediment and nutrients has been reestablished in the newly created flood plain adjacent to the demonstration project, and data indicate that dissolved-oxygen concentrations in the river may be increasing (Toth, 1993).

The Caloosahatchee and St. Lucie Canals divert water out of Lake Okeechobee to maintain lake level schedules and prevent floods. This diversion limits the amount and timing of water delivered to the southern Everglades. Levees around the southern edge of the lake further guard against overflow from the lake to the south. Another series of levees and canals in Palm Beach and Dade Counties prevent sheetflow from the Everglades from flowing to the east coast urban area. In the Everglades, water-quality changes can be directly related to the movement of water by canals through the WCA's (Kushlan, 1991; Walker, 1991). The SFWMD regulates the amount of water discharged through structures throughout the area. In years of high annual rainfall, this delivery pattern is problematic for the ENP, and naturally high water levels in the Park are even higher (South Florida Water Management District, 1995). Moreover, drawdown and reflooding of marshlands in the WCA's may increase the release of inorganic phosphorus (Gleason, 1974; Swift and Nicholas, 1987; Worth, 1988).

The construction of canals in southern Florida has resulted in a much greater transport of nutrients, suspended sediment, trace elements, and other contaminants in water than occurred when most water moved overland to the coasts by sheetflow (Carter and others, 1973). Canals in the northern Everglades were constructed to drain water and to create agricultural land (the EAA). Intensive agriculture in this area contributes significant amounts of nutrients to surface waters in southern Florida. Soil subsidence (due to physical, chemical, and microbiological processes) is a direct result of drainage and exposure of Everglades soil to air, and is a severe threat to agriculture in the EAA (Science Sub-Group, 1994).

Demand for water in the East Coast Urban area is out of phase with the natural seasonal hydrologic cycle, necessitating the artificial movement of water. Balancing water needs for the ENP with needs for the urban population (about 5 million) of the East Coast Urban area (Miami, West Palm Beach, Boca Raton, Ft. Lauderdale) is critical to the region. Although rainfall provides most of the recharge to ground water, which in turn provides most of the drinking-water supply, water carried into the area by canals supplements this recharge during the dry season. The South Dade Conveyance System provides a mandated supply of water to the ENP and also supplies water to other southern Dade County canals to prevent saltwater intrusion (Cooper and Lane, 1987). The Lower East Coast Regional Water Supply Plan, when fully implemented, will aid in achieving the critical balance (South Florida Water Management District, 1995).

When ecosystem restoration is implemented in southern Florida, patterns of water flow in many areas will again be changed—this time back toward historical patterns (South Florida Water Management District, 1995). More water will be moved through historical flow paths, such as Shark River and Taylor Sloughs. Water quality, however, could be poor (contain high concentrations of nutrients, pesticides, and sediment) if water is diverted directly from agricultural or urban lands where fertilizers and pesticides are intensively applied. Redirection of water to the Everglades Protection Area will be beneficial to the ecosystem only if the water quality is good and concentrations of nutrients, pesticides, and other contaminants are low. Projects are underway to evaluate appropriate water-quality standards for waters entering the Everglades and to implement treatment of stormwater runoff from the EAA in Stormwater Treatment Areas so that surface-water inflows will cause no imbalance in Everglades flora and fauna (South Florida Water Management District, 1995).

Relation of Atmospheric Deposition to Surface-Water Quality

The atmosphere is recognized as a principal pathway by which nutrients, pesticides, and other organic and inorganic compounds are transported and deposited in areas frequently far removed from their sources (Majewski and Capel, 1995). The chemical composition of rainfall is influenced by natural factors such as fires, oceanic sources of sea salts, and the frequency of thundershowers which produce oxides of nitrogen; and by human activities such as agriculture, application of lawn-care chemicals, burning of fossil fuels in powerplants and vehicles, and waste processing.

Atmospheric deposition is a significant source of many contaminants detected in surface water in southern Florida, including nutrients, pesticides, PCB's, and mercury. Bulk precipitation (dry-fall and rainfall) is a major source of nutrients in southern Florida surface waters (Waller, 1975). However, accurate measurements of atmospheric concentrations of nutrients are subject to a number of complicating factors. Consequently, estimates of atmospheric deposition of nutrients may vary significantly with location, date, and method of collection (Irwin and Kirkland, 1980; Allen and Sutton, 1990; Baker, 1991; South Florida Water Management District, 1992b; Peters and Reese, 1994). The SFWMD (1992b) has a network of 273 rainfall-quantity stations, 4 long-term (10-14 years) rainfall-quality stations, and several other short-term rainfall-quality stations. During 1974-86, most samples collected were bulk precipitation; after May 1986, separate samples of wet and dry atmospheric precipitation were collected (South Florida Water Management District, 1992b). The mean concentration of phosphorus during 1979-89 ranged from 0.03 to 0.11 mg/L; concentrations were highest at sites that were affected by airborne particles from soil, agricultural activities, and fires (South Florida Water Management District,

Table 1. Average nutrient concentrations in precipitation at selected sites in Florida, 1990-92

[South Florida Water Management District sites sampled during 1990-92. (See Germain, 1994); mg/L, milligrams per liter]

Site	Total nitrogen		Total phosphorus	
	Average (mg/L)	Range, (mg/L)	Average (mg/L)	Range, (mg/L)
Kissimmee River at S65A	1.01	<0.50 - 5.43	0.065	<0.004 - 0.792
Lake Okeechobee Field Station	1.11	0.52 - 11.70	0.026	<0.004 - 0.452
Lake Okeechobee, southeast shore	0.98	0.56 - 4.59	0.058	<0.004 - 0.424
Pump Station S-7	1.07	0.54 - 2.60	0.042	<0.004 - 0.379
Everglades Nutrient Removal Project	0.77	0.54 - 2.04	0.012	<0.004 - 0.112
Water Conservation- Area 3A near Pump Station S-140	1.45	<0.50 - 7.18	0.098	<0.004 - 1.135
Everglades National Park Research Center	1.21	0.51 - 21.40	0.014	<0.004 - 0.203

1992b). During 1990-92, concentrations of nitrogen and phosphorus were determined in wet and dry atmospheric precipitation collected at seven sites in southern Florida (table 1) following NADP protocols (Stansland and others, 1983; Peden, 1986; Bigelow and Dossett, 1989), except that samples were collected every 2 weeks. After March 1992, samples were collected weekly to satisfy NADP protocols. Average phosphorus concentrations ranged from 0.012 to 0.098 mg/L, and average nitrogen concentrations ranged from 0.77 to 1.45 mg/L.

Estimates of atmospheric deposition rates (loading) of nitrogen and phosphorus are available for the southern Florida study area and other parts of Florida (table 2). Total phosphorus loading from precipitation in WCA-1, WCA-2, and WCA-3 was estimated to be 54, 56, and 56 (kg /km^2)/yr, respectively (South Florida Water Management District, 1992a). The SFWMD (1992a) estimated that rainfall contributed 40 percent of the total phosphorus input to the WCAs during 1979-88. Efforts continue to refine estimates of the relative contribution to nutrient loading from atmospheric deposition, as well as from the other nonpoint sources.

Several national studies of atmospheric sources of pesticides include data from sites in southern Florida. At least 10 organochlorine insecticides and at least 5 organophosphorus insecticides have been detected in air, rain, or fog at sample sites in Florida (Majewski and Capel, 1995). Dieldrin, alpha and gamma HCH, diazinon, and malathion are all used on cropland in southern Florida and were all detected in air samples collected at sites in southern Florida (Majewski and Capel, 1995). Aldrin was detected in air samples collected in Florida City (Tabor, 1965). Several pesticides, including chlordane, oxychlordane, parathion, and methylparathion, were detected in air samples collected in Miami in 1975 (Kutz and others, 1976). The relatively wide distribution of PCBs in Florida is most likely a result of volatilization and transport by aerosols and fallout with dust or rain (Pfeuffer, 1991).

Vast amounts of mercury continually enter the atmosphere from natural sources, vaporized from the Earth's crust and mobilized from marine sediments. Burning coal and other industrial activities add to the global atmospheric mercury burden. Most mercury entering the aquatic habitat from the atmosphere is primarily in the inorganic form, which is only moderately toxic and has a short retention time. Under acidic conditions, anaerobic bacteria in many aquatic systems can convert inorganic mercury to highly toxic methyl mercury. Mercury in southern Florida is principally of interest because of its effects on the biota; consequently, mercury is discussed in greater detail in the section of this report on issues of regional importance to aquatic ecology.

Nutrient Enrichment

Human activities are the principal source of nutrient inputs to surface water in southern Florida. Application of fertilizers and other agricultural activities in many parts of the study unit have significantly increased nutrient input to surface waters above historical levels. For example, high nutrient concentrations in the Kissimmee River primarily are attributable to

Table 2. Estimated annual atmospheric loading of nitrogen and phosphorus at selected sites in Florida
[SFWMD, South Florida Water Management District; SWIM, Surface Water Improvement and Management; --, not available]

Description of data	Source of data	Atmospheric loading, in kilograms per square kilometer per year			
		Total phosphorus	Total nitrogen	Nitrogen, ammonia plus nitrate	Nitrogen, nitrate
Bulk precipitation; statewide[1]; collected during 1970's	Irwin and Kirkland (1980)	130	1,400	--	--
Bulk precipitation; south Florida	SFWMD SWIM Program (1992b)	65	--	--	--
Bulk precipitation; three Water Conservation Areas[2]	SFWMD SWIM Program (1992b)	55	--	--	--
Bulk precipitation; uncontaminated areas of south Florida	SFWMD SWIM Program (1992b)	39	--	--	--
Wet + dry precipitation; Cary Forest northeast of Gainesville; 1988-89	Allen and Sutton (1990)	15	660	--	--
Wetfall only; five Florida sites; 1993; volume-weighted	National Atmospheric Deposition Program (1994)	--	--	330	--
Wetfall only; four Tampa sites; 8-10 events during 1975-80	Lopez and Giovanelli (1984)	250	1,300	--	--
Wetfall only; not volume-weighted;average of seven sites in south Florida	Germain (1994)	59	1,400	--	330
Wetfall only; quantity estimated from rain gage at Okeechobee Field Station; 04/92-04/93	Computed from SFWMD data	20	1,800	--	--
Wetfall only; quantity estimated from rain gage at Structure S-65A; 04/92-04/94	Computed from SFWMD data	42	1,400	--	--
Wetfall only; quantity estimated from rain gage at Structure S-7; 05/92-05/94	Computed from SFWMD data	18	1,300	--	--

[1]Based on 130 centimeters average annual precipitation.
[2]Based on 118 centimeters average annual precipitation.

runoff from improved pasture and dairy operations. Nutrient concentrations in the Taylor Creek, Nubbin Slough, Lower Kissimmee River, and Arbuckle Creek subbasins (fig. 2) are influenced by feedlot and cattle operations (Germain, 1994). Nutrient concentrations in the St. Lucie River Basin during 1976-77 were highest during periods of highest discharge and were influenced by agricultural runoff (Federico, 1983). The range of average nitrogen concentrations was 1.38 to 1.58 mg/L and the range of average phosphorus concentrations was 0.11 to 0.26 mg/L in surface waters during 1976-77 (Federico, 1983).

Urban land use is the most important influence on surface-water quality in parts of the study unit. Urban stormwater runoff from Fort Myers and La Belle contributes significant amounts of nutrients to the Caloosahatchee River (Environmental Science and Engineering, 1977). Effluent from wastewater treatment plants in Lakeland, Winter Haven, and Bartow contributes nitrogen to the streams of the Peace River Basin (Fraser, 1991; Irwin and Swihart, 1993). Total nitrogen concentrations in the Peace River, which often exceed 1.0 mg/L (German and Schiffer, 1988), are also influenced by agricultural runoff and the discharge of citrus processing operations. In at least one part of the study unit, natural sources of nutrients are important. The Peace River is naturally enriched with phosphorus, because the river flows through phosphate deposits. However, mining activities in the basin accelerate the rate at which phosphorus enters surface waters. The Peace River has the second highest phosphate concentration of all of Florida's rivers. During 1974-82, total phosphorus concentrations commonly exceeded 0.1 mg/L (German and Schiffer, 1988).

Lake Okeechobee is naturally eutrophic, but due to human influence, the lake has become hypereutrophic. The lake acts as a sink for nutrients, which are retained in the organic bottom sediment. The concentration of total phosphorus almost doubled, from 49 µg/L in 1973 to 98 µg/L in 1984 (Aumen, 1995). More than 50 percent of the phosphorus and 30 percent of the nitrogen inputs to the lake are from the Kissimmee River and from Taylor Creek/Nubbin Slough (Federico and others, 1981; Jones, 1987; Janus and others, 1990). Also, nutrient-laden waters discharged from the EAA were formerly channeled to Lake Okeechobee (Dickson and others, 1978). In recent years, however, efforts have been made to keep these nutrient-laden waters out of Lake Okeechobee. As a result, back pumping of water from the EAA to the lake has decreased, but more of this nutrient-enriched water has entered the WCAs (Lutz, 1977b). Total nitrogen concentrations at sites in the northern Everglades influenced by the EAA are now among the highest in southern Florida. Mean total nitrogen concentrations ranged from 1.10 to 5.60 mg/L in the WCAs during the period of record, and mean total phosphorus concentrations ranged from 0.01 to 0.91 µg/L (Germain, 1994). Estimates of phosphorus concentrations flowing into and out of the WCAs indicates that the WCAs are efficient at assimilating the phosphorus loads (South Florida Water Management District, 1992a). Phosphorus concentrations in water in WCA marshlands generally follow a gradient of high to low from the input point to interior marsh locations (Whalen and others, 1992; Reddy and others, 1993; Urban and others, 1993; Davis, 1994). This pattern is most conspicuous in WCA-2, where water from canals flows into the interior marshes. In WCA-1, land surface elevation is greater in the marsh interior than along the perimeter; therefore, water tends to flow along the periphery of the marsh instead of through it.

A significant component of ongoing southern Florida ecosystem restoration efforts is the reduction of phosphorus loading to WCA-1 and the ENP (South Florida Water Management District, 1995). The SFWMD and the FDEP are conducting research to define acceptable nutrient concentrations for the protection and restoration of the Everglades, with the emphasis on phosphorus concentrations. This research began in WCA-2 in 1994 and has several components. Data are being collected along a nutrient gradient in the marsh where sawgrass has been replaced by cattails. Data are also being collected from a series of "dosing chambers" placed in the marsh which are treated with known amounts of phosphorus and then monitored for changes in vegetation. In addition, State and Federal agencies are jointly sponsoring dosing threshold research being conducted by Florida International University.

Development of a nutrient budget for southern Florida is a goal of the SFWMD, as well as other agencies involved in ecosystem restoration in the region. Estimates of nutrient inputs and outflows is an initial step in this complex process (Puckett, 1994). In this report, the relative contributions of various point and nonpoint sources of phosphorus (fig. 3) and nitrogen (fig. 4) were estimated in nine surface-water basins in the Southern Florida study unit (see Appendix for data sources and computation methods). Fertilizer and manure from agriculture account for much of the nutrient inputs. Fertilizer is the dominant source of phosphorus in eight basins and of nitrogen in at least five basins. Canal inflow is the largest source of phosphorus input to Lake Okeechobee and the second largest source of nitrogen input to the lake, after atmospheric deposition. Atmospheric sources of nitrogen contribute more than about 20 percent of the total nitrogen input to all basins and are the dominant source of input to Lake Okeechobee and the Everglades.

The total nutrient input from all sources was estimated for the nine southern Florida surface-water basins (table 3). Total phosphorus inputs ranged from 100 (kg/ km^2)/yr in Lake Okeechobee to 4,800 (kg/ km^2)/yr in the EAA. Total nitrogen inputs ranged from 2,900 (kg/ km^2)/yr in the Everglades to 9,200 (kg/ km^2)/ yr in the EAA.

Estimates of nutrient loads in selected canal and river outflows in southern Florida were calculated for this report from data collected by the SFWMD and the USGS (figs. 5-6). Annual phosphorus loads from the Peace River (fig. 5) are the highest in the study unit; annual phosphorus loads from the Caloosahatchee River and the major Palm Beach canals are also high, compared to loads in other parts of southern Florida. Estimated annual loads of phosphorus from the S-12 water-control structures and parts of the Big Cypress Basin (Tamiami Trail; 40-Mile Bend to Monroe) are low compared with estimated loads in the northern part of the study unit (fig. 5). Annual nitrogen loads (fig. 6) were highest in outflows from the Caloosahatchee River Basin and the major Palm Beach canals. Nitrogen loads in outflows from parts of the Big Cypress subbasin (Tamiami Trail; 40-Mile Bend to Monroe) were lower than estimated loads to the north.

Pesticides and Other Organic Compounds in Water and Sediment

Pesticides are widely used in southern Florida for agriculture; for maintenance of highway right-of-ways, domestic lawns, and golf courses; and for control of aquatic weeds and mosquitoes. Application to agricultural crops constitutes the major use of pesticides in southern Florida, where citrus, sugar cane, and vegetables are the principal crops. Petroleum distillates and ethion are the principal insecticides (on a weight basis) used on citrus crops. Methomyl is the main insecticide used on vegetables (corn, peppers, and tomatoes), and ethoprop and phorate are the main insecticides used on sugarcane. Chlorpyrifos is another widely applied insecticide, with approximately equal amounts used on vegetables, citrus, domestic lawns, and golf courses.

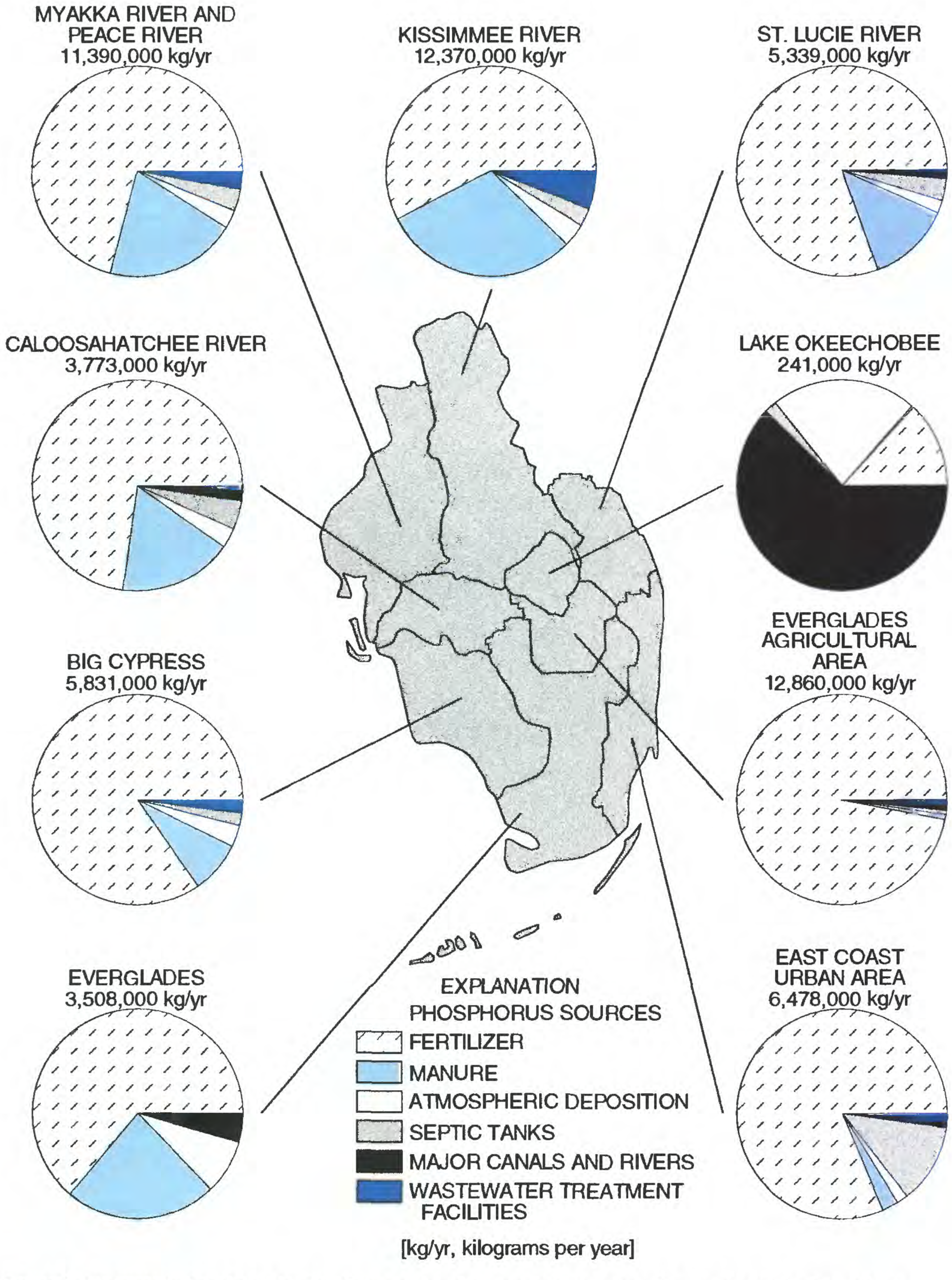


Figure 3. Estimated phosphorus loading from point and nonpoint sources in surface-water basins in southern Florida (see appendix for information on data sources and computational methods).

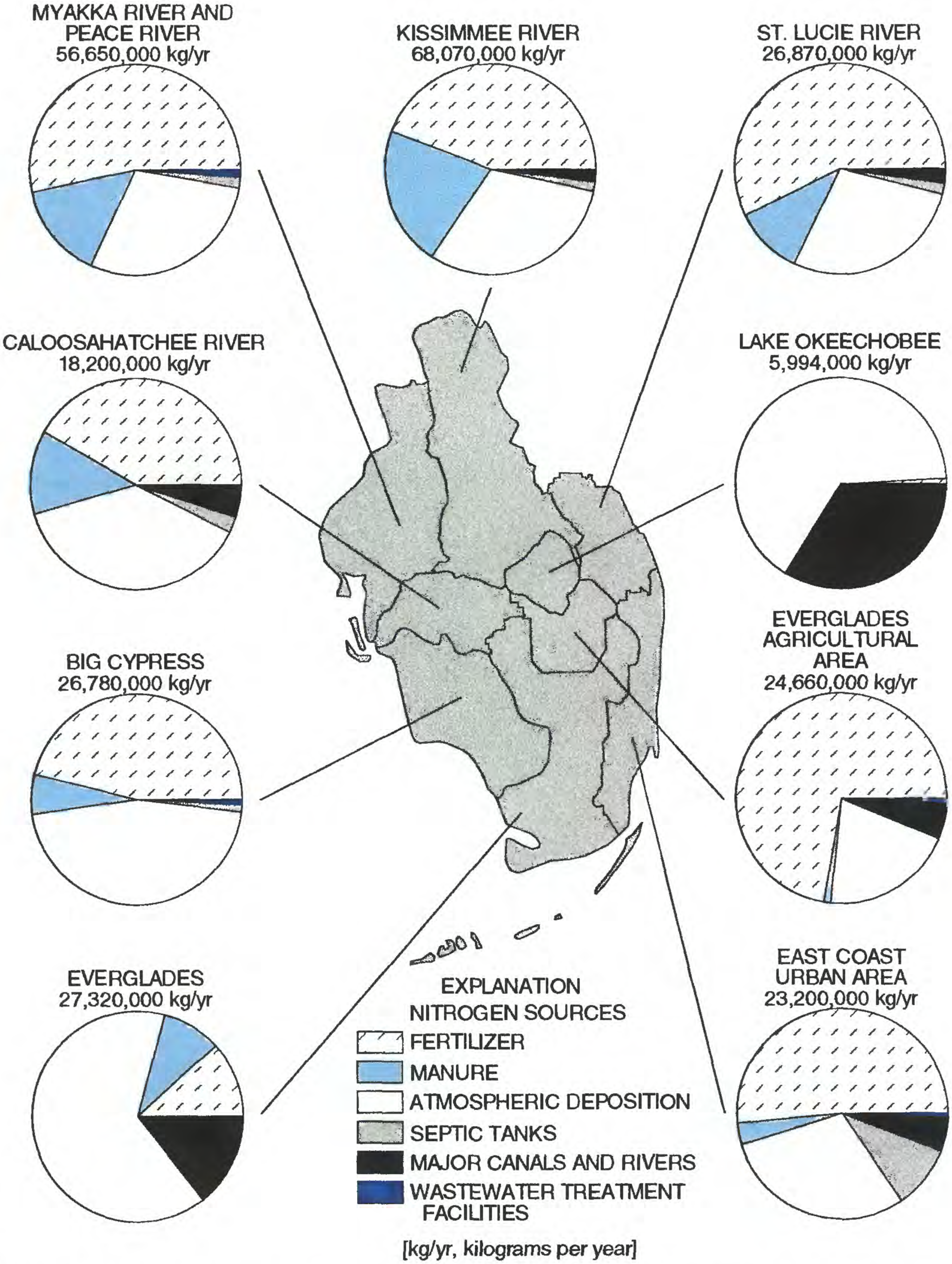


Figure 4. Estimated nitrogen loading from point and nonpoint sources in surface-water basins in southern Florida (see appendix for information on data sources and computational methods).

Table 3. Estimates of nitrogen and phosphorus inputs to drainage basins in the Southern Florida NAWQA study unit

Basin	Total nitrogen input (kilograms per year)	Total phosphorus input (kilograms per year)	Basin area (hectares)	Nitrogen input (kilograms per hectare per year)	Phosphorus input, (kilograms per hectare per year)
Big Cypress	26,800,000	5,830,000	649,000	41	9
Caloosahatchee River	18,200,000	3,770,000	349,000	52	11
East Coast Urban Area	23,200,000	6,480,000	412,000	56	16
Everglades	27,300,000	3,510,000	935,000	29	4
Everglades Agricultural Area	24,700,000	12,900,000	270,000	91	48
Kissimmee River	68,100,000	12,400,000	1,060,000	64	12
Lake Okeechobee	6,000,000	241,000	181,000	33	1
St. Lucie River	26,900,000	5,340,000	351,000	77	15
Myakka River and Peace River	56,700,000	11,400,000	840,000	67	14

Atrazine, the major herbicide used in southern Florida, is applied primarily on sugarcane, but also on vegetables. Bromacil, diuron, glyphosate, and simazine are all used on citrus crops, and monosodium methanearsonate (MSMA) is the main herbicide used on golf courses. Agricultural application also leads in the use of fungicides. Sulfur and copper hydroxides are the most frequently applied fungicides on citrus crops, and EBDCs (ethylenebisdithiocarbamates) and chlorothalonil are used mostly frequently on vegetables (primarily tomatoes). Fenamiphos is the major nematocide used, and it is applied primarily on golf courses. Methyl bromide and chloropicrin are the major soil fumigants used, and they are used exclusively on tomatoes and peppers (R.J. Miles and C.J. Pfeuffer, SFWMD, written commun., 1994).

The occurrence, distribution, and fate of pesticides has been a long-standing water-quality concern in southern Florida. In the late 1960's and early 1970's, pesticides were detected in water, bed sediment, and fish in the Everglades (Kolipinski and Higer, 1969; Kolipinski and others, 1971; McPherson, 1973). Other studies reported relatively high concentrations of chlorinated hydrocarbons in southern Lake Okeechobee, Hillsboro Canal, and Miami Canal (Pfeuffer, 1985). In the early 1970's, PCBs were determined to be widely distributed in the southern Florida environment (Klein and others, 1970). Early studies of pesticides in southwestern Florida indicated few detections in water, but more frequent detections in bed sediment (McPherson 1969; U.S. Environmental Protection Agency, 1972; Carter and others, 1973). For example, in the Big Cypress Basin pesticides were detected in low concentrations in water samples and at high concentrations in bed sediment (Klein and others, 1970). DDT and its degradation products were the most commonly detected compounds in bed sediment during 1969-70; the mean reported concentration of DDT in the BCNP was 5.1 μg/kg. Soil samples collected in the eastern part of the ENP indicated that concentrations of PCBs and DDT were very low within the ENP, although concentrations in soil samples from agricultural fields within 2 km of the ENP boundary were two orders of magnitude higher (Requejo and others, 1979).

The SFWMD initiated a district-wide pesticide monitoring program in 1984. During 1984-90, atrazine was the only pesticide consistently detected in surface-water samples; most of the detections were between 0.1 and 1.0 μg/L. The greatest frequency of atrazine detections was along the south shore of Lake Okeechobee, and in canals draining the EAA, indicating that atrazine use may be significant in areas adjacent to these sites (Pfeuffer, 1991). Atrazine concentrations in basins within the EAA are frequently above the State criteria (South Florida Water Management District, 1995).Residues of DDD and DDE were detected in bed-sediment samples collected at these sites, as well as in canals adjacent to agricultural land to the east of the ENP. Detectable concentrations of ethion and DDT were consistently measured in areas adjacent to citrus agriculture. An ongoing SFWMD pesticide monitoring program continues to detect herbicides, including atrazine, ametryn, bromacil, and simazine, and the insecticide endosulfan (South Florida Water Management District, 1995).

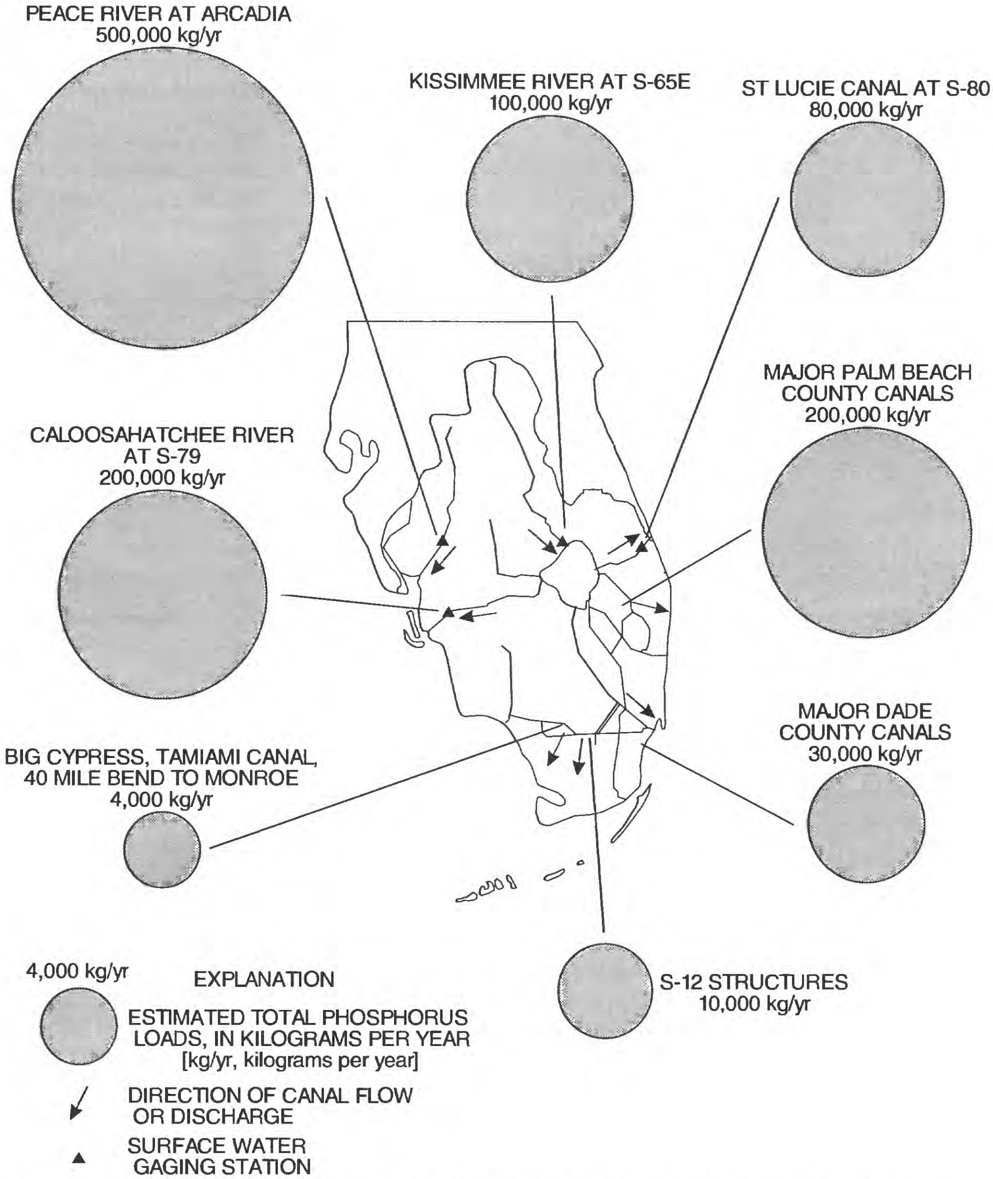


Figure 5. Estimated total phosphorus loads for selected canal and river outflows from surface-water basins in southern Florida.

In the Barron River Canal, d-BHC (benzene hexachloride) (99 µg/kg) and aldrin (1.3 µg/kg) were detected in bed sediment samples during 1989-91 (Collier County Environmental Services Division, 1994). Stream-bed sediment has been sampled repeatedly since 1990 in Collier County; eight organochlorine pesticides have been detected at 15 of 26 sites sampled. Concentrations of chlordane in the Coconut Palm River, d-BHC in the Barron River Canal, and endosulfan sulfate in the Haldeman Canal were the highest concentrations of these pesticides in bed sediment reported to date in Florida (Collier County Environmental Services Division, 1994).

In the Caloosahatchee River, several agricultural pesticides (aldrin, dieldrin, DDT, and chlordane) have been detected at concentrations exceeding the Florida Water Quality Standards (Drew and Schomer, 1984). Urban stormwater runoff from Ft. Myers and LaBelle also contributes pesticides to the Caloosahatchee River, which is a primary or secondary source of drinking water for basin residents (Environmental Science and Engineering, Inc., 1977).

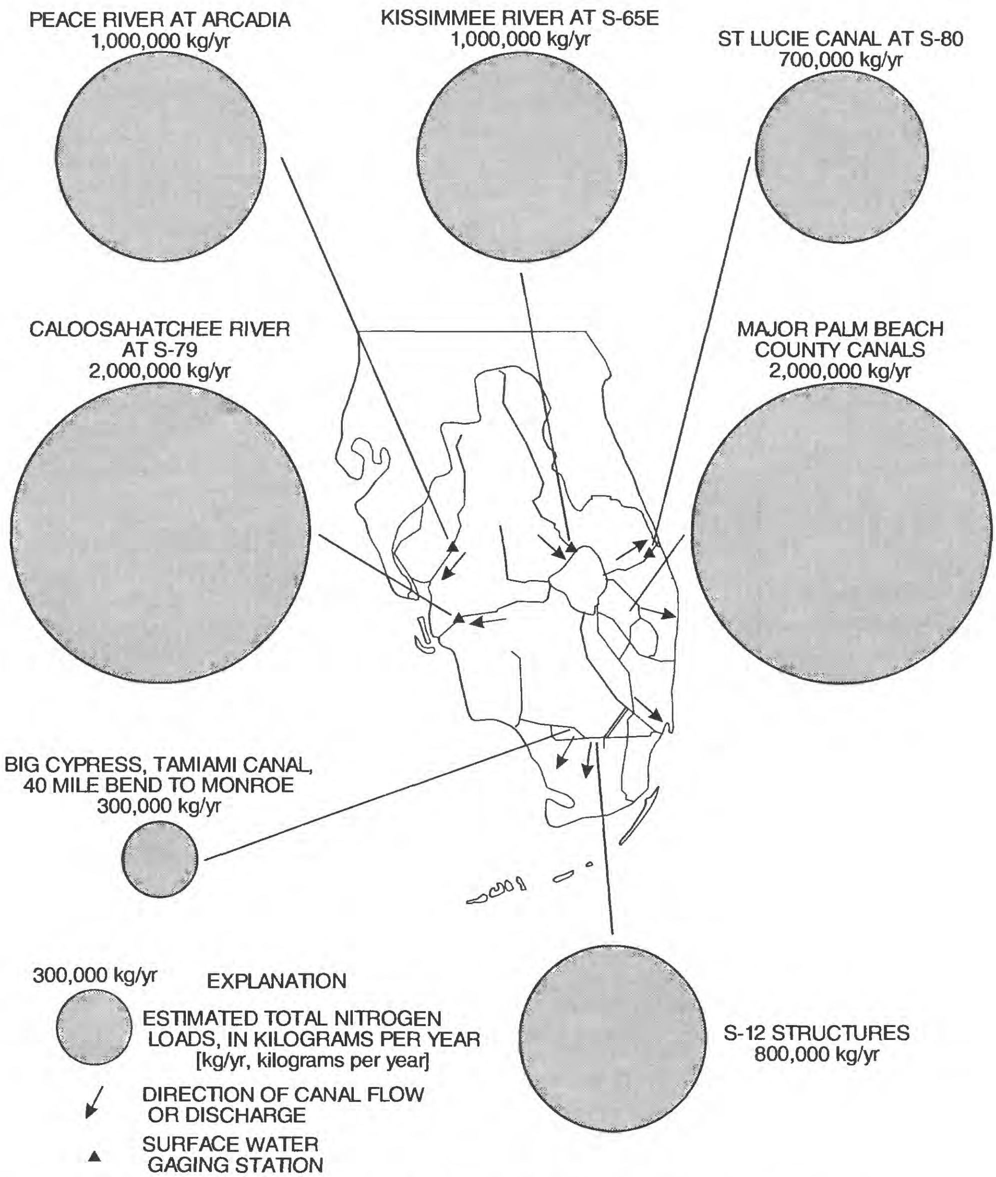


Figure 6. Estimated total nitrogen loads for selected canal and river outflows from surface-water basins in southern Florida.

In the East Coast Urban Basin, pesticides associated with citrus farming have been detected in the Ten Mile Creek subbasin. Bromacil, metalaxyl, simazine, diazinon, ethion, malathion, and endosulfan sulfate are among the 14 pesticides detected in water samples during 1993-95 (Graves and Strom, 1995a,b). Biscayne Bay has a significant pesticide input due to agricultural land use (24 percent of the watershed). An estimated 200,000 kg of 35 common pesticides are used per year in the basin. Among the pesticides of greatest concern are atrazine, 2,4-D, endosulfan, and chlorpyrifos (Pait and others, 1992). Contaminants of greatest concern in the East Coast Urban area are trace elements, PCBs, PAHs, and pesticides. Endosulfan degradation products have been detected at five water-control structures in south Dade County (C.J. Miles and R.J. Pfeuffer, SFWMD, written commun., 1995), occasionally at concentrations which exceeded the Florida surface-water-quality standard for endosulfan (0.056 µg/L) (Florida Department of Environmental Protection, 1995).

In the ENP aldrin, heptachlor, and toxaphene were detected in surface-water samples collected during 1980 (Pfeuffer, 1985). Endosulfan and endosulfan oxide residues have been detected in water samples collected at all water control structures in south Dade County since 1987 (C.J. Miles and R.J. Pfeuffer, SFWMD, written commun., 1995). Maximum concentrations of endosulfan (0.03–0.29 μg/L) occurred in late winter and early spring, and exceeded the FDEP standard for Class III waters (0.056 μg/L) (Florida Department of Environmental Protection, 1995) on more than one sampling date. Concentrations of DDD and/or DDE in bed sediment in the ENP during August 1984-July 1988 were lower than those routinely measured during previous SFWMD monitoring (Pfeuffer, 1991).

Monitoring of pesticides in water and bed sediment has been carried out for many years in southern Florida, but there is little information or understanding of processes of pesticide transport, degradation, uptake, and biological effects. Recent studies suggest that there are widespread effects of low-level concentrations of pesticides and other organic compounds on wildlife reproduction and human health (Colborn and others, 1993). More information is needed before the degree that these contaminants are affecting the southern Florida ecosystem can be assessed.

Radioactivity

The Peace River and Myakka River Basins have significant inputs of radionuclides from the naturally high radioactivity associated with phosphate deposits that occur within the basins and from phosphate mining and processing. In the upper Peace River Basin, much of the radioactivity tends to be transported on particles such as clays and other fines that are washed downstream, whereas in the lower part of the basin ground water introduces significant amounts of soluble radium-226 (Miller and others, 1990). Occasionally, dikes that contain waste clays (slimes) from phosphate mines rupture and release large volumes of these fines into the Peace River. Miller and Morris (1981) reported 22 slime-pond spills into the Peace River between 1942 and 1980. These accidental spills have the potential to release enough ion-exchangeable radium-226 to equal the annual load of natural radium-226 transported by the river (Miller and McPherson, 1987). Radium-226 concentrations in estuarine water in Charlotte Harbor are approximately an order of magnitude higher than for water in many other estuaries in the Nation, due to the inflow of radium-226 rich ground water. Radium-226 and radon-222 have been used to identify areas of significant ground-water inflow; radium-226 has been used as a natural tracer to estimate the rate of ground-water inflow into the Charlotte Harbor estuary (Miller and others, 1990). Radium-226 radioactivity approximately doubled in the Myakka River below where Warm Mineral Springs flows into the river (Miller and others, 1990). Disposal of the highly concentrated reject water from reverse osmosis plants in coastal areas of southwestern Florida is another potentially important source of radioactivity in surface water as the treatment of saline water for public consumption becomes more common.

GROUND-WATER QUALITY IN SOUTHERN FLORIDA

Ground water is the most important drinking-water resource in southern Florida. About 5.5 million people depend on ground water as a primary source of drinking water, and about 4.7 million of those people use water from wells less than 60 m deep. Ground water in southern Florida is vulnerable to contamination because of its close proximity to the surface.The focus of the NAWQA Program's study of ground-water quality in southern Florida is on assessing human influences on shallow ground water.

Overview of Ground-Water Quality and Hydrogeology

The hydrogeologic features of southern Florida's principal aquifers have been described previously by Parker and others (1955) and many other authors. The principal aquifers in southern Florida are the Biscayne aquifer, the surficial and intermediate aquifer systems, and the Floridan aquifer system. Waters in all the aquifer systems in the study unit are primarily a calcium bicarbonate type, mostly because shell, limestone, or dolomite is predominant in the aquifers. The waters are generally considered to be hard to very hard.

The Biscayne aquifer is a surficial aquifer that underlies all of Dade, Broward, and parts of Palm Beach and Monroe Counties and consists of a very permeable interbedded limestone and sandstone. The Biscayne aquifer has a water table that is close to the land surface and has a high recharge rate of approximately 98 cm/yr. The Biscayne aquifer is aerobic in the upper 9 m or so, and anaerobic (reducing) in the deeper parts. Waters from the Biscayne aquifer are used extensively for public supply. Pumping of the aquifer is managed carefully to minimize saltwater intrusion. Concentrations of most water-quality constituents in the aquifer do not exceed primary drinking-water standards (Anderson and Shaw, 1991). Water-quality constituents, which may be of concern where ground water is the source of drinking water include: sodium, chloride, and dissolved solids in areas affected by saltwater intrusion; hydrocarbons in urban-industrial areas; nitrate in localized areas of urban or suburban development; and organic carbon in areas where overlying peat deposits occur.

The surficial and intermediate aquifer systems, located to the west and north of the Biscayne aquifer, consist of interlayered beds of sand, peat, clayey sand, silt, and shell, with minor limestone beds. The surficial aquifer system can be further subdivided into: the medium-to-fine sand and clayey sand of the Lake Wales Ridge area (fig. 2); and the interbedded layers of sand, silt, and shell or limestone that are present in the central part of the study area (fig. 7). The surficial aquifer system in the Lake Wales Ridge area has a moderate recharge rate of approximately 25 to 38 cm/yr, and an aerobic saturated zone. The surficial aquifer system within the Lake Wales Ridge area is used primarily for domestic supply and small-scale agricultural irrigation supply. The sand, silt, and shell surficial aquifer system in the central and southern part of the study area generally has a water table close to the land surface, a low recharge rate of 2.5 to 23 cm/yr, and an anaerobic saturated zone.

The Biscayne aquifer and parts of the other surficial aquifer system are overlain by a layer of peat in the Everglades region (fig. 7). The peats of the Everglades are an accumulation of 0.3 to 3.3 m of peat, muck, and marl (Davis, 1943) which generally has a low permeability. The water table in the peats usually is less than 0.6 m below land surface in areas where the Everglades is not inundated.

The intermediate aquifer system is similar to the sand, silt, and shell surficial aquifer system but is somewhat deeper. The waters in the sand, silt, and shell surficial and intermediate aquifer systems are used extensively for public supply in all areas south of Lake Okeechobee and in cities along the western coastlines. Saltwater intrusion and free-flowing deeper artesian wells have rendered parts of these aquifer systems nonpotable. Concentrations of VOCs in ground water used for drinking-water supply are often of concern in urban areas on the east coast, and high radioactivity has been measured in ground water in the western part of the study area where saline water contacts phosphate deposits rich in natural radioactivity (Miller and Sutcliffe, 1985).

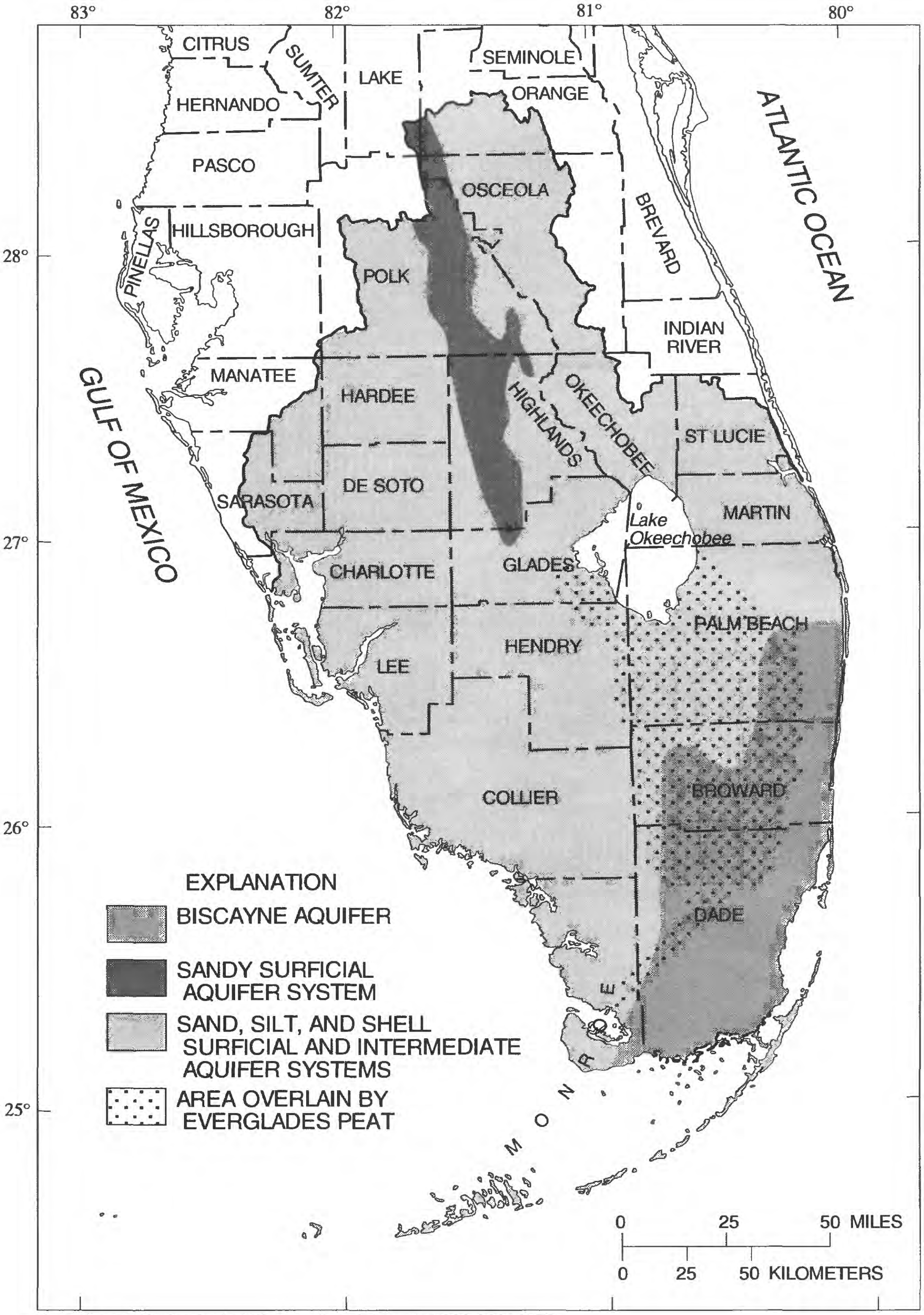
The Floridan aquifer system underlies the entire study unit and occurs near the land surface in the northern part but drops to 150 m below land surface in the southern part (McPherson, 1996). It consists of limestone and dolomite beds that are generally highly transmissive. The Floridan aquifer system generally contains older water or a mix of recent and older water. It is used extensively for public supply and agriculture in the northern part of the study area because good-quality water is relatively close to the surface and easily accessible. Conversely, in the southern part, the aquifer contains nonpotable water due to high salinity. Concentrations of most water-quality constituents in waters from the Floridan aquifer system generally do not exceed applicable drinking-water standards, although high concentrations of nitrate and pesticides may occur in ground water near current or former citrus grove operations.

Issues of Regional Importance to Ground-Water Quality

Ground water in southern Florida is vulnerable to many sources of contamination (Herr and Shaw, 1989). Issues of greatest concern are saltwater or brackish-water intrusion, nutrient enrichment, pesticides, metals and trace elements, volatile organic compounds, and radioactivity. Contaminants indirectly reach the ground-water systems in southern Florida from landfill leachates, spills of industrial organic solvents, and areal application of fertilizers and pesticides; and directly from leaking fuel storage tanks, septic systems, and drainage wells (Kimrey and Fayard, 1984; Irwin and Bonds, 1987; Bradner, 1991). Saltwater or brackish-water from remnant or recent seawater, and radioactivity from phosphatic deposits reach ground-water systems as a result of natural processes, but their occurrence may also be affected by human activities.

Saltwater Intrusion

Saltwater intrusion became a significant problem for urban water supply along the urban southeast coast in the 1940's and 1950's. Increased demand for freshwater resulted in increased pumping of the surficial



Base from U.S. Geological Survey digital data, 1:2,000,000, 1972
Albers Equal-Area Conic projection
Standard Parallels 29°30′ and 45°30′, central meridian -83°00′

Figure 7. Aquifer systems in southern Florida and extent of peat in the Everglades region.

aquifer system. At the same time, canals were dredged to drain land for development. These activities lowered water tables and allowed saltwater to move inland within the aquifer. The most severe problems have been somewhat alleviated through impoundment and storage of water in the WCAs which is later released to maintain sufficient water levels during dry seasons, and by restricting canal flow to the ocean during the dry season (Howie, 1987; Sonntag, 1987; Miller, 1988; Radell and Katz, 1991). Other strategies for improving the quality of the public-water supplies have included desalinization, rotation of well pumpage, and relocation of well fields to inland areas (Sonenshein and Hofstetter, 1990).

Saltwater intrusion also has occurred on the southwest coast of Florida in areas of urban development (Duerr and others, 1988; Duerr and Enos, 1991; Florida Geological Survey, 1992; Trommer, 1993). Saltwater intrusion into highly phosphatic zones of the intermediate aquifer can release large amounts of radium -226 into the ground water (Miller, 1992). Brackish water from deep, free-flowing, abandoned irrigation wells has infiltrated many localized areas in the central part of the study unit. Strategies for improving the quality of the surficial aquifer in these areas involve plugging abandoned wells and backplugging saltwater-flow zones in deep wells (LaRose, 1990; Bradner, 1994).

Nutrient Enrichment

Sources of nutrient enrichment of ground water in southern Florida include fertilizer application, stormwater runoff, and wastewater disposal. Nutrients in ground water are a concern in southern Florida because of their potential effect on human health and on surface waters. Nutrients such as nitrate and ammonia present in high concentrations in ground water may pose a threat to human health because most drinking water in southern Florida is from ground-water sources. Shallow ground water and surface water in southern Florida are closely connected and rapidly interchange. Therefore, nutrient-rich ground water that seeps or is pumped into surface-water bodies can contribute to nutrient enrichment and undesirable algal growth.

Fertilizer applied to citrus groves, vegetable crops, golf courses, and residential areas is a source of nitrate, ammonia, and phosphorus in ground water in southern Florida. For example, nitrate concentrations exceeding 30 mg/L have been detected in ground water beneath citrus growing areas in the Lake Wales Ridge area (German, 1996) and in the upper part of the Biscayne aquifer in the vicinity of vegetable-growing areas (Florida Department of Environmental Protection, Public Water System, written commun., 1995). The highest number of wells yielding water exceeding the drinking-water standard for nitrate (10 mg/L) (Florida Department of State, 1993) are in Polk and Highlands Counties near the citrus-growing areas (822 domestic supply wells) and in Dade County near the vegetable-growing areas (7 noncommunity supply wells) (Florida Department of Environmental Protection, Pesticide Contaminant Monitoring System, written commun., 1995). Generally, as recharge water with high organic nitrogen concentration enters anaerobic zones of the aquifer system, conversion to ammonia occurs by mineralization. High ammonia concentrations have been detected in ground water in the Biscayne aquifer near a golf course (Swancar, 1996). Although phosphorus is not typically a problem in ground water, runoff of phosphorus-rich ground water used for irrigation may result in algal blooms in wetlands, lakes, and streams.

Stormwater runoff may enter ground water through drainage wells or percolation ponds. Shallow drainage wells in Dade and Broward Counties that divert stormwater into the Biscayne aquifer may be a source of ammonia contamination (Kimrey and Fayard, 1984). Drainage wells in Orange County that divert stormwater by gravity flow into the Floridan aquifer system are also a source of ammonia contamination (Bradner, 1991).

Wastewater disposal is a widespread sources of nutrient contamination to ground water. For example, citrus processing wastes and wastewater treatment plant effluent are often applied to sprayfields or placed into percolation ponds (Bradner, 1991; Sumner and Bradner, 1996). Wastes from dairy operations contain high concentrations of phosphorus and nitrogen (Federico, 1977; Lake Okeechobee Technical Advisory Council, written commun., 1989; South Florida Water Management District, 1989) which may be transported in surface-water runoff and subsequently contaminate shallow ground water overlain by sandy soils. Nutrients from septic tanks and shallow disposal wells can potentially seep into surface water and contribute to enrichment and degradation of surface water and ground water. In the Florida Keys, there are more than 25,000 septic tanks, 5,000 cesspools, and 600 shallow drainage wells that release nutrient-rich water into very porous limestone. There is concern that nutrients from these sources may seep into shallow marine waters and adversely affect this environment, including the coral reefs. Recent studies have reported high concentrations of ammonia in shallow ground water offshore of the Keys (Shinn and others, 1994; Paul and others, 1995).

Occurrence and Distribution of Pesticides

Pesticide use in southern Florida includes ground and aerial application of pesticides for agriculture, mosquito control, and aquatic weed control; and pesticide use on golf courses, residential property, and power and transportation right-of-ways. Many pesticides reach shallow ground water by runoff and percolation through the soil; however, the transport and degradation of pesticides in ground water are not well understood. Pesticides detected in wells tapping the surficial aquifer system include the herbicides bromacil, diuron, and propazine; and the insecticides 1,2-Dibromoethane (EDB), aldicarb, carbofuran, and endosulfan sulfate (Florida Department of Environmental Protection, Groundwater Monitoring Program, written commun., 1995).

A widespread source of ground-water contamination by pesticides in southern Florida is heavy application in citrus groves. Bromacil is widely applied to citrus groves and has been frequently detected in citrus-growing areas. Untreated water samples from more than 800 domestic-supply wells in Polk and Highlands Counties contained detectable concentrations of bromacil (Florida Department of Environmental Protection Groundwater Monitoring Program, written commun., 1995). By 1995, 56 of these wells had water samples with bromacil concentrations greater than the health-advisory concentration of 90 μg/L (Florida Department of Environmental Regulation, 1989; Florida Department of Health, Environmental Toxicology, written commun., 1995). Diuron is commonly combined with bromacil for application in citrus groves; however, detections of diuron are less frequent and generally at lower concentrations than bromacil (Florida Department of Environmental Protection, Groundwater Monitoring Program, written commun., 1995). The herbicide propazine, used for weed control in sorghum (a common feed crop for cattle), was detected in several background wells in Collier, Glades, Hendry, and Lee Counties. The extent of propazine contamination has not been determined because the counties cover large areas of land and the background wells are sparsely located.

One of the most publicized contaminants is EDB, which was banned for agricultural use in Florida in 1983 (Katz, 1993). By 1995, more than 1,000 domestic supply wells in the sandy ridge area of Polk and Highlands Counties were contaminated by EDB (Florida Department of Environmental Protection, Pesticide Contaminant Monitoring System, written commun., 1995). Many of the contaminated wells are located in areas where former citrus groves were converted to residential developments. In these developments, drinking water is supplied by individual shallow wells. Traces of EDB also are detected in ground water in other parts of the study area. Sources of EDB contamination in areas away from citrus groves have not been determined.The fumigant methyl bromide is now being used instead of EDB as an insecticide in southern Florida; further studies are needed to determine whether ground water has been contaminated in areas where methyl bromide is being used.

Aldicarb, a carbamate insecticide, has been detected in water samples from more than 100 wells that tap the surficial aquifer system in current and former citrus-growing areas in Orange, Polk, and Highlands Counties (German, 1996), as well as in water samples from background wells (Florida Department of Environmental Protection, Groundwater Monitoring Program, written commun., 1995). Carbofuran, another carbamate insecticide, was detected in water from one background monitoring well, but has not been detected in water from domestic supply wells in the areas where other insecticides have been detected (Florida Department of Environmental Protection, Ground Water Monitoring Program, written commun., 1995) Endosulfan I and II, insecticides that are used on vegetables and citrus, have been detected in surface waters in southern Florida (R.J. Miles and C.J. Pfeuffer, SFWMD, written commun., 1995). Only endosulfan sulfate, a less hazardous breakdown product of the two parent compounds, has been detected in ground water in the study area.

Volatile Organic Compounds

Detections of volatile organic compounds (VOCs) in ground water are common in urban areas and sporadic in rural areas in southern Florida. The principal VOCs detected in untreated ground water used for public supplies are the halogenated aliphatic hydrocarbons, particularly trichloroethene, vinyl chloride, and tetrachloroethene; and the monocyclic aromatics hydrocarbons such as benzene, toluene, and xylenes.

A study of public-water supplies in Broward, Dade, and Palm Beach Counties reported that 27 large public water systems had detectable levels of VOCs in the raw water supplied to the utilities (Vincent, 1984). Numerous drinking-water utilities in southeastern Florida treat raw ground water contaminated by halogenated aliphatic hydrocarbons (fig. 8a) and monocyclic aliphatic hydrocarbons (fig. 8b). Concentrations of these compounds in raw untreated water samples sometimes exceed drinking-water guidance concentrations. Many of these water-supply systems are using air stripping techniques to remove significant quantities of vinyl chloride and trichloroethene from raw water as a part of the treatment process (FDEP Public Water Supply, written commun., 1995). Samples from background monitoring wells were also reviewed for detections of halogenated aliphatic hydrocarbons (fig. 8c) and monocyclic aromatics hydrocarbons (fig. 8d). The highest densities of background monitoring wells with detections of these VOCs in raw water samples were in Polk, Martin, Dade, and Palm Beach Counties.

Metals and Trace Elements

Natural iron sources are widespread in southern Florida's aquifer systems. Sources include oxidation of pyrite and organic compounds, and the dissolution of iron oxide and silicate minerals (Florida Geological Survey, 1992). Iron can be mobile in some ground water environments and can occur in relatively high concentrations (>1.0 mg/L). Iron in ground water is an issue of concern primarily for esthetic reasons, and it can be easily removed using conventional treatment methods.

Trace elements are generally present at low (<0.001 mg/L) concentrations in ground water in southern Florida (Florida Geological Survey, 1992). Lead, arsenic, and mercury in ground water are of concern because of their potentially toxic effects on the biota. Lead concentrations in ground water samples from background monitoring wells sometimes exceed the 50 µg/L primary drinking water standard, but some of these detections may be artifacts of well contamination. Lead mobility should be limited by sorption on clays and organic compounds (Florida Geological Survey, 1992).

Arsenic has been a contaminant around old cattle-dipping pits in the vicinity of cattle ranches (Blasland, Bouck, and Lee, 1992), but these areas are very small compared to the large size of the ranch (usually thousands of hectares in drained prairie wetland compared to about 1 ha of contamination). Arsenic has been detected in the bed sediment of canals in southern Florida (Sherwood and others, 1973); further studies are needed to determine whether the ground water in these areas has been contaminated. Arsenic has also been detected in ground water beneath golf courses where the arsenic-containing compound MSMA has been applied for weed control (Swancar, 1996).

Mercury is generally in low concentrations in ground water in southern Florida, but an abundance of dissolved organic compounds in ground water is conducive to the transport of mercury. Surficial ground water in the Everglades may be enriched in certain constituents that enhance mercury cycling. Sulfate-reducing bacteria in peat soils of the Everglades may enhance the transformation of inorganic mercury to methyl mercury, a toxic form that concentrates in the biota. Studies are underway by the U.S. Geological Survey to evaluate biogeochemical processes in the Everglades peat that might control mercury cycling (Krabbenhoft and Rickert, 1995).

Radioactivity

Much of the northwestern part of the study unit is underlain by phosphatic deposits containing phosphate ore (pebbles) that typically contains 100 to 150 ppm of uranium, mainly uranium-238 (Guimond and Windom, 1975). Uranium is not very soluble in the reducing environment typical of ground water. Consequently, many of the studies of radioactivity in Florida have been related to uranium-238 daughter radionuclides such as radium-226 in drinking-water sources (Kaufmann and Bliss, 1977; Miller and Sutcliffe, 1985) or in ground water near phosphate chemical plants and mines (Miller and Sutcliffe, 1984); radon-222 in water and dwellings (Nagda and others, 1987); and polonium-210 in water (Harada and others, 1989) because of the cancer risk associated with ingestion or inhalation of these radionuclides. Phosphate ore occurs in greatest concentration in the intermediate aquifer, but the ore also occurs in other parts of the surficial aquifer system in southwestern Florida. Radium-226 in ground water often exceeds drinking-water regulations (5.0 pCi/L) in coastal counties and its radioactivity usually increases with dissolved-solids concentration due to ion exchange reactions (Miller and Sutcliffe, 1985). The highest radium-226 activity that Miller and Sutcliffe (1985) measured was 110 pCi/L in a sample with

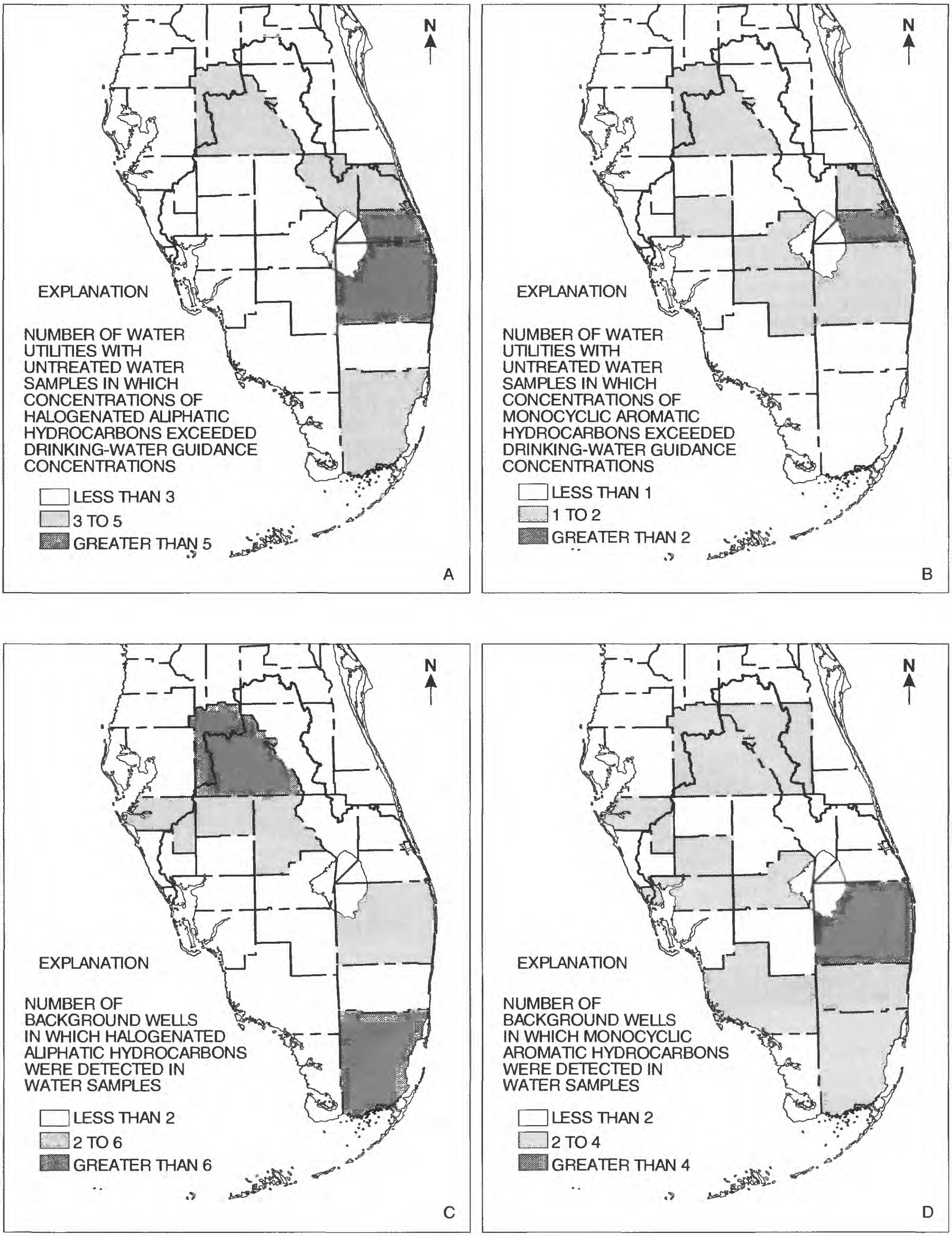


Figure 8. Occurrence of hydrogenated aliphatic and monocyclic aromatic hydrocarbons in ground water in southern Florida.

a specific conductance of 19,000 microsiemens per centimeter at 25° C. Efforts have been made to provide treated water from public water utilities to people living in areas with elevated radium-226 to reduce cancer risks associated with ingesting this bone-seeking radionuclide. Radon-222 concentrations in ground water in central Florida ranged from 20 to 46,000 pCi/L (Kaufmann and Bliss, 1977). Polonium-210 in ground water ranged from less than 0.05 to greater than 4.5 pCi/L; tended to occur in shallow ground water with low pH, high sulfide, and high radon-222; and may be released by bacterial action (Harada and others, 1989).

AQUATIC ECOLOGY IN SOUTHERN FLORIDA

The biological communities of aquatic ecosystems in southern Florida reflect past and present water-quality conditions and simultaneously influence the nature of future water quality through a series of complex and dynamic interactions.

Overview of Aquatic Ecology

Wetlands are the dominant aquatic systems in the surface-water basins of southern Florida (table 4). These wetlands include a variety of ecosystem types including cypress strands, cypress domes, flatwoods sloughs, hardwood swamps, prairies, marshes, and riverine/lacustrine flood plains (Livingston and Fernald, 1991). Freshwater wetlands merge with coastal wetlands and sustain them through seasonal sheetflow of waters with low nutrient concentrations. A large number of canals cut through the wetlands of southern Florida and are isolated from the ecosystems of the adjacent wetlands. These canals are often dredged to facilitate maximum discharge and have habitat characteristics very different from surrounding wetlands, natural rivers, and streams. Unchannelized rivers, such as the Myakka and the Peace Rivers, constitute a relatively small part of the surface water ecosystem in southern Florida.

The Big Cypress Basin, including the Big Cypress Swamp and the BCNP, is a unique wetland environment in southern Florida. The Big Cypress Basin differs from the adjacent Everglades in that it has relatively higher land elevation, thinner soils of marl or sand, and widespread forest vegetation (McPherson, 1974). Natural drainage in the Big Cypress is by slow, overland flow of water to the south, and well-defined streams generally do not exist (McPherson, 1984).

Freshwater vegetation in the Big Cypress Basin primarily consists of cypress forests, mixed swamp forests, willow thickets, prairies, marshes, and ponds (Duever, 1984); cypress and hardwood vegetation is dominant (table 4). Periphyton is also an important component of wet prairies, coastal marsh, and dwarf cypress communities. Blue-green algae precipitate

Table 4. Extent of wetlands in drainage basins in southern Florida

Basin	Total basin area, in hectares	Hectares of wetlands[1]						
		Cypress	Hardwoods	Marsh and slough	Lakes	Canals and rivers	Mangrove	Salt marsh
Big Cypress	649,000	184,000	75,300	51,500	1,360	358	58,200	9,260
Caloosahatchee River	349,000	7,240	5,960	18,200	377	1,070	1,090	200
Everglades Agricultural Area	270,000	0	49,900	351	49	769	0	0
Everglades	935,000	55,900	96,500	111,000	61	1,930	125,000	24,000
Florida Keys	39,400	0	0	0	0	0	12,300	59
Kissimmee River	1,060,000	13,600	37,600	96,800	79,600	3,510	0	0
St. Lucie River	351,000	5,890	5,270	50,300	491	2,360	1,060	91
Lake Okeechobee	181,000	15	4,620	10,200	88,600	878	0	0
Peace and Myakka Rivers	840,000	4,790	55,600	40,300	21,200	1,360	13,700	2,320
East Coast Urban Area	412,000	126	12,100	48,300	5,940	2,350	7,090	1,390

[1]Modified from U.S. Department of the Interior, Fish and Wildlife Service, National Wetlands Inventory, 1979-81.

considerable amounts of calcium carbonate, which forms calcitic mud or marl found throughout the Big Cypress (Duever and others, 1986).

Little is known about the ecology of the invertebrates in the Big Cypress Basin (Drew and Schomer, 1984). Among the most abundant fish in the Big Cypress Basin are the Florida gar, the bowfin, the lake chubsucker, the swamp darter, species of killifish, and the mosquito fish (Drew and Schomer, 1984; Duever and others, 1986). The Big Cypress Basin is perhaps the most ecologically undisturbed natural wetlands system in southern Florida (Duever, 1984). Major contemporary perturbations to the ecology of the Big Cypress include agriculture and residential development on the periphery of the basin, oil exploration, off-road vehicle use, construction of roads and an airport, and limerock quarrying.

The Kissimmee River, Lake Okeechobee, and the Everglades watersheds are a complex, highly modified system where watershed boundaries and ecological relations are difficult to assess. The Kissimmee River is in a state of transition as a result of efforts to restore the hydrology of the Kissimmee-Okeechobee-Everglades system to an approximation of predevelopment conditions.

Historically, the Kissimmee River meandered for about 160 km through its watershed and periodically overflowed its banks to inundate an adjacent wetland mosaic of broadleaf marsh, wet prairie, and wetland shrub communities (Milleson and others, 1980), which made up 20 percent of the watershed (Kushlan, 1991). By the early 1980's the Kissimmee River had been transformed into a canal (sometimes called C-38) about 90-km long, fitted with a number of water-control structures.

Wetlands are much reduced in extent, and the wetlands that remain are homogeneous plant communities confined to the lower, impounded parts of each pool (Toth, 1993). At least 39 species of native freshwater fishes were present in the pre-impounded Kissimmee River Basin (Bass, 1991). Following canalization, only 17 fish species were collected, and the proportion of game species decreased from 43 to 28 percent (Davis and others, 1990). Macroinvertebrate communities in the canalized reaches are generally characterized by low invertebrate density and low species richness (Rutter and others, 1986; Toth, 1993). Restoration of the Kissimmee River, including a 4-year demonstration project designed to recreate hydrologic conditions prevalent during predevelopment times, has provided a focus for recent ecological studies (Toth, 1993).

Lake Okeechobee is a shallow, naturally eutrophic lake which is extensively influenced by nutrient enrichment from human activities. Primary production is limited by nutrient concentration and/or light. In some years algal blooms of blue-green species (cyanobacteria) cover more than 40 percent of the lake surface in late June and early July (Brezonik and others, 1987). Average annual chlorophyll *a* concentrations (a common measure of productivity of algal populations) ranged from 19 to 27 μg/L during 1974-84 (Canfield and Hoyer, 1988). The highest chlorophyll *a* concentrations were measured in the northern and western parts of the lake (Phlips and others, 1994). The relative importance of factors contributing to frequency and intensity of algal blooms has not been determined. Phosphorus inputs, disturbance and resuspension of nutrient-rich bed sediments, and other factors are all being studied to quantify their relative contributions to blooms of blue-green algae. The lake contains large nuisance populations of several exotic aquatic macrophytes, including water hyacinth, hydrilla, and water lettuce. Periodic application of herbicides for control of nuisance macrophytes results in greater light penetration and greater availability of plant nutrients, which in turn promotes subsequent algal blooms.

The Everglades is a large, peat-based wetland that historically covered about 11,000 km^2. In modern times, the Everglades watershed south of Lake Okeechobee has been drained and divided into the EAA, the WCAs, and the ENP. The EAA is an area of drained wetlands used for large-scale agricultural production of sugar cane, winter vegetables, and rice. The WCAs are diked, vegetated, shallow-water reservoirs designed for flood control and water supply. The ENP contains about 20 percent of the original Everglades system now preserved for wilderness and wildlife habitat.

The majority of the wetlands already lost from the Everglades system may never be restored because restoration would come at an incalculable cost to agriculture and the millions of residents living on the already drained land. Maintaining the remaining wetlands in the Everglades system as a self-sustaining multi-use resource which provides water supply, flood control, and water-quality enhancement is the goal of present (1995) interagency efforts.

The Everglades has been described as the most intensely studied wetlands in the world (Kushlan, 1991). Historically, the Everglades was dominated by sawgrass, *Cladium jamaicense*. This dominance is presumably due to the tolerance of sawgrass for very low nutrient concentrations (Steward and Ornes, 1975).

Sawgrass does not have a competitive advantage over other macrophytes, such as cattail, under high-nutrient conditions.

Periphyton is an important component of the ecosystem in many areas of the Everglades; periphyton varies in composition according to nutrient concentration and hydropattern (defined as the depth of water, and the duration and timing of freshwater inundation). Desmids, filamentous green algae, and certain species of diatoms are present in acid, low-mineral, low-nutrient habitats such as those present in the interior of WCA-1. Rainfall is the primary source of water-quality constituents in these habitats. In marsh areas with low nutrient concentrations but high dissolved-mineral content, calcareous blue-green algae and diatoms dominate the periphyton community. These areas occur in interior parts of WCA-2 and WCA-3, and in parts of the ENP. Marsh areas adjacent to and fed by the EAA canals carrying drainage water with high nutrient and dissolved-mineral concentrations typically contain periphyton dominated by filamentous, nutrient-tolerant, blue-green algae and diatoms (Swift, 1984; Swift and Nicholas, 1987). Calcareous periphyton and the formation of an algal mat are characteristic of Taylor Slough and other areas where the hydroperiod (the duration of freshwater inundation) is 6 to 7 months. At sites with a longer hydroperiod, approaching year-round flooding, periphyton composed of green algae, especially desmids, is common (Browder and others, 1981).

A review of data on periphyton food utilization by macroinvertebrates and vertebrate animals in the Everglades indicates that diatoms are a preferred food source; green algae are consumed less frequently, and blue-green algae are likely an unsuitable food for many invertebrates, fish, and other organisms (Browder and others, 1994).

Fish are an important component of the Everglades ecosystem, and they function at many levels of the food web ranging from primary consumers of vegetation and detritus, to secondary consumers of invertebrates, and finally as top predators (Loftus and Eklund, 1994). Forty-three species of fishes in 18 families, including at least four exotic species, were collected in the Everglades during 1962-74 (Dineen, 1974). Only two long-term, quantitative studies of Everglades freshwater fishes have been conducted, and both occurred within the ENP (Loftus and Eklund, 1994). It is likely that the intensity of human activities in southern Florida will result in ecosystem alterations that will influence the fish community composition.

The Myakka River, Peace River, Caloosahatchee River, and other streams are locally important components of surface-water systems in the northwestern part of the study unit. The Myakka River is one of southern Florida's most pristine rivers (Estevez and others, 1991), and the lower two-thirds of the river is designated as an Outstanding Florida Water (Livingston, 1991). The basin still contains areas of forested wetlands and large amounts of instream and bankside logs, branches, roots and other snag habitats. Submersed aquatic vegetation is relatively scarce (Canfield and Hoyer, 1988), perhaps due to shading, and food chains are based on detrital inputs (Estevez and others, 1991). One exception is the natural in-stream lakes which are typically wide, grassy, and shallow lentic reaches in the main riverbed. In these habitats, insects are the most abundant invertebrates in the upstream reaches, whereas crustaceans dominate in the downstream parts of the river (Estevez and others, 1991).

In contrast to the Myakka River, the Peace River Basin contains a relatively small amount of undisturbed and public land, and the few remaining natural areas in the basin are being diminished by expanding citrus operations and phosphate mining. Blue-green algae with the capacity to fix nitrogen dominate the phytoplankton community in the phosphate-enriched streams of the Peace River Basin (Fraser, 1991). The Peace River contained 34 species of native freshwater fishes and a number of exotic species during 1983-88. The most abundant species collected were the Florida gar, bluegill, largemouth bass, and redear sunfish (Bass, 1991).

In the Caloosahatchee River, very low streamflow velocity and the presence of numerous oxbow lakes along the main channel allows the establishment of floating aquatic macrophyte communities including alligator weed, floating maidencane, water lettuce, and primrose willow. In the main channel of the river, emergent and floating vegetation is rare, and algae dominate the plant community (Drew and Schomer, 1984). Chlorophyll *a* concentrations in the Caloosahatchee River vary seasonally, and maximum chlorophyll *a* concentrations coincide with algal blooms of blue-green algal species including *Anabaena flosaquae* and *Microsystis aeruginosa.* Algal blooms occur downstream of wastewater treatment plants, and also downstream from sources of agricultural runoff including flower nurseries and citrus groves. At least 31 species of native freshwater fishes have been collected in the Caloosahatchee River (Bass, 1991).

Issues of Regional Importance to Aquatic Ecology

The intensity and pervasive nature of human activities in southern Florida has significant consequences for the ecology of the aquatic habitats in the region. Although there are many issues of importance relating to aquatic ecology in southern Florida, those which are of particular interest include altered hydropatterns, the influence of nutrient enrichment, the occurrence and distribution of mercury, endocrine disruption and other effects of pesticides and other organic compounds, and the spread of exotic plant and animal species.The many factors relating to aquatic ecology in southern Florida are discussed separately in this report, for ease of presentation. However, in many cases these factors interact in complex ways, with consequences of greater magnitude for the biota than would otherwise be expected.

Altered Hydropatterns

Hydropatterns have been significantly altered in southern Florida from historical times. The hydroperiod in the Everglades marshes was 5 to 10 months, but under present conditions, many Everglades marshes are wet only 2 to 5 months per year. The dense sawgrass once covering the northern Everglades likely slowed the southward flow of water from rainfall and Lake Okeechobee overflow, resulting in a prolonged or continuous hydroperiod for the marshes farther south (Fennema and others, 1994). The conversion of the sawgrass marsh in the northern Everglades to agricultural fields and drainage canals may have had an indirect effect on hydropattern in the sawgrass marshes to the south in the WCAs, accelerating the rate of water flow and changing the timing of water supply (Walters and others, 1992). One goal of the Everglades Construction Project is to use treated water from the proposed STAs to improve seasonal water supply in the Everglades and specifically to reestablish sheetflow to the WCAs.

Changes in hydropattern have many ramifications for aquatic ecosystem structure (numbers and types of organisms) and function (processing and cycling of food and energy). Altered hydropatterns have influenced historic fire patterns in the BCNP (Duever and others, 1986). There appears to be a general increase in fires in the BCNP since 1971, although inconsistent records prior to 1970 preclude statistical analysis of these changes (Duever and others, 1986). Changes in dominant flora, for example a shift from sawgrass to cattail, may result from changes in hydrologic and fire regimes (Urban and others, 1993; Davis and others, 1994). Studies indicate that marshes with a longer hydroperiod have greater densities of macroinvertebrates than marshes with a shorter hydroperiod (Loftus and others, 1990). Densities of many small fish species that provide a food source for wading birds have been positively correlated with the number of months of marsh inundation (Loftus and Eklund, 1994). Two long-term, quantitative studies of Everglades fishes focus on the response of fish communities to changing hydroperiod (Kushlan, 1976; Loftus and Kushlan, 1987) and indicate that populations of larger predatory fish are enhanced during periods when the hydroperiod is extended.

Data from studies in the Kissimmee River Basin indicate that wetland communities can revert to predevelopment types within a year once the hydrologic regime is restored (Toth and others, 1993). Data also indicate that maintenance of diverse and self-sustaining littoral and flood-plain vegetation requires maintenance of continuous flow and widely varying stage and discharge regimes (Toth and others, 1993). Macroinvertebrate communities sampled adjacent to the Kissimmee River main channel following flow restoration indicate increased species richness especially of current-loving species (Rutter and others, 1989). However, unless water levels are deep enough for long enough, fish species cannot utilize marsh habitat to any extent in the Kissimmee watershed, and enhancement of game fish populations will not occur (Toth, 1993).

Influence of Nutrient Enrichment on Habitat Integrity

Historically, nutrient concentrations were low in the Everglades and controlled by nutrient concentrations in rainfall (Waller, 1982). In recent times, numerous areas of southern Florida have been subjected to nutrient enrichment. The EAA is the source of 45 percent of the phosphorus load discharged to the Everglades (South Florida Water Management District, 1995). During 1978-87 WCA-2 received at least 1,825 Mg of nitrogen and 61 Mg of phosphorus per year from adjacent canals (South Florida Water Management District, 1992b). During 1978-91, an estimated mean annual load of 204 Mg of total phosphorus was transported by EAA drainage/runoff water with 85 percent going to the south (South Florida Water Management

District, 1992b). A north-to-south gradient of decreasing nitrogen and phosphorus concentrations has been documented across the WCAs (Belanger and others, 1989). Nutrient concentrations of up to 30 times the background concentration have been measured in canal water adjacent to the ENP (Gordon and others, 1986); however, the annual phosphorus input to the ENP has increased very little over predrainage inputs (Davis, 1994). Data indicate that phosphorus is more important than nitrogen as a limiting nutrient for plant growth in the Everglades system as a whole (Davis, 1994).

Studies show that algae and macrophytes respond rapidly (within days or weeks) to increased nutrient availability (Belanger and others, 1989; Grimshaw and others, 1993). Experimental additions of phosphorus at field sites in WCA-2 resulted in increased phosphorus uptake and increased biomass production by sawgrass communities (Craft and others, 1995). No significant change in macrophyte species diversity or expansion of cattail stands was observed in experimental plots receiving nutrient additions, but the duration of the study (2 years) may have been too short to show effects.

Numerous other studies indicate that nutrient enrichment in the Everglades has resulted in or contributed to the replacement of sawgrass and slough communities by cattail and disappearance of the native blue-green algae/ diatom-dominated periphyton mats (Flora and others, 1988; Belanger and others, 1989; Scheidt and others, 1989; Davis, 1991; South Florida Water Management District, 1992b). Increases in nutrient concentrations, however, do not fully explain the distribution of cattail in the Everglades. Urban and others (1993) monitored sawgrass and cattail densities in WCA-2 and reported that deep water, fire, and nutrient enrichment synergistically stimulated cattail expansion into sawgrass communities. Physical disturbance of any kind appears to provide cattail with a competitive advantage over sawgrass because cattail is adapted to function as an early colonizer in these habitats (Davis, 1994).

In the Everglades ecosystem, the dominant macrophyte type (sawgrass or cattail) can exert a profound influence on the ecology of the habitat (Belanger and others, 1989). Cattails have a shorter life cycle than sawgrass, so the production of detrital material (and associated biological oxygen demand) is greater. The shape and size of cattail leaves reduces reaeration and light availability at the water surface, thus reducing benthic algal photosynthesis and lowering dissolved-oxygen concentrations. Changes in organic bed-sediment texture, dissolved-oxygen concentration, transpiration rate, and the community composition of microbial, periphyton, and macroinvertebrate populations occur following nutrient enrichment (Davis, 1994). Richardson (1994) and Craft and others (1995) reported a significant decline of the *Utricularia*-periphyton mat after only 1 year of nutrient additions and subsequent expansion of *Chara* (musk-grass) populations to replace the floating periphyton mat. Several studies have reported that macroinvertebrate diversity in the Everglades is naturally low (Waller, 1976; Loftus and others, 1990). Following a shift from sawgrass to cattail stands, a reduction in numbers of Diptera, snails, and isopods was observed, whereas the density of annelid worms doubled (Davis, 1994). Rader and Richardson (1992) reported no reduction in diversity, although their analyses of macroinvertebrate data were preliminary. Implications of a shift in macroinvertebrate community composition for the Everglades food chain are poorly understood but may be significant (Davis, 1994) and warrant further investigation.

The goal of the Everglades Construction Project is to reduce the phosphorus loading to the Everglades Protection Area by creating six STAs comprising about 16,000 ha of wetlands. In combination with implementation of on-farm Best Management Practices in the EAA, the STAs should keep phosphorus inflows to the Everglades Protection Area from exceeding 50 ppb (South Florida Water Management District, 1994b). The Everglades Nutrient Removal Project is a prototype STA and operation was initiated in 1994 (South Florida Water Management district, 1994b). Data collected from this 1,600-ha constructed wetland will be used to refine and improve design, operation, and management of the Everglades Construction Project.

Occurrence and Distribution of Mercury

The build up of mercury in the environment is widespread in many parts of the world (National Academy of Sciences, 1978). Concentrations of mercury have increased worldwide in the atmosphere over the last 100 years, presumably as a result of industrialization. In Florida and particularly in the Everglades, the build up of mercury in bed sediment and biota has been pronounced (Atkeson, 1994). Analysis of bed-sediment cores in the Everglades indicates that mercury accumulation rates are presently about six times higher than in 1900 (Delfino and Crisman, 1993).

Most mercury entering the aquatic habitat from the atmosphere is primarily in the inorganic form. Mercury is then transformed by bacteria to the more toxic organic form (methyl mercury) in many aquatic systems. Most mercury detected in freshwater fish is methyl mercury (Grieb and others, 1990), which bioaccumulates through uptake from water or diet.

In 1989, high concentrations of mercury were detected in freshwater fish that were collected in a joint monitoring project by the FGFWFC, the Florida Health and Rehabilitative Services Department of Environmental Health, and the FDEP (Ware and others, 1990). Concentrations of mercury greater than 0.5 µg/kg were detected in largemouth bass collected from remote and urban lakes and rivers throughout Florida (Ware and others, 1990). Since that time, health advisories have been issued for more than 810,000 ha of aquatic habitat in southern Florida, including the BCNP, WCA-2, WCA-3, and the Shark River drainage in the ENP. During 1990-91, mercury concentrations were determined in largemouth bass from 53 sites in Florida. Mercury concentrations increased with fish age and size at all study sites, and exceeded the Florida health advisory standard (0.5 µg/kg) in fish from 24 of the 53 lakes sampled. Maximum concentrations of mercury detected in largemouth bass (4.4 mg/kg) and bowfin (7 mg/kg) from the Everglades are the highest concentrations detected in Florida (Stober and others, 1994).

A 1993 study of mercury in southern Florida indicated the presence of a north-to-south (high to low) gradient for total mercury and methyl mercury in water. Gradients were reversed (low to high) for total mercury in bed sediment and mosquito fish tissue (Stober and others, 1995). Bed sediment from Military Canal had the highest concentrations of mercury of any site in Dade County (SFWMD, 1994), and mobilization from the bed sediment into the food chain may occur. Mercury accumulation through the food web may suppress the breeding success of wading birds (Frederick and Spalding, 1994) and contribute to the endangered status of the Florida panther (Roelke and others, 1991).

Sources of mercury in southern Florida ecosystems are not well understood. Atmospheric transport and deposition from global and regional sources is one likely source. Periodic inundation of natural mineral and peat deposits during fluctuating water levels may facilitate mercury mobilization (Delfino and Crisman, 1993; Lange and others, 1993). Other waterborne sources may include release from limestone formations underlying the Everglades, and runoff from periodically burned croplands in the EAA. Definitive studies of the influence of water quality on mercury transformation and uptake are not complete, and at this time (1996) correlations between other water-quality constituents and mercury concentrations in biota have not been substantiated. Numerous studies of mercury occurrence and distribution in water, bed sediment, and biota, as well as process-oriented studies of mercury mobilization, transformation, and bioaccumulation, are underway in southern Florida (Mercury Technical Committee, 1991).

Endocrine Disruption and Other Effects of Pesticides on Biota

Pesticides and other organic compounds are detected throughout the ecosystems of the world (Simonich and Hites, 1995). The same suite of characteristics which make pesticides effective (persistence, low volatility, low water solubility, high lipid solubility, and low rate of biodegradation) also may lead to bioaccumulation and biomagnification with resultant toxicity in nontarget wildlife and humans (Bason and Colborn, 1992). Pesticide use is so widespread in southern Florida that documenting the extent of use is difficult (Scheidt, 1989). As of the late 1980's, at least 88 pesticide compounds were used in southern Florida agriculture (Scheidt, 1989). Principal regional pesticide uses include ground and aerial spraying of pesticides for agriculture, mosquito control, and aquatic weed control, and application of pesticides on golf courses, on residential property, and on power and transportation right-of-ways.

The only long-term pesticide monitoring program in southern Florida is carried out by the SFWMD; long-term quarterly monitoring sites for a suite of 68 pesticides in surface water and hydrosoil are confined to the canal system and no marsh sites are included (Scheidt, 1989). No ongoing programs to monitor pesticides in wildlife existed as of the late 1980's (Scheidt, 1989).

Fish were collected in the WCAs during 1971-72 and in the ENP during 1969-70 for pesticide analyses. Measurable concentrations of DDT (6–218 µg/kg), dieldrin (6–130 µg/kg), toxaphene (2,200–5,000 µg/kg), and PCBs (10–100 µg/kg) were detected in tissue from largemouth bass, bluegill, and several sunfish species (McPherson, 1973). No detectable concentrations of aldrin, endrin, heptachlor, lindane, or chlordane were measured in that study. Measurable concentrations of several pesticides including chlordane, oxychlordane, p,p DDE, and nonachlor were detected in fish fillet tissue samples collected in Collier County in 1995 (Al Ruth, Collier County Environmental Services Division, written commun., 1995). Measurable concentrations of endrin were detected in fish tissue samples collected in a remote area of Fakahatchee Strand State Preserve, and dieldrin was detected in fish tissue samples collected in Lake Trafford. The focus of recent monitoring efforts couples analyses of water and bed sediment with analyses of biota at various levels in the food chain (filterers, gatherers, predators) to obtain information on bioaccumulation and biomagnification of pesticides and other organic compounds.

A large number of pesticides and other organic compounds with widespread distribution in the environment are reported to have endocrine-disrupting effects (Colborn and others, 1993). Reproductive anomalies have been observed in fish, wading birds, the American alligator, and other animals living in ecosystems polluted by compounds that disrupt the endocrine system (Davis and Bradlow, 1995). The National Biological Service has collected fish from several sites in southern Florida as well as from numerous sites throughout the United States; analyses to determine estrogen/testosterone ratios were in progress in 1996 (Wade Bryant, National Biological Service, written commun., 1995). Coupled with analyses of fish tissue for the presence of pesticides and other organic compounds, these data may indicate areas in southern Florida where organisms are at greatest risk from pesticide contamination.

Spread of Exotic Plant and Animal Species

Exotic aquatic and wetlands plants are spreading rapidly through many parts of southern Florida. Invading plant species of greatest concern include melaleuca (*Melaleuca quinquinervia*), Australian pine (*Casuarina equisetifolia*), Brazilian pepper (*Schinus terebinthifolius*), hydrilla (*Hydrilla verticillata*), and water hyacinth (*Eichornia crassipes*) (Exotic Pest Plant Council, 1993). Melaleuca has invaded more than 200,000 ha in Florida. Infestations occur in Lake Okeechobee's marshes, the WCAs, the BCNP, and areas east of the ENP. The BCNP is vulnerable to invasion of aggressive exotic plant species, particularly in areas disturbed by off-road vehicles, fire-control activities, construction, and drainage projects. The northwestern quadrant of the BCNP is most vulnerable to establishment of melaleuca forest because of the area's deep sandy soils, which are preferred by melaleuca (Duever and others, 1986). Agricultural activities associated with conventional crop farming, including alteration of patterns of periodic floods and fires, have also facilitated the invasion of a number of exotic species especially in the northern part of the area (Duever, 1984).

By the early 1990s, 15 to 17 species of exotic fishes were considered to be well established in southern Florida, and at least 7 of these species were present in the Everglades (Robertson and Frederick, 1994).The detrimental effects of exotic fish species include predation on native fish species and competition with native fish species for habitat and food. These activities can result in negative impacts on animals at other levels of the food chain. However, some exotic fish species are highly productive in marsh habitats and may produce a significant amount of food for predatory bird species (Robertson and Frederick, 1994), thereby making these exotic fish species valuable to the food web in southern Florida. The National Biological Service is presently collecting data on distribution, abundance, and food habits of exotic fish species in southern Florida to assess their role and effect on the ecosystem.

SUMMARY

Historically, southern Florida surface waters were characterized by large areas of wetlands that were drained by numerous small coastal streams and several large rivers. Today, surface water exists in southern Florida in a complex system of highly modified and intensively managed wetlands, lakes, canals, and regulated rivers. Surface-water basins are not well-defined and discharge in some rivers and canals may cease or be reversed at times of the year when backpumping is used to manage local water levels and regional water supply. The quality of surface water has been and continues to be profoundly influenced by altered patterns of water flow, atmospheric deposition of nutrients and other contaminants, runoff from agriculture and livestock operations, phosphate mining, urban runoff, municipal wastewater discharge, and other human activities.

Development of a nutrient budget for southern Florida is a goal of several agencies involved in ecosystem restoration in the region. The relative contributions of various point and nonpoint sources of phosphorus and nitrogen were estimated in nine surface-water basins in the Southern Florida NAWQA study unit. Fertilizer and manure from agriculture account for much of the nutrient inputs. Fertilizer is the dominant source of phosphorus in eight basins and the dominant source of nitrogen in at least five basins. Canal inflow is the largest source of phosphorus input to Lake Okeechobee and the second largest source of nitrogen input to the lake. Atmospheric sources of nitrogen contribute more than 20 percent of the total nitrogen input to all basins and are the dominant source of nitrogen input to Lake Okeechobee and the Everglades.

Nutrient loads in selected canal and river outflows in southern Florida were estimated using data collected by the SFWMD and the USGS. Annual phosphorus loads from the Peace River are the highest in the study unit; annual phosphorus loads from the Caloosahatchee River and the major Palm Beach canals are also high, compared to other parts of southern Florida. Estimated annual loads of phosphorus from parts of the Big Cypress Basin and the S-12 water-control structures of the Tamiami Canal are low compared with estimated phosphorus loads in outflows in the northern part of the study unit. Annual nitrogen loads in southern Florida were highest in outflows from the Caloosahatchee River Basin and the major Palm Beach canals. Nitrogen loads in outflows from parts of the Big Cypress subbasin were lower than those estimated to the north.

The principal aquifers in southern Florida are the Biscayne aquifer, the surficial and intermediate aquifer systems, and the Floridan aquifer system. Waters in all the aquifer systems are primarily a calcium bicarbonate type, mostly because shell, limestone, or dolomite is abundant in the aquifers. The waters are generally hard to very hard. Ground water is the most important drinking-water resource in southern Florida; about 5.5 million people depend on ground water as a primary source of drinking water.

Ground water in southern Florida is vulnerable to contamination because of its close proximity to the surface. Ground-water contamination issues of greatest concern include: saltwater or brackish-water intrusion, nutrient enrichment, pesticides, metals and trace elements, volatile organic compounds, and radioactivity. Most contaminants reach the ground-water system in southern Florida indirectly through the land surface from landfill leachate, spills of industrial organic solvents, and areal application of fertilizers and pesticides; and directly from leaking fuel storage tanks, septic systems, and drainage wells. Saltwater or brackish water from remnant or recent seawater, and radioactivity from phosphatic deposits reach ground-water systems as a result of natural processes, but their occurrence may also be affected by human activities.

Wetlands are the dominant aquatic ecosystem type in the surface-water basins of southern Florida, and include the cypress forests of the Big Cypress Basin, the sawgrass marshes of the Everglades, and the mangrove forests of coastal waters. Freshwater wetlands merge with coastal wetlands and sustain them through seasonal sheetflow of waters with low nutrient concentrations. A large number of canals cut through the wetlands of southern Florida and are isolated from the ecosystems of the adjacent wetlands. These canals are often enriched with nutrients, are periodically dredged to facilitate maximum discharge, and have habitat characteristics very different from surrounding wetlands, natural rivers, and streams. The biological communities of aquatic ecosystems in southern Florida reflect past and present water-quality conditions and simultaneously influence the nature of future water quality through a series of complex and dynamic interactions.

The intensity and pervasive nature of human activities in southern Florida has had significant consequences for the ecology of the aquatic habitats in the region. Although there are many issues of importance to aquatic ecology in southern Florida, those which are critical to the ecosystem include: altered hydropatterns; the influence of nutrient enrichment; the occurrence and distribution of mercury; endocrine disruption and other effects of pesticides and other organic compounds; and the spread of exotic plant and animal species.The many factors influencing aquatic ecology in southern Florida interact in complex ways, with consequences of greater magnitude for the biota than those expected if the individual factors acted separately.

Surface-water quality, ground-water quality, and aquatic ecology in southern Florida are being studied (1996) in the context of ecosystem restoration by numerous Federal, State, and local agencies, and by private organizations. There is a widespread commitment to develop a fundamental understanding of ecosystem function in southern Florida. Efforts are underway to formulate and implement a broadly based, basin-wide water management strategy for the region in order to restore and maintain a sustainable ecosystem in southern Florida. The U.S. Geological Survey is a participant in these efforts, and the data collected in the Southern Florida NAWQA study unit will contribute to ecosystem restoration efforts in south Florida.

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Appendix

Data Sources and Computation Methods Used for Pie Diagrams of Estimated Nutrient Loads in Southern Florida

Fertilizer and Manure

Fertilizer and manure loads were calculated using a combination of county-level estimates for fertilizer and manure and large-scale land use and land cover (LULC) digital maps. Fertilizer estimates were obtained from the Florida Department of Agriculture and Consumer Services. Manure data were computed by R.B. Alexander (U.S. Geological Survey, written commun., 1992) using data on county animal populations obtained from the 1987 Census of Agriculture and the manure nutrient content in units of kilograms per year as N and P. Computations are based on estimates of the nutrient content of daily wastes produced per 454 kg of animal weight. Estimates obtained from the Soil Conservation Service, April 1992, the Agricultural Waste Management Field Handbook, Chapter 4. Estimates of nutrient content, in some cases, represent an average of the reported range of values or are assumed values.

Fertilizer and manure data were available for each county in the study unit, but not for the designated surface-water basins. In order to determine estimates for the designated surface-water basins, it was necessary to determine the proportion of cropland in the basins for fertilizer estimates and the proportion of other agricultural land in the basins for manure estimates, compared to total cropland and total other agricultural land in the county. The proportion of cropland was used to calculate the fertilizer use estimates for the basin. The proportion of other agricultural land was used to calculate the manure estimates for the basin.

The cropland estimates used are based on Water Management District (WMD) land cover and land use digital maps. The Southern Florida NAWQA study unit falls under the jurisdictions of three Water Management Districts: South Florida (SFWMD), Southwest Florida (SWFWMD), and St. Johns River (SJRWMD). The LULC data for SFWMD were compiled in 1988. SWFWMD LULC digital maps were compiled from aerial photography dated from 1989-91. SJRWMD LULC digital maps were compiled from aerial photography dated from 1986-91.

The specific LULC classification systems differed slightly between Water Management Districts. For SFWMD, the following LULC categories were used for the fertilizer calculations: cropland, including sugar cane, truck crops, rice groves, ornamentals, nurseries, tropical fruits, and sod farms. For manure calculations the following LULC categories were used: improved and unimproved pasture, confined feeding operations, including cattle, dairy, fish, horse, and poultry farms.

For SWFWMD and SJRWMD, the following categories were used for fertilizer calculations: row crops, field crops, citrus, fruit, other groves, tree nurseries, sod farms, ornamentals, vineyards, floriculture, and timber seedlings. For manure calculations, the following categories were used: pasture, improved pastured, woodland pasture, feeding operations, including, cattle, poultry, swine, horse, dairies, kennels, and fish farms.

Atmospheric Deposition

Three South Florida Water Management District precipitation-quality sites were used. These sites were selected where water quality could be matched with data from nearby daily precipitation-quality collectors. Only precipitation-quality data collected after March 1992 were used (when SFWMD began using NADP protocols). The precipitation-quantity data (wetfall only) were summed for the 7 days preceding the Tuesday morning collection of the precipitation-quality sample. This approach was used because precipitation often falls in the afternoon or evening during much of the year. If precipitation-quantity/quality data were missing, the nearest before and after data were averaged to compute an estimated value to avoid assuming zero loading during the gaps in data. To compute the weekly atmospheric loading, the 7-day sum of precipitation quantity in inches was multiplied by the concentration of total nitrogen or total phosphorus in milligrams per liter and by a conversion factor of 25.4 L kg mg^{-1} $inch^{-1}$ km^{-2} to get a weekly loading in kilograms per square kilometer. The weekly periods at the beginning and end of the 1- or 2-year summing period were adjusted by multiplying by the number of days in the period of computation and then dividing by 7 days. The weekly sums were then added together to get total atmospheric loading. If a 2-year period was summed the load was divided by 2 to get an annual atmospheric loading of total nitrogen or total phosphorus in kilograms (kg) of N or P per square kilometer (km^2) per year. The designated basins were converted to a grid consisting of 1-km^2 grid cells. The three annual average precipitation loadings were interpolated/extrapolated to the centers of the grid cells using the ARC/INFO inverse distance weighting function. The interpolated/extrapolated values were summed to produced total nitrogen and phosphorus loads per basin.

Total atmospheric deposition of nitrogen and phosphorus includes wet and dry components, although the dry deposition is generally not measured and is poorly understood (Edgerton and Lavery, 1990); total deposition is usually estimated using a ratio of dry to wet deposition (Gerald Morrison, South Florida Water Management District, written commun., 1992). Estimates of the dryfall to wetfall ratio in Florida range from 0.30 (CH_2M Hill, 1992) to 2.04 (Environmental Science and Engineering, 1977; Zarback and others, 1994). We have chosen the lower ratio as a conservative estimate for southern Florida and have multiplied the wet deposition by 1.3 to obtain a total atmospheric deposition.

Septic Tanks

The nitrogen and phosphorus loads for septic tanks were calculated using county estimates of septic tank numbers and drainage basin population data. The septic tank data were obtained from Marella (1994). In order to determine the number of septic tanks within each basin from the county estimate, the proportion of population within the basin was calculated from county population estimates for census block groups. For example, if 90 percent of a county's 1990 population lived within a given basin, then 90 percent of the septic tanks for that county were allocated to that basin.

In order to determine nitrogen and phosphorus loads from numbers of septic tanks, estimates were obtained for the amount of nitrogen and phosphorus potentially generated by a septic tank. According to Tchobanoglous (1991), 11 kg/yr of nitrogen and 4 kg/yr of phosphorus can be generated per septic tank. Therefore, the number of septic tanks in a given basin was multiplied by 11 and 4 to obtain nitrogen and phosphorus loads, respectively, for that basin.

Major Canals and Rivers

Loads of total phosphorus and total nitrogen from major canals and rivers were estimated for use in table 3 and figures 5 and 6. For most sites, these loads were estimated using average annual discharge during 1980-89 (South Florida Water Management District, 1993) reported in 1,000 acre-feet per year times the mean concentration of total phosphorus or total nitrogen (Germain, 1994) reported in milligrams per liter times a unit conversion factor of 1233.482 (L kg)/(thousands acre-ft mg). The computation was done using a FORTRAN program.

Loads for 3 major canals and rivers were computed from different data sources. Loads for the Peace River at Arcadia were computed from USGS discharge and nutrient-concentration data collected during 1984-93 using the Estimator program written by Timothy Cohn of the USGS. The use of Estimator is described by Baier and others (1993). The nutrient loads for the St. Lucie Canal were estimated using the mean USGS discharge data for the St. Lucie Canal at structure S80 collected during 1953-91 and the mean nutrient concentration data collected during 1989-91 by Germain (1994). Nutrient loads to the Big Cypress Basin were estimated from USGS discharge data collected during 1964-94 at 40-Mile Bend to Monroe and mean nutrient concentration data collected at Tamiami Trail Bridge 105, as reported in the SFWMD data base (DBHYDRO) from 1984-93.

Wastewater Treatment Facilities

Nitrogen and phosphorus loads generated by wastewater treatment facilities were calculated using wastewater discharge amounts and disposal source. The amount of nutrients in wastewater is determined primarily by the level of treatment. Most wastewater treatment in Florida is secondary (Sharon Sowicki, Florida Department of Environmental Protection, written commun., 1996). Only those facilities that discharged wastewater within the designated basins were included in the calculations. Wastewater treatment facilities that discharged treated wastewater directly to the Atlantic Ocean were removed from the calculations. According to David York (Florida Department of Environmental Protection, Draft Domestic Wastewater Management Section for Chapter 10 (Water Management Programs), Florida Water Atlas, table 1, written commun., 1996), secondarily treated wastewater can contain 15 mg/L nitrogen and 8 mg/L phosphorus, so these amounts, along with the discharge amounts, were used to determine nitrogen and phosphorus loads.

Everglades Agricultural Area Soil Subsidence and Sustainability[1]

Jehangir H. Bhadha, Alan L. Wright, and George H. Snyder[2]

Introduction

This document describes the soils in the Everglades Agricultural Area (EAA) and their gradual change over time. The EAA is an agricultural region south of Lake Okeechobee, Florida, growing primarily sugarcane in rotation with sweet corn, winter vegetables, sod, and rice. The objective is to describe soil losses in the EAA because this region was converted from wetlands to agricultural use, and to illustrate how these changes affect the future of agricultural sustainability in the region.

The organic soils (Histosols) of the EAA formed over a period of several thousand years when organic matter production exceeded decomposition in the flooded sawgrass prairies that flourished in the area south of Lake Okeechobee. Since the onset of drainage of the EAA soils in the early 1900s for crop production, organic matter decomposition has exceeded accretion, resulting in a loss of soil and lowering of the surface elevation, a process commonly referred to as *subsidence*. These Histosols are underlain by hard limestone bedrock, making subsidence all the more important, because cultivation of the bedrock by physically crushing the limestone and water management would be difficult.

These Histosols formed because the land was flooded for much of the year, resulting in insufficient oxygen in the soil to maintain active populations of aerobic microorganisms that decompose organic matter. Oxygen penetration into the soil increases upon drainage, stimulating the activity of aerobic microorganisms (Ponnamperuma 1984). These microorganisms then decompose the soil organic matter at a much higher rate compared to the anaerobic microorganisms that dominate in flooded soil (Tate and Terry 1980). As such, microbial activity as affected by drainage is considered the main factor influencing subsidence. Other factors can also influence soil subsidence, including loss of buoyancy following drainage, shrinkage, compaction caused by vehicular traffic, mineral content of the soil, and soil loss by wind erosion and burning. Each of these factors has likely been partly responsible for subsidence in the EAA. Within the EAA, Aich et al. (2013) estimated the subsidence to be approximately 6.5 feet, corresponding to 5 $\times 10^8$ metric tons of CO_2 being emitted to the atmosphere.

Soil Subsidence

Subsidence was observed as soon as the Everglades were drained in the early 1900s to remove water from soil to better support crop production. In 1924, a graduated concrete post was driven into the underlying bedrock at the UF/IFAS Everglades Research and Education Center (EREC) in Belle Glade, Florida. The soil surface was level with the top of the post, which is 9 feet in length (Figure 1). During a 43-year period from 1924 to 1967, there was

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a 48-inch decline in soil depth at the subsidence post, resulting in a subsidence rate of 1.12 inches/year (Figure 2). As of 2009, the soil depth at the site was 37 inches. From 1968 to 2009, the elevation reduction was 23 inches, for an average subsidence rate of 0.55 inches/year. From 2010 to 2019, the elevation reduction was 2.5 inches, resulting in an average subsidence rate of 0.25 inches/year. At this site, it is apparent that the soil subsidence rate has not remained constant through time, and in fact has decreased by 50% from 1924–1967 to 1968–2009, and by 55% from the period of 1968–2009 to 2010–2019.

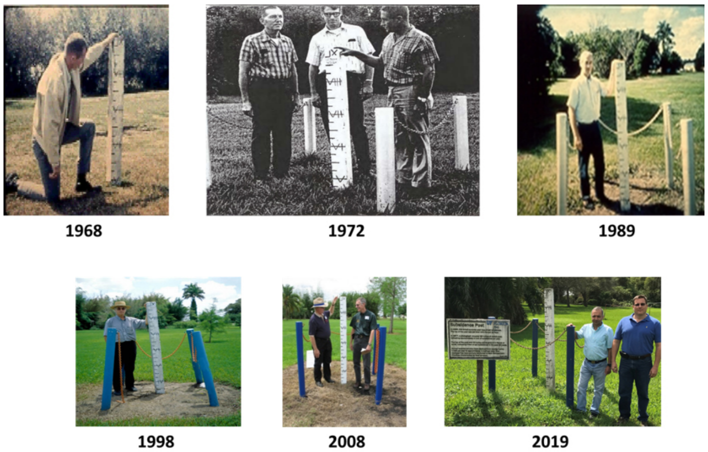

Figure 1. Soil subsidence post being used to visually document the change in soil loss since 1924. Note: This post is located at the EREC, in Belle Glade, FL, and may not be typical of other areas, because it has no crop and is drained most of the year.
Credits: Alan L. Wright, George H. Snyder, and Jehangir H. Bhadha, UF/IFAS

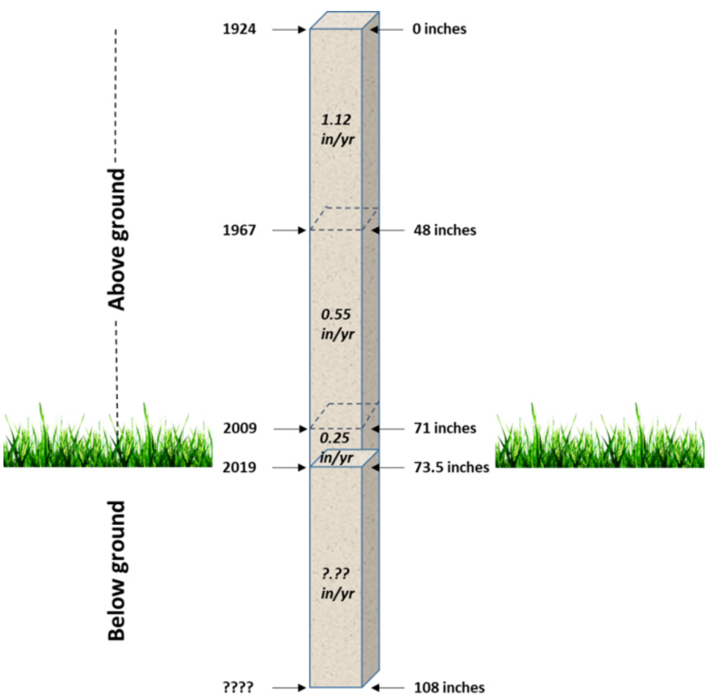

Figure 2. Changes in rate of soil subsidence since 1924.
Credits: Jehangir H. Bhadha, UF/IFAS

The rate of subsidence throughout the EAA has been investigated and documented in several other ways. The subsidence rate estimate at the EREC subsidence post coincides favorably with estimates obtained from transect lines monitored across the EAA (Shih et al. 1998). Starting in 1913, and further augmented in the 1930s, a series of transects (termed subsidence lines) were established in which the surface elevation relative to mean sea level was measured at 25-to-50-foot intervals for a distance of several thousand feet every 5 to 20 years. Two east-west elevation transects were made in 1912, and a much more detailed measurement of surface elevation was made throughout the entire Everglades in 1939–1940.

In the 1930s, a study was conducted at EREC to relate the rate of subsidence to the depth to water table (Neller 1944). Based on this study, Stephens and Johnson (1951) concluded that the subsidence rate would be one foot per decade, assuming that the water table is maintained at a depth of 18–24 inches. The resulting subsidence rate was calculated to be 1.2 inches/year, and this estimate was later substantiated by Shih et al. (1978) by monitoring the transect lines. Shih et al. (1998) measured surface elevation along the subsidence lines following a 19-year lapse in measurement and concluded that the subsidence rate during this period averaged 0.57 inches/year. This rate was significantly lower than the 1.2 inches/year calculated by Stephens and Johnson (1951), and Shih et al. (1998) speculated that maintenance of higher water tables after 1978 was one of the major reasons for the observed reduction in the subsidence rate.

It thus appears that the subsidence rate has shown a declining trend over time. Several potential mechanisms can explain this decline, including increased mineral content in soil (Figure 3), humification, and water management (maintenance of higher water tables).

One argument for a decrease in subsidence is that as these soils continue to get shallower, mineral matter composed mostly of calcium carbonate within the organic soil profile starts to increase. As the organic matter is decomposed, the mineral content, such as calcium carbonate, sand, or clay, does not change, and in fact, its proportion to the total soil increases as subsidence continues. This theory has been corroborated by the gradual increase in soil pH, from about 5.5 when these soils were drained (Wright et al. 2018) to as high as 8.0 in regions where the soils are shallow (Bhadha et al. 2018).

Figure 3. Presence of calcium carbonate in the form of limestone gets higher as the soils become shallow, raising the pH.
Credits: Alan L. Wright, UF/IFAS

As Histosols decompose, the easily degradable components are lost first, but the more resistant components persist longer, leading to decreases in the subsidence rate. The organic soils should become less easily oxidized with time as they become more humified and as the organic particles become more resistant to decomposition start to accumulate (Olk et al. 1996). In addition to accumulation of mineral matter, such a theory could predict or account for a reduced subsidence rate as soils become very thin (shallow) over bedrock.

Another major factor influencing the decline in the subsidence rate through time has been improved water management. It has been well documented that the subsidence rate is closely aligned with water table depth, because organic matter decomposition is impaired by flooded conditions (Stephens and Johnson 1951; Snyder et al. 1978). Implementation of best management practices (BMPs) in the mid-1990s has led to more water storage on EAA fields, which helps to slow organic matter decomposition and decrease the subsidence rate. The rate of oxidation of organic matter under flooded anaerobic conditions is significantly slower compared to aerobic conditions.

Current Trends

During the 1930s and 1940s, vegetables were the primary crops in the EAA, and they required good water control and did not tolerate flooded or waterlogged soils. Widespread adoption of sugarcane in the early 1960s led to changes in crop and land management practices, which increased water storage in EAA fields because sugarcane is more tolerant of flooded conditions. During the summer period, more than 50,000 acres of fallow sugarcane land is available for flooded rice production (Bhadha et al. 2016). In addition to being a food crop in Florida, production of flooded rice provides several benefits to the EAA agroecosystem. By flooding fields, growers greatly reduce the negative impacts from issues related to insect pests (Cherry et al. 2015). This in turn enhances the subsequent sugarcane crop and maximizes the longevity of the soil by reducing soil loss due to oxidation. Soil insecticides for wireworm control are rarely needed, if ever, when planting sugarcane after rice (Cherry 2014). Shih et al. (1982) also observed that temperature reduction in sugarcane fields decreased the subsidence rate by 16%. These two mechanisms (water and temperature) suggest that widespread cultivation of sugarcane contributed to a decrease in the rate of soil subsidence in recent years. Growers have also modified field operations in response to shallower soils by tilling less deeply and making fewer passes over the fields, which minimizes soil disturbance. Thus, growers have contributed to the reduction of the soil subsidence rate through their management practices. Continuation of BMP implementation by growers, development of crop cultivars more tolerant of flooded conditions, reduced tillage, and potential adoption of green manure crop rotations, will likely further minimize subsidence in the future and increase the longevity of these soils for agricultural use.

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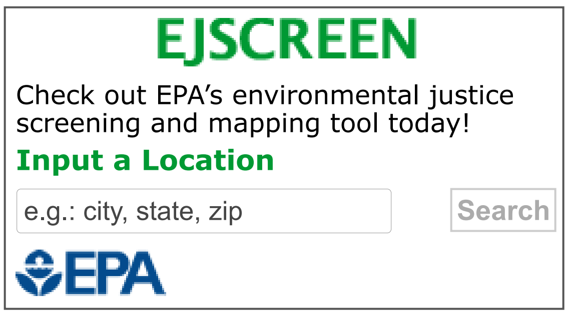

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LAST UPDATED ON MAY 25, 2021

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

September 20, 1999

MEMORANDUM

SUBJECT: State Implementation Plans: Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown

FROM: Steven A. Herman
Assistant Administrator for Enforcement and Compliance Assurance

Robert Perciasepe
Assistant Administrator for Air and Radiation

TO: Regional Administrators, Regions I - X

EPA's policy for state implementation plans (SIPs) regarding excess emissions during malfunctions, startup, shutdown, and maintenance is contained in memoranda from Kathleen Bennett, formerly Assistant Administrator for Air, Noise and Radiation dated September 28, 1982 and February 15, 1983. A recent review of SIPs suggests that several contain provisions that appear to be inconsistent with this policy, either because they were inadvertently approved after EPA issued the 1982-1983 guidance or because they were part of the SIP at that time and have never been removed. In order to address these provisions in a consistent manner, today we are reaffirming and supplementing the 1982-83 policy. In so doing, we are taking this opportunity to clarify several issues of interpretation that have arisen since that time. The updated policy will clarify the types of excess emissions provisions states may incorporate into SIPs so that they can in turn provide greater certainty to the regulated community.

As EPA stated in its 1982 memorandum, because excess emissions might aggravate air quality so as to prevent attainment or interfere with maintenance of the ambient air quality standards, EPA views all excess emissions as violations of the applicable emission limitation. Nevertheless, EPA recognizes that imposition of a penalty for sudden and unavoidable malfunctions caused by circumstances entirely beyond the control of the owner or operator may not be appropriate. Accordingly, a state or EPA can exercise its "enforcement discretion" to refrain from taking an enforcement action in these circumstances.

The main question of interpretation that has arisen regarding the old policy is whether a state may go beyond this "enforcement discretion" approach and include in its SIP a provision that would, in the context of an enforcement action for excess emissions, excuse a source from penalties if the source can demonstrate that it meets certain objective criteria (an "affirmative defense"). This policy clarifies that states have the discretion to provide such a defense to actions for penalties brought for excess emissions that arise during certain malfunction, startup, and shutdown episodes.

In the context of malfunctions, EPA recognizes that even equipment that is properly designed and maintained can sometimes fail. At the same time, EPA has a fundamental responsibility under the Clean Air Act to ensure that SIPs provide for attainment and maintenance of the national ambient air quality standards ("NAAQS")and protection of PSD increments. Thus, EPA cannot approve an affirmative defense provision that would undermine the fundamental requirement of attainment and maintenance of the NAAQS, or any other requirement of the Clean Air Act. See sections 110(a) and (l) of the Clean Air Act, 42 U.S.C. § 7410(a) and (l).[1] Accordingly, an acceptable affirmative defense provision may only apply to actions for penalties, but not to actions for injunctive relief. This restriction insures that both state and federal authorities remain able to protect air quality standards and PSD increments.

Furthermore, this approach is appropriate only when the respective contributions of individual sources to pollutant concentrations in ambient air are such that no single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments.[2] Where a single source or small

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[1]Pursuant to Section 110(l), EPA may not approve a SIP revision if "the revision would interfere with any applicable requirement concerning attainment and reasonable further progress, or any other applicable requirement of this chapter." See also CAA § 193, 42 U.S.C. § 7515, and the definitions of "emission limitation" and "emission standard" contained in CAA § 302(k), 42 U.S.C. § 7602(k).

[2] In the case of lead and sulfur dioxide, attainment problems usually are caused by one or a few sources and an affirmative defense is not appropriate. This situation can be

group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, EPA believes an affirmative defense approach will not be adequate to protect public health and the environment, and the only appropriate means of dealing with excess emissions during malfunction, startup, and shutdown episodes is through an enforcement discretion approach.[3]

EPA is also taking this opportunity to clarify that it does not intend to approve SIP revisions that would allow a state director’s decision to bar EPA’s or citizens' ability to enforce applicable requirements. Such an approach would be inconsistent with the regulatory scheme established in Title I of the Clean Air Act. EPA is also adding contemporaneous record keeping and notification criteria to make its policy regarding these types of events consistent with its enforcement approach.

Finally, EPA is clarifying how excess emissions that occur during periods of startup and shutdown should be addressed. In general, because excess emissions that occur during these periods are reasonably foreseeable, they should not be excused. However, EPA recognizes that, for some source categories, even the best available emissions control systems might not be consistently effective during startup or shutdown periods. In areas where the respective contributions of individual sources to pollutant concentrations in ambient air are such that no single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, these technological limitations may be addressed in the underlying standards themselves through narrowly-tailored SIP revisions that take into account the potential impacts on ambient air quality caused by the inclusion of these allowances. In these instances, as part of its justification of the SIP revision, the state should analyze the

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particularly aggravated where a short-term standard (e.g., where exceedances or violations are based on a few hour period) is also in place. Although this policy is generally applicable for other NAAQS, enforcement discretion is the only appropriate approach for dealing with excess emissions during startup, shutdown, and malfunction in a specific area where a single source or a small group of sources has the potential to cause nonattainment of a short-term NAAQS.

[3] In American Trucking Association v. EPA, 175 F. 3d 1027 (D.C. Circ., 1999), the court remanded the PM2.5 NAAQS to the EPA. The Agency has not determined whether this policy is appropriate for PM2.5 NAAQS.

impact of the potential worst-case emissions that could occur during startup and shutdown.[4]

In addition to this approach, states may address this problem through the use of enforcement discretion or they may include a general affirmative defense provision in their SIPs for short and infrequent startup and shutdown periods along the lines outlined in the attachment. As mentioned above, however, in those areas where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, issues relating to excess emissions arising during startup and shutdown may only be addressed through an enforcement discretion approach.

All Regions should review the SIPs for their states in light of this clarification and take steps to insure that excess emissions provisions in these SIPs are consistent with the attached guidance.

Attachment

[4]States may account for such emissions by including them in their routine rule effectiveness estimates. Rule effectiveness estimates may be prepared in accordance with an EPA policy document entitled “Guidelines for Estimating and Applying Rule Effectiveness for Ozone/Carbon Monoxide State Implementation Plan Base Year Inventories.” (EPA-452/R-92-010) November 1992.

Attachment

POLICY ON EXCESS EMISSIONS DURING MALFUNCTIONS, STARTUP, AND SHUTDOWN

Introduction

This policy specifies when and in what manner state implementation plans (SIPs) may provide for defenses to violations caused by periods of excess emissions due to malfunctions,[1] startup, or shutdown. Generally, since SIPs must provide for attainment and maintenance of the national ambient air quality standards and the achievement of PSD increments, all periods of excess emissions must be considered violations. Accordingly, any provision that allows for an automatic exemption[2] for excess emissions is prohibited.

However, the imposition of a penalty for excess emissions during malfunctions caused by circumstances entirely beyond the control of the owner or operator may not be appropriate. States may, therefore, as an exercise of their inherent enforcement discretion, choose not to penalize a source that has produced excess emissions under such circumstances.

This policy provides an alternative approach to enforcement discretion for areas and pollutants where the respective contributions of individual sources to pollutant concentrations in ambient air are such that no single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments. Where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, as is often the case for sulfur dioxide and lead,[3] EPA believes approaches other than enforcement discretion are not appropriate. In such cases, any excess emissions may have a significant chance of causing an exceedance or violation of the applicable standard or PSD increment.

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[1]The term <u>excess emission</u> means an air emission level which exceeds any applicable emission limitation. <u>Malfunction</u> means a sudden and unavoidable breakdown of process or control equipment.

[2]The term <u>automatic exemption</u> means a generally applicable provision in a SIP that would provide that if certain conditions existed during a period of excess emissions, then those exceedances would not be considered violations.

[3]This policy also does not apply for purposes of PM2.5 NAAQS. In American Trucking Association v. EPA, 175 F. 3d 1027 (D.C. Circ., 1999), the court remanded the PM2.5 NAAQS to the EPA. The Agency has not determined whether this policy is appropriate for PM2.5 NAAQS.

Except where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, states may include in their SIPs affirmative defenses[4] for excess emissions, as long as the SIP establishes limitations consistent with those set out below. If approved into a SIP, an affirmative defense would be available to sources in an enforcement action seeking penalties brought by the state, EPA, or citizens. However, a determination by the state not to take an enforcement action would not bar EPA or citizen action.[5]

In addition, in certain limited circumstances, it may be appropriate for the state to build into a source-specific or source-category-specific emission standard a provision stating that the otherwise applicable emission limitations do not apply during narrowly defined startup and shutdown periods.

I. AUTOMATIC EXEMPTIONS AND ENFORCEMENT DISCRETION

If a SIP contains a provision addressing excess emissions, it cannot be the type that provides for automatic exemptions. Automatic exemptions might aggravate ambient air quality by excusing excess emissions that cause or contribute to a violation of an ambient air quality standard. Additional grounds for disapproving a SIP that includes the automatic exemption approach are discussed in more detail at 42 Fed. Reg. 58171 (November 8, 1977) and 42 Fed. Reg. 21372 (April 27, 1977). As a result, EPA will not approve any SIP revisions that provide automatic exemptions for periods of excess emissions.

The best assurance that excess emissions will not interfere with NAAQS attainment, maintenance, or increments is to address excess emissions through enforcement discretion. This policy provides alternative means for addressing excess emissions of criteria pollutants. However, this policy does not apply where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments. Moreover,

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[4]The term affirmative defense means, in the context of an enforcement proceeding, a response or defense put forward by a defendant, regarding which the defendant has the burden of proof, and the merits of which are independently and objectively evaluated in a judicial or administrative proceeding.

[5]Because all periods of excess emissions are violations and because affirmative defense provisions may not apply in actions for injunctive relief, under no circumstances would EPA consider periods of excess emissions, even if covered by an affirmative defense, to be “federally permitted releases” under EPCRA or CERCLA.

nothing in this guidance should be construed as requiring states to include affirmative defense provisions in their SIPs.

II. AFFIRMATIVE DEFENSES FOR MALFUNCTIONS

EPA can approve a SIP revision that creates an affirmative defense to claims for penalties in enforcement actions regarding excess emissions caused by malfunctions as long as the defense does not apply to SIP provisions that derive from federally promulgated performance standards or emission limits, such as new source performance standards (NSPS) and national emissions standards for hazardous air pollutants (NESHAPS).[6] In addition, affirmative defenses are not appropriate for areas and pollutants where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments. Furthermore, affirmative defenses to claims for injunctive relief are not allowed. To be approved, an affirmative defense provision must provide that the defendant has the burden of proof of demonstrating that:

1. The excess emissions were caused by a sudden, unavoidable breakdown of technology, beyond the control of the owner or operator;

2. The excess emissions (a) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (b) could not have been avoided by better operation and maintenance practices;

3. To the maximum extent practicable the air pollution control equipment or processes were maintained and operated in a manner consistent with good practice for minimizing emissions;

4. Repairs were made in an expeditious fashion when the operator knew or should have known that applicable emission limitations were being exceeded. Off-shift labor and overtime must have been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;

5. The amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions;

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[6]To the extent a state includes NSPS or NESHAPS in its SIP, the standards should not deviate from those that were federally promulgated. Because EPA set these standards taking into account technological limitations, additional exemptions would be inappropriate.

6. All possible steps were taken to minimize the impact of the excess emissions on ambient air quality;

7. All emission monitoring systems were kept in operation if at all possible;

8. The owner or operator's actions in response to the excess emissions were documented by properly signed, contemporaneous operating logs, or other relevant evidence;

9. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

10. The owner or operator properly and promptly notified the appropriate regulatory authority.

EPA interprets these criteria narrowly. Only those malfunctions that are sudden, unavoidable, and unpredictable in nature qualify for the defense. For example, a single instance of a burst pipe that meets the above criteria may qualify under an affirmative defense. The defense would not be available, however, if the facility had a history of similar failures because of improper design, improper maintenance, or poor operating practices. Furthermore, a source must have taken all available measures to compensate for and resolve the malfunction. If a facility has a baghouse fire that leads to excess emissions, the affirmative defense would be appropriate only for the period of time necessary to modify or curtail operations to come into compliance. The fire should not be used to excuse excess emissions generated during an extended period of time while the operator orders and installs new bags, and relevant SIP language must limit applicability of the affirmative defense accordingly.

III. EXCESS EMISSIONS DURING STARTUP AND SHUTDOWN

In general, startup and shutdown of process equipment are part of the normal operation of a source and should be accounted for in the planning, design, and implementation of operating procedures for the process and control equipment. Accordingly, it is reasonable to expect that careful and prudent planning and design will eliminate violations of emission limitations during such periods.

A. SOURCE CATEGORY SPECIFIC RULES FOR STARTUP AND SHUTDOWN

For some source categories, given the types of control technologies available, there may exist short periods of emissions during startup and shutdown when, despite best efforts regarding planning, design, and operating procedures, the otherwise applicable emission limitation cannot be met. Accordingly, except in the case where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, it may be appropriate, in consultation with EPA, to create narrowly-tailored SIP revisions that take these technological limitations into account and state that the otherwise applicable emissions limitations do not apply during narrowly defined startup and shutdown periods. To be approved, these revisions should meet the following requirements:

1. The revision must be limited to specific, narrowly-defined source categories using specific control strategies (e.g., cogeneration facilities burning natural gas and using selective catalytic reduction);

2. Use of the control strategy for this source category must be technically infeasible during startup or shutdown periods;

3. The frequency and duration of operation in startup or shutdown mode must be minimized to the maximum extent practicable;

4. As part of its justification of the SIP revision, the state should analyze the potential worst-case emissions that could occur during startup and shutdown;

5. All possible steps must be taken to minimize the impact of emissions during startup and shutdown on ambient air quality;

6. At all times, the facility must be operated in a manner consistent with good practice for minimizing emissions, and the source must have used best efforts regarding planning, design, and operating procedures to meet the otherwise applicable emission limitation; and

7. The owner or operator's actions during startup and shutdown periods must be documented by properly signed, contemporaneous operating logs, or other relevant evidence.

B. GENERAL AFFIRMATIVE DEFENSE PROVISIONS RELATING TO STARTUP AND SHUTDOWN

In addition to the approach outlined in Section II(A) above, states may address the problem of excess emissions occurring during startup and shutdown periods through an enforcement discretion approach. Further, except in the case where a single source or small group of sources has the potential to cause an exceedance of the NAAQS or PSD increments, states may also adopt for their SIPs an affirmative defense approach. Using this approach, all periods of excess emissions arising during startup and shutdown must be treated as violations, and the affirmative defense provision must not be available for claims for injunctive relief. Furthermore, to be approved, such a provision must provide that the defendant has the burden of proof of demonstrating that:

1. The periods of excess emissions that occurred during startup and shutdown were short and infrequent and could not have been prevented through careful planning and design;

2. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

3. If the excess emissions were caused by a bypass (an intentional diversion of control equipment), then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

4. At all times, the facility was operated in a manner consistent with good practice for minimizing emissions;

5. The frequency and duration of operation in startup or shutdown mode was minimized to the maximum extent practicable;

6. All possible steps were taken to minimize the impact of the excess emissions on ambient air quality;

7. All emission monitoring systems were kept in operation if at all possible;

8. The owner or operator's actions during the period of excess emissions were documented by properly signed, contemporaneous operating logs, or other relevant evidence; and

9. The owner or operator properly and promptly notified the appropriate regulatory authority.

If excess emissions occur during routine startup or shutdown periods due to a malfunction, then those instances should be treated as other malfunctions that are subject to the malfunction provisions of this policy. (Reference Part I above).

LANCE R. LEFLEUR
DIRECTOR

ADEM

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KAY IVEY
GOVERNOR

November 17, 2017

Roy Baggett
Manager of Environmental Affairs
Sanders Lead Company
100 Sanders Road
Troy, Alabama 36081

Re: Air Permit
Facility No.: 201-0005
Permit No.: X034

Dear Mr. Baggett:

The enclosed Air Permit is issued pursuant to the Department's air pollution control rules and regulations. Please note the conditions that must be observed in order to retain these permits.

New sources of air pollution receiving approval by an Air Permit should provide written notification to the Chief of the Air Division upon completion of construction and prior to the planned operation. This notification should indicate whether the project was completed as proposed in the permit application. If the notification states that the project was constructed as proposed, a Temporary Authorization to Operate will be sent which authorizes the facility to operate until any required emissions tests are completed or until a Department inspector verifies the information in the notification.

Your cooperation in this matter is appreciated. If you have any questions or require clarification of permit conditions, please contact Jennifer Youngpeter in Montgomery at (334) 270-5676 or by e-mail at jennifer.youngpeter@adem.alabama.gov.

Sincerely,

Ronald W. Gore, Chief
Air Division

RWG/jsy

ADEM
Alabama Department of Environmental Management

AIR PERMIT

PERMITTEE: SANDERS LEAD COMPANY

FACILITY NAME: SANDERS LEAD COMPANY

LOCATION: TROY, PIKE COUNTY, ALABAMA

PERMIT NUMBER	DESCRIPTION OF EQUIPMENT, ARTICLE, OR DEVICE
210-0005-X034	Ammonia Injection Scrubber (Stack 15) including: • Baghouse No. 1 o Blast Furnace No. 1 w/ Afterburner No. 1 o Blast Furnace No. 2 w/ Afterburner No. 2 o Agglomeration Furnace • Baghouse No. 5 o Blast Furnace No. 3 w/ Afterburner No. 3 o Blast Furnace No. 4 w/ Afterburner No. 4

In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, Ala. Code §§22-28-1 to 22-28-23 (2006 Rplc. Vol and 2007 Cum. Supp.) (the "AAPCA") and the Alabama Environmental Management Act, as amended, Ala. Code §§22-22A-1 to 22-22A-15 (2006 Rplc. Vol and 2007 Cum. Supp.), and rules and regulations adopted there under, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and use the equipment, device or other article described above.

ISSUANCE DATE: NOVEMBER 17, 2017

Ronald for

Alabama Department of Environmental Management

SANDERS LEAD COMPANY
TROY, ALABAMA
(PERMIT NO. 210-0005-X034)
PROVISOS

General Permit Provisos

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.

2. This permit is not transferable. Upon sale or legal transfer, the new owner or operator must apply for a permit within 30 days.

3. A new permit application must be made for new sources, replacements, alterations or design changes which may result in the issuance of, or an increase in the issuance of, air contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants.

4. Each point of emission, which requires testing, will be provided with sampling ports, ladders, platforms, and other safety equipment to facilitate testing performed in accordance with procedures established by Part 60 of Title 40 of the Code of Federal Regulations, as the same may be amended or revised.

5. All air pollution control equipment shall be operated at all times while this process is operational. In the event of scheduled maintenance, unscheduled maintenance, or a breakdown of the pollution control equipment, the process shall be shutdown as expeditiously as possible (unless this act and subsequent re-start would clearly cause greater emissions than continuing operations of the process for a short period). The Department shall be notified of all such events **that exceed 1 hour** within 24 hours. The notification shall include all pertinent facts, including the duration of the process operating without the control device and the level of excess emissions which have occurred. Records of all such events, regardless of reporting requirements, shall be made and maintained for a period of five years. These records shall be available for inspection.

6. In the event there is a breakdown of equipment in such a manner as to cause increased emission of air contaminants for a period greater than **1 hour**, the person responsible for such equipment shall notify the Air Division within an additional 24 hours and provide a statement giving all pertinent facts, including the duration of the breakdown. The Air Division shall be notified when the breakdown has been corrected.

7. All deviations from requirements within this permit shall be reported to the Department within 48 hours of the deviation or by the next work day while providing a statement with regards to the date, time, duration, cause, and corrective actions taken to bring the sources back into compliance.

8. This process, including all air pollution control devices and capture systems for which this permit is issued shall be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants shall be established.

9. This permit expires and the application is cancelled if construction has not begun within 24 months of the date of issuance of the permit.

10. On completion of construction of the device(s) for which this permit is issued, written notification of the fact is to be submitted to the Chief of the Air Division. The notification shall indicate whether the device(s) was constructed as proposed in the application. The device(s) shall not be operated until authorization to operate is granted by the Chief of the Air Division. Failure to notify the Chief of the Air Division of completion of construction and/or operation without authorization could result in revocation of this permit.

11. Prior to a date to be specified by the Chief of the Air Division in the authorization to operate, emission tests are to be conducted by persons familiar with and using the EPA Sampling Train and Test Procedure as described in the Code of Federal Regulations, Title 40, Part 60, for the following pollutants. Written tests results are to be reported to the Air Division within 60 working days of completion of testing.

Particulates	(X)	Carbon Monoxide	( )
Sulfur Dioxide	(X)	Nitrogen Oxides	( )
Volatile Organic Compounds	( )	Total Hydrocarbons	(X)
Lead	(X)	Dioxins and Furans	(X)

12. Submittal of other reports regarding monitoring records, fuel analyses, operating rates, and equipment malfunctions may be required as authorized in the Department's air pollution control rules and regulations. The Department may require stack emission testing at any time.

13. Additions and revisions to the conditions of this Permit will be made, if necessary, to ensure that the Department's air pollution control rules and regulations are not violated.

14. Nothing in this permit or conditions thereto shall negate any authority granted to the Air Division pursuant to the Alabama Environmental Management Act or regulations issued thereunder.

15. This permit is issued with the condition that, should obnoxious odors arising from the plant operations be verified by Air Division inspectors, measures to abate the odorous emissions shall be taken upon a determination by the Alabama Department of Environmental Management that these measures are technically and economically feasible.

16. The Air Division must be notified in writing at least 10 working days in advance of all emission tests to be conducted and submitted as proof of compliance with the Department's air pollution control rules and regulations.

    To avoid problems concerning testing methods and procedures, the following shall be included with the notification letter:

a. The date the test crew is expected to arrive, the date and time anticipated of the start of the first run, how many and which sources are to be tested, and the names of the persons and/or testing company that will conduct the tests.

b. A complete description of each sampling train to be used, including type of media used in determining gas stream components, type of probe lining, type of filter media, and probe cleaning method and solvent to be used (if test procedure requires probe cleaning).

c. A description of the process(es) to be tested, including the feed rate, any operating parameter used to control or influence the operations, and the rated capacity.

d. A sketch or sketches showing sampling point locations and their relative positions to the nearest upstream and downstream gas flow disturbances.

A pretest meeting may be held at the request of the source owner or the Department. The necessity for such a meeting and the required attendees will be determined on a case-by-case basis.

All test reports must be submitted to the Air Division within 30 days of the actual completion of the test, unless an extension of time is specifically approved by the Air Division.

17. Records will be maintained of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the process equipment and any malfunction of the air pollution control equipment. These records will be kept in a permanent form suitable for inspection and will be retained for at least two years following the date of each occurrence.

18. Precautions shall be taken to prevent fugitive dust emanating from plant roads, grounds, stockpiles, screens, dryers, hoppers, ductwork, etc.

Plant or haul roads and grounds will be maintained in the following manner so that dust will not become airborne. A minimum of one, or a combination, of the following methods shall be utilized to minimize airborne dust from plant or haul roads and grounds:

(a) by the application of water any time the surface of the road is sufficiently dry to allow the creation of dust emissions by the act of wind or vehicular traffic;

(b) by reducing the speed of vehicular traffic to a point below that at which dust emissions are created;

(c) by paving;

(d) by the application of binders to the road surface at any time the road surface is found to allow the creation of dust emissions;

Should one, or a combination, of the above methods fail to adequately reduce airborne dust from plant or haul roads and grounds, alternative methods shall be employed, either exclusively or in combination with one or all of the above control techniques, so that dust will not become airborne. Alternative methods shall be approved by the Department prior to utilization.

19. Any performance tests required shall be conducted and data reduced in accordance with the test methods and procedures contained in each specific permit condition unless the Director (1) specifies or approves, in specific cases, the use of a reference method with minor changes in

methodology, (2) approves the use of an equivalent method, or (3) approves the use of an alternative method, the results of which he has determined to be adequate for indicating whether a specific source is in compliance.

20. The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege.

21. The permittee shall not use as a defense in an enforcement action that maintaining compliance with conditions of this permit would have required halting or reducing the permitted activity.

22. The permittee shall keep this permit under file or on display at all times at the site where the facility for which the permit is issued is located and shall make the permit readily available for inspection by any or all persons who may request to see it.

23. The permittee shall submit an annual compliance certification to the Department no later than 60 days following the anniversary of the permittee's Title V permit. The compliance certification shall include the following:

    (a) The compliance certification shall include the following:

        a. The identification of each term or condition of this permit that is the basis of the certification;

        b. The compliance status;

        c. The method(s) used for determining the compliance status of the source, currently and over the reporting period consistent with Rule 335-3-16-.05(c) (Monitoring and Recordkeeping Requirements);

        d. Whether compliance has been continuous or intermittent; and

        e. Such other facts as the Department may require in order to determine the compliance status of the source.

    (b) The compliance certification shall be submitted to:

Alabama Department of Environmental Management
Air Division
P.O. Box 301463
Montgomery, AL 36130-1463

Ammonia Injection Scrubber (Stack 15) including:

Baghouse No. 1 [Blast Furnace No. 1 w/ Afterburner No.1, Blast Furnace No. 2 w/ Afterburner No. 2, Agglomeration Furnace]

Baghouse No. 5 [Blast Furnace No. 3 w/ Afterburner No.3, Blast Furnace No. 4 w/ Afterburner No. 4]

	Regulations
Applicability	
1. This source has enforceable limits in place in order to provide for the attainment of the National Ambient Air Quality Standards.	Rule 335-3-1-.03
2. This source is subject to the applicable requirements of ADEM Admin. Code r. 335-3-4-.15, "*Control of Particulate Emissions from Secondary Lead Smelters.*"	Rule 335-3-4-.15
3. This source is subject to the applicable requirements of ADEM Admin. Code r. 335-3-14-.04, "*Air Permits Authorizing Construction in Clean Air Areas [Prevention of Significant Deterioration Permitting (PSD)].*"	Rule 335-3-14-.04 [PSD/BACT]
4. This source has enforceable limits in place in order to prevent it from being subject to the provisions of ADEM Admin. Code r. 335-3-14-.04.	Rule 335-3-14-.04 [Anti-PSD]
5. This source is subject to the applicable requirements of ADEM Admin. Code r. 335-3-16, "*Major Source Operating Permits.*"	Rule 335-3-16-.03
6. This source is subject to the applicable requirements of 40 CFR part 60, subpart L, "*Standards of Performance for Secondary Lead Smelters.*"	40 CFR 60.120(a) Rule 335-3-10-.02(12)
7. This source is subject to the applicable requirements of 40 CFR part 60, subpart A, "*General Provisions.*"	40 CFR 60.1(a)
8. This source is subject to the applicable requirements of 40 CFR part 63, subpart X, "*National Emission Standards for Hazardous Air Pollutants from Secondary Lead Smelting.*"	40 CFR 63.541(a) Rule 335-3-11-.06(23)
9. This source is subject to the applicable requirements of 40 CFR part 63, subpart A, "*General Provisions*" as listed in Table 1 of subpart X.	Table 1 of subpart X
Emission Standards	
1. Particulate matter (PM) emissions from Stack 15 shall not exceed a mass emission rate of 5.28 lb/hr.	Rule 335-3-1-.03

	Regulations
2. Lead emissions from Stack 15 shall not exceed 0.00043 gr/dscf and a mass emission rate of 0.258 lb/hr.	Rule 335-3-1-.03 40 CFR 63.543(a)
3. Sulfur Dioxide (SO_2) emissions from Stack 15 shall not exceed a mass emission rate of 315 lb/hr, based on a rolling three hour average.	Rule 335-3-1-.03
4. Volatile Organic Compound (VOC) emissions, as total gaseous non methane organics (TGNMO), from Stack 15 shall not exceed the following mass emission rates: a. 17 lb/hr if one blast furnace is operating b. 34 lb/hr if two blast furnaces are operating c. 50 lb/hr if three blast furnaces are operating d. 66 lb/hr if all blast furnaces are operating	Rule 335-3-14-.04 [Anti-PSD]
5. Carbon monoxide (CO) emissions from Stack 15 shall not exceed the following mass emission rates: a. 325 lb/hr if one blast furnace is operating b. 650 lb/hr if two blast furnaces are operating c. 975 lb/hr if three blast furnaces are operating d. 1,300 lb/hr if all blast furnaces are operating	Rule 335-3-14-.04 [Anti-PSD]
6. The afterburner exit temperatures for the blast furnaces must be maintained at or above 1,300°F, based on a rolling three hour average.	Rule 335-3-14-.04 [Anti-PSD]
7. The opacity of emissions from Stack 15 and its associated sources shall not exceed that designated as 20% opacity.	40 CFR 60.122(a)(2)
8. Total Hydrocarbon (THC) emissions from Stack 15 shall not exceed 360 ppmv, expressed as propane corrected to 4% carbon dioxide.	40 CFR 63.543(d)
9. Dioxin and Furan (D/F) emissions from Stack 15 shall not exceed 170 nanograms/dscm, expressed as TEQ corrected to 7% O_2.	40 CFR 63.543(d)
10. These sources shall be operated in a total enclosure that is maintained at negative pressure at all times and vented to a control device(s) designed to capture lead emissions.	Rule 335-3-1-.03 40 CFR 63.544(a)

	Regulations
11. The dust handling systems associated with Baghouse No. 1 and Baghouse No. 5 shall be enclosed to prevent fugitive emissions from these handling systems.	Rule 335-3-1-.03 40 CFR 63.544(a)
12. If an exceedance of the 2008 Lead National Ambient Air Quality Standard occurs during any three month period, Sanders Lead Company shall, within 180 days, complete and submit a plan to identify which stack or stacks will be raised and to what extent. Sanders Lead Company shall have to plan implemented within 18 months of the exceedance.	Rule 335-3-1-.03
13. The Ammonia Injection Scrubber will be operational and Sanders Lead Company shall be in compliance with the above stated limits no later than October 1, 2019.	Rule 335-3-14-.04
Compliance and Performance Test Methods and Procedures	
1. Method 5 of 40 CFR part 60, appendix A shall be used in the determination of PM emissions.	Rule 335-3-1-.05
2. Method 6C of 40 CFR part 60, appendix A shall be used in the determination of SO_2 emissions.	Rule 335-3-1-.05
3. Method 9 of 40 CFR part 60, appendix A shall be used in the determination of opacity of the stack emissions.	Rule 335-3-1-.05
4. Method 9 of 40 CFR part 60, appendix A, excluding Section 2.5, shall be used in the determination of opacity of emissions escaping the capture system from the charge doors, slag traps, and lead traps.	Rule 335-3-4-.15(6)
5. Method 10 of 40 CFR part 60, appendix A shall be used in the determination of CO emissions.	Rule 335-3-1-.05
6. Method 12 or 29 of 40 CFR part 60, appendix A shall be used in the determination of lead compound emissions.	40 CFR 63.547(a)(5)
7. Method 25 of 40 CFR part 60, appendix A shall be used in the determination of VOC (TGNMO) emissions.	Rule 335-3-1-.05
8. Method 25A of 40 CFR part 60, appendix A shall be used in the determination of THC emissions.	40 CFR 63.547(b)(4)
9. Method 23 of 40 CFR part 60, appendix A shall be used in the determination of D/F emissions.	40 CFR 63.547(d)(5)

	Regulations
10. Alternative test methods may be used provided prior approval by the Department is granted.	
Emission Monitoring	
1. This source is subject to the monitoring requirements in §63.548 of 40 CFR part 63, subpart X.	40 CFR 63.548
2. A standard operating procedures (SOP) manual shall be prepared and adhered to as required by §63.548(a). The SOP manual must, at a minimum, include the requirements of §63.548(c) and (d).	40 CFR 63.548(a)-(d)
3. To demonstrate compliance with the lead and PM limits, the following requirements shall be adhered to:	
a. Performance tests for lead emissions shall be conducted according to the schedule in §63.543(g).	40 CFR 63.543(g)
b. Each baghouse shall be equipped with a continuous opacity monitoring system (COMS).	Rule 335-3-14-.04
i. The COMS shall be operated and maintained according to the procedures in Performance Specification 1 of 40 CFR part 60, appendix B.	
ii. The COMS will be operated on a primary scale as opacity monitors with a scale of 0-100% opacity.	
1. A deviation is defined as an opacity measurements exceeding 10.0% on a six minute average (50% of the limit). An excursion triggers an immediate inspection and corrective action. Excursions shall be reported in accordance with the SOP manual.	
iii. The COMS will be operated on a secondary scale as bag leak detectors with a scale of 0-20% opacity and an alarm set point at 50% of the scale.	
1. A deviation is defined as an alarm at 50% of the scale. In the event of an excursion, a determination shall be made regarding the need for an inspection and corrective action. If an inspection and corrective action are necessary,	

	Regulations
a record of the inspection and action taken shall be kept in accordance with the SOP manual.	
iv. The COMS are located at the baghouse outlets and measure the opacity continuously.	
c. Baghouse system operation and maintenance inspections shall be conducted in accordance with the SOP manual.	40 CFR 63.548(c)-(d)
d. The baghouses shall be operated at all times according to a SOP manual that has been reviewed and approved by the Department.	40 CFR 63.548(b)
4. To demonstrate compliance with the CO, VOC (TGNMO), THC, and D/F limits, the following requirements shall be adhered to:	
a. Performance tests for THC emissions shall be conducted according to the schedule in §63.543(h).	40 CFR 63.543(h)
b. A performance test for D/F emissions shall be conducted at least once every 6 years.	40 CFR 63.543(i)
c. Afterburner exit temperature will be used to demonstrate compliance with these limits.	Rule 335-3-14-.04
i. The afterburner's exit temperatures shall be continuously monitored and recorded by thermocouples. The thermocouples shall be operated in a manner consistent with the requirements in §63.8.	40 CFR 63.548(j)(1)
1. A deviation is defined as a temperature drop greater than 50°F below the average temperature recorded during the most recent stack test, based on a running 3-hour average.	40 CFR 63.548(j)(4)
d. The thermocouple systems on each afterburner shall be inspected daily.	Rule 335-3-14-.04
e. The burner systems of each afterburner shall be inspected and tuned annually.	Rule 335-3-14-.04
5. To demonstrate compliance with the SO_2 limit, the following requirements shall be adhered to:	

	Regulations
a. The scrubber shall be equipped with a continuous emissions monitor system (CEMS) to measure the SO_2 emission rate. i. The CEMS shall be operated and maintained according to the procedures in Performance Specification 2 of 40 CFR part 60, appendix B. ii. A deviation is defined as a SO_2 emission rate greater than 315 lb/hr, based on a rolling 3-hour average. A deviation triggers an immediate inspection and corrective action. Deviations shall be reported to the Department within 48 hours, or two business days. iii. The CEMS will be located in the scrubber stack.	Rule 335-3-14-.04
b. Sanders shall establish a normal pressure differential across the scrubber and monitor and record the pressure differential at least once per shift. i. Corrective action shall be taken within two (2) hours if the pressure differential falls out of the range established by the facility. A deviation is defined as failure to take corrective action. ii. The pressure gauge must be calibrated, operated, and maintained according to the manufacturer's guidance.	Rule 335-3-14-.04
6. Ambient air monitoring shall be conducted once the scrubber is installed and operational. The type, number, and location of these instruments must be approved by the Director. Collected data is to be submitted to this agency in a format and at a frequency specified by the Director.	Rule 335-3-14-.04
7. The Permittee shall install, operate and maintain a digital differential pressure monitoring system to continuously monitor each total enclosure.	40 CFR 63.548(k)
Recordkeeping and Reporting Requirements	
1. All upsets, accidents, or other events that create or cause higher than expected lead-bearing emissions that may impact ambient air quality will be reported to the Department. A monthly summary report of these events will be submitted to the Department no later than the tenth day of the following month. In the event that no upsets occur, a letter to that effect will be submitted to the Department for that month.	Rule 335-3-14-.04

	Regulations
2. An Excess Emissions report for Stack 15 shall be submitted to the Department quarterly. The report will include the following information: a. *Opacity*: The magnitude of emissions in excess of 20% opacity as computed from 6-minute averages. *SO_2*: Emission rates in excess of 315 lb/hr as computed from a rolling 3-hour average. *Afterburner Exit Temperature*: Each reading below 1,300°F as computed from a rolling 3-hour average. *Note*: Data recorded during periods of monitor system breakdowns, maintenance, adjustments, and calibration checks shall not be included in any of the above data averages. b. The date and time each excess emissions event commenced and ended. c. The nature and cause of the excess emissions (if known) and the corrective action(s) taken or preventative measure(s) adopted. d. The date and time of each period during which any of the monitors were inoperative (excepting zero and span checks) and the nature of the repairs or adjustments. e. The equations used to convert SO_2 emissions data as monitored to the required reporting standard (lb/hr). f. If, during a reporting period, no excess emission events occur and the monitoring systems are operable at all times, a statement to that effect will be included in the report. g. The report will be submitted according to the following schedule:	Rule 335-3-14-.04

Reporting Period	Submittal Date
January 1st through March 31st	*April 30th*
April 1st through June 30th	*July 30th*
July 1st through September 30th	*October 30th*
October 1st through December 31st	*January 30th*

	Regulations
3. Should the emissions from Stack 15 exceed a 6-minute average opacity of 20%, the Department will be notified immediately. A decision will be made as to whether operations can continue or must be suspended until corrective measures are taken.	Rule 335-3-14-.04
4. The facility shall maintain a record of when each furnace is operating.	Rule 335-3-14-.04
5. The facility shall maintain a record of the pressure drop across the scrubber. This shall include all problems observed and corrective action taken.	Rule 335-3-14-.04
6. The facility shall comply with the recordkeeping and recording requirements in §63.10.	40 CFR 63.550(a)
7. The facility shall comply with the recordkeeping and reporting requirements in §63.550.	40 CFR 63.550
8. All records shall be maintained for a period of at least five (5) years in a form suitable for inspection.	Rule 335-3-1-.04

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The Location and Community Demographics of Targeted Environmental Hazardous Sites in Florida

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THE LOCATION AND COMMUNITY DEMOGRAPHICS OF TARGETED ENVIRONMENTAL HAZARDOUS SITES IN FLORIDA

Submitted in Part to the Florida Environmental Equity and Justice Commission

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Table of Contents

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The founding principle upon which this nation was established is that all persons were initially created equal and are entitled to have their individual human dignity respected. This guarantee of equal treatment has been carried forward in explicit provisions of our federal and state constitutions. It is not by chance that the words "Equal Justice Under Law" have been placed for all to see above the entrance to this nation's highest court.[1]

I. INTRODUCTION

On a basic level, notions of justice and equity are fundamental principles to which our legal and political systems aspire. Likewise, in facing environmental concerns, justice and equity are emerging standards.[2] In response to a question on what "environmental equity and justice" is, Representative Josephus Eggelletion, Jr., said: "It is a debate about everyone having equal access to environmental protection."[3] Thus, the goal of environmental justice is to administer the protections afforded by our legal and political systems justly and equally to all individuals and communities, not to distribute pollution.

In 1994, the Florida Legislature created the Environmental Equity and Justice Commission (Commission).[4] The seventeen member commission, appointed by Governor Lawton Chiles, included representatives from the state legislature, state and local government agencies, business and industry, environmental advocacy groups, and grass-roots community organizations.[5] The enabling legislation charged the Commission with the task of determining whether environmental hazards are disproportionately located in minority and low income communities in Florida.[6] Thus, Florida became one of

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1. Powell v. Allstate Ins. Co., 652 So. 2d 354, 358 (Fla. 1995) (Anstead, J., writing for the majority).

2. *See* PAT COSTNER & JOE THORNTON, PLAYING WITH FIRE: HAZARDOUS WASTE INCINERATION (A GREENPEACE REPORT) 49 (1991) ("Protection of public health and the environment is, in its entirety, a matter of political and social justice.").

3. Maribel N. Nicholson & Ralph A. DeMeo, *Air of Equality: An Analysis of Florida's Environmental Equity and Justice Act*, 68 FLA. BAR J. 112, 112 (Oct. 1994). The Legislature found that "the term `environmental equity' generally refers to consideration of the distribution of environmental risks across population groups and to governmental policy responses to such risk distribution." 1994 Fla. Laws 94-219 (whereas clause of session law).

4. 1994 Fla. Laws ch. 94-219 (codified at FLA. STAT. §§ 760.85-.853 (1995)).

5. *See* FLA. STAT. §§ 760.85(2)(a)-(k) (1995). The members of the Commission were Representative Josephus Eggelletion, Jr., Eugene Ravenel, Lee Ann Clements, President Frederick Humphries, Charlan Jackson-Sanders, Cynthia Laramore, Pepe Menendez, Marible Nicholson-Choice, Julian Perez, Stan Posey, Debbie Romanello, Suzi Ruhl, Andree Sanders, Dan Thompson, Senator William Turner (co-sponsor), Peter Ware, and Margaret Williams. Representative Eggelletion, co-sponsor of the enabling legislation, served as chairperson of the Commission.

6. *See* 1994 Fla. Laws ch. 94-219. The Legislature declared

the first states to sponsor and fund a state-wide study into the issues of environmental justice. The Commission was organized into six reporting subcommittees: (1) Rules and Non-Rules Policies of the Florida Department of Environmental Protection (DEP); (2) Health Effects and Risks; (3) Enforcement and Evaluation; (4) Local Government Site Placement; (5) Case Studies; and (6) Proximity and Demographic Analysis.[7]

This article comprises the proximity and demographic analysis report to the Commission. Accordingly, Part II of this article reviews the environmental justice movement in the United States and cites previous research on environmental equity and justice issues in Florida. Part III discusses the methodology that the Commission used for the proximity and demographic analysis. Part IV presents and discusses the results of the Commission's analyses, discussing the demographic characteristics of Florida, the blockgroup proximity to targeted sites, and the relationship between proximity and demographics. Finally, this article concludes that targeted environmental hazardous waste sites are disproportionately located in minority and low income areas in Florida and urges that further research is necessary to expand the scope of the Commission's analyses.

II. BACKGROUND

A. *Environmental Equity and Justice Issues*

The environmental justice movement can be traced backed to the late 1970s and early 1980s. Large-scale tragedies—such as the poisoning of the entire community of Love Canal[8] by 21,800 tons of buried toxic chemicals in 1978[9] and Union Carbide's 1984 release of a

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> there is an affirmative interest in determining within Florida whether penalties assessed against violators in sites located in white communities are disproportionately larger than penalties assessed against polluters in minority communities; whether hazardous waste site evaluations are conducted more slowly and start of cleanup efforts are delayed longer in minority communities; and whether containment as opposed to cleanup is more frequently selected in minority communities.

Id. (whereas clause of session law).

7. Section 760.85(5), *Florida Statutes* (1995) requires that "[t]he commission shall conduct a scientific analysis, including case studies, and submit a written report to the Speaker of the House of Representatives . . . ." FLA. STAT. § 760.85(5) (1995). It is this scientific analysis that is presented in this article.

8. *See* MICHAEL H. BROWN, LAYING WASTE: THE POISONING OF AMERICA BY TOXIC CHEMICALS 24-27 (1980); *see also* Sidney M. Wolf, *Public Opposition to Hazardous Waste Sites: The Self-Defeating Approach to National Hazardous Waste Control Under Subtitle C of the Resource Conservation and Recovery Act of 1976*, 8 B.C. ENVTL. AFF. L. REV. 463, 467 n.13 (1980) (describing the Love Canal tragedy).

9. *See* LOIS M. GIBBS, DYING FROM DIOXIN: A CITIZEN'S GUIDE TO RECLAIMING OUR HEALTH AND REBUILDING DEMOCRACY xvii (1995); *see also* Ronald A. Christaldi, *Book Review, Dying from Dioxin: A Citizen's Guide to Reclaiming Our Health and Rebuilding Democracy*, 11 J. LAND USE &

highly toxic pesticide in Bhopal, India which killed more than 2000 people and injured over 200,000 others[10]—raised world-wide consciousness to the potential magnitude of environmental tragedies in the modern world.[11] But it was not only wide-scale tragedies, such as those in Love Canal or Bhopal, that concerned many Americans; many began to realize the potential for negative effects from many of the facilities that existed in their own communities.[12] On a fundamental level, questions concerning the value of human health and the environment in relation to monetary and industrial interests arose.[13] In an effort to respond to these concerns,[14] Congress passed the Emergency Planning and Community Right to Know Act of 1986 (EPCRA),[15] empowering citizens with critical information, raising environmental awareness, and purporting to offer environmental protections.[16]

In 1983, the federal government, led by the District of Columbia delegate and the chairman of the Congressional Black Caucus, Walter Fauntroy, directed the United States General Accounting Office (GAO) "to determine the correlation between the location of hazardous waste landfills and the racial and economic status of

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ENVTL. L. 467, 467-68 (1996) (offering background on the Love Canal tragedy and reviewing Gibbs' book).

10. *See* Paul Shrivastava, Bhopal: Anatomy of a Crisis 64-67 (1987); *see also* WARD MOREHOUSE & M. ARUN SUBRAMANIAM, THE BHOPAL TRAGEDY: WHAT REALLY HAPPENED AND WHAT IT MEANS FOR AMERICAN WORKERS AND COMMUNITIES AT RISK vii (1986); Symposium, *The Bhopal Tragedy: Social and Legal Issues,* 20 TEX. INT'L L.J. 267, 269 (1985).

11. *See generally* Viki Reath, *The Media's Perspective,* 9 ST. JOHN'S J. LEGAL COMMENT. 531 (1994) (commenting that "the media will have an impact on the environmental justice movement . . . [because] there is a sense of reality that comes through the television, newspapers, and magazines").

12. *See* Douglas L. Anderton et al., *Hazardous Waste Facilities: "Environmental Equity" Issues in Metropolitan Areas,* 18 EVALUATION REV. 123, 123-24 (1994).

13. *See, e.g.,* Heather Fisher Lindsay, *Balancing Community Needs Against Individual Desires,* 10 J. LAND USE & ENVTL. L. 371, 373 (1995) (presenting a radical challenge to traditional views on property and questioning the current level of significance placed on human health and the environment where profits are concerned); *cf.* Frank B. Cross, *Natural Resource Damage Valuation,* 42 VAND. L. REV. 269, 302-09 (1989) (describing how market valuation operates).

14. *See Carbide Accident May Speed Controls, Right-to-Know, Emergency Response Rules,* 16 Envtl. Rep. (BNA) 635 (Aug. 16, 1985).

15. Pub. L. No. 99-499, tit. III, § 300(a), 100 Stat. 1729 (1986) (codified as amended at 42 U.S.C. §§ 11001-11050 (1988 & Supp. V 1993)); *see* Sidney M. Wolf, *Fear and Loathing About the Public Right to Know: The Surprising Success of the Emergency Planning and Community Right-to-Know Act,* 11 J. LAND USE & ENVTL. L. 217, 218-19 (1996); *see also* Steven J. Christiansen & Stephen H. Urquhart, *The Emergency Planning and Community Right to Know Act of 1986: Analysis and Update,* 6 B.Y.U. J. PUB. L. 235, 235-36 (1992).

16. EPCRA has two main objectives. The first objective is "to provide the public access to information concerning hazardous chemicals in the community." Christiansen, *supra* note 15, at 236. The second objective is "to use [the provided information] to formulate and administer local emergency response plans in case of hazardous chemical release." *Id.*

surrounding communities."[17] This was the first wide-scale review of environmental justice studies.[18] The GAO study concluded that three out of four communities where hazardous waste landfills were sited contained a majority of African Americans.[19]

In 1987, the United Church of Christ Commission for Racial Justice (CRJ) found a significant correlation between the number of minorities in a community and the existence of a toxic waste site exists in that area.[20] The CRJ report stated that "three out of every five Black and Hispanic Americans live[] in communities with uncontrolled toxic waste sites."[21] This led some to conclude that minorities were disproportionately harmed both at their jobs and in their communities.[22]

However, despite the resounding conclusions of the CRJ study and the fact that it has been revisited with similar results,[23] critics have consistently challenged the findings of the CRJ study. Some have suggested that market dynamics, not race or poverty, is the most significant factor in the siting of these undesirable land uses.[24] Others studies have challenged the methodology of the CRJ study,[25] the reliability of the data used,[26] and even the conclusions of the study.[27]

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17. *See* Anderton et al., *supra* note 12, at 126.

18. *See id.*

19. *See* U.S. GENERAL ACCOUNTING OFFICE, SITING OF HAZARDOUS WASTE LANDFILLS AND THEIR CORRELATION WITH RACIAL AND ECONOMIC STATUS OF SURROUNDING COMMUNITIES 3 (1983); *see also* Anderton et al., *supra* note 12, at 126.

20. *See* UNITED CHURCH OF CHRIST COMMISSION FOR RACIAL JUSTICE, TOXIC WASTES AND RACE IN THE UNITED STATES 13 (1987) [hereinafter United Church of Christ].

21. *Id.* ("This figure represents more than 15 million African Americans and 8 million Hispanics. Approximately 2 million Asian/Pacific Islanders and 700,000 American Indians lived in such communities.").

22. *See* Robert D. Bullard, *Anatomy of Environmental Racism and the Environmental Justice Movement*, *in* CONFRONTING ENVIRONMENTAL RACISM, VOICES FROM THE GRASSROOTS 15 (R. Bullard ed., 1993); *see also* Luke W. Cole, *Empowerment as the Key to Environmental Protection: The Need for Environmental Poverty Law*, 19 ECOLOGY L.Q. 619, 620 (1992).

23. *See generally* BENJAMIN A. GOLDMAN & LAURA FITTON, TOXIC WASTES AND RACE REVISITED: AN UPDATE OF THE 1987 REPORT ON THE RACIAL AND SOCIOECONOMIC CHARACTERISTICS OF COMMUNITIES WITH HAZARDOUS WASTE SITES (1994).

24. *See, e.g.*, Vicki Been, *Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics?*, 103 YALE L.J. 1383, 1388-92 (1994) (discussing market dynamics and the distribution of undesirable land uses).

25. *See* Vicki Been, *Analyzing Evidence of Environmental Justice*, 11 J. LAND USE & ENVTL. L. 1, 2-8 (1995). *Contra* Colin Crawford, *Analyzing Environmental Justice Evidence: A Suggestion for Professor Been*, 12 J. LAND USE & ENVTL. L. 104 (1996).

26. *See* Been, *supra* note 25, at 8-12; *see also* Vicki Been, *What's Fairness Got to do With It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001, 1009 n.39 (1993).

27. *See* JOHN MICHAEL OAKES ET. AL., SOCIAL AND DEMOGRAPHIC RESEARCH INSTITUTE (SADRI), ENVIRONMENTAL INEQUITY, INDUSTRIAL SITING, AND THE STRUCTURE OF AMERICAN CITIES 2-3 (1994) [hereinafter SADRI study]; *see also* Douglas L. Anderton et al., *Environmental*

The Environmental Justice movement has created two paths of inquiry. The first considers the distribution of both benefits and burdens.[28] Regardless of the process, if the outcome results in a disproportionate number of LULUs in disadvantaged or minority communities, then an injustice exists.[29] The second investigative level focuses on the process and concerns itself with whether the same criteria are applied in each siting.[30] If the same criteria are applied at each site, no injustice exists.[31] However, these levels are not mutually exclusive. The Environmental Justice movement is concerned with both the process and the outcome.[32] Given this dual concern, those concerned with issues of environmental justice and equity gather data on "the distributional implications of the way in which our society seeks to manage environmental threats and improve and protect environmental quality."[33] The Environmental Justice movement sought a fair distribution of those hazards.[34]

To the extent that the environmental justice debate has focused on why hazardous facilities are disproportionately located in minority or other disadvantaged communities, it has missed the mark. There are four relevant questions from a societal viewpoint. The first is whether disproportionate sitings exist. If so, the second question is whether these disproportionate sitings have detrimental effects on

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Equity: Evaluating TSDF Siting Over the Past Two Decades, Waste Age, July 1994, at 100. Although the SADRI study found no significant correlation between race and the siting of locally undesireable land uses (LULUs), it has been criticized because it was funded in part by the waste management industry. *See* Anderton et al., *supra* note 12, at 123-24 (authors' note).

28. *See* Michael Greenberg, *Proving Environmental Inequity in Siting Locally Unwanted Land Uses*, 4 RISK: ISSUES IN HEALTH & SAFETY 235, 236 (1993).

29. *See id.* Mr. Greenberg identifies "inequities" rather than "injustices" in his discussion of the movement.

30. *See id.*

31. *See id.* (commenting that if "appropriate environmental, health, physical, legal, economic, and political criteria are applied to every area, then the results are fair even if they disproportionately burden some groups and benefit others").

32. *See* Symposium, *Race, Class, and Environmental Regulation*, 63 U. COLO. L. REV. 839, 840 (1992). For an overview of the general goals and concerns of the Environmental Justice Movement, see Bullard, *supra* note 22, at 15, 17-19

33. Been, *supra* note 25, at 1; *see also* Richard J. Lazarus, *Pursuing "Environmental Justice:" The Distributive Effects of Environmental Protection*, 57 NW. U. L. REV. 787, 787-88 (1993). The impetus of these investigations into the distributional impacts is often traced to the protests against the siting of a landfill in an African American community in Warren County, North Carolina in 1982. *See, e.g.*, Rachel D. Godsil, Note, *Remedying Environmental Racism*, 90 MICH. L. REV. 394 (1991) (commenting that while the protesters' campaign failed, the protest "focused national attention on the relationship between pollution and minority communities").

34. *See* Richard J. Lazarus, *The Meaning and Promotion of Environmental Justice*, 4 MD. J. CONTEMP. LEGAL ISSUES 1, 1 (1993) ("'Environmental Justice' focuses on the distribution of environmental hazards across society and seeks a fair distribution of those hazards."); *see also* Richard J. Lazarus, *Distribution in Environmental Justice: Is There a Middle Ground?*, 9 ST. JOHN'S J. LEGAL COMMENT. 481, 483-84 (1994).

their host communities. If both of these questions are affirmatively answered, then one must ask whether the disproportional siting is due to a problem in the process, the outcome, or both. Finally, if it is established that such a problem exists, that its effects are negative, and that the locus of the problem is located, then potential solutions to that problem must be explored.

B. Environmental Equity and Justice Issues in Florida

In a report to the Public Interest Law Section of the Florida Bar, Dr. M. Elliot Vittes presented findings on the proximity of minority groups to Toxic Release Inventory (TRI)[35] facilities (SWS).[36] Demographic information was identified at the census block group summary level.[37] The proximity of Florida's block groups to the closest TRI reporting facility was measured by triangulation and reported in units of miles.[38] Dr. Vittes reported that race, ethnicity, and income are critical in explaining proximity.[39] Minority and low income households were found to be over-represented at closer proximities and under-represented at farther proximities.[40] The same results held true even when other contributing factors, such as (1) urban versus overall population; (2) manufacturing versus all workers; (3) median house age; and (4) median house value were controlled for using regression analysis.[41] When Dr. Vittes included other pollution sources, such as (1) air point source emissions; (2) treaters, storers and disposers (TSDs) of Resource, Conservation and Recovery Act (RCRA)[42] hazardous waste; and (3) National Priority

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35. Section 313 of EPCRA requires manufacturing facilities that surpass threshold levels measured in quantity of toxic chemicals to submit an annual report outlining that facilities use, manufacture, or processing of several hundred toxic chemicals. *See* 42 U.S.C. § 11023 (1988 & Supp. V 1993). This data is compiled by the United States Environmental Protection Agency (EPA) and is collectively known as the TRI. *See* Wolf, *supra* note 15, at 229-30. Because of the critical information that this report provides to the general public, section 313 has been called "[t]he most far-reaching, important and controversial right-to-know provision in EPCRA." *Id.* at 229.

36. *See* M. ELLIOT VITTES & PHILLIP H. POLLOCK, III, POVERTY, POLLUTION AND SOLID AND HAZARDOUS WASTE SITING: HOW STRONG ARE THE LINKS? (1994). Dr. Vittes conducted that study at the University of Central Florida in Orlando. *See* Nicholson & DeMeo, *supra* note 3, at 113.

37. *See* VITTES, *supra* note 36, at 4. The 1990 census data, the most recent data available, was used. *See id.*; *see also* MARK T. MATTSON, ATLAS OF THE 1990 CENSUS (1992) (outlining the data collected in the 1990 census).

38. *See* VITTES, *supra* note 36, at 4.

39. *See* M. ELLIOT VITTES & PHILLIP H. POLLOCK, III, RESEARCH ON ENVIRONMENTAL EQUITY ISSUES IN FLORIDA (1994).

40. *See id.*

41. *See* VITTES, *supra* note 36, at 6.

42. The Resource, Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (1976) (codified as amended at 42 U.S.C. §§ 6921-6939e (1988 & Supp. V 1993)). RCRA is

List (NPL)[43] and non-NPL sites, his previous findings were reinforced.[44] TRI facilities represented "the closest facilities for three-quarters of the households in Florida, making them an important indicator of potential pollution exposure."[45] Black households were over-represented at close distances to each source, and low income Black households were at a higher ratio compared to low income White households.[46] With communities ostensibly suffering detrimental environmental and health consequences,[47] the time has come for action. It is with this background that the Florida Legislature charged the Commission with the examination of the possible disproportionate location of targeted environmental hazardous sites in minority and low income communities in Florida.

C. *Targeted Environmental Hazardous Sites*

The term environmental hazard can refer to a wide variety of phenomena that have the potential to cause adverse health effects by emitting toxic and/or hazardous chemical and substances into the environment.[48] Targeted environmental hazardous sites were defined by the enabling legislation as "a representative sample of sites in both minority and low-income neighborhoods, as well as other socioeconomic neighborhoods."[49] Other targeted sites included businesses and facilities regulated by DEP.[50] DEP-regulated businesses included government-owned facilities, facilities regulated by

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actually an amendment to the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k. *See* Robert L. Rhodes, *Federal Resource Conservation and Recovery Act*, *in* FLORIDA ENVIRONMENTAL AND LAND USE LAW 11-1, 11-3 (1991 & Supp. 1995) (outlining RCRA).

43. The NPL is a list of hazardous substance releases that are prioritized over other sites for long term evaluation and response. *See* 40 C.F.R. § 300.5 (1995). For a discussion of the NPL, see WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: HAZARDOUS WASTES AND SUBSTANCES 573-77 (1992 & Supp. 1996). By 1990, the NPL had 1246 sites listed, with governmental estimates that 1700 sites could be added by the year 2020. *See id.* at 573 (1992), 68-69 n.73 (Supp. 1996).

44. *See* M. ELLIOT VITTES & PHILLIP H. POLLOCK, III, POVERTY, POLLUTION, AND SOLID AND HAZARDOUS WASTE SITING: THE LINKAGE FOR DIFFERENT SOURCES 44 (1994).

45. *Id.* at 50.

46. *See id.* at 46.

47. For example, the community of Pensacola, Florida has been suffering horrible effects from continual toxic poisoning. *See* Bill Kaczor, *Residents Live and Die Under the Shadow of Mount Dioxin*, TALLAHASSEE DEM., Feb. 18, 1996, at 10B; *see also EPA to Move Families from Toxic Site*, TAMPA TRIBUNE, Oct. 4, 1996, at Florida/Metro 7; Christaldi, *supra* note 9, at n.20; Luke W. Cole, *Environmental Justice in the Classroom: Real Life Lessons for Law Students*, 96 W. VA. L. REV. 1051 (1994); Crawford, *supra* note 25 (discussing a case study in Mississippi); Greenburg, *supra* note 28, at 247-50 (discussing a New Jersey case study).

48. *See* H. STEVEN DASHEFSKY, ENVIRONMENTAL LITERACY 118 (1993). Hazardous waste "refers to all substances that pose an immediate or long-term danger to the health or well-being of humans or to the environment . . . ." *Id.*

49. FLA. STAT. § 760.85(5)(a) (1995).

50. *See id.*

DEP through delegation to any local governments or water management districts, and Superfund NPL sites.[51]

The Commission subsequently selected six different types of hazardous sites for review: (1) landfills, disposal, reduction, and resource recovery sites (FLS); (2) large quantity generators (LQG); (3) NPL sites; (4) solid waste facilities (SWF); (5) TRI reporting facilities; and (6) TSD facilities. In all, 3,287 targeted environmental hazardous sites were identified and located in Florida. (*See* Table 1).

1. National Priority List

The most serious environmental hazardous waste sites in Florida are those listed by the EPA on the Superfund NPL. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)[52] was extended and amended by the Superfund Amendments and Reauthorization Act (SARA)[53] in 1986. This legislation classifies priority sites eligible for federally-funded clean-up and remediation.[54] Most of the NPL sites have multiple contaminants and contaminated media.[55] The primary contaminants found at the fifty-nine NPL sites in Florida include: heavy metals such as arsenic, cadmium, chromium, lead, manganese, nickel, and zinc at 78% of the sites; volatile organic compounds (VOCs) at 64% of the sites; polychlorinated biphenyls (PCBs) at 17% of the sites; pesticides and herbicides at 17%; creasotes at 16% of the sites; petrochemicals and explosives at 7% of the sites; and a broad category of other chemicals including cyanide, fluoride, nitrate, sulfate and ammonia at 5% of the sites; dioxin, acids, and gases at 2% of the sites.[56] Contaminated media include groundwater at 93% of the sites, soil at 84%, surface water at 44%, sediments at 28%, and air at 3%.[57]

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51. *See id.*

52. Pub. L. No. 96-510. tit. I, § 101, 94 Stat. 2767 (1980) (codified as amended at 42 U.S.C. §§ 9601-9675 (1988 & Supp. V 1993)). One of the principle purposes of CERCLA was "to achieve prompt cleanup of hazardous waste sites and to impose the cost of cleanup on those responsible for contamination." Richard L. Bradford, *The Personal Injury Endorsement: An Unwarranted Straining To Obtain Insurance Coverage for Environmental Damage,* 11 J. LAND USE & ENVTL. L. 111, 115-16 (1995); *see also* City & County of Denver v. Adolph Coors Co., 829 F. Supp. 340, 344 (D. Colo. 1993).

53. Pub. L. No. 99-499, 100 Stat. 1613 (1986) (codified as amended at 42 U.S.C. §§ 9601-9675 (1988 & Supp. V 1993)). For an overview of the SARA amendments, see Timothy B. Atkeson et al., *Analysis of the Superfund Amendments and Reauthorization Act of 1986, in* SUPERFUND DESK-BOOK 1-58 (1986).

54. *See* 40 C.F.R. § 300.5 (1995).

55. *See* FLORIDA CENTER FOR PUBLIC MANAGEMENT, COMPARING FLORIDA'S ENVIRONMENTAL RISK: RISK TO FLORIDA AND FLORIDIANS, Technical Appendix 102 (Sept. 1995) [hereinafter Florida's Risk].

56. *See id.*

57. *See id.*

Different activities are responsible for hazardous waste site contamination, including recyclers, storage and disposal facilities, and landfills responsible for 43%; manufacturing facilities responsible for 22%; chemical and pesticide manufacturers responsible for 14%; petroleum and refining operations responsible for 9%; federal facilities responsible for 7%; and electroplating operations responsible for 5%.[58]

2. *Florida List Sites*

Thirty-nine state-funded action sites (FLS) in Florida are managed and remediated by DEP's Bureau of Waste Cleanup.[59] Designation as a state-funded site is based upon the measurement of the relative risk to public health, the likelihood of groundwater contamination, and the potential for harmful contamination of the environment.[60] Twenty-one of these state-funded sites are active sites with on-going remediation, while eighteen have been remediated to the point where they no longer pose a threat to humans or the environment.[61] Most "active sites have contaminants which have significantly impacted ground water quality."[62] These sites include landfills and dumps, gas and/or petroleum sites, chemical manufacturers and/or processors, industrial solvent disposal sites, pesticide disposal sites, electroplaters, wood preserving sites, waste oil disposal sites, battery recyclers, and other lead recovery sites.[63] The multiple contaminants found in the groundwater and soil at these sites include but are not limited to polycyclic aromatic hydrocarbons (PAHs) such as benzo[a]pyrene, PCBs, perchloroethylene (PCE), dichlorodiphenyltrichloroethane (DDT), and its metabolite dichlorodiphenyldichloroethane (DDD), and metals such as arsenic, chromium, copper, lead and zinc.[64] Activities responsible for the contamination are primarily former industrial and manufacturing facilities, and gasoline service stations.[65]

58. *See id.* at 338.
59. *See id.* at 220.
60. *See id.* at 338.
61. *See id.* at 42.
62. *Id.*
63. *See id.* at 102.
64. *See id.* at 103.
65. *See id.*

3. Toxics Release Inventory

EPCRA mandated TRI reporting.[66] Over 500 TRI facilities in Florida are required to submit estimates of their permitted and accidental release emissions to the TRI database, which provides release information for entire geographic areas.[67] Five compounds account for over 60% of the TRI releases and transfers in the state: phosphoric acid (24%), methanol (16%), ammonia (10%), hydrochloric acid (6%), and ammonium nitrate solution (4.8%).[68] The main sources for these releases and transfers are phosphate mining and the manufacture and production of fertilizer, pulp paper, and aluminum.[69] Based upon volume estimates, the most commonly released chemicals in Florida are ammonia, sulfuric acid, and chlorine.[70] Facilities which "typically use or store these chemicals include refrigeration facilities (e.g., beverage plants and supermarket warehouses), wastewater treatment plants, drinking water plants, wholesalers and chemical manufacturers" and utilities.[71] In 1992 approximately 16,175 pounds of ammonia, 410 pounds of chlorine, and 96,631 pounds of sulfuric acid were accidentally released, above permitted levels, into the environment.[72] Based upon the TRI emissions data for 1993, approximately 24,856,630 pounds of phosphoric acid, 7,398,672 pounds of ammonia, 6,576,113 pounds of methanol and 6,203,007 pounds of hydrochloric acid were released by permit into the environment.[73] Other chemicals emitted included sulfuric acid, chlorine, acetone, and toluene.[74]

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66. *See* discussion *supra* Part II.B.

67. In 1993, there were 512 reporting facilities in Florida. ENVIRONMENTAL PROTECTION AGENCY, TOXICS RELEASE INVENTORY: FLORIDA SUMMARY (1993) [hereinafter 1993 TRI]; *see also* Wolf, *supra* note 15, at 323, Appendix 5.

68. *See* 1993 TRI, *supra* note 67; *see also* Wolf, *supra* note 15, at 323, Appendix 5.

69. In 1993, the top ten facilities for total releases in Florida according to the TRI data from highest to lowest were IMC Fertilizer, Inc., Occidental Chemical Corp., Mansanto Co., Kaiser Aluminum & Chemical, IMC-Argico Co., Cargill Fertilizer Inc., U.S. Agri-Chemicals Corp., ITT Rayoner Inc., CF Industries Inc., and Buckeye Florida L.P. *See* 1993 TRI, *supra* note 67; *see also* Wolf, *supra* note 15, at 324, Appendix 6.

70. *See* 1993 TRI, *supra* note 67.

71. FLORIDA'S RISK, *supra* note 55, at 29.

72. *See id.*

73. *See* 1993 TRI, *supra* note 67; *see also* Wolf, *supra* note 15, at 323, Appendix 5.

74. *See* FLORIDA'S RISK, *supra* note 55; *see also* VITTES & POLLOCK, *supra* note 39.

4. *Large Quantity Generators, Treaters/Storers/Disposers and Solid Waste Facilities*

LQG, TSD, and SWS sites may legally store, use, or treat toxic or hazardous substances.[75] Only some of these sites are known to have released hazardous materials into the environment. These sites are regulated and monitored by DEP to prevent accidental releases or spills and to mandate notification upon such release or spill.[76]

D. *Potential Adverse Health Effects*

A broad range of potential adverse acute and chronic health effects are associated with exposure to the contaminants found in media at NPL and FLS, TSD, LQG, and SWS sites and toxic emissions from TRI facilities.[77] These health effects include aggravation of respiratory diseases, such as bronchitis and asthma; skin, eyes, ear, nose, mouth, and respiratory tract irritation and sensitization; damage to brain, kidneys, lungs and liver; known and possible cancer causing agents mainly via inhalation; headache, convulsions, coma, central nervous system depression and toxicity.[78]

III. DATA COLLECTION AND ANALYSIS

A. *Demographic Variables*

Many of the prior environmental justice research studies defined the affected area in overly-broad geographic terms.[79] As a result, the studies reached conclusions from data that would not be valid if a smaller, more consistent geographic unit were examined. The Census Bureau reports demographic information in a summary form that varies according to geographic area,[80] e.g., state, county, census tract, census blockgroup, and census block.[81] Blockgroups generally contain between 250 and 550 housing units, with the ideal size being 400 housing units. The Commission report was performed using the

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75. *See* FLA. STAT. § 403.707(1) (1995) ("[n]o solid waste management facility may be operated . . . without an appropriate and currently valid permit issued by the department"); *see also* FLA. ADMIN. CODE r. 64-701 (1995) (containing DEP regulations for permitting most solid waste management facilities).

76. *See* FLA. STAT. § 403.708(1) (1995) (prohibiting disposal of a waste other than in a manner approved by DEP); *see also* FLA. STAT. § 403.726 (1995) (allowing DEP to seek judicial or injunctive relief on the occurrence of an imminent hazard caused by hazardous waste).

77. See FLORIDA'S RISK, *supra* note 55, at 108.

78. *See id.*

79. *See, e.g.*, Mark Monmonier, *Zip Codes, Data Compatibility, and Environmental Racism*, 2 GIS L. 4, 4-5 (1994).

80. *See* MATTSON, *supra* note 37.

81. *See id.*

blockgroup summary level because the blockgroups offered the smallest geographic area in which all the demographic variables selected by the Commission were reported by the Census Bureau. In conducting their analysis, the Commission selected twelve demographic variables having a potential impact on the proximity and surrounding community demographics of environmental hazardous sites. (*See* Table 2).

B. Fifteen Study Counties

From each of the five water management districts across the state of Florida,[82] three counties with the highest, lowest, and median population density (number of persons per square mile) were selected. (*See* Table 3). The fifteen selected study counties contain 1589 census blockgroups and 571 targeted environmental hazardous sites. (*See* Table 4).

The enabling legislation[83] specifically charged the Commission with the task of examining whether environmental hazardous sites in Florida were disproportionately located in minority and low income communities or other socioeconomic communities.[84] To answer this question, the density, minority, and poverty variables were stratified into three categories: high, medium, and low. Cut-off points for the categories were determined by ranking the 1589 census blockgroups in ascending order, by the %Minority, %Poverty, and #Density populations and by determining the percentages or numbers separating the lower, middle, and upper third ranges of the blockgroups. (*See* Table 5). The three categories allowed for a comparison of differences in proximity and demographics among blockgroups and communities with respect to environmental hazardous sites.

C. Proximity and Demographic Analyses

The proximity analysis was performed by measuring the distance from the center of a census blockgroup to the nearest targeted environmental hazardous sites. (*See* Figure 1). This analysis was completed for the 1589 block groups in the fifteen study counties and

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82. The Water Management Districts are drawn along hydrologic boundaries. *See* FLA. STAT. § 373.069 (1995); *see also* Ronald A. Christaldi, *Sharing the Cup: A Proposal for the Allocation of Florida's Water Resources*, 23 FLA. ST. U. L. REV. 1063, 1073 (1996); Donna R. Christie, *Florida*, *in* WATER AND WATER RIGHTS 289 (1991 & Supp. 1995); Sidney F. Ansbacher & Doug Brown, *A Proposal for Regional Water Management Districts to Regulate Consumptive Use in Minnesota*, 10 HAMLINE J. PUB. L. & POL'Y 235, 248 (1989).

83. *See* discussion *supra* Part I.

84. *See* FLA. STAT. § 760.85 (1995).

the 3287 targeted environmental hazardous sites. Distance or proximity was characterized in terms of high, medium, and low Minority (MIN), Poverty (POV), and Density populations.

The demographic analysis was performed by calculating the community demographics of persons and households within 0.5, 1.0, and 2.0 miles of an environmental hazardous site. (*See* Figure 2). This analysis was completed for the 3287 targeted environmental hazardous sites using the twelve demographic variables in Table 1. Blockgroups were weighted proportionately according to the area within the mile perimeter and the number of persons or households within the blockgroup. A weighted average of the census demographic variables was then calculated for each site. Demographics were characterized in terms of high, medium, and low Minority (MIN), Poverty (POV), and Density populations.

All raw data was generated from the Florida Department of Environmental Protection Geographical Information Systems (GIS) databases, and the Census of Population and Housing, 1990: Summary Tape File 3A (Florida), provided by the United States Bureau of the Census (1992). The GIS databases contained information on environmental hazardous sites and census blockgroups identified by geographic coordinates. The data was analyzed by regression analysis, analysis of variance, and comparison of means and was graphed using Statview Integrated Data Analysis & Presentation System, Abacus Concepts, Inc.

IV. RESULTS AND DISCUSSION

A. *Selected Demographic Characteristics of Florida and the Fifteen Study Counties*

In 1990, the minority and poverty populations of Florida were 26.7% and 12.8% respectively. Eighty-six percent of the households were not connected to a public sewer, and 56% of the population older than twenty-five held a high school degree or less. Fourteen percent of the households were not connected to a public or private water company, and 32% were renter-occupied. (*See* Table 6).

In the fifteen study counties, the lowest density counties were 86.4% rural, medium minority (20.4%), and high poverty (20.3%), with over 50% of households not connected to public or private company water. Seventy-five percent of the residents did not have a college degree, and 42.4% were employed in farming, forestry, fishing, precision production, craft, repair, operator, fabricator, and laborer occupations. These demographics were generally less for the median density counties and even smaller for the highest density counties. The average percent Minority, Rent, Language, and Origin for the study counties were lower than the state averages. The average percent Poverty, Water, Sewer, Occupation, Rural, and Education were higher. (*See* Table 6).

1. Population Density of 1589 Blockgroups

Population density may be a factor in the degree of exposure. Previous studies citing the proportion of minority or low income residents in a given host community did not provide information about how many people are actually exposed to environmental hazards.[85] For example, given that African Americans presently comprise 12.4% of the nation's populations,[86] a host community of 1000 residents, 20% of whom are African American, would be considered "minority," while a host community of 6000 residents, 10% of whom are African American, would not. By overlooking population density, the studies fail to point out that more African Americans, 600 versus 200, would be exposed to the pollution in the second, non-minority community, than in the first.

Figure 3 shows the average population density of the blockgroups in the selected study counties characterized by high, medium, and low minority and poverty blockgroup populations. There was an average of 5,900 persons per square mile in the high density blockgroups, 3,000 in the medium, and 500 in the low. (*See* Figure 3b). High minority blockgroups had an average of 4,000 persons per square mile, medium minority blockgroups 3,000, and low minority blockgroups 2,600. (*See* Figure 3a). High and medium poverty blockgroups had a population density of 3,200, and low poverty blockgroups had a population density of 2,800 persons per square mile. (*See* Figure 3c).[87]

2. Minority and Poverty Populations of the 1589 Blockgroups

Figure 4 shows the average percent minority populations of the minority blockgroups. The high minority blockgroups were 60% minority and 27% poverty; the low minority blockgroups averaged were 2% minority and 8% poverty; and the medium minority blockgroups were 12% minority and 10% poverty. (*See* Figures 4a and 4b). Figure 5 shows the average percent poverty populations of

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85. *See* UNITED CHURCH OF CHRIST, *supra* note 20; *see also* SADRI study, *supra* note 27.

86. *See* U.S. NEWS & WORLD REPORT, NEW WORLD OF NATIONS: TODAY'S ALMANAC 46 (1995).

87. Florida Department of Environmental Protection Geographical Information Systems (GIS), databases [hereinafter GIS database]; United States Bureau of the Census, Census of Population and Housing, 1990: Summary Tape File 3A (Florida) (1992) [hereinafter Census database].

the poverty blockgroups. The high poverty blockgroups were 45% minority and 30% poverty; the low poverty blockgroups were 8% minority and 4% poverty; and the medium poverty blockgroups were 13% minority and 10% poverty. (*See* Figures 5a and 5b). The results in Figures 4 and 5 show that the high minority and high poverty blockgroups have twice the average levels of %Minority and %Poverty populations compared to the state levels shown in Table 6.

B. Blockgroup Proximity to Targeted Sites

1. Average Blockgroup Distance to 3287 Hazardous Sites

Figure 6a shows that the average distance in miles from the center of a blockgroup to a targeted environmental hazardous site was: 15 miles to an FLS site, 12.5 miles to an NPL site, 8.5 miles to a TSD site, 3.5 miles to a TRI site, 3.0 miles to an LQG site, and 2.0 miles to a SWS site. When blockgroup distance was characterized by blockgroup density (*See* Figure 6b), there was an increase in the average distance from low density blockgroups to hazardous sites and a decrease in the average distance from high and medium density blockgroups to hazardous sites. The results in Figure 6 show that blockgroups tend to be closest to solid waste facilities (SWS) and furthest from FLS sites. Thus, blockgroup density can be a factor in the distance from a blockgroup to a hazardous site.

Figure 7 shows average blockgroup distance, characterized by the minority and poverty blockgroup populations. Figure 7a shows that the high and medium minority blockgroups were closer to hazardous sites than the low minority blockgroups. Figure 7b shows that characterization of blockgroup distance by the blockgroup poverty population did not affect the blockgroup distance to a targeted site. The results in Figure 7 show that blockgroup minority populations may be a factor in the blockgroup distance to a hazardous site.

2. Relationship Between Proximity and Demographics

The relationship between the proximity of the 3,287 targeted sites and 1,589 census blockgroups demographics is shown in Table 7. The results indicate that, except for FLS sites, as the percent minority population of the blockgroup increased the distance from the blockgroup to the nearest targeted environmental hazardous site decreased. This means that blockgroups with high minority populations have a higher number of hazardous sites located in the area and, conversely, that blockgroups with low minority populations have fewer hazardous waste sites located nearby. This relationship was also true between persons who were foreign born (%Citizen) and LQG and NPL sites; persons speaking a language other than English at home (%Language) and SWS, TRI, and TSD sites; renter-occupied households (%Rent) and FLS, LQG, NPL, and TRI sites; households not connected to public or private company water (%Water) and FLS and NPL sites; and population density per square mile (%Density) and LQG, TRI, and TSD sites. The percent of households located in a rural area (%Rural) showed the opposite relationship. The %Rural decreased as the distance from the blockgroup to the site decreased for all of the targeted sites. Thus, blockgroups with a high percentage of rural households have a lower number of hazardous sites located in the area and, conversely, blockgroups with low percentages of rural households have a higher number of hazardous sites located nearby. This relationship was also true between %Poverty and LQG sites; %Citizen and FLS sites; %Sewer and FLS sites; and %Water and TSD sites. The regression results also showed that the no relationship between blockgroup %Poverty, %Occupation, and %Sewer and their proximity to hazardous sites, except for FLS, LQG, and SWS sites.

C. *Community Demographics Around Targeted Sites*

1. *3287 Targeted Environmental Hazardous Sites*

This analysis calculated the demographic characteristics of communities within 0.5, 1.0, and 2.0 mile perimeters around targeted environmental hazardous sites. Perimeter circles were drawn around each site (*See* Figure 2), and the percentages of the twelve demographic variables, defined in Table 1, were calculated for those populations and households within the perimeter. Results are reported for communities within two mile perimeters around the 3287 targeted sites in Florida. (*See* Table 8).

Table 8 shows that, except for %Education, %Occupation, and %Sewer, community demographics within two miles around the targeted sites were disproportionately represented compared to the state demographics in Table 6. %Origin, %Language, %Minority, and %Rent demographics were substantially higher for communities within the two mile perimeters. %Rural and %Sewer were substantially lower. %Poverty was somewhat higher.

The summation of the total number of persons (#Persons) within two mile perimeters around each of the 3,287 sites (*See* Table 8) equaled 20,102,609 people which was 7,155,540 more people than the total state population of 12,947,069. This means that people and households within two miles of the targeted sites were exposed to multiple sites.

2. 571 Selected Targeted Sites in the Fifteen Study Counties

Multiple exposure occurred to a greater extent in the fifteen study counties. The summation of the total number of persons (#Persons) within two mile perimeters of the targeted sites was 15,549,333 compared to a total population of 2,862,495 in the fifteen study counties. (*See* Table 9).

3. 571 Sites Characterized by Minority and Poverty Demographics

Table 9 shows the community demographic within two mile perimeters around the six types of targeted sites. Figures 8 through 17[88] show the same community demographics characterized by high, medium, and low minority and poverty populations. Figure 8 shows that when community demographics around targeted sites were characterized by high, medium, and low minority populations a disproportionate representation of %Minority (*See* Figure 8a) and %Poverty (*See* Figure 8b) populations in the high minority communities existed around the targeted sites compared to the average %Minority and %Poverty within two mile perimeters shown in Table 9.

Figure 9 shows that when community demographics around targeted sites were characterized by high, medium, and low poverty populations, there was a disproportionate representation of %Minority (*See* Figure 9a) and %Poverty (*See* Figure 9b) populations in the high poverty communities existing around the targeted sites compared to the average %Minority and %Poverty within two miles shown in Table 9.

Figure 10b shows that %Occupation was disproportionate within two miles for high and medium poverty communities compared to low poverty communities and was also higher than %Occupation in Table 9. Figure 11a shows that the %Renter-occupied households were disproportionate in high and medium minority communities compared to low minority communities for all site types and was also higher than %Rent in Table 9. Figure 12b shows a similar disproportion for high and medium poverty communities around FLS, LQG, and NPL sites. Figure 11b shows disproportion in %Education for high and medium poverty communities compared to low poverty communities for all hazardous site types and was also higher than %Education in Table 9. Figure 13b shows disproportion in %Water for high poverty communities around SWS sites compared to

88. In Figures 8 through 17, any absence of bars for a particular statistic indicates a lack of data for that population-type within two miles of the specified hazardous waste site.

medium and low poverty communities and was also higher than %Water in Table 9. Figure 14b shows the same disproportion for %Rural. %Sewer in Figure 15 was comparable to the results in Table 9. Figure 16a shows disproportion in %Origin around FLS, TRI, SWS, and LQG sites. Figure 17a shows the same disproportion for %Language.

V. SUMMARY

The proximity analysis shows that the distance from census blockgroups to the nearest targeted environmental hazardous sites increased in the following order: SWS, LQG, TRI, TSD, NPL, and FLS. High and medium population density blockgroups were closer in proximity to targeted sites than in low population density blockgroups. The population density was higher in high and medium minority and poverty blockgroups than in low minority and poverty blockgroups and was closer in proximity to targeted sites than low minority blockgroups.

The %Minority population increased as the distance from the center of the blockgroup to the targeted hazardous site decreased for all sites except FLS sites. This means that blockgroups with a high percentage of minority populations had a higher number of hazardous sites located in the area and conversely in blockgroups of low minority concentrations. The same relationship held true for %Language with SWS, TRI, and TSD sites and %Renter-occupied households with FLS, LQG, NPL, and TRI sites. There was no relationship between poverty and distance, except for LQG where %Poverty decreased as the distance to the nearest targeted site decreased. The %Households in a rural area decreased as the distance from the blockgroups to all of the targeted sites decreased. This means that blockgroups with a high percentage of rural households had a lower number of hazardous sites located in the area and conversely in blockgroups with a low percentage of rural households.

The demographic analysis shows that minority and low income populations were disproportionately represented within two miles around targeted environmental hazardous sites and that they were exposed to multiple sites. Characterization of populations by high, medium, and low minority, poverty, and density levels give a more accurate representation of those populations disproportionately represented in neighborhoods around environmental hazardous sites in Florida.

VI. CONCLUSIONS

The results of the proximity and demographic analysis report show that minority and low income communities are disproportionately impacted by multiple targeted environmental hazardous sites in Florida. Minority, poverty, and density factors can impact the distance, location, and the surrounding community demographics of targeted environmental hazardous sites. Having established these conclusions, further research is necessary.[89] First, the results indicate the critical need for health and risk exposure assessments of minority and poverty populations around environmental hazardous sites in Florida. Next, further research is necessary to expand the scope of this analysis to include the environmental hazardous site types, counties, and blockgroups not covered in this report. Finally, an analysis must be performed to determine why these disproportions exist. Is the problem in the process, the outcome, or both? Only then can solutions or remedies to any environmental injustices or inequities be implemented.

89. The Legislature specifically requested that the Commission's report include "[c]onsideration of the advisability of creating a permanent institutional review entity to deal with environmental equity issues." FLA. STAT. § 760.85(5)(j) (1995).

VII. APPENDIX: TABLES AND FIGURES

Table 1. 3287 Selected Targeted Environmental Hazardous Sites in Florida[90]

Site Type	Number	Description
FLS	39	Florida List Sites—landfills, disposal, reduction, and resource recovery sites
LQG	858	Large Quantity Generators—generators of RCRA designated hazardous waste or acute hazardous waste
NPL	59	National Priority List—hazardous sites designated by the EPA for receipt of federal funds to assist in cleanup under the Superfund Act
SWS	1647	Solid Waste Facilities—for the collection, source separation, storage, transfer, transportation, processing, treatment,or disposal of solid waste, including toxic and hazardous waste
TRI	569	Toxic Release Inventory—facilities that manufacture, import, process, or otherwise use above threshold quantities of substances on the federal chemical list
TSD	115	Treatment/Storage/Disposal—facilities that treat, store or dispose of hazardous waste

90. Census database, *supra* note 87; GIS database, *supra* note 87.

Table 2. Twelve Demographic Variables[91]

Name	Attribute
%Minority	Percent of persons who are Black, Black Hispanic, White Hispanic, and American Indian, Eskimo, Aleutian Islander, Asian, Pacific Islander and Other Race of Hispanic origin and not of Hispanic origin
%Poverty	Percent of persons below the 1990 poverty level
%Education	Percent of persons older than 25 with only a high school degree or less education
%Sewer	Percent of households not using a public sewer
%Occupation	Percent of persons who are employed in farming, forestry, fishing, precision production, craft, repair, operator, fabricator, and laborer occupations
%Rent	Percent of households which are renter-occupied
%Rural	Percent of households located in a rural area
%Origin	Percent of persons who are foreign born
%Language	Percent of persons older than 5 who speak a language other than English at home
%Water	Percent of households not receiving water from a public or private company
# Persons	Total number of persons
# Density	Number of persons per square mile

Table 3. Location and Density of Fifteen Study Counties[92]

Florida Water Management Districts	Population Density Per Square Mile		
	Highest	Median	Lowest
Northwest	Escambia	Holmes	Franklin
Suwannee River	Bradford	Hamilton	Lafayette
St. Johns River	Seminole	Indian River	Baker
Southwest Florida	Pinellas	Hernando	Hardee
South Florida	Broward	Osceola	Glades

91. Census database, *supra* note 87.
92. GIS database, *supra* note 87.

Table 4. Selected Targeted Sites Fifteen in Study Counties[93]

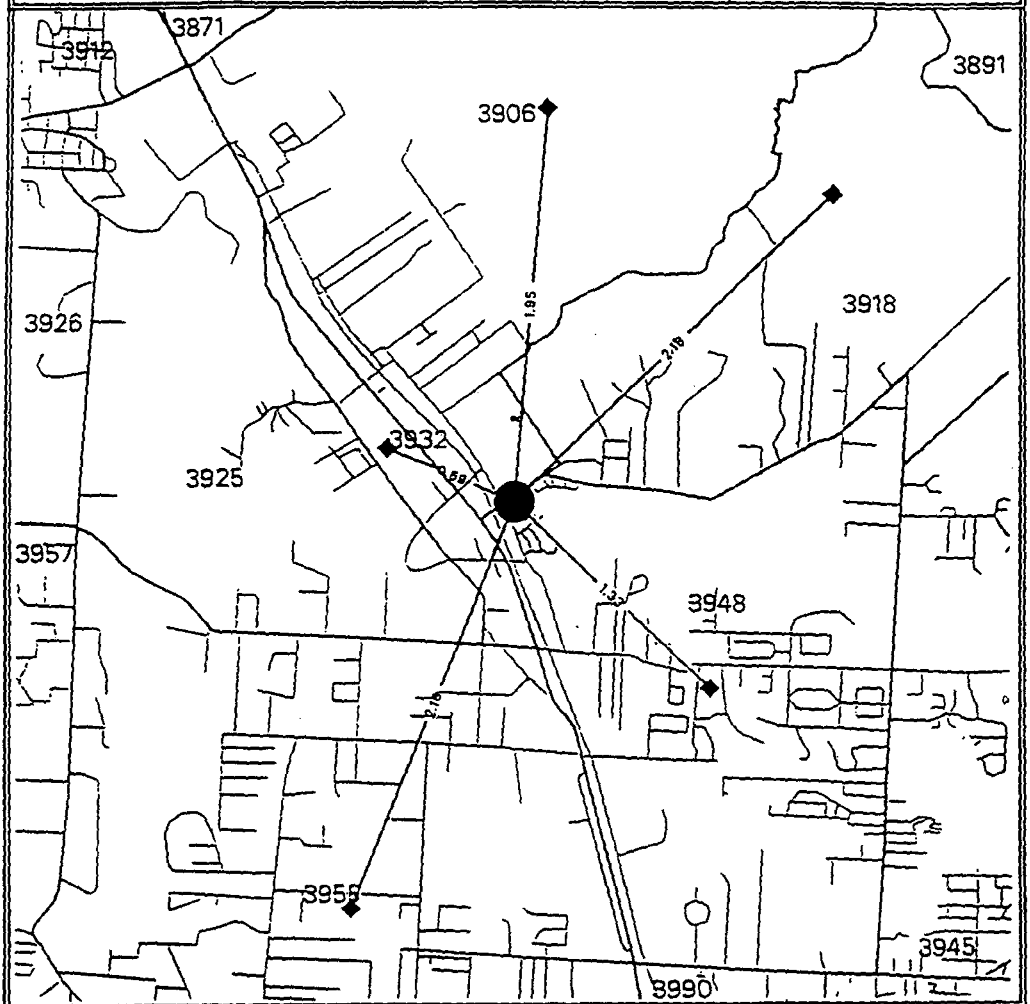
County Population Density Per Square Mile	Environmental Hazardous Site						
	FLS	LQG	NPL	SWS	TRI	TSD	TOTAL
5 Highest	5	86	14	202	110	14	432
5 Median	1	6	1	70	7	1	86
5 Lowest	0	2	0	46	5	1	53
TOTAL	6	94	15	318	122	16	571

Table 5. Classification of Minority (MIN), Poverty (POV), and Density Categories

Category	MIN	POV	Density
High	23.9-100%	15.6-100%	4129-16,961
Medium	6.0-23.8%	6.5-15.5%	1647-4128
Low	0.0-5.9%	0.0-6.4%	0.47-1646

93. GIS database, *supra* note 87.

Figure 1. Measuring Proximity



The map displays one of the 63 selected environmental hazards investigated by Florida A&M University Environmental Sciences Institute in support of the Florida Legislature's Environmental Equity & Justice Commission.

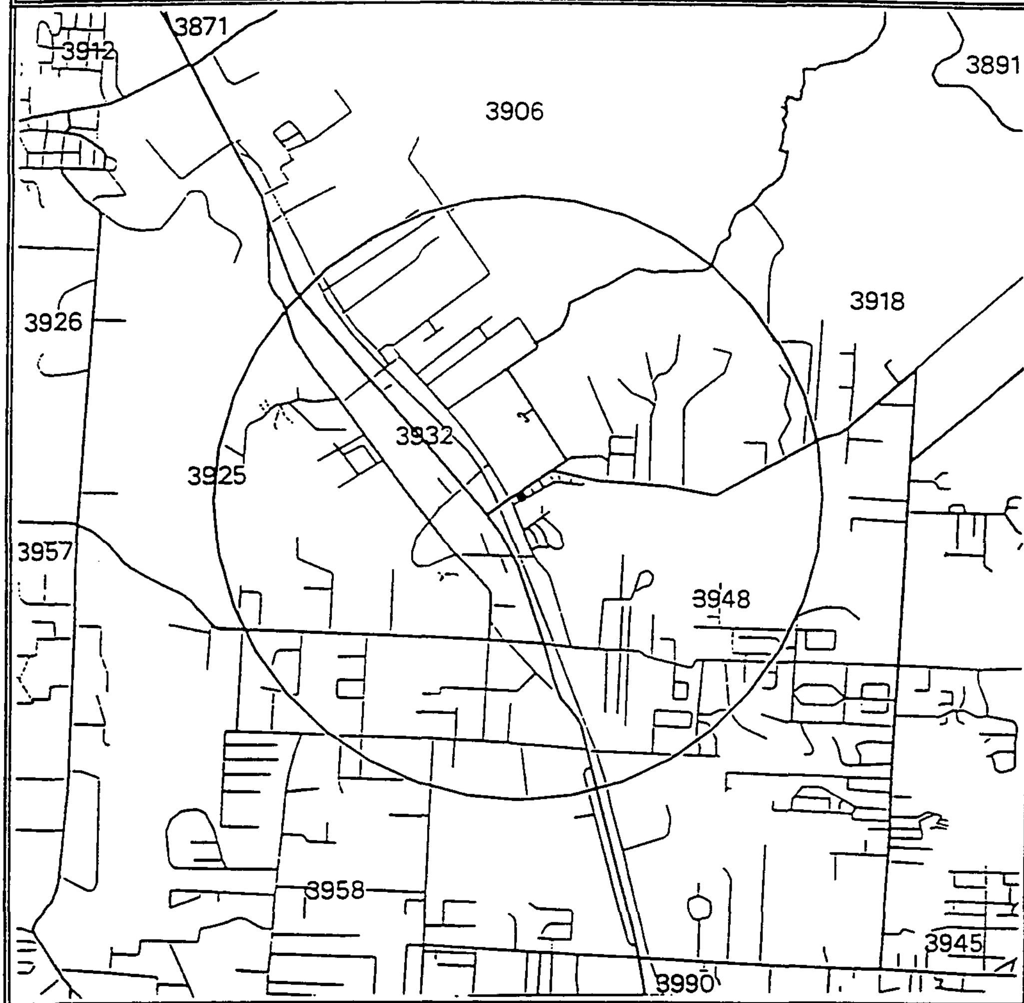
Map was created by the Florida Department of Environmental Protection, Bureau of Information Systems. Funding was provided by Bureau of Solid and Hazardous Waste.

Environmental Equity and Justice

3948	**Blockgroup ID**
•	**Site Location**
◆	**Center of Blockgroup**
——	**Blockgroup Boundary**
——	**Roads and Streets**

Map depicts the distance measurements made as a part of the proximity analysis of the EEJ Commission.

Figure 2. Defining the Community



The map displays one of the 63 selected environmental hazards investigated by Florida A&M University Environmental Sciences Institute in support of the Florida Legislature's Environmental Equity & Justice Commission.

Map was created by the Florida Department of Environmental Protection, Bureau of Information Systems. Funding was provided by Buerau of Solid and Hazardous Waste.

Environmental Equity and Justice

3948	Blockgroup ID
•	Site Location
o	Radius Around Site
—	Blockgroup Boundary
—	Roads and Streets
—	Radius Lines

The map depicts 2 mile radii around a potential hazardous waste sites. Census blockgroups were used to define the community inflenced by the site.

Table 6. Demographics of Florida and the Fifteen Study Counties Demographics[94]

		Counties				
	Florida (67)	Highest Density (5)	Median Density (5)	Lowest Density (5)	Total	Study Counties Average
# Blockgroups	9144	1272	264	53	1589	
# Persons	12,947,069	2,476,615	325,758	60,121	2,862,495	
% Origin	12.8	5.8	4.3	3.5		4.5
% Education	56.0	56.9	68.3	75.7		66.9
% Occupation	26.3	27.2	35.2	44.2		35.5
% Language	17.4	7.9	7.4	8.7		8.0
% Minority	26.7	18.1	17.7	20.4		18.7
% Poverty	12.8	13.1	16.2	20.3		16.5
% Rural	15.1	29.6	53.8	86.4		56.6
% Water	14.3	15.2	39.7	52.5		35.8
% Sewer	86.2	87.0	87.6	90.0		88.2
% Rent	32.2	28.6	23.0	21.2		24.3

94. *See* FLA. STAT. § 760.85 (1995).

Figure 3. Blockgroup Population Density

Number of persons per square mile in the 1,589 Blockgroups (Fig. 3b) Characterized by High(H), Medium(M) and Low(L) Minority (MIN Fig. 3a) and Poverty (POV Fig. 3c) Blockgroup Populations

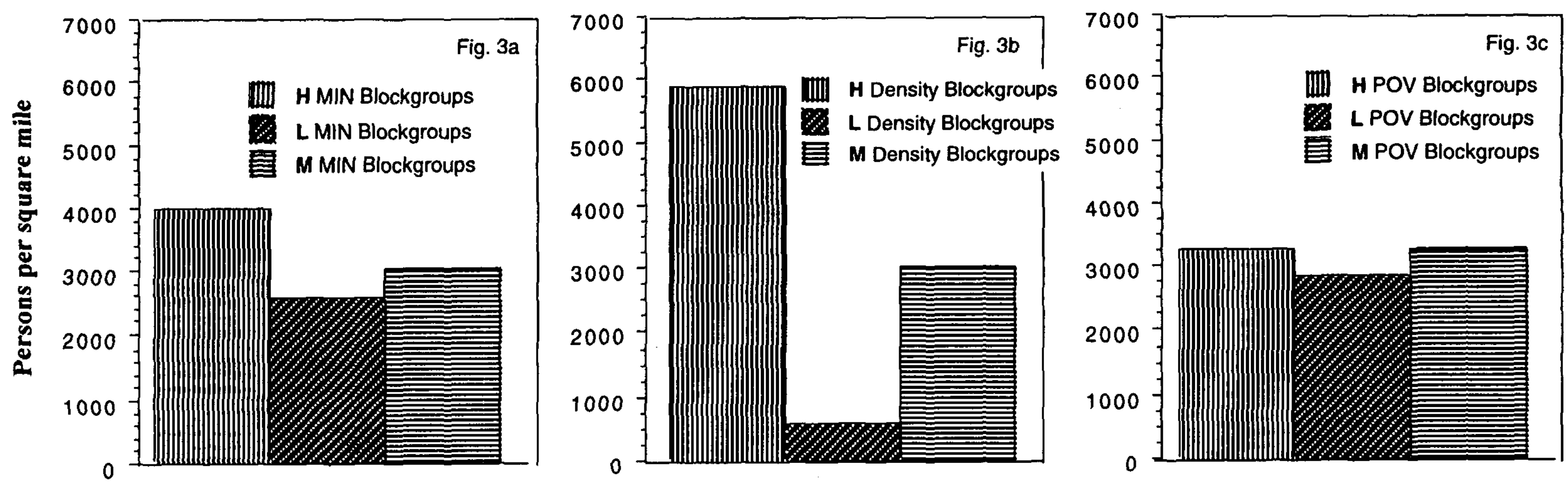


Figure 4. Blockgroup Minority Populations

Percent Minority and Poverty in the 1,589 Blockgroups
Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 4a and 4b)

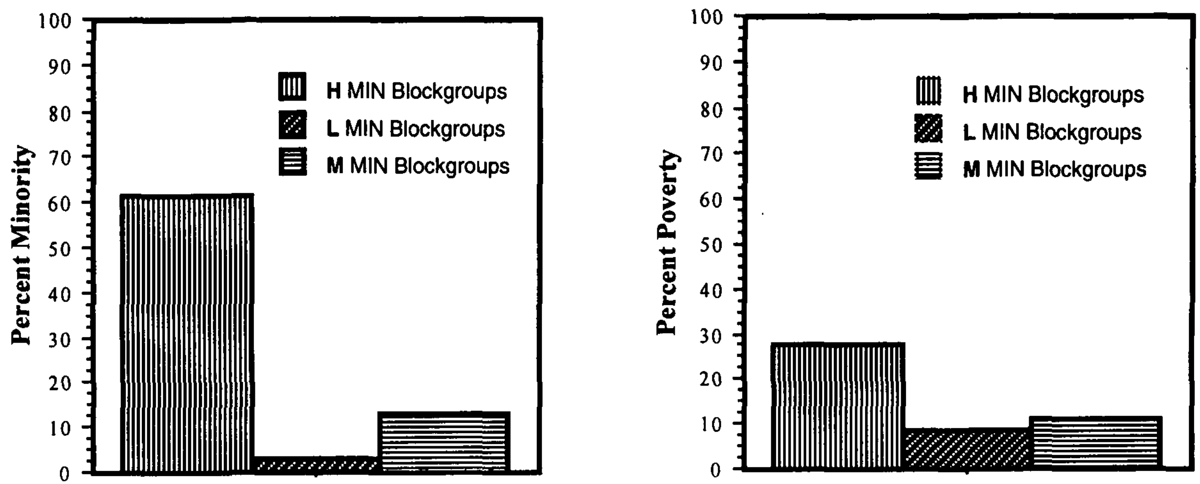
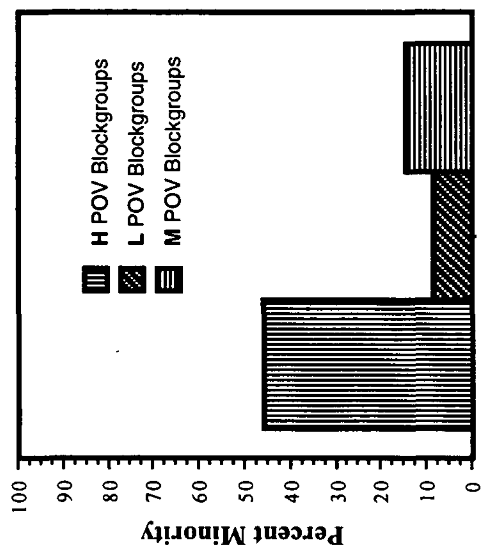


Figure 5. Blockgroup Poverty Populations

Percent Minority and Poverty in the 1,589 Blockgroups
Characterized by High (H), Medium (M) and Low (L) Poverty (POV Fig. 5a and 5b)



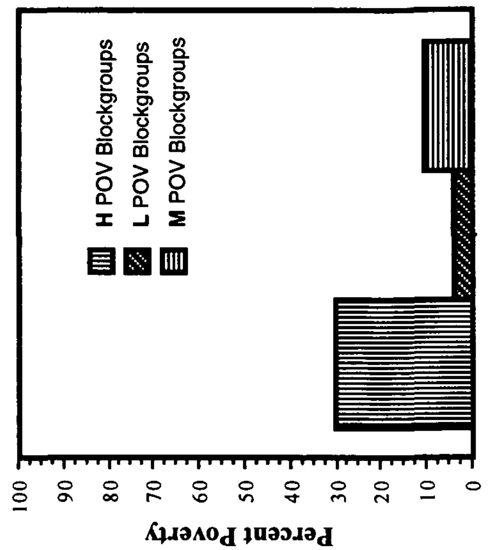


Figure 6. Distance Characterized by Density

**Average Distance From the Center of a Census Blockgroup
To a Targeted Environmental Hazardous Site (Fig. 6a)
Characterized by High (H), Medium (M) and Low (L) Blockgroup Density (Fig. 6b)**

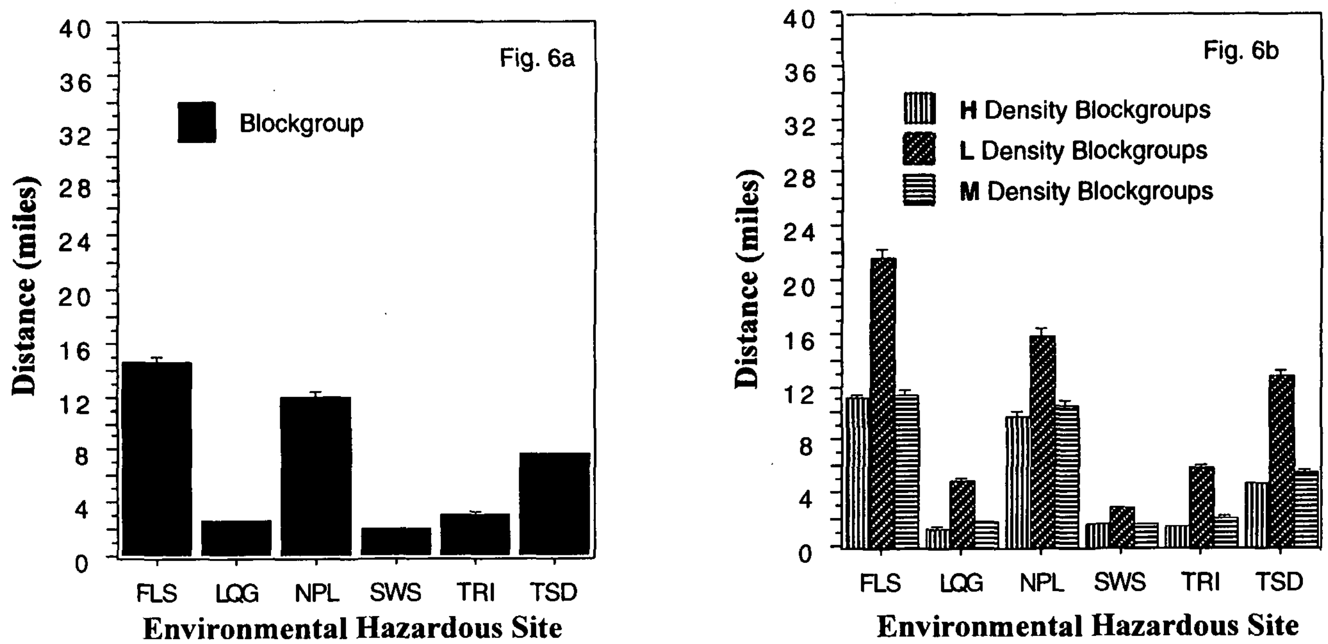


Figure 7. Distance Characterized by Minority and Poverty

Average Distance From the Center of a Census Block Group
To a Targeted Environmental Hazardous Site
Characterized by High (H), Medium (M) and Low (L)
Minority (MIN Fig. 7a) and Poverty (POV Fig. 7b) Populations of the Blockgroups

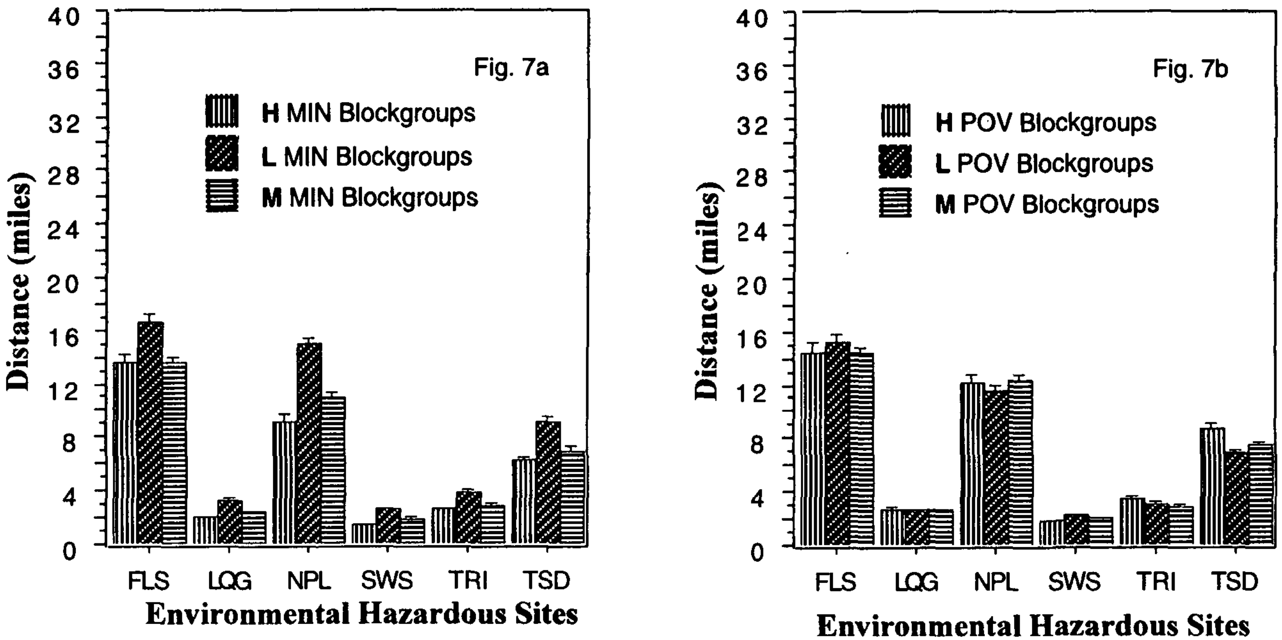


Table 7. Relationship Between Blockgroup Demographics and Distance to the Nearest Targeted Site

1589 Census Blockgroups Demographics	3287 Targeted Environmental Hazardous Sites					
	FLS (39)	LQG (858)	NPL (59)	SWS (1647)	TRI (569)	TSD (115)
%Minority	0 0 0	+ + +	+ + +	+ + +	+ + +	+ + +
%Poverty	0 0 0	_ _ _	0 0 0	0 0 0	0 0 0	0 0 0
%Origin	_ _ _	+ + +	+ + +	0 0 0	0 0 0	0 0 0
%Language	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	+ + +
%Occupation	0 0 0	0 0 0	0 0 0	+ + +	0 0 0	0 0 0
%Rent	+ + +	+ + +	+ + +	0 0 0	+ + +	0 0 0
%Rural	_ _ _	_ _ _	_ _ _	_ _ _	_ _ _	_ _ _
%Sewer	_ _ _	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
%Water	+ + +	0 0 0	+ + +	0 0 0	0 0 0	_ _ _
#Density	0 0 0	+ + +	0 0 0	0 0 0	+ + +	+ + +

Legend (Table 7)

+ + +	Blockgroup demographic increases as the distance to the nearest hazardous site decreases.
_ _ _	Blockgroup demographic decreases as the distance to the nearest hazardous site decreases.
0 0 0	No relationship between blockgroup demographic and distance to the nearest hazardous site.

Table 8. Community Demographics Within Two Miles Around the 3287 Targeted Environmental Hazardous Sites in Florida and Regulated by the Florida Department of Environmental Protection[95]

Community Demographics	Targeted Environmental Hazardous Sites					
	FLS(39)	LQG(858)	NPL(59)	SWS(1,647)	TRI(569)	TSD(115)
#Persons	505,804	5,444,841	1,138,883	6,872,920	4,869,934	1,270,227
% Origin	26.8	17.9	17.0	15.4	15.2	14.6
% Education	62.7	59.1	58.7	59.6	62.3	57.6
% Occupation	30.6	26.8	27.0	27.8	29.7	26.7
% Language	32.9	23.4	22.0	20.1	21.9	19.4
% Minority	54.1	38.8	36.4	36.2	43.7	31.4
% Poverty	17.6	17.7	15.9	15.7	18.5	14.0
% Rural	2.4	3.5	3.4	4.1	5.2	8.7
% Water	4.7	5.9	5.4	5.9	6.6	9.3
% Sewer	80.3	84.7	83.5	83.8	82.1	85.7
% Rent	39.4	40.9	39.3	38.7	40.7	35.0

95. Census database, *supra* note 87; GIS database, *supra* note 87.

Table 9. Community Demographics Within Two Miles Around the 571 Selected Targeted Environmental Hazardous Sites in the Fifteen Study Counties and Regulated by the Florida Department of Environmental Protection[96]

Community Demographics		Targeted Environmental Hazardous Sites				
		LQG(94)	NPL(15)	SWS(318)	TRI(122)	TSD(16)
# Persons	120,941	3,473,516	432,032	5,477,903	3,680,454	364,487
% Origin	3.8	9.2	9.6	6.6	8.5	7.1
% Education	60.2	59.4	60.1	62.1	57.8	55.9
% Occupation	35.6	26.6	29.5	32.1	27.1	26.8
% Language	6.3	11.7	12.0	9.4	10.9	10.5
% Minority	20.4	23.9	28.1	20.1	17.3	15.8
% Poverty	14.8	14.4	15.3	14.4	11.4	10.1
% Rural	16.9	7.9	13.5	36.9	11.3	17.0
% Water	19.6	4.7	3.9	22.7	8.6	10.7
% Sewer	92.1	81.2	79.3	88.2	86.9	84.0
% Rent	34.5	33.1	32.9	26.7	32.3	33.3

96. Census database, *supra* note 87; GIS database, *supra* note 87.

Figure 8. Percent Minority and Poverty

Percent Minority and Poverty
Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties
Characterized by High (H), Medium (M) and Low (L)
Minority Populations (MIN Fig.8a and Fig.8b)

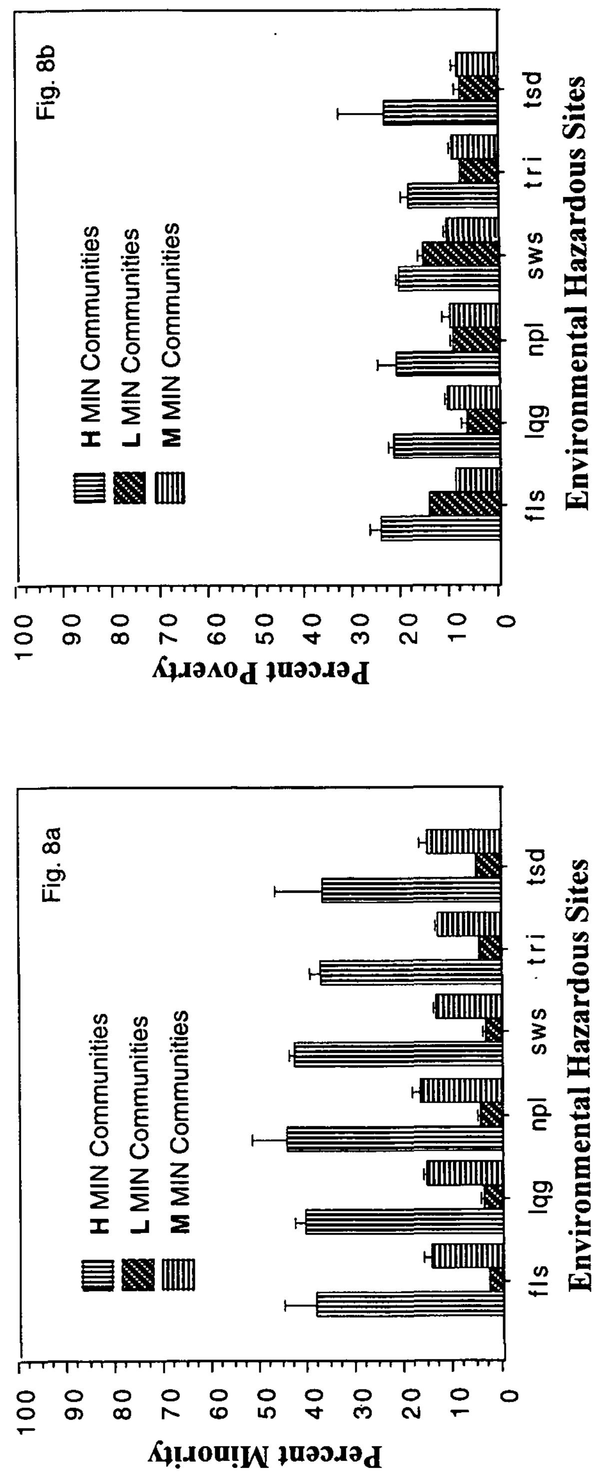
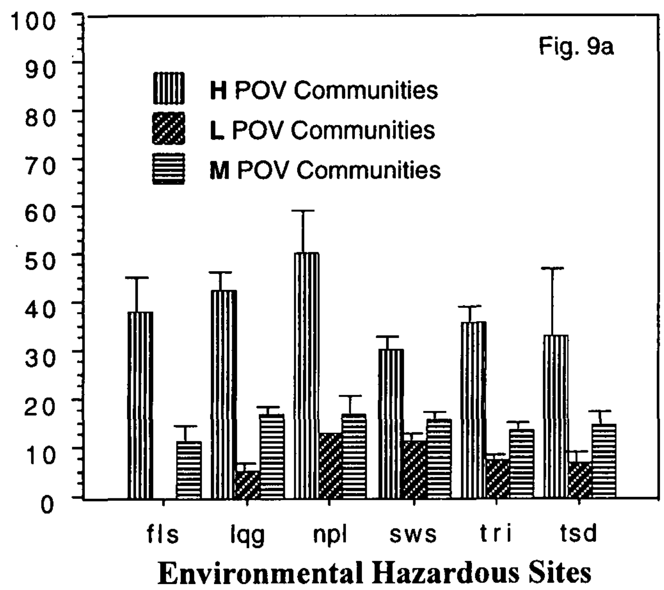


Figure 9. Percent Minority and Poverty

Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Poverty Populations (POV Fig. 9a and Fig. 9b)



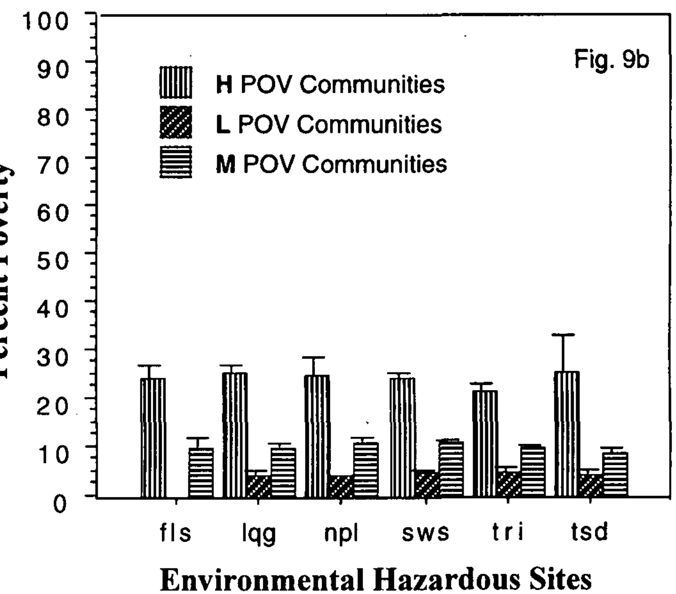
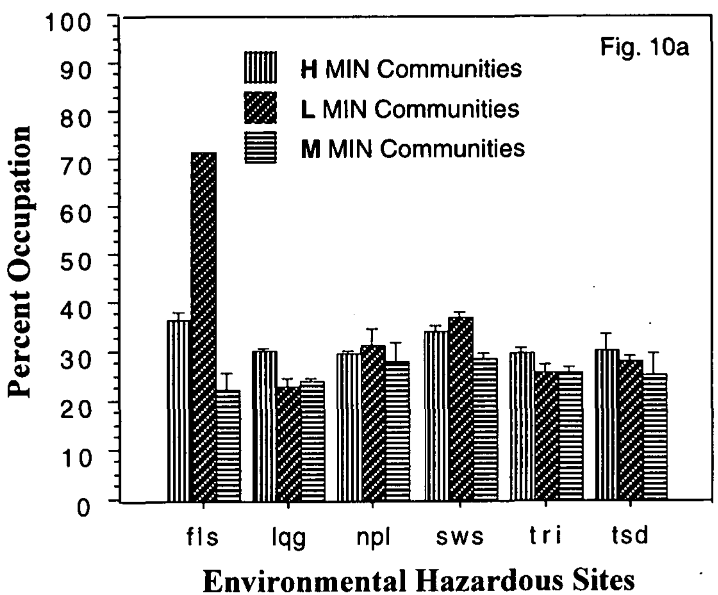


Figure 10. Percent Occupation

Percentage of Population Employed in Farming, Forestry, Fishing, Precision Production, Craft, Repair, Operator, Fabricator, and Laborer Occupations Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 10a) and Poverty (POV Fig. 10b) Populations



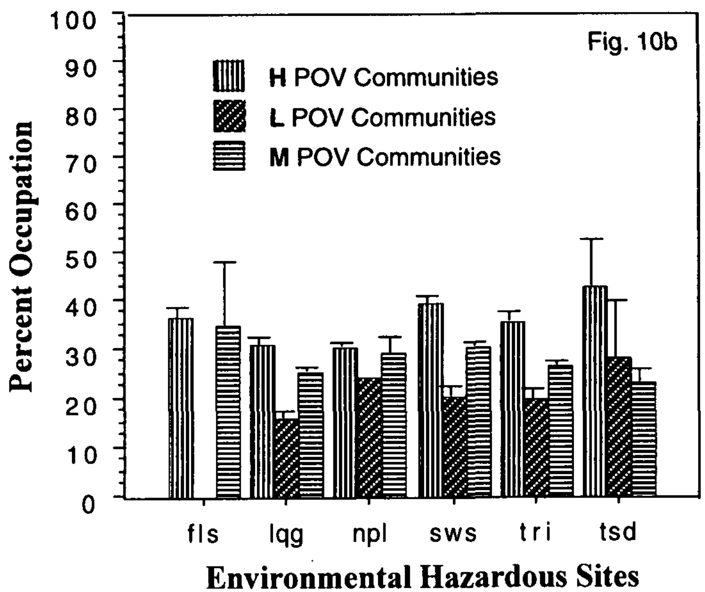
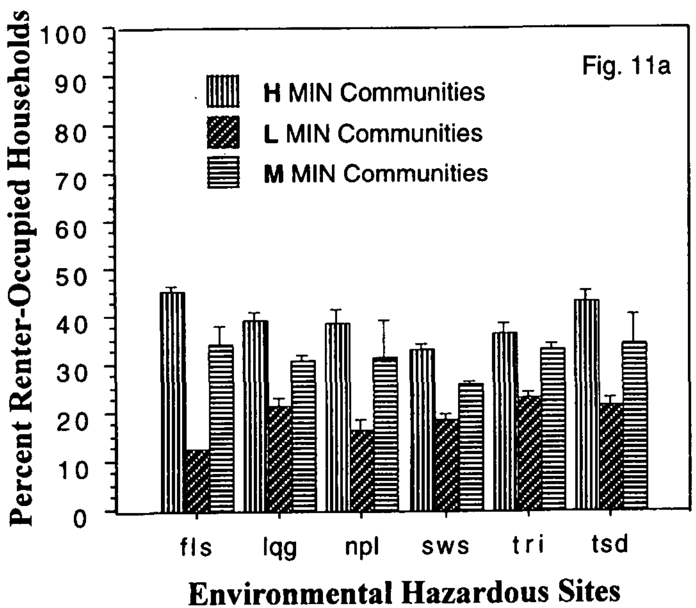


Figure 11. Percent Renter-Occupied Households

Percentage of Rented Households
Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties
Characterized by High (H), Medium (M) and Low (L)
Minority (MIN Fig. 11a) and Poverty (POV Fig. 11b) Populations



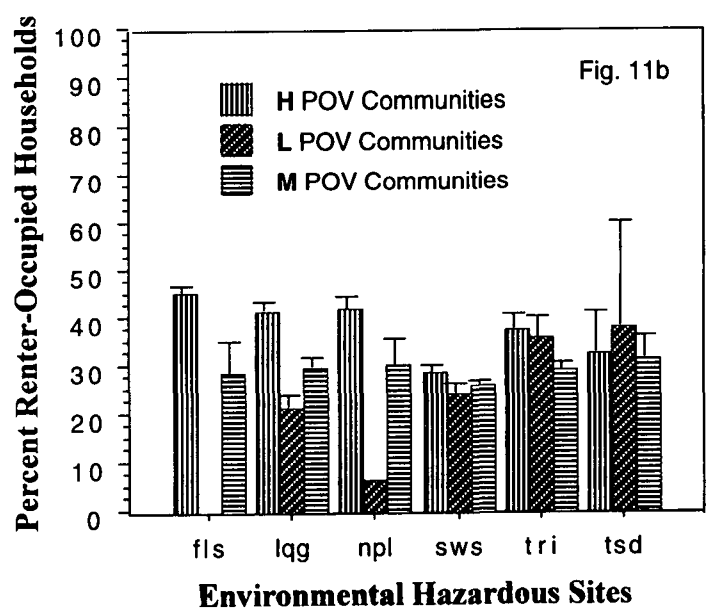


Figure 12. Percent Education

Percentage of Population Over Twenty-Five with a High School Degree or Less Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 12a) and Poverty (POV Fig. 12b) Populations

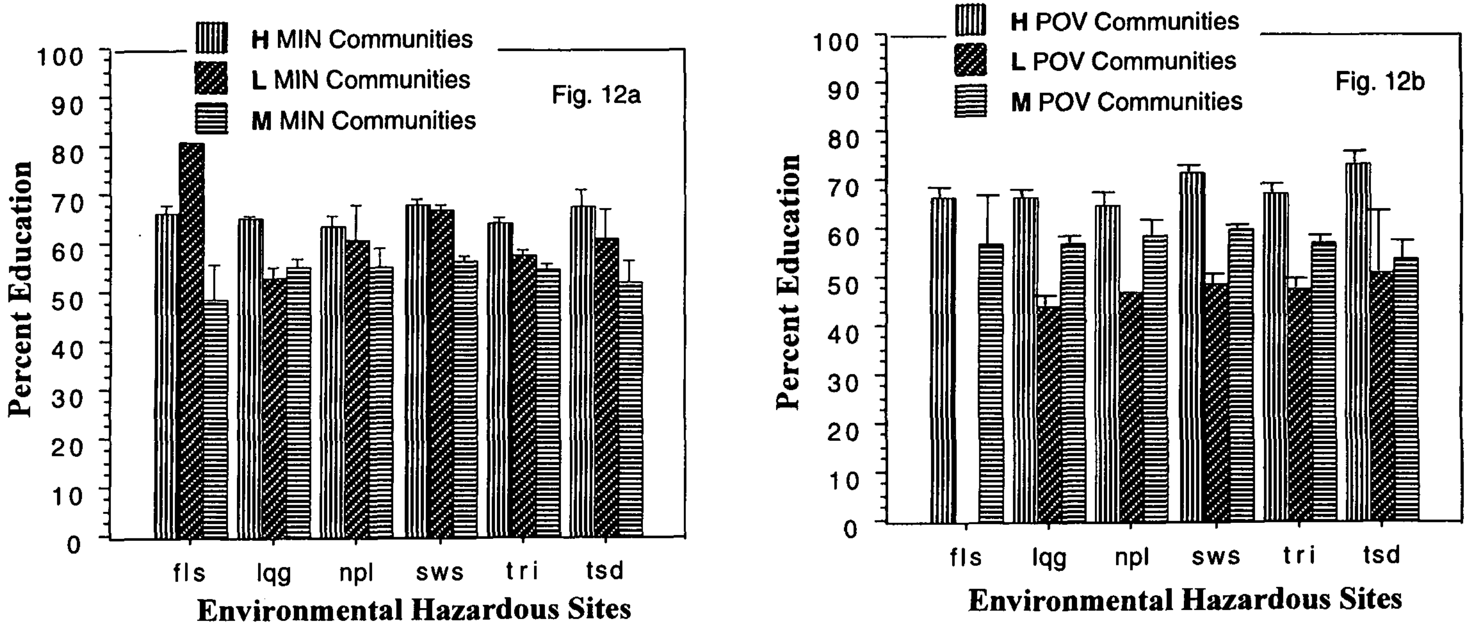
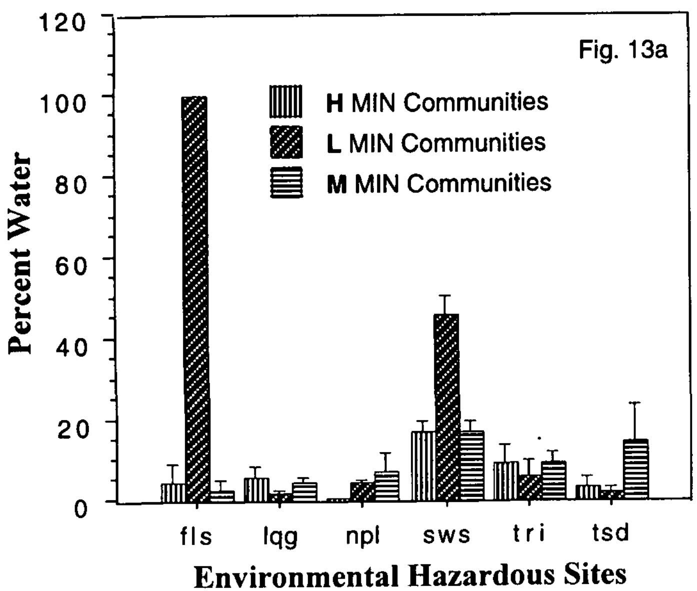


Figure 13. Percent Water

Percentage of Households not Receiving Public System or Private Company Water Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 13a) and Poverty (POV Fig. 13b) Populations



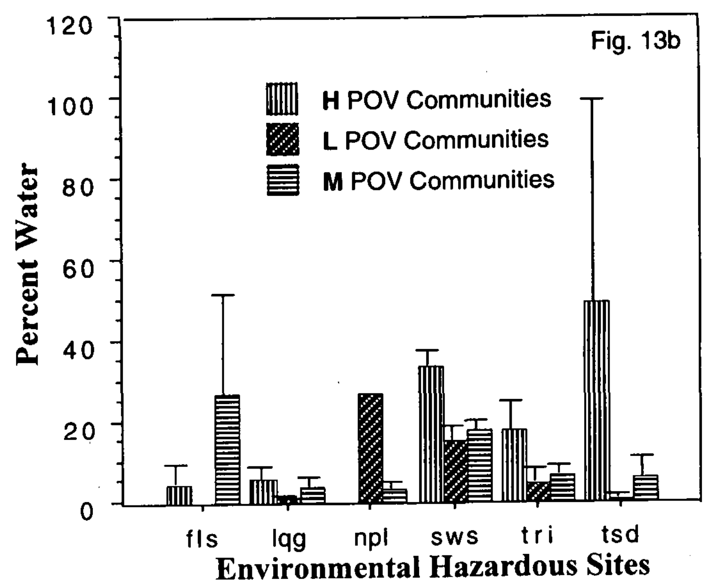


Figure 14. Percent Rural

**Percentage of Households Located in a Rural Area
Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties
Characterized by High (H), Medium (M) and Low (L)
Minority (MIN Fig. 14a) and Poverty (POV Fig. 14b) Populations**

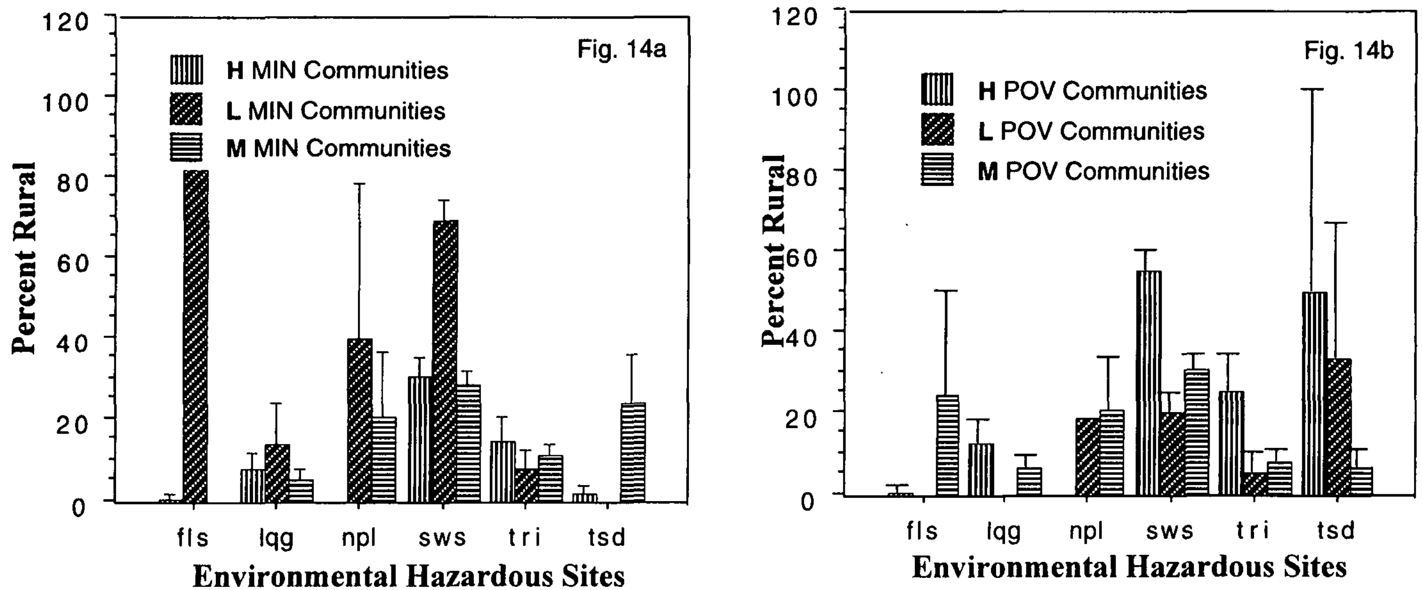


Figure 15. Percent Sewer

Percentage of Households Not Using a Public Sewer Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 15a) and Poverty (POV Fig. 15b) Populations

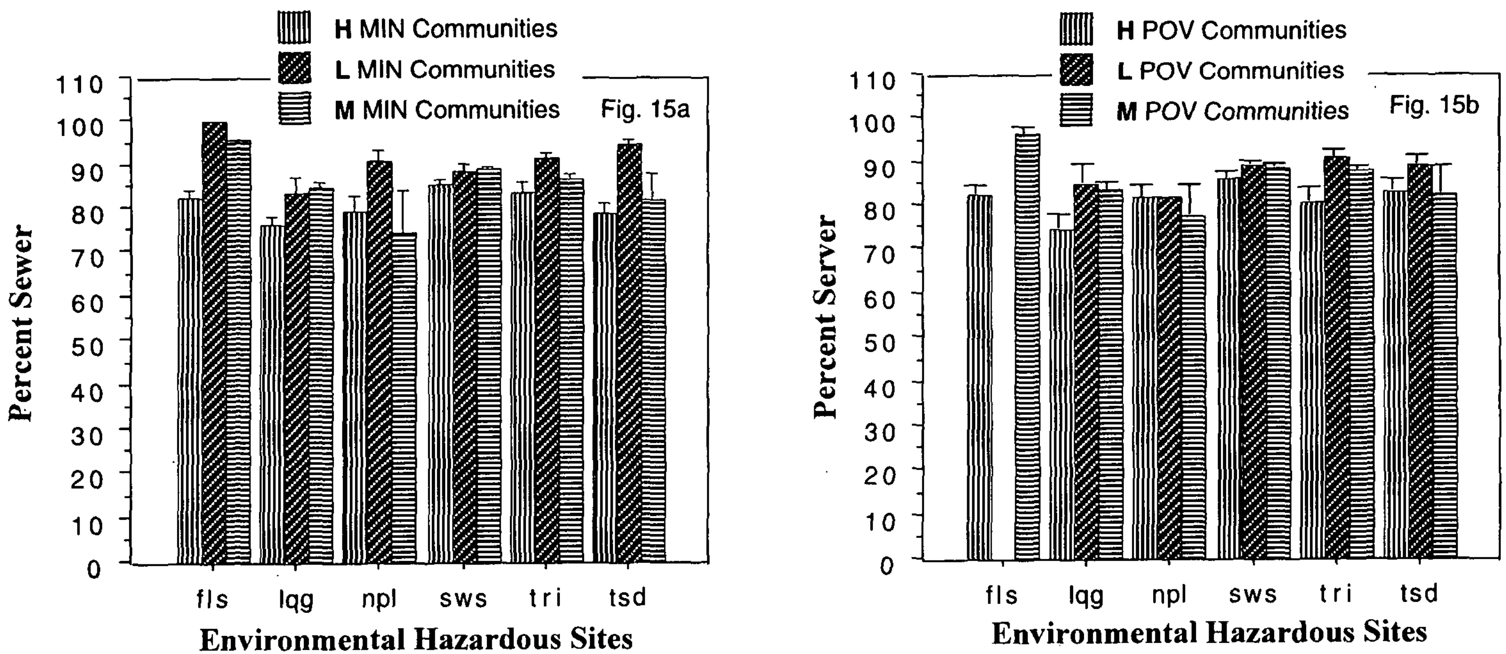
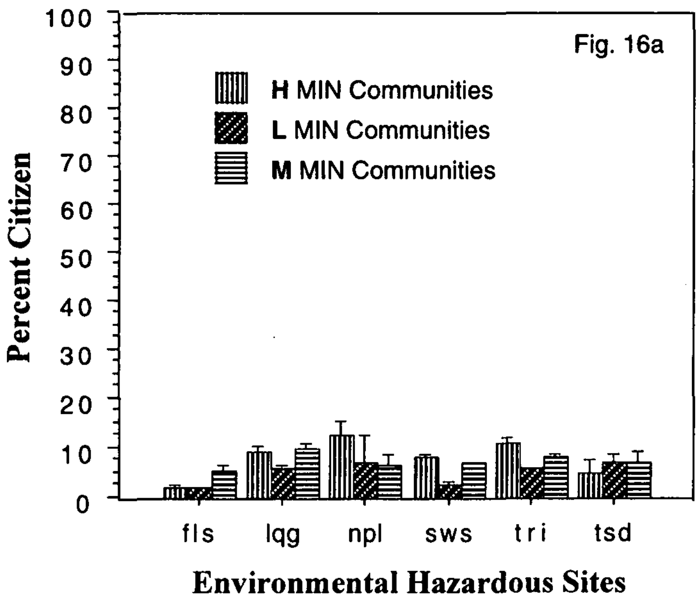


Figure 16. Percent Origin

**Percentage of Population Foreign Born
Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties
Characterized by High (H), Medium (M) and Low (L)
Minority (MIN Fig. 16a) and Poverty (POV Fig. 16b) Populations**



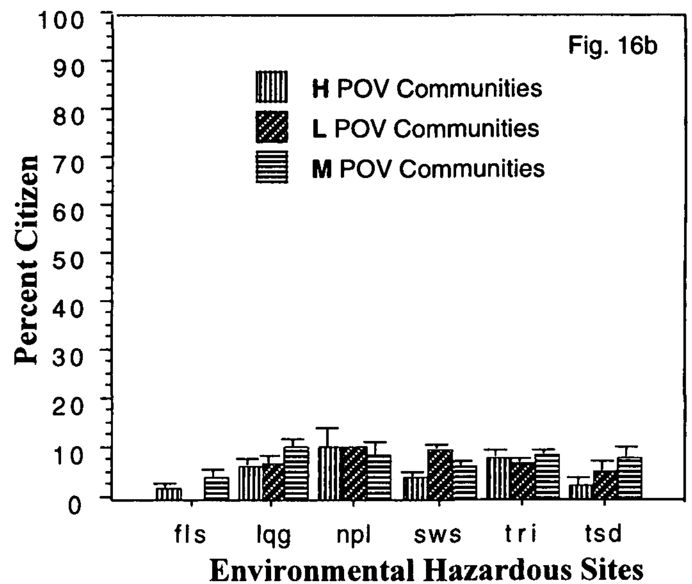
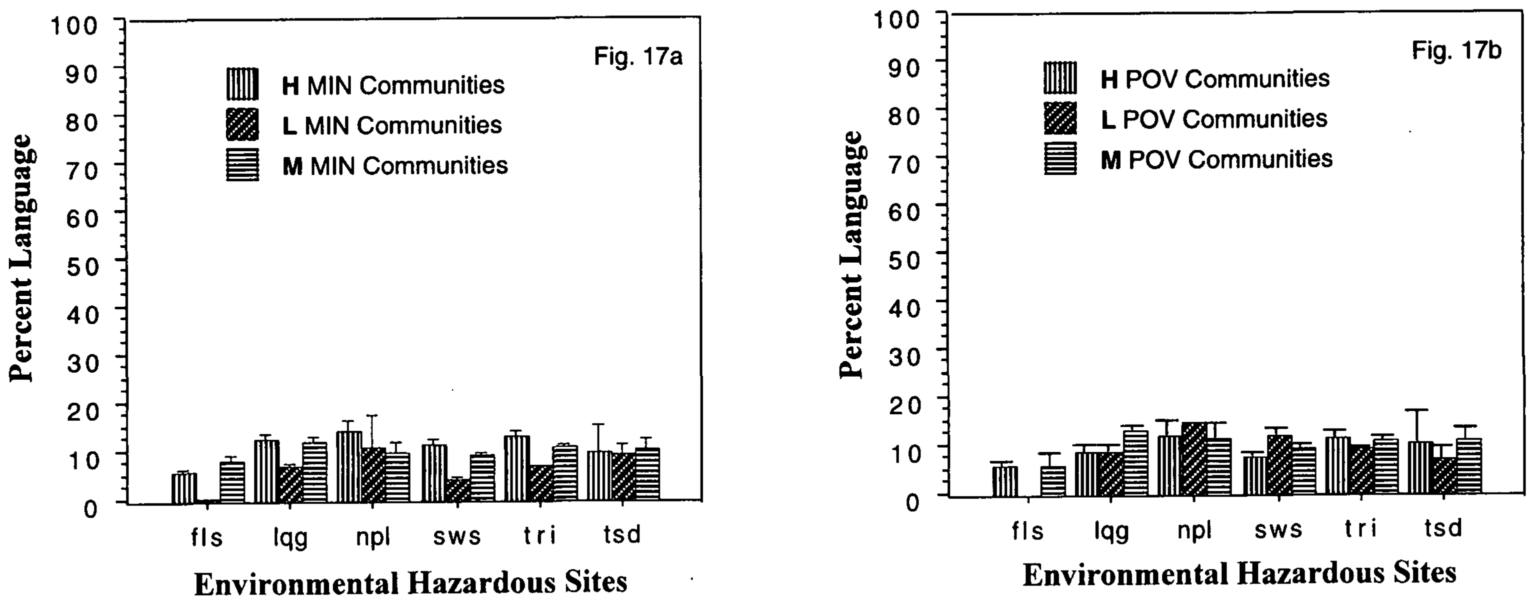


Figure 17. Percent Language

Percentage of Population Over Five that Speaks a Language other than English at Home Within Two Miles of the 571 Selected Hazardous Sites in the Fifteen Study Counties Characterized by High (H), Medium (M) and Low (L) Minority (MIN Fig. 17a) and Poverty (POV Fig. 17b) Populations



CHAPTER 98-304

Committee Substitute for House Bill No. 945

An act relating to environmental equity and justice; creating s. 760.854, F.S.; creating the Center for Environmental Equity and Justice; providing purpose of the center; creating s. 381.101, F.S.; creating the Community Environmental Health Program; providing purposes of the program; providing for a Community Environmental Health Advisory Board; providing an appropriation; providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1. Section 760.854, Florida Statutes, is created to read:

760.854 Center for Environmental Equity and Justice.—

(1) There is hereby established the Center for Environmental Equity and Justice.

(2) The purpose of the center is to conduct and facilitate research, develop policies, and engage in education, training, and community outreach with respect to environmental equity and justice issues.

(3) The Center for Environmental Equity and Justice shall be established at the Florida Agricultural and Mechanical University within the Environmental Sciences Institute.

(4) The Center for Environmental Equity and Justice shall sponsor students to serve as interns at the Department of Health, the Department of Environmental Protection, the Department of Community Affairs, and other relevant state agencies. The Center may enter into a memorandum of understanding with these agencies to address environmental equity and justice issues.

Section 2. There is hereby appropriated $672,000 from the General Revenue Fund to the Florida Agricultural and Mechanical University to implement the provisions of this act.

Section 3. Section 381.101, Florida Statutes, is created to read:

381.101 Community Environmental Health Program; creation; purposes.—

(1) There is created the Community Environmental Health Program. The primary purpose of the program is to ensure the availability of public health services to members of low-income communities that may be adversely affected by contaminated sites located in or near the community. These services extend beyond health services that are currently provided pursuant to chapter 154 and include measures to address the health effects that are associated with exposure to environmental contamination.

CODING: Words ~~striken~~ are deletions; words underlined are additions.

(2) The Department of Health shall establish a Community Environmental Health Advisory Board. The majority of board members shall be low-income residents. The board must also include representatives from the respective county health departments, health care professionals and providers, and elected officials. The board shall identify the community environmental health needs and types of services which should be provided.

(3) As used in this section:

(a) "Low-income community" means a contiguous grouping of residences with a significant portion of occupants who have a family income equal to or below 100 percent of the most recent federal poverty level and who are exposed to multiple sources of environmental contamination.

(b) "Contaminated site" means any contiguous land, surface water, or groundwater areas that contain contaminants that may be harmful to human health or the environment and includes federal Superfund sites and state or federally designated Brownfield areas.

Section 4. The sum of $100,000 is appropriated from the General Revenue Fund during the 1998-1999 fiscal year for the Community Environmental Health Program.

Section 5. This act shall take effect upon becoming law.

Approved by the Governor May 29, 1998.

Filed in Office Secretary of State May 29, 1998.

SCHOOL OF THE ENVIRONMENT

The Center for Environmental Equity and Justice (CEEJ)

The Center for Environmental Equity and Justice is an information resource center to increase the community, faith-based organizations, state and local government and any other interested parties awareness of environmental justice issues primarily in the state of Florida and throughout the country. The Center assists, trains, and educates people about environmental justice.

In response to numerous concerns regarding environmental equity and justice issues in Florida, the Legislature (Florida Law, CH. 94-219) (/environmentalscience/chapter_94.pdf), created the Florida

Environmental Equity and Justice Commission in 1994. The Commission was directed to conduct a study to determine if low-income and minority communities are more at risk from environmental hazards than the general population. The report concluded specific communities were disproportionately impacted by environmental hazards. The report recommended that a center for environmental equity and justice be established. In 1998, the Center was established at Florida Agricultural and Mechanical University (Florida Law, CH. 98-304) (/environmentalscience/ch98_304.pdf). The Center's mission is to address environmental issues through research, education, training and community outreach, and make recommendations to be used in developing policies that are designed to protect all citizens from exposure to environmental hazards.

Environmental equity and justice issues came to the forefront when the United Church of Christ Commission on Racial Justice published in 1987, a landmark study titled "Toxic Waste and Race in the United States". The study found that three out of five Black and Hispanic Americans reside in communities with uncontrolled toxic waste sites. The study is largely considered to be the first to nationally address the siting of toxic waste sites in minority and low-income communities.

In 1994, the White House issued Executive Order 12898; Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations;. It states that to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of Mariana Islands.

The Center for Environmental Equity and Justice at Florida Agricultural and Mechanical University addresses critical environmental equity and justice issues by:

-examining issues relating to enforcement, evaluation, health effects and risks, and site placement;
-providing and facilitating education and training on environmental equity and justice issues to students, citizens, and local and state government employees through traditional media networks;
-developing research programs to elucidate and validate contaminant biomarkers of exposure, effect and susceptibility; in human populations;
-assessing environmental impacts on populations using geographical information systems and other technologies for developing strategies;
-focusing on the sampling and analysis of environmental contaminants in impacted communities;
-serving as a statewide environmental justice technical and public information resource.

Contact Information

The Center for Environmental Equity and Justice is located on the campus of Florida Agricultural and Mechanical University, the School of the Environment, in the Frederick S. Humphries Science Research Center.

Address: 1515 Martin Luther King Blvd.
Florida Agricultural and Mechanical University
Frederick S. Humphries Science Research Center
Tallahassee, Florida 32306
Phone:850-599-8193, 1-800-391-7513; Fax:850-412-7785
E-mail:ceej@famu.edu

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FSH Science Research Center
Tallahassee, Florida 32307

P: (Phone) (850) 599-3550
F: (Fax) (850) 599-8183

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FAMU's Bragg Memorial Stadium Renovations Ahead of Schedule...more (http://www.famunews.com/2021/06/famus-bragg-memorial-stadium-renovations-ahead-of-schedule/)

FAMU Names Robert Seniors Chief Information Officer/AVP Informati...more (http://www.famunews.com/2021/06/famu-names-robert-seniors-chief-information-officer-avp-information-technology-services/)

FAMU Set To Officially Become Members of the SWAC...more (http://www.famunews.com/2021/06/famu-set-to-officially-become-members-of-the-swac/)

FAMU Mourns the Passing of Former President Dr. Frederick S. Hump...more (http://www.famunews.com/2021/06/famu-mourns-the-passing-of-former-president-dr-frederick-s-humphries-sr/)

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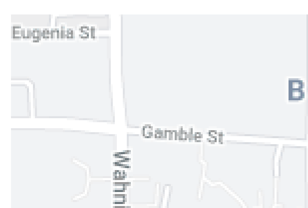

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FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Office of the Secretary

Contact Office of the Secretary

3900 Commonwealth Boulevard M.S. 49
Tallahassee, FL 32399
850-245-2118

Shawn Hamilton, Interim Secretary

Shawn Hamilton has worked at the Florida Department of Environmental Protection since 2007, where he has risen through the ranks of the department. Early in his career he served as Ombudsman and public affairs manager in DEP's Northwest District Office. He was promoted to assistant district director in 2010 and was appointed district director in 2011 and was subsequently promoted to interim deputy secretary of Land and Recreation in 2020 and formally appointed as deputy secretary in 2021.

Mr. Hamilton has 20 years of experience in the public and private sectors, where he has proven to be an effective and driven leader with the ability to influence and build trusted and constructive connections with community stakeholders, elected and appointed municipal officials, and organizational team members.

He served as the agency's environmental justice coordinator with responsibility for providing statewide guidance on sensitive environmental justice issues and was appointed as the principle state liaison for the Environmental Protection Agency's, Office of Environmental Justice.

Shawn had provided effective leadership, incident command, and focused recovery during multiple large-scale natural and industrial emergencies to include Deepwater Horizon Oil Spill, International Paper Mill Explosion and Hurricanes Irma and Michael.

He also led the creation and execution of reoccurring partnership meetings with the U.S. Air Force, U.S. Navy, Gulf Power, Emerald Coast Utilities and Escambia County.

Mr. Hamilton has a bachelor's degree in computer science from Troy State University, with a minor in business. He and his wife Charlene have three sons Christopher, Brandon and Joshua.

Office of the Secretary

The secretary works alongside more than 2,900 full-time and 1,300 OPS employees to protect Florida's water and natural resources. Along with oversight of the agency's strategic and executive leadership teams, DEP's regulatory programs, ecosystem and restoration programs and land and recreation programs.

The secretary oversees all functions of the department:

- Ecosystems Restoration oversees Florida water quality, restoration and research, including coastal resources, the Everglades and water restoration assistance.
- Land and Recreation oversees public lands, including Florida State Parks, the Office of Greenways and Trails and the Division of State Lands.
- Regulatory Programs oversees the air resource, water resource and waste management divisions; the Florida Geological Survey, the Office of Emergency Response and six regulatory district offices.
- Division of Administrative Services provides centralized support in the areas of budget and planning; finance and accounting; human resource management; and others.
- Office of General Counsel represents DEP and provides counsel in implementing Florida's top environmental priorities.
- Office of Inspector General promotes accountability, efficiency and integrity in government.
- Office of Intergovernmental Programs oversees the state of Florida Clearinghouse and DEP's review of local government comprehensive plans.
- Office of Legislative Affairs develops and coordinates the department's legislative lobbying efforts and serves as the central point of contact for legislators and their staff.
- Office of Technology and Information Services provides support services to DEP's divisions and offices in Tallahassee as well as its six regulatory and five park districts across the state.

An official website of the United States government.

Learn About Environmental Justice

President Clinton signing the EJ Executive Order in 1994.

Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

Meaningful involvement means:

- People have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- The public's contribution can influence the regulatory agency's decision;
- Community concerns will be considered in the decision making process; and
- Decision makers will seek out and facilitate the involvement of those potentially affected.

Want to learn more about the EPA's Office of Environmental Justice?

- Factsheet on the EPA's Office of Environmental Justice
- Memorandum on EPA's Environmental Justice and Community Revitalization (released 23 February 2018)

Read the accomplishment reports to learn more about the progress that the EPA has made in advancing environmental justice principles? Click here to read annual progress reports on the Agency's most recent EJ accomplishments.

> “Whether by conscious design or institutional neglect, communities of color in urban ghettos, in rural 'poverty pockets,' or on economically impoverished Native-American reservations face some of the worst environmental devastation in the nation.”
>
> Dr. Robert Bullard

- Overview
- Executive Order 12898
- Interagency Working Group
- Laws and Statutes
- Integrating EJ at EPA

EPA and Environmental Justice

EPA's goal is to provide an environment where all people enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work.

EPA's environmental justice mandate extends to all of the Agency's work, including:

- setting standards
- permitting facilities
- awarding grants
- issuing licenses
- regulations
- reviewing proposed actions by the federal agencies

EPA works with all stakeholders to constructively and collaboratively address environmental and public health issues and concerns. The Office of Environmental Justice (OEJ) coordinates the Agency's efforts to integrate environmental justice into all policies, programs, and activities. OEJ's mission is to facilitate Agency efforts to protect environment and public health in minority, low-income, tribal and other vulnerable communities by integrating environmental justice in all programs, policies and activities.

Executive Order 12898

Executive Order 12898 directed federal agencies to develop environmental justice strategies to help federal agencies address disproportionately high and adverse human health or environmental effects of their programs on minority and low-income populations.

The Presidential Memorandum accompanying the order underscores certain provisions of existing law that can help ensure that all communities and persons across the nation live in a safe and healthy environment.

Federal Interagency Working Group

The executive order established an Interagency Working Group on Environmental Justice (EJ IWG) chaired by the EPA Administrator and comprised of the heads of 11 departments or agencies and several White House offices. The EJ IWG now includes 17 agencies and meets on a monthly basis to continue collaborative efforts.

Laws and Statutes

The statutes that EPA implements provide the Agency with authority to consider and address environmental justice concerns. These laws encompass the breadth of the Agency's activities including:

- Setting standards
- Permitting facilities
- Making grants
- Issuing licenses or regulations
- Reviewing proposed actions of other federal agencies

These laws often require the Agency to consider a variety of factors that generally include one or more of the following:

- Public health
- Cumulative impacts
- Social costs
- Welfare impacts

Moreover, some statutory provisions, such as under the Toxics Substances Control Act, explicitly direct the Agency to target low-income populations for assistance. Other statutes direct the Agency to consider vulnerable populations in setting standards. In all cases, the way in which the Agency chooses to implement and enforce its authority can have substantial effects on the achievement of environmental justice for all communities.

Integrating EJ at EPA

Since OEJ was created, there have been significant efforts across EPA to integrate environmental justice into the Agency's day-to-day operations. Read more about how EPA's EJ 2020 Action Agenda will help EPA advance environmental justice through its programs, policies and activities, and support our cross-agency strategy on making a visible difference in environmentally overburdened, underserved, and economically distressed communities.

Every regional and headquarter office has an environmental justice coordinator who serves as a focal point within that organization. This network of individuals provides outreach and educational opportunities to external, as well as internal, individuals and organizations. To find out more about Agency efforts to address environmental justice, contact an EJ coordinator based on your location or area of interest.

LAST UPDATED ON SEPTEMBER 24, 2020

News Releases from Headquarters › Office of the Administrator (AO) › Office of Policy (OP)

EPA Administrator Announces Agency Actions to Advance Environmental Justice

Administrator Regan Directs Agency to Take Steps to Better Serve Historically Marginalized Communities

04/07/2021

Contact Information:
EPA Press Office (press@epa.gov)

WASHINGTON – Today, U.S. Environmental Protection Agency (EPA) Administrator Michael S. Regan directed all EPA offices to clearly integrate environmental justice considerations into their plans and actions.

"Too many communities whose residents are predominantly of color, Indigenous, or low-income continue to suffer from disproportionately high pollution levels and the resulting adverse health and environmental impacts," **said EPA Administrator Michael S. Regan in a message to all agency staff.** "We must do better. This will be one of my top priorities as Administrator, and I expect it to be one of yours as well."

The new measures announced today are one part of EPA's response to the Biden-Harris Administration's directive to all federal agencies to embed equity into their programs and services to ensure the consistent and systematic fair, just, and impartial treatment of all individuals. In his message, Administrator Regan, while acknowledging the agency's past environmental justice efforts, called on all EPA offices to take the following steps:

1. Strengthen enforcement of violations of cornerstone environmental statutes and civil rights laws in communities overburdened by pollution.

2. Take immediate and affirmative steps to incorporate environmental justice considerations into their work, including assessing impacts to pollution-burdened, underserved, and Tribal communities in regulatory development processes and to consider regulatory options to maximize benefits to these

communities.

3. Take immediate and affirmative steps to improve early and more frequent engagement with pollution-burdened and underserved communities affected by agency rulemakings, permitting and enforcement decisions, and policies. Following President Biden's memorandum on strengthening the Nation-to-Nation relationship with Tribal Nations, EPA staff should engage in regular, meaningful, and robust consultation with Tribal officials in the development of federal policies that have Tribal implications

4. Consistent with the Administration's Justice 40 initiative, consider and prioritize direct and indirect benefits to underserved communities in the development of requests for grant applications and in making grant award decisions, to the extent allowed by law.

Today Administrator Regan is engaging in a series of roundtables to hear directly from representatives of underserved communities and environmental justice leaders about pollution burdens and the importance of EPA leadership. These meetings include one with national Environmental Justice leaders, a Congressional roundtable with the co-chairs of the Senate EJ Caucus, Senator Tom Carper and Senator Corey Booker along with the co-chairs of the United for Climate and Environmental Justice Congressional Task Force, Congresswoman Nanette Barragán and Congressman Donald McEachin, followed by a meeting with mayors and city councilmembers in the National Black Caucus of Local Elected Officials.

EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies." Environmental justice is a major part of the agency's core mission of protecting human life and the environment.

For more information: https://www.epa.gov/environmentaljustice

LAST UPDATED ON APRIL 7, 2021