STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SIP Submittal: State Implementation Plan Infrastructure Confirmation for the 2010 Revised Sulfur Dioxide National Ambient Air Quality Standard for CAA Section 110(a)(2)(D)(i)(I) Prongs 1 and 2

On June 2, 2010, the United States Environmental Protection Agency (EPA) revised the National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO_2). *See* 75 Fed. Reg. 35,520 (June 22, 2010). Pursuant to Clean Air Act (CAA) section 110(a)(1), states must address basic State Implementation Plan (SIP) "infrastructure" elements listed under section 110(a)(2) of the CAA within three years of EPA's promulgation of a revised NAAQS. EPA has historically referred to the submittals in which states address these requirements as "infrastructure SIPs."[1]

On June 3, 2013, the Florida Department of Environmental Protection (Department) submitted its infrastructure SIP for the 2010 SO_2 NAAQS. The courts had vacated the Cross-State Air Pollution Rule, and EPA advised that it did not expect states to address the interstate transport requirements at that time.[2] Consequently, the Department inserted language into the response to CAA Section 110(a)(2)(D)(i)(I) that reflected EPA's expectation. In EPA's approval of Florida's SIP revision, EPA did not act (approval or disapproval) on this section of the infrastructure SIP.[3]

Section 403.061(35), Florida Statues, grants the Department the broad authority to "[e]xercise the duties, powers and responsibilities required of the state under the federal [CAA], 42 U.S.C. ss. 7401 et seq" and "implement the programs required under that act in conjunction with its other powers and duties." By virtue of this statute, the Department has the authority and responsibility to act on behalf of the State of Florida to develop and revise a SIP as required by CAA section 110(a)(1) and to ensure that the SIP adequately addresses the required infrastructure element prescribed under CAA section 110(a)(2)(D)(i)(I) prongs 1 and 2.

The Department hereby confirms that Florida's SIP has adequate provisions to prohibit sources or other emission activities within the state from emitting SO_2 in amounts that would contribute

[1] The term "infrastructure SIP" does not appear in the statute, but EPA uses the term to distinguish this particular type of SIP submission designed to address basic structural requirements of a SIP from other types of SIP submissions designed to address different requirements, such as "nonattainment SIP" submissions required to address the nonattainment planning requirements of part D, "regional haze SIP" submissions required to address the visibility protection requirements of CAA section 169A, New Source Review (NSR) permitting program submissions required to address the requirements of parts C and D.

[2] McCarthy, Gina, Assistant EPA Administrator, Memo to Air Division Directors, Regions 1-10, Re: *Next Steps for Pending Redesignation Requests and Pending State Implementation Plan Actions Affected by the Recent Court Decision Vacating the 2011 Cross-State Air Pollution Rule*, November 19, 2012.

[3] *See* 81 Fed. Reg. 67,179 (September 3, 2016). Footnote 5 in the approval of Florida's infrastructure SIP for the 2010 SO_2 NAAQS states:

> EPA's final action does not address CAA section 110(a)(2)(D)(i)(I) because Florida has not made a submission for these elements.

significantly to nonattainment in, or interfere with maintenance by, any other state with respect to the 2010 SO_2 NAAQS. As such, Florida's SIP adequately addresses the infrastructure elements required by section 110(a)(2)(D)(i)(I) prongs 1 and 2 of the CAA with respect to the implementation of the 2010 SO_2 NAAQS. This document demonstrates the correlation between the section 110(a)(2)(D)(i)(I) prongs 1 and 2 infrastructure elements and the Florida Statutes and SIP-approved Florida rules that address each such element.

The Department further confirms that this element of Florida's infrastructure SIP has undergone public notice in accordance with the requirements of 40 C.F.R. 51.102. On August 3, 2018, the Department published a Notice of Hearing in the Florida Administrative Register announcing the Department's intent to submit this revision to Florida's 2010 SO_2 NAAQS infrastructure SIP. The Department also sent EPA a pre-hearing hearing copy of the proposed infrastructure SIP revision. No comments were received from EPA.

Rules and Statutes

Florida's existing SIP consists largely of Florida Administrative Code (F.A.C.) rules adopted by the Department and approved by EPA through the SIP revision process. The complete list of Department rules approved and incorporated by reference into Florida's SIP is published by EPA in the United States Code of Federal Regulations at 40 C.F.R. 52.520(c). The list includes each F.A.C. rule section number and effective date, with a corresponding EPA approval date for each rule section. The complete F.A.C. rules are available online at the Florida Department of State website (https://www.flrules.org/default.asp) and at the Department's Division of Air Resource Management website (https://floridadep.gov/air/air-business-planning/content/current-air-rules).

There are three rule chapters of the F.A.C. that contain SIP-approved rule sections that directly or indirectly address implementation of the SO_2 NAAQS:

- **Chapter 62-210, F.A.C., Stationary Sources – General Requirements.** This rule chapter establishes definitions and the general requirements for major and minor stationary sources of air pollutant emissions. It provides criteria for determining the need for an owner or operator to obtain Department authorization by permit to conduct certain activities involving sources of air pollutant emissions, and it establishes reporting requirements and requirements relating to estimating emissions. This chapter also sets forth special provisions related to compliance monitoring, stack heights, circumvention of pollution control equipment, and excess emissions. This rule chapter is referenced in the discussion below regarding the requirements in section 110(a)(2)(D)(i)(I) of the CAA.
- **Chapter 62-212, F.A.C., Stationary Sources – Preconstruction Review.** This rule chapter establishes the preconstruction review requirements for proposed new emissions units, new facilities, and modifications to existing units and facilities. The requirements of this chapter apply to those proposed activities for which an air construction permit is required. This chapter includes general preconstruction review requirements and specific requirements for emission units subject to both attainment and nonattainment area preconstruction review (i.e., New Source Review). This rule chapter is referenced in the discussion below regarding the requirements in section 110(a)(2)(D)(i)(I) of the CAA.

- **Chapter 62-296, F.A.C., Stationary Sources – Emission Standards.** This rule chapter establishes emission limiting standards and compliance requirements for stationary sources of air pollutant emissions. It establishes emission limitations for specific categories of facilities and emissions units, including reasonably available control technology (RACT) requirements. This rule chapter is referenced in the discussion below regarding the requirements in section 110(a)(2)(D)(i)(I) of the CAA.

As mentioned above, the Department has adopted many of the current SIP-approved rules under the authority of subsection 403.061(35), Florida Statutes. Beyond this broad authority to implement the CAA, the Department relies on other Florida Statutes for authority to conduct various air program activities such as permitting, monitoring, fee collection, compliance assurance, enforcement, and emergency response. These statutes are essential to Florida's implementation of the SO_2 NAAQS and are referenced in the discussion below regarding the requirements of CAA section 110(a)(2)(D)(i)(I). For the most part, these Florida Statutes are referenced only to confirm the Department's legal authority to implement the SIP. Certain statutes have, however, been approved and incorporated into Florida's SIP and are noted as such. The complete Florida Statutes are available online at http://www.leg.state.fl.us/Statutes.

<u>Section 110(a)(2)(D)(i)(I) – Interstate Transport – Implementing Rules and Statutes</u>

110(a)(2)(D)(i)(I) – Interstate transport: SIPs must include provisions prohibiting any source or other type of emissions activity within the state from emitting any air pollutant in amounts which will contribute significantly to nonattainment in (Prong 1), or interfere with maintenance by (Prong 2), any other state with respect to any such primary or secondary NAAQS.

Section 110(a)(2)(D)(i)(I) Prong 1:

- <u>Rules:</u> SIP-approved sections of Chapters 62-210 and 62-212, F.A.C., require any new major source or major modification to undergo prevention of significant deterioration (PSD) or nonattainment new source review (NNSR) permitting and thereby demonstrate that it will not cause or contribute to a violation of any NAAQS or PSD increment in Florida or any other state and require that the owner or operator provide an analysis of additional impacts of the source or modification, including impacts on visibility. All new or modified major sources of SO_2 emissions will apply the Best Available Control Technology (BACT) to reduce SO_2 emissions in accordance with the CAA and EPA PSD permitting requirements. In addition, Florida's SIP contains other emission limiting standards such as Chapter 62-296, F.A.C., which includes SIP emission limits that restrict SO_2 emissions from various source categories, including electrical generating units (Rule 62-296.405, F.A.C.) and sulfuric acid plants (Rule 62-296.402, F.A.C.) and source-specific SO_2 emission limits that form of the basis of Florida's SO_2 nonattainment area SIPs.
- <u>Statutes:</u> Subsection 403.061(14), Florida Statutes, authorizes the Department to "[e]stablish a permit system whereby a permit may be required for the operation, construction or expansion of any installation that may be a source of air pollution…." (with the definition of "pollution" provided in Section 403.031(7), Florida Statutes), and

Section 403.087, Florida Statutes, provides specific requirements for implementation of a permit system for operation of reasonably expected sources of air pollution.

- Note 1: SO_2 is a source-oriented pollutant that is not naturally present in the environment in high concentrations and is not formed in large quantities by any atmospheric process. Elevated concentrations are often due to a single large industrial source or group of sources with localized impacts. The concentration of SO_2 surrounding these sources decreases rapidly beyond the peak levels that occur within a few kilometers of the source. SO_2 emissions by nature result in localized pollutant impacts very near the emissions source and therefore do not contribute to regional pollution and nonattainment. As stated in EPA's memo "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard,"[4] which applies equally to the 1-hour SO_2 standard, the distance to maximum 1-hour impact and the region of significant concentration gradients in flat terrain is approximately 10 times the source release height. No SO_2 source in Florida has a stack height of more than 205 meters. Therefore, the maximum distance to a significant concentration gradient from a Florida source is approximately 2,050 meters from the source. Beyond this point, source impacts drop significantly. Because SO_2 emissions do not exhibit the same regional transport and influence as either ozone or $PM_{2.5}$, and significant impacts are expected be localized very near the SO_2 source, the Department focused on an area within 50 km of potential sources as a very conservative threshold to assess source impacts on air quality. Therefore, only Florida sources located within 50 km of the Florida border were assessed as having the potential to impact air quality in another state.
- Note 2: The largest source categories of SO_2 emissions in Florida according to the EPA's 2014 National Emissions Inventory are fuel combustion at electric utilities and industrial facilities, and chemical and allied product manufacturing (See **Appendix 1**). Florida SO_2 emissions from industrial sources have decreased by 90 percent since the year 2000 due to unit shut downs, fuel switches from higher sulfur-emitting fuels such as coal to much lower sulfur-emitting fuels such as natural gas, and reductions in SO_2 resulting from compliance with EPA's Mercury and Air Toxics Standards (MATS). Emissions are expected to decrease further in the coming years due to additional unit shutdowns and fuel switches.
- Note 3: There are no nearby SO_2 monitors in neighboring states showing violations of the 2010 SO_2 NAAQS. The only SO_2 monitor within 50 km of Florida is monitor 01-097-0003 in Mobile, Alabama. Although this monitor has only two years of SO_2 data, the maximum 1-hour SO_2 values recorded in 2016 and 2017 at this monitor are less than 50 percent of the standard (See **Appendix 1**).
- Note 4: The EPA's SO_2 Data Requirements Rule (DRR) required an analysis of air quality impacts from sources that emitted greater than 2,000 tons per year of SO_2 in 2014. Florida's DRR modeling demonstrations were submitted to EPA on January 13, 2017. The types of sources included in the DRR analysis for Florida are representative of the largest source categories of SO_2 emissions in Florida. Four of the sources analyzed as

[4] *See* Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard. Tyler Fox Memorandum dated March 1, 2011, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/sites/production/files/2015-07/documents/appwno2_2.pdf

part of the DRR are located within 50 km of the Florida border (See **Table 2** in **Appendix 1**). Florida used the EPA-recommended dispersion model AERMOD to evaluate the area around each of these sources to satisfy the requirements of the DRR. Florida ran this model for 2012-2014 using actual emissions data and monitored background concentrations. The 99th percentile (4th high) daily maximum one-hour average concentration for each year at each receptor was averaged across all three years. The highest modeled design value at any receptor was then compared to the 2010 one-hour SO_2 NAAQS. The results from the modeling analyses indicate that the area surrounding each facility is in attainment of the SO_2 NAAQS (See **Appendix 2**). Since 2014, actual emissions from these sources have decreased by 65 percent. All of these sources except for the Gulf Power Crist Plant, which modeled below 50 percent of the NAAQS, will continue to be monitored under the continuing review obligation required by the SO_2 DRR.

- <u>Note 5:</u> On August 5, 2013 (effective October 4, 2013), EPA designated an area in Nassau County, Florida "nonattainment" for SO_2 based on ambient SO_2 monitoring data in the area showing violation of the revised standard over the three-year period 2009-2011. 78 Fed. Reg. 47,191. This is the only SO_2 nonattainment area within 50 km of another state (approximately 4 km from the Georgia border). The only point source of SO_2 emissions within the Nassau County nonattainment area is a pulp and paper mill – Rayonier Performance Fibers, LLC Fernandina Beach Sulfite Pulp Mill (Rayonier). An additional pulp and paper mill – WestRock CP, LLC[5] Fernandina Beach Mill (WestRock) – is immediately adjacent to the nonattainment area. In 2012, Rayonier received an air construction permit from the Department to construct a new, taller stack for the Vent Gas Scrubbing System, extend the stack at the Power Boiler if needed, and lower the allowable SO_2 emission limits for several units.[6] In 2015, WestRock received an air construction permit from the Department to implement a variety of controls, including improvements to the recovery boilers and installation and operation of a piping system to transport non-condensable gases for combustion in the No. 7 Power Boiler.[7] These two permits formed the basis of the Department's attainment demonstration for the area in a nonattainment area plan submitted to EPA on April 3, 2015, and fully approved by EPA on July 3, 2017 (effective August 2, 2017). 82 Fed. Reg. 30,749. The nonattainment area plan was fully implemented with the completion of all construction, controls and limits by December 1, 2017. The EPA-approved nonattainment area plan included an attainment modeling demonstration showing compliance with the 2010 SO_2 NAAQS based on the facilities' current permitted emission rates (See **Appendix 3**). In addition, the Fernandina Beach monitor (12-089-0005) in the nonattainment area has been attaining the 2010 SO_2 NAAQS since the period 2011-2013 (see **Appendix 1**), and the Department submitted a Redesignation Request and Maintenance Plan for the area on June 7, 2018.
- <u>Note 6:</u> EPA has designated parts of 18 states as nonattainment for the 2010 SO_2 NAAQS (78 Fed. Reg. 47,191; 81 Fed. Reg. 45,039; 81 Fed. Reg. 89,870; 83 Fed. Reg.

[5] WestRock CP, LLC was formerly known as RockTenn CP, LLC. The legal name was changed September 1, 2015.
[6] *See* air construction permit 0890004-036-AC issued by the Florida Department of Environmental Protection on April 12, 2012.
[7] *See* air construction permit 0890003-046-AC issued by the Florida Department of Environmental Protection on January 9, 2015.

1,098). The closest SO_2 nonattainment area outside of Florida to any part of Florida is 145 km away (St. Bernard Parish in New Orleans, Louisiana). The next closest SO_2 nonattainment area is over 400 km away (Evangeline Parish (p) in Louisiana).

- The Department believes that it can be concluded, based on the local nature of SO_2 dispersion, the emissions and monitoring data discussed above, and the above-mentioned modeling demonstrating that all large SO_2 sources within 50 km of the Florida border have modeled attainment with the 2010 SO_2 NAAQS, that Florida is meeting its Section 110(a)(2)(D)(i) Prong 1 obligations for the 2010 SO_2 NAAQS. As such, Florida does not contribute significantly to nonattainment in any other state with respect to the 2010 SO_2 NAAQS. Florida has an EPA-approved New Source Review (NSR) program that evaluates new major sources, and new major modifications to major sources, to minimize SO_2 emissions. This program, along with various federal programs that reduce SO_2 emissions, limit any future state-to-state contributions to potential nonattainment areas.

Section 110(a)(2)(D)(i)(I) Prong 2:

- Rules: SIP-approved sections of Chapters 62-210 and 62-212, F.A.C., require any new major source or major modification to undergo prevention of significant deterioration (PSD) or nonattainment new source review (NNSR) permitting and thereby demonstrate that it will not cause or contribute to a violation of any NAAQS or PSD increment in Florida or any other state and require that the owner or operator provide an analysis of additional impacts of the source or modification, including impacts on visibility. All new or modified major sources of SO_2 emissions will apply the Best Available Control Technology (BACT) to reduce SO_2 emissions in accordance with the CAA and EPA PSD permitting requirements. In addition, Florida's SIP contains other emission limiting standards such as Chapter 62-296, F.A.C., which includes SIP emission limits that restrict SO_2 emissions from various source categories, including electrical generating units (Rule 62-296.405, F.A.C.) and sulfuric acid plants (Rule 62-296.402, F.A.C.) and source-specific SO_2 emission limits that form of the basis of Florida's SO_2 nonattainment area SIPs.
- Statutes: Subsection 403.061(14), Florida Statutes, authorizes the Department to "[e]stablish a permit system whereby a permit may be required for the operation, construction or expansion of any installation that may be a source of air pollution…." (with the definition of "pollution" provided in Section 403.031(7), Florida Statutes), and Section 403.087, Florida Statutes, provides specific requirements for implementation of a permit system for operation of reasonably expected sources of air pollution.
- The Department believes that it can be concluded, based on the local nature of SO_2 dispersion, the emissions and monitoring data discussed above, and the above-mentioned modeling demonstrating that all large SO_2 sources within 50 km of the Florida border have modeled attainment with the 2010 SO_2 NAAQS, that Florida is meeting its Section 110(a)(2)(D)(i) Prong 2 obligations for the 2010 SO_2 NAAQS. As such, Florida does not interfere with maintenance by any other state with respect to the 2010 SO_2 NAAQS. Florida has an EPA-approved New Source Review (NSR) program that evaluates new major sources, and new major modifications to major sources, to minimize SO_2 emissions. This program, along with various federal programs that reduce SO_2 emissions, limit any future state-to-state contributions to maintenance areas.

Appendix 1

Florida SO_2 Emission Trends

Table 1 shows Florida statewide source-category SO_2 emissions in 2014. Electric utility fuel combustion is the largest source of SO_2 emissions in Florida, representing 60 percent of total Florida SO_2 emissions. Other large sources of SO_2 emissions in Florida include chemical and allied product manufacturing and fuel combustion at industrial sources. Together, these source categories represent 80 percent of Florida's total SO_2 emissions.

Table 1. Summary of EPA's 2014 National Emissions Inventory (NEI) SO_2 Emissions Data for Florida.

Category	**Emissions (tons per year)**
Fuel Combustion: Electric Utilities	99,363
Chemical and Allied Product Manufacturing	20,706
Miscellaneous	13,342
Fuel Combustion: Industrial	12,111
Off-Highway	10,462
Other Industrial Processes	3,560
Highway Vehicles	2,132
Waste Disposal and Recycling	2,089
Fuel Combustion: Other	279
Petroleum and Related Industries	191
Metals Processing	183
Storage and Transport	20
Solvent Utilizations	0
Total	164,437

Table 2 lists the largest SO_2 sources within 50 km of the Florida border. Air quality impacts from these sources were analyzed as part of the SO_2 Data Requirements Rule. Total annual emissions from these facilities have decreased by 22,021 tons (74 percent) since 2014. Note that two coal-fired units at St. Johns River Power Park were shutdown, effective December 31, 2017.

Table 2. Largest SO_2 sources within 50 km of the Florida border.

Facility	Facility Type	County	2014 Emissions (tons per year)	2017 Emissions (tons per year)	Decrease
JEA Northside	Electricity Generation via Combustion	Duval	2,473	1,485	-40%
JEA St Johns River Power Park*	Electricity Generation via Combustion	Duval	18,505	1,708	-91%
WestRock Fernandina Beach Mill	Pulp and Paper Plant	Nassau	3,477	2,297	-34%
Gulf Power Crist Plant	Electricity Generation via Combustion	Escambia	2,820	498	-82%
White Springs Ag Chemicals	Fertilizer Plant	Hamilton	2,487	1,753	-30%
Total			29,762	7,741	-74%

*Units 1 and 2 at St. John River Power Park shut down effective December 31, 2017.

Figure 1 below shows Florida statewide emission trends for SO_2 from stationary industrial, on-road, non-road, and nonpoint sources from 2000 to 2017. Note that changes in nonpoint and non-road emissions are not taking into account changes made to the Nonpoint and Non-Road National Emissions Inventory (NEI) categories over time, such as the addition of commercial marine vessel, locomotive, and biogenic emissions to Nonpoint in 2008, the addition of emissions from various types of equipment to Non-Road in 2002, and the removal of aircraft, commercial marine vessel, and locomotive emissions from Non-Road in 2008.

Emissions of SO_2 from stationary industrial sources have decreased by 90 percent since 2000. Emissions of SO_2 from mobile on-road sources have decreased by 95 percent since 2000. Emissions of SO_2 from non-road sources have decreased by 99 percent since 2000. Emissions of SO_2 from nonpoint sources have decreased by 61 percent since 2000.

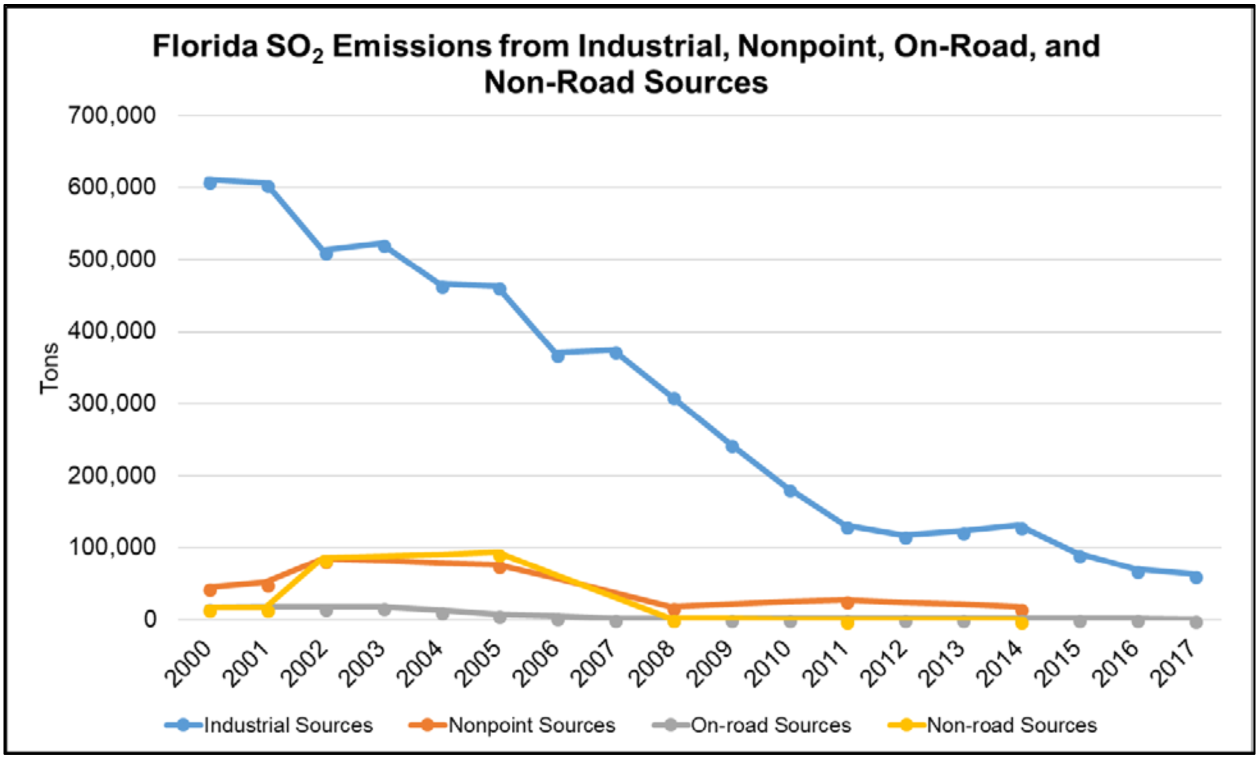

Figure 1. Emissions of SO_2 from industrial, nonpoint, on-road, and non-road sources. Industrial source emissions data are from Florida facility Annual Operating Report submissions. Mobile on-road source emissions are estimated from the Motor Vehicle Emission Simulator (MOVES2014a) model. Nonpoint and non-road emissions data are from the NEI.

Monitoring Data Trends

Table 3 below shows SO_2 design value trends from 2007 – 2017 for Florida's existing SO_2 air quality monitors. All of Florida's SO_2 monitors have current (2015-2017) SO_2 design values below the 2010 1-hour SO_2 NAAQS, with the majority of monitors well below the NAAQS. In addition, several monitors show significant decreases in SO_2 design values over the last several years, reflecting the significant emissions reductions discussed above.

Table 3. Florida Monitoring Sites' Sulfur Dioxide Design Values

AQS Site #	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
12-011-0010	65	55	46	41	39	27	16	12	3	4	4
12-011-0034									1	1	1
12-017-0006							5	56	67	81	58
12-031-0032	29	23	16	15	16	16	17	17	16	16	16
12-031-0080	21	18	17	17	15	13	11	17	17	17	10
12-031-0081	69	54	38	26	28	29	29	27	23	20	12
12-031-0097	42	33	24	18	17	18	21	21	23	18	14
12-033-0004	76	93	91	79	47	27	22	25	24	16	8
12-047-0015	32	34	28	23	18	23	25	26	26		13
12-057-0081	47	37	29	23	22	21	19	18	16	16	13
12-057-0109	119	115	118	110	103	105	93	79	66	66	60
12-057-0112										17	16
12-057-1035	71	62	50	47	43	43	35	32	26	19	15
12-057-3002	19	19	18	17	15	13	13	13	14	13	10
12-081-0028							17	16	13	10	8
12-086-0019	2	2	2	2	2	1	1	1	1	1	1
12-089-0005	119	119	84	129	129	122	70	57	58	51	43
12-095-2002	11	10	9	8	7	6	4	5	4	4	3
12-103-0023	96	88	71	45	29	14	11	9	7	7	7
12-103-5003	83	67	47	34	33	25	20	11	9	4	3
12-105-6005							31	30	26	23	21
12-107-1008	52	45	39	39	36	30	28	26	25	20	18
12-129-0001									6	9	6

Table 4 below shows ambient air quality monitoring data for the only monitor in a neighboring state within 50 km of the Florida border (01-097-0003 in Mobile, Alabama). The maximum one-hour SO_2 values in 2016 and 2017 for this monitor are well below the NAAQS. **Table 5** shows ambient air quality monitoring data for the next nearest SO_2 monitor, 155.4 km away from the Florida border (13-021-0012 in Savannah, Georgia). The most recent design value (2015-2017) for this monitor is only 7 percent of the NAAQS.

Table 4. Ambient air quality monitoring data for monitor 01-097-0003 in Mobile, Alabama, 2016-2017.

Year	Maximum 1-hour SO_2 value	2010 SO_2 NAAQS	Percent of NAAQS
2016	30.1 ppb	75 ppb	40%
2017	23.9 ppb	75 ppb	32%

Table 5. Ambient air quality monitoring data for monitor 13-021-0012 in Savannah, Georgia, 2015-2017.

Year	Fourth high 1-hour SO_2 value	2010 SO_2 NAAQS	Percent of NAAQS
2015	8 ppb	75 ppb	11%
2016	6 ppb	75 ppb	8%
2017	2 ppb	75 ppb	3%
2015-2017 Design Value	5 ppb	75 ppb	7%

Table 6 below shows ambient air quality monitoring data for the Fernandina Beach monitor (12-089-0005) in the Nassau County Nonattainment Area. The Nassau County Nonattainment Area has been attaining the 2010 SO_2 NAAQS since the period 2011-2013.

Table 6. Fourth high SO_2 values and design values for monitor 12-089-0005 for 2007-2017.

Year	Fourth High Value (ppb)	Design Value (ppb)
2007	82	
2008	98	
2009	73	84
2010	216	129
2011	97	129
2012	54	122
2013	60	70
2014	56	57
2015	57	58
2016	35	51
2017	32	43

Appendix C
SO_2 Data Requirements Rule Modeling Report
Duval County, Florida

Division of Air Resource Management

Florida Department of Environmental Protection

January 13, 2017

2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400
www.dep.state.fl.us

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1. Background

On August 21, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule" (DRR) (80 Fed. Reg. 51,052; codified at 40 CFR Part 51, Subpart BB), which requires states to evaluate compliance with the 2010 one-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) in areas surrounding certain large SO_2 sources. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either air quality monitoring or air dispersion modeling.

2. Overview

Jacksonville Electric Authority (JEA) owns and operates the combined Northside Generating Station (NGS) and St. Johns River Power Park (SJRPP) facility in Jacksonville, Florida under Title V Permit No. 0310045-042-AV issued by the Florida Department of Environmental Protection (Department). NGS/SJRPP emitted 20,978 tons of SO_2 from its nine electric generating units in 2014, exceeding the DRR applicability threshold of 2,000 tons.[1] The Department has chosen to characterize the area around NGS/SJRPP in Duval County, Florida using air dispersion modeling following the approach outlined in the Department's modeling protocol submitted to EPA Region 4 on July 1, 2016, and in compliance with all applicable EPA rules and guidance including *Appendix W to 40 CFR Part 51: The Guideline on Air Quality Models*[2] (Appendix W) and the *SO_2 NAAQS Designations Modeling Technical Assistance Document*[3] (Modeling TAD). This report summarizes the Department's completed modeling efforts that indicate Duval County is in attainment of the 2010 SO_2 NAAQS.

3. Dispersion Modeling

3.1. Model Selection

EPA recommends the use of the American Meteorological Society/Environmental Protection Agency Regulatory Modeling System (AERMOD), including the pre-processing programs AERMET, AERMINUTE, AERMAP, and AERSURFACE, for all regulatory modeling of inert pollutants in the near field.[4] Accordingly, the Department utilized the latest version of AERMOD (v.15181) using the regulatory default options for characterizing the area around NGS/SJRPP for the DRR.

3.2. Modeled Facilities

NGS/SJRPP is the only DRR-applicable facility in Duval County. There are, however, a variety of small nearby SO_2 sources in Duval County and adjacent Nassau County. Appendix W states, and the Modeling TAD reiterates, that the number of sources to explicitly model should be small except in unusual cases. An analysis of emissions data and spatial proximity was performed for all nearby sources to determine which sources to explicitly include in the modeling demonstration. All sources within 20 km of the primary facility that had 2014 SO_2 emissions of at least 100 tons were automatically included. All other sources within 35 km were then subject to a widely used screening procedure known as 20d. This method suggests that if a source's annual emissions in tons (Q) is less than its distance from the primary source in kilometers (d) multiplied by 20, then it is unlikely to have a significant concentration

[1] *See* 40 CFR 51.1202.
[2] *Guideline on Air Quality Models*. 40 CFR Part 51 Appendix W.
[3] SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf.
[4] *See* Appendix W to 40 CFR 51, Section 3.2.

gradient in the area of concern. Finally, for all sources not already identified for inclusion, the Department considered emissions data, stack parameters, and spatial proximity (both to other sources and the background monitor), and used professional judgment to determine whether they should be included.

The Department determined that Cedar Bay, Renessenz, Anchor Glass, and IFF Chemical in Jacksonville are the only other sources of SO_2 emissions that have the potential to cause a significant concentration gradient in the area of interest (**Figure 1**). WestRock was not chosen despite exceeding the 20d screening approach because it is a DRR-applicable source that is fully addressed in the Nassau County modeling demonstration in **Appendix G** to this submittal. All other sources in Duval County emitted less than 50 tons of SO_2 in 2014 (**Table 1**) and are represented in the added monitored background concentrations discussed in **Section 3.9**.

Figure 1: 2014 SO_2 emission sources in Duval County, Florida.

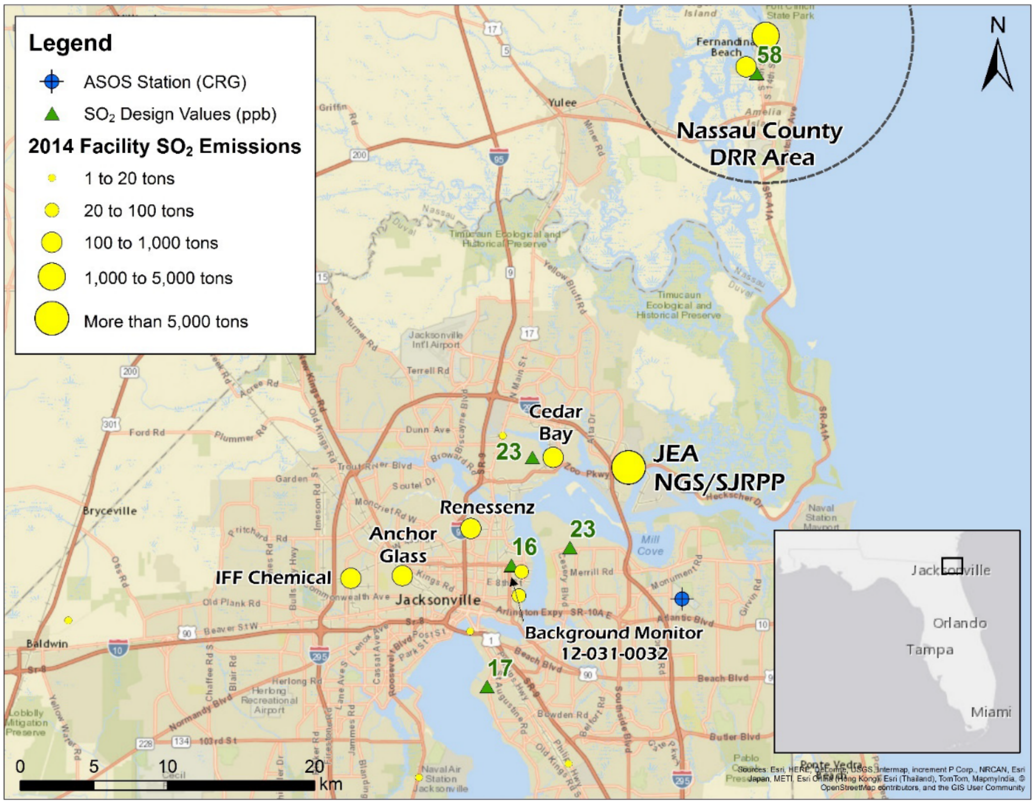


Table 1: Sources of SO_2 emissions greater than 10 tons in 2014 within 35 km of JEA's NGS/SJRPP Facility.

Facility ID	Facility Name	Distance from NGS/SJRPP (km) (d)	20d	2014 SO_2 Emissions (tons) (Q)	Q > 20d
031-0045	JEA NGS/SJRPP Facility [a]	0	0	20,978.32	Yes
031-0337	Cedar Bay Generating Plant [a]	5	100	732.82	Yes
031-0166	JEA Buckman	11	220	37.05	No
031-0039	Renessenz Jacksonville Facility [a]	12	240	642.05	Yes
031-0050	Owens-Corning Jacksonville	12	240	45.91	No
031-0005	Anchor Glass Jacksonville Plant [a]	17	340	123.06	Yes
031-0071	IFF Chemical Holdings [a]	21	420	986.45	Yes
031-0043	Duval Asphalt Phillips Highway	21	420	8.81	No
089-0004	Rayonier Performance Fibers [b]	28	560	354.82	No
089-0003	WestRock Fernandina Beach [c]	31	620	3,477.17	Yes

a. Explicitly modeled facilities.
b. Rayonier is an explicitly modeled facility in the WestRock DRR report; **Appendix G** to this submittal.
c. WestRock is a DRR-applicable facility and is characterized in **Appendix G** to this submittal.

3.3. Meteorological Input Data

Florida has a relatively dense network of high-quality National Weather Service (NWS) Automated Surface Observing System (ASOS) stations for use in air dispersion modeling demonstrations. Hourly meteorological surface observations for 2012-2014 from the nearest representative NWS ASOS station at Jacksonville's Craig Municipal Airport (CRG) were processed with AERMET v.15181. The raw data were retrieved from the National Climatic Data Center's (NCDC) file transfer protocol site in the standard integrated surface hourly data format (ISHD) along with the TD-6405 ASOS 1-minute wind data. Upper air parameters were derived from twice daily radiosonde observations (RAOB) from the nearest NWS atmospheric sounding location at the Jacksonville International Airport (JAX) downloaded from the National Oceanic and Atmospheric Administration's (NOAA) Earth System Research Laboratory (ESRL) website. Missing 12Z soundings were filled with archived modeled soundings from NOAA's Air Resources Laboratory (ARL) website prior to processing in AERMET.

Default options and settings were used when processing AERMET with the exception of the following:

- ASOS1MIN – Include ASOS 1-minute wind data processed by AERMINUTE v.15272
- THRESH_1MIN 0.5 – Minimum wind speed threshold: 0.5 m/s
- METHOD WIND_DIR RANDOM – Wind directions are randomized to correct rounding
- NWS_HGT WIND 7.92 – Sets ASOS anemometer height to 7.92 m

EPA has established criteria for the use of meteorological data for modeling purposes that states that meteorological data should be 90% complete on a quarterly basis.[5] The 2012-2014 CRG dataset satisfies this completeness requirement.

3.3.1. Surface Characteristics

AERMET requires information about the surface characteristics of the land surrounding the meteorological station. The Department used the recommended AERMET preprocessing program AERSURFACE v.13016 to extract estimates of the Bowen ratio, surface roughness, and albedo from the

[5] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-454/R-99-005, *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* (February 2000).

1992 National Land Cover Dataset (NLCD) for Florida. Per EPA guidance, because the Bowen ratio is dependent upon surface moisture and precipitation patterns, each year was classified as wet, dry, or average by comparing the annual precipitation to the 1981-2010 climatological record at the site. The default seasonal categories for each month were changed to reflect the subtropical climate of Duval County. All inputs to AERSURFACE are summarized in **Table 2**.

Table 2: AERSURFACE inputs for 2012-2014 CRG AERMET dataset.

Parameter	Value
Coordinate System	LATLON
Meteorological Station Latitude (Degrees)	30.337
Meteorological Station Longitude (Degrees)	-81.5126
Horizontal Datum	NAD83
Radius of Study Area for Surface Roughness (km)	1
Number of Sectors	12
Temporal Resolution	Monthly
Continuous Snow Cover for at Least One Month	No
Late Autumn or Winter Without Snow	1,2
Transitional Spring	3,4
Midsummer	5,6,7,8,9
Autumn	10,11,12
Located at an Airport	Yes
Arid Region	No
Average Surface Moisture 2012	Average
Average Surface Moisture 2013	Dry
Average Surface Moisture 2014	Wet

3.3.2. Site Representativeness

The surface characteristics were also extracted for the area around NGS/SJRPP so that a comparison could be done to determine if the meteorological data recorded at CRG are representative of the meteorological conditions in the modeling domain. The resulting average surface characteristics at both sites are similar and are summarized in **Table 3**. Due to Florida's uniform flat topography, the most important geographical influence on mesoscale meteorological conditions is proximity to the coastline. CRG and NGS/SJRPP are approximately 12 km and 14 km from Northeast Florida's Atlantic Coast respectively. In addition, the airport is just 10 km southeast of NGS/SJRPP and the entire area has a flat, coastal plain topography. Based on this analysis, the CRG meteorological dataset was considered to be representative of the domain for this modeling demonstration.

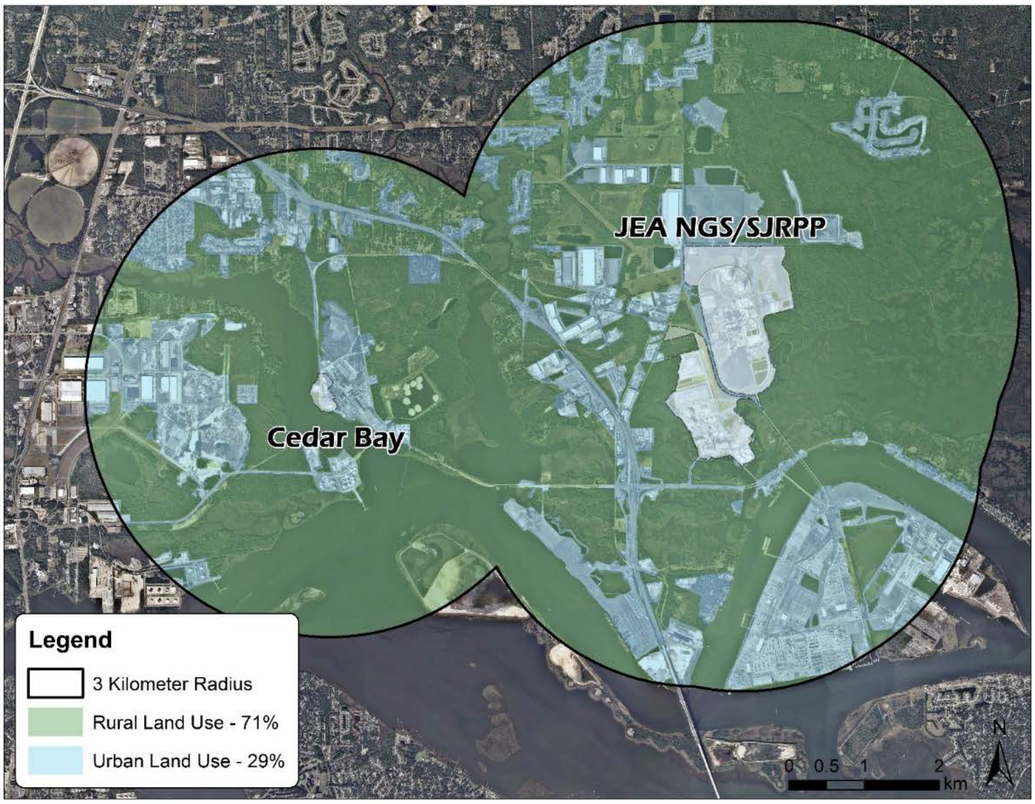
Table 3: Average surface characteristics from AERSURFACE for Duval County.

Location	Albedo	Bowen Ratio	Surface Roughness (z_0)
Craig Municipal Airport	0.15	0.51	0.114
JEA NGS/SJRPP Facility	0.14	0.30	0.296

3.4. Rural/Urban Determination

AERMOD contains different dispersion coefficients for rural and urban settings. Appendix W outlines two methods for determining whether the area should be considered rural or urban. The Department chose the land-use classification approach employing Auer's method.[6] The Auer method requires an analysis of the land use within a 3-km radius around a facility to determine whether the majority of the land is classified as rural or urban. If more than fifty percent of the area consists of Auer land-use industrial, commercial, or residential land types, then urban dispersion coefficients are used in the model; otherwise, rural dispersion coefficients are used. As shown in **Figure 2** below, rural land use constitutes a majority (71%) of the combined 3-km radius around NGS/SJRPP and Cedar Bay.

Figure 2: Land use classification around JEA's NGS/SJRPP Facility in Duval County.



3.5. Terrain Elevations

Terrain elevations were determined using the AERMOD terrain preprocessor AERMAP v.11103. AERMAP extracted elevations and hill heights for all sources, buildings, and receptors from the United States Geological Survey (USGS) National Elevation Dataset (NED) with a 10 m horizontal resolution.

[6] Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, 17:636-643 (1978).

3.6. Receptor Placement

According to EPA's March 2011 Memo *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard* and reiterated in the Modeling TAD, it is expected that the distance from the source to the area of the maximum ground-level 1-hour impact of SO_2 will be approximately 10 times the source release height.[7] Based on this guidance, the Department developed a uniform method for receptor grid placement for all DRR sources in Florida. As a conservative approach, a dense grid of receptors was placed from the primary facility's tallest stack (if multiple stacks are the tallest, the most centrally located was chosen) to the greater of 20 times the tallest stack height at the primary facility or 2500 m. Receptor density then decreased in 2500 m intervals. Receptors located within NGS/SJRPP's fenceline were removed and receptors were placed with 50 m spacing along the fenceline. This grid placement was sufficient to fully resolve the maximum modeled concentrations in the Duval County modeling demonstration.

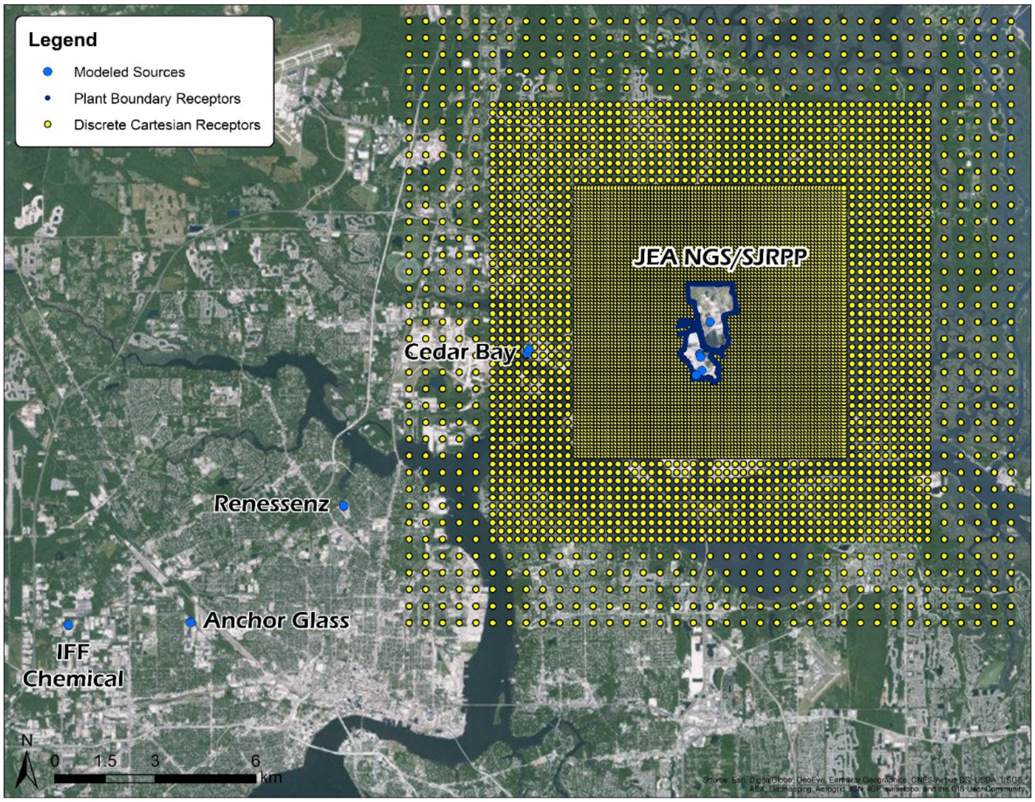
The Modeling TAD describes a process for removing receptors placed in areas that it would not be feasible to place an actual monitor, such as bodies of water, that is unique to the DRR. The Department chose not to employ this process and instead included receptors in all areas of ambient air within 9.5 km of NGS/SJRPP. The receptor grid used in the Duval County DRR modeling demonstration is described below in **Table 4** and **Figure 3**.

Table 4: Duval County DRR modeling demonstration receptor grid description.

Receptor Grid Parameter	Value/Description
Description of Unit at Grid Center	SJRPP Boiler 1
Unit UTM Zone	17N
Unit UTM Easting (m)	447,087.08
Unit UTM Northing (m)	3,366,660.94
Actual Stack Height (m)	195.07
Expected Distance to Max Concentration (m)	1,951
20 Times Stack Height (m)	3,901
100 m Receptor Spacing - Extent from the Origin (m)	4,000
250 m Receptor Spacing - Extent from the Origin (m)	6,500
500 m Receptor Spacing - Extent from the Origin (m)	9,000
Plant Boundary Receptor Spacing (m)	50
Total Receptors	8,991

[7] Applicability of Appendix W Modeling Guidance for the 1-hr NO_2 National Ambient Air Quality Standard. Tyler Fox Memorandum dated June 28, 2010, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf.

Figure 3: Receptor grid placement for the Duval County DRR modeling demonstration.



3.7. Building Downwash

Building downwash effects on emitted plumes were simulated using the Plume Rise Model Enhancements (PRIME) algorithm v.04274 in AERMOD. PRIME predicts concentrations in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the uncaptured primary plume, and reemitted to the far wake as a volume source. Twenty significant structures onsite at NGS/SJRPP and three structures at Cedar Bay were included in the downwash analysis. Direction-specific downwash parameters for all stacks at NGS/SJRPP and Cedar Bay were calculated and input to AERMOD by EPA's Building Profile Input Program for PRIME (BPIPPRM).

3.8. Source Parameters and Emissions Data

The Department chose to use actual hourly emissions data to characterize the largest sources at NGS/SJRPP and some background sources. Three background facilities, Cedar Bay, IFF Chemical, and Anchor Glass, were characterized with their maximum permitted short-term emission rates. The hourly data for all units were requested from the facilities for the years 2012-2014 by the Department in July 2015. All data received were thoroughly checked for accuracy and representativeness. The hourly data were then included in the modeling demonstration using the AERMOD keyword HOUREMIS for the units that were characterized with actual emissions data. Missing hourly data from NGS/SJRPP were substituted following the procedures outlined in 40 CFR 75.33(b). A variety of small, intermittent emissions sources including fire pumps and emergency generators at all facilities were not included because their emissions are not "continuous or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations."[8]

3.8.1. NGS/SJRPP Modeled Units

SO_2 emissions from NGS/SJRPP are predominantly from four fossil fuel-fired electric generating boilers that operate mostly on coal. The two units at NGS are circulating fluidized bed (CFB) boilers that utilize limestone injection to the bed to eliminate most SO_2 emissions. The two units at SJRPP utilize flue-gas desulfurization (FGD) systems to scrub the plumes of SO_2 before the plumes leave the stacks. There are also four pre-NSPS simple-cycle combustion turbine (SCCT) peaker units at NGS that fire only fuel oil and have uncontrolled emissions. These units are rarely operated. Finally, there is also a pre-NSPS fossil fuel-fired electric generating boiler at NGS that fires mostly natural gas to control emissions. Given the low utilization of the peakers and the low sulfur content of natural gas, these five units typically constitute only about 1% of NGS/SJRPP's total SO_2 emissions. SO_2 emissions from all units are monitored by in-stack continuous emissions monitoring systems (CEMS).

Traditional modeling demonstrations require the use of the calculated good engineering practice (GEP)[9] stack height for all sources in the model. The DRR is different in that the purpose is to replicate actual ambient concentrations of SO_2. As such, the use of actual stack heights for those stacks that exceed their calculated GEP height is permitted if the source is characterized using actual hourly emissions data.[10] The stacks for NGS Boilers 1 and 2 are the only stacks at NGS/SJRPP that exceed GEP height. A summary of the modeled stack parameters for NGS/SJRPP is presented below in **Table 5**.

Table 5: NGS/SJRPP units' Duval County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate
SJRPP Boiler 1	195.07	6.79	CEMS	CEMS	CEMS
SJRPP Boiler 2	195.07	6.79	CEMS	CEMS	CEMS
NGS Boiler 1	150.88 [a]	4.57	CEMS	CEMS	CEMS
NGS Boiler 2	150.88 [a]	4.57	CEMS	CEMS	CEMS
NGS Boiler 3	91.44	4.72	46.54	397.70	CEMS
NGS SCCT 3	9.14	3.93	45.09	699.80	CEMS
NGS SCCT 4	9.14	3.93	45.09	699.80	CEMS
NGS SCCT 5	9.14	3.93	45.09	699.80	CEMS
NGS SCCT 6	9.14	3.93	45.09	699.80	CEMS

a. The calculated GEP stack height is 137.03 m.

3.8.2. Cedar Bay Modeled Units

Cedar Bay is an electrical generating facility with three predominantly coal-fired CFB boilers on site that exhaust through a single shared stack. Limestone is injected to the beds to control SO_2 emissions. There are also three fuel oil-fired absorber dryer systems (ADS) for drying limestone and ash. These

[8] *See* Modeling TAD, Section 5.5.
[9] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-450/4-80-023R, *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (June 1985).
[10] *See* Modeling TAD, Section 6.1.

small units are limited to 0.05% sulfur fuel oil and therefore emit very little SO_2. The modeled parameters for these six units are summarized in **Table 6**. The actual stack height for the boilers exceeds the calculated GEP height so the GEP height was input. The ADS stack heights are less than their GEP heights.

Table 6: Cedar Bay units' Duval County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
Boiler A	114.00 [a]	4.04	36.93	402.59	388.37
Boiler B	114.00 [a]	4.04	36.93	402.59	382.03
Boiler C	114.00 [a]	4.04	36.93	402.59	379.14
ADS 1	19.20	1.3	12.0	355.0	0.85
ADS 2	19.20	1.3	12.0	355.0	0.85
ADS 3 [b]	19.20	1.3	16.0	344.0	0.71

a. The actual height of the common stack is 133.81 m.
b. ADS 3 exhausts to the ADS 2 stack.

3.8.2.1. Modeled Emission Rate Averaging Times

If a compliance averaging time for an emission limit is longer than the averaging time for the applicable NAAQS (here, one hour), EPA guidance provides a method of calculating an "equivalent" longer-term emission limit where appropriate.[11] The adjustment method suggested by EPA is to scale the longer-term average emission limit by the ratio of each source's historic 99th percentile one-hour average emission rate to its 99th percentile longer-term average emission rate. The premise of this method is that a longer-term emission limit allows a higher level of emissions variability than the short-term limit. Thus, a larger short-term limit needs to be input to the model in order to account for this variability. The SO_2 emission limits for three of the modeled sources at Cedar Bay are based on 3-hour averaging periods so this adjustment process was used. The analysis was performed using CEMS data from 2012-2014 and is summarized in **Table 7**.

Table 7: Emissions variability analysis and equivalent emission rate calculations for Cedar Bay.

Unit Description	99th Percentile Rate (lb/hr) 1-hr	3-hr	Ratio 1-hr/3-hr	Permitted Limit (lb/hr)	Equivalent Limit (lb/hr)
Boiler A	280.10	252.84	0.903	350.70	388.37
Boiler B	259.52	238.33	0.918	350.70	382.03
Boiler C	254.28	235.30	0.925	350.70	379.14

3.8.3. Renessenz Modeled Units

Renessenz is an industrial organic chemical plant with three steam-generating boilers on site that operate on a combination of natural gas, ultra-low sulfur diesel (ULSD), and process-derived fuels (PDF). In addition, these units are authorized to incinerate vapors from the vapor collection system. The actual emissions data were derived from hourly and daily fuel usage and monthly average vapor incineration. The sulfur content of the PDF was based on the most recent test of the fuel and the assumption that all sulfur in the fuel is converted to SO_2. The facility maintains records of vapor incineration monthly. The

[11] Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/oarpg/t1pgm.html

monthly total vapor incineration was then allocated to each unit hourly based on the proportion incinerated in that unit. The modeled parameters for these units are summarized in **Table 8**. The actual stack heights for both stacks are less than the calculated GEP stack heights.

Table 8: Renessenz units' Duval County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
Boiler 1	38.10	1.16	23.29	449.82	Natural Gas: Hourly at 0.6 lb/MMscf
Boiler 6 [a]	38.10	1.55	22.70	449.82	PDF: Daily at measured Sulfur content
Boiler 7 [a]	38.10	1.55	22.70	449.82	Vapor Incineration: Monthly total

a. Boilers 6 and 7 exhaust to a common stack.

3.8.4. Anchor Glass Modeled Units

Anchor Glass manufactures container glass primarily for the food and beverage industry. SO_2 emissions are from two natural gas and propane-fired glass melting furnaces. The modeled parameters for these two units are summarized in **Table 9**. The actual stack heights for both units are less than the calculated GEP stack heights.

Table 9: Anchor Glass units' Duval County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
Furnace 3	36.28	1.70	4.88	560.90	44.24
Furnace 4	38.93	1.58	5.09	541.50	36.50

3.8.5. IFF Chemical Modeled Units

IFF Chemical is an industrial organic chemical plant with three steam-generating boilers on site that operate on a combination of natural gas, fuel oils, and process-derived fuels (PDF). In addition, Boilers 2 and 3 are authorized to incinerate vapors from the vapor collection system. Each unit has a permitted short-term SO_2 emission rate based on fuel sulfur content. However, these limits do not account for emissions from incinerating vapors for Boilers 2 and 3. Therefore, as a conservative estimate, the facility's annual SO_2 cap, 1,549 tons, was divided by 8,760 and distributed amongst those two units, disregarding any possible emissions from Boiler 1. These emission rates are more than three-times higher than the permitted rates based on fuel sulfur content and are considered to be a very conservative estimate. The modeled parameters for these three units are summarized in **Table 10**. The actual stack heights for all three units are less than the calculated GEP stack heights.

Table 10: IFF Chemical units' Duval County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
Boiler 1	22.86	0.76	14.32	338.20	27.48
Boiler 2	20.00	1.22	11.71	588.70	176.83 [a]
Boiler 3	20.00	1.22	11.71	588.70	176.83 [a]

a. Permitted short-term emission rate based on fuel sulfur content is 53.56 lb/hr.

3.9. Background Concentrations

The City of Jacksonville operates a robust SO_2 monitoring network in Duval County. There are currently four operational monitors within 20 km of NGS/SJRPP and all have current design values of less than 1/3 of the SO_2 NAAQS (**Figure 1**). The Department chose to use monitoring station No. 12-031-0032 to develop a set of background concentrations to account for all SO_2 sources not explicitly modeled.[12] As shown in **Figure 1**, the monitor is just 10 km southwest of NGS/SJRPP in Downtown Jacksonville. This monitor was chosen due to its close proximity to the cluster of both modeled and un-modeled background SO_2 sources in Jacksonville.

The data used to develop the background concentrations were obtained from the Florida Air Monitoring and Assessment System (FAMAS) for the period February 2012 to December 2014[13]. In order to avoid double-counting the emissions from the explicitly modeled sources, Appendix W recommends filtering the data to remove measurements when the wind direction could transport pollutants from any modeled source. In this case, there are too many modeled sources to filter the data for all of them. Therefore, only measurements recorded when the wind direction was from NGS/SJRPP (0° to 90°) were removed from the background calculation as shown in **Figure 4**. This is a conservative approach as it results in a certain level of double-counting emissions from the explicitly modeled background facilities to the west of the monitor. The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input to AERMOD with the BACKGRND SEASHR keyword. The final set of background concentrations is summarized in **Table 11**.

[12] *See* Modeling TAD, Section 8.1

[13] Monitoring station 12-031-0032 had data quality issues in January 2012.

Figure 4: 2012-2014 average SO_2 concentrations by wind direction for monitor 12-031-0032.

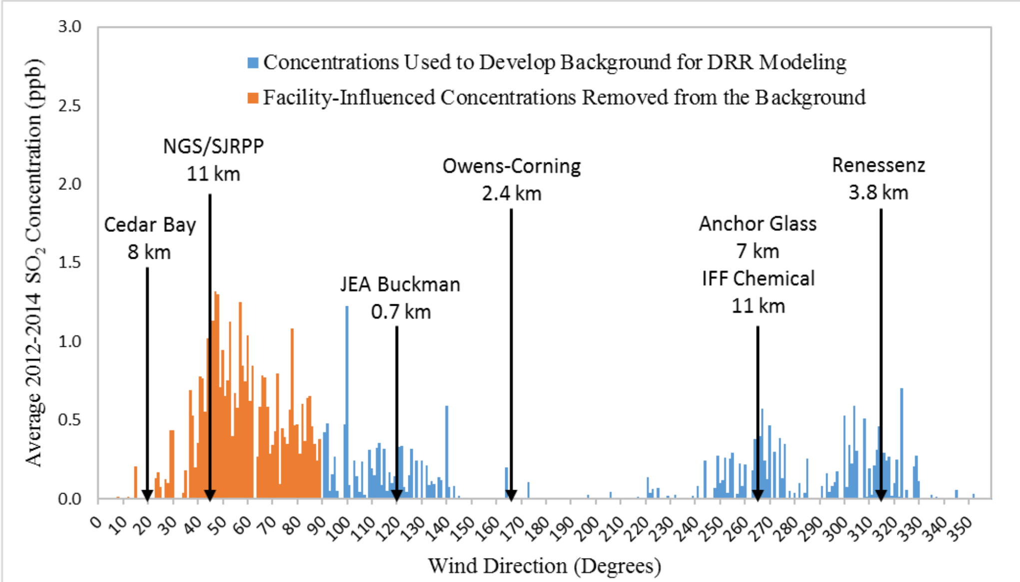


Table 11: 2012-2014 SO_2 background concentrations (ppb) by hour-of-day by season for the Duval County DRR modeling demonstration.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	4.00	1.00	1.00	2.00	12:00	7.00	3.00	1.33	3.67
1:00	4.67	0.67	1.33	1.33	13:00	5.00	1.67	1.00	3.33
2:00	3.67	1.00	0.67	1.33	14:00	4.00	1.33	1.67	2.67
3:00	4.33	1.00	0.67	1.67	15:00	4.33	2.00	1.33	2.00
4:00	4.00	1.00	1.33	2.00	16:00	4.67	1.67	1.33	3.33
5:00	4.33	1.00	1.67	2.00	17:00	4.67	2.33	1.67	3.00
6:00	4.00	1.33	2.00	2.00	18:00	2.67	1.67	2.00	2.67
7:00	5.67	1.33	4.67	2.00	19:00	3.67	1.33	2.67	3.67
8:00	5.33	2.33	2.67	2.67	20:00	3.33	2.00	1.33	2.00
9:00	4.33	2.00	3.00	6.33	21:00	4.33	1.00	1.00	1.67
10:00	4.33	2.33	3.00	6.67	22:00	4.67	1.00	1.00	3.33
11:00	5.67	3.00	1.67	3.00	23:00	5.33	1.00	1.00	4.67

4. Modeling Summary and Results

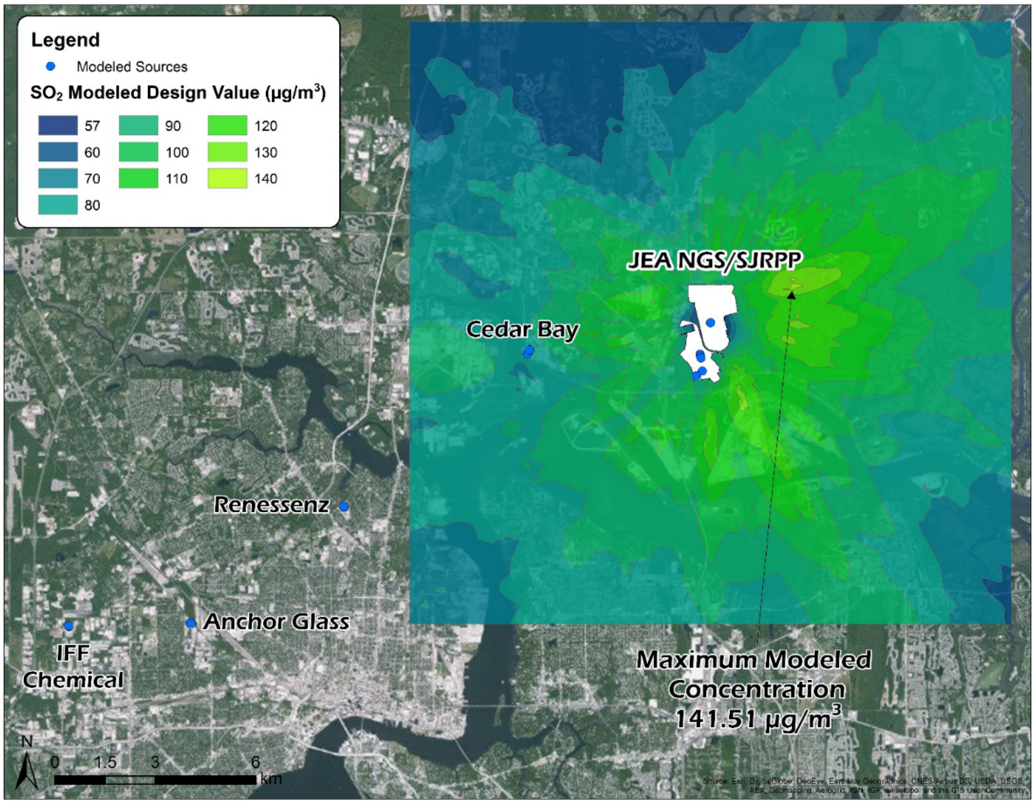
The EPA-recommended dispersion model AERMOD was used to evaluate the area around JEA's Combined Northside Generating Station and St. Johns River Power Park facility in Duval County, Florida in order to satisfy the requirements of the DRR. The model was run from 2012-2014 using actual emissions data and monitored background concentrations. The 99th percentile (4th high) daily maximum one-hour average concentration for each year at each receptor was averaged across all three years. The highest modeled design value at any receptor was then compared to the 2010 one-hour SO_2 NAAQS.

The results summarized in **Table 12** and **Figure 5** indicate that Duval County is in attainment of the SO_2 NAAQS.

Table 12: Maximum modeled SO_2 design value in the Duval County DRR modeling demonstration.

UTM 17N Easting (m)	UTM 17N Northing (m)	Max Modeled Design Value (μg/m³)				1-Hour SO_2 NAAQS	Percent of NAAQS
		NGS/SJRPP	Others	Background	Total		
449,687.09	3,367,761.00	106.69	22.02	12.79	141.51	196.4	72.1%

Figure 5: Modeled SO_2 design values in the Duval County DRR modeling demonstration.

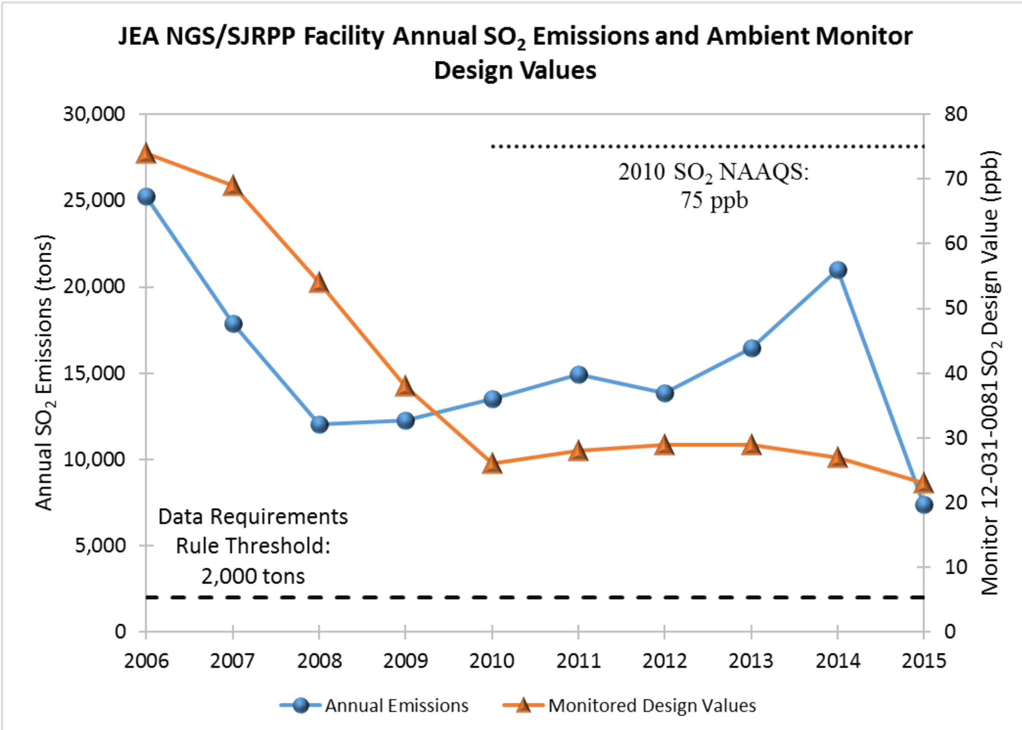


4.1. Continuing Review Obligations

The DRR modeling demonstration for Duval County shows that the area is well within attainment of the 2010 SO_2 NAAQS, supporting the robust local ambient monitoring data. Under the DRR, the Department has a continuing obligation to review SO_2 emissions in the area annually for continued compliance with the NAAQS. It is expected that the ambient concentrations and emissions of SO_2 in Duval County will continue to fall as they have for at least the past decade (**Figure 6**). 2015 emissions of SO_2 at NGS/SJRPP were more than 70% less than in 2014. It is anticipated that the implementation of a variety of national rules and regulations (particularly the Mercury and Air Toxics Standard) and economic forcing will result in the maintenance or even further reduction of these lower levels of SO_2

emissions ensuring continued compliance with the NAAQS. In addition, the Cedar Bay facility is anticipated to permanently cease operations in early 2017.

Figure 6: 2006-2015 NGS/SJRPP SO_2 emissions and monitor 12-031-0081 SO_2 design values.



Appendix D
SO_2 Data Requirements Rule Modeling Report
Escambia County, Florida

Division of Air Resource Management

Florida Department of Environmental Protection

January 13, 2017

2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400
www.dep.state.fl.us

Table of Contents

1. Background

On August 21, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule" (DRR) (80 Fed. Reg. 51,052; codified at 40 CFR Part 51, Subpart BB), which requires states to evaluate compliance with the 2010 one-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) in areas surrounding certain large SO_2 sources. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either air quality monitoring or air dispersion modeling.

2. Overview

Gulf Power Company (Gulf) owns and operates Crist Electric Generating Station (Crist), an electrical generating facility, in Pensacola, Florida under Title V Permit No. 0330045-044-AV issued by the Florida Department of Environmental Protection (Department). Crist emitted 2,820 tons of SO_2 from its four electric generating boilers in 2014, exceeding the DRR applicability threshold of 2,000 tons.[1] The Department has chosen to characterize the area around Crist in Escambia County, Florida using air dispersion modeling following the approach outlined in the Department's modeling protocol submitted to EPA Region 4 on July 1, 2016, and in compliance with all applicable EPA rules and guidance including *Appendix W to 40 CFR Part 51: The Guideline on Air Quality Models*[2] (Appendix W) and the *SO_2 NAAQS Designations Modeling Technical Assistance Document*[3] (Modeling TAD). This report summarizes the Department's completed modeling efforts that indicate Escambia County is in attainment of the 2010 SO_2 NAAQS.

3. Dispersion Modeling

3.1. Model Selection

EPA recommends the use of the American Meteorological Society/Environmental Protection Agency Regulatory Modeling System (AERMOD), including the pre-processing programs AERMET, AERMINUTE, AERMAP, and AERSURFACE, for all regulatory modeling of inert pollutants in the near field.[4] Accordingly, the Department utilized the latest version of AERMOD (v.15181) using the regulatory default options for characterizing the area around Crist for the DRR.

3.2. Modeled Facilities

Crist is the only DRR-applicable facility in Escambia County. There are, however, a variety of small nearby SO_2 sources in both Escambia County and adjacent Santa Rosa County. Appendix W states, and the Modeling TAD reiterates, that the number of sources to explicitly model should be small except in unusual cases. An analysis of emissions data and spatial proximity was performed for all nearby sources to determine which sources to explicitly include in the modeling demonstration. All sources within 20 km of the primary facility that had 2014 SO_2 emissions of at least 100 tons were automatically included. All other sources within 35 km were then subjected to a widely used screening procedure known as 20d. This method suggests that if a source's annual emissions in tons (Q) is less than its distance from the primary source in kilometers (d) multiplied by 20, then it is unlikely to have a significant concentration

[1] *See* 40 CFR 51.1202.
[2] *Guideline on Air Quality Models*. 40 CFR Part 51 Appendix W.
[3] SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf.
[4] *See* Appendix W to 40 CFR 51, Section 3.2.

gradient in the area of concern. Finally, for all sources not already identified for inclusion, the Department considered emissions data, stack parameters, and spatial proximity (both to other sources and the background monitor), and used professional judgment to determine whether they should be included.

The Department determined that the International Paper (IP) facility located approximately 10 km to the northwest is the only other source of SO_2 emissions that has the potential to cause a significant concentration gradient in the area of interest (**Figure 1**). All other sources within 35 km of Crist emitted less than 25 tons of SO_2 in 2014 (**Table 1**) and are represented in the added monitored background concentrations discussed in **Section 3.9**.

Figure 1: 2014 SO_2 emission sources in and around Escambia County, Florida.

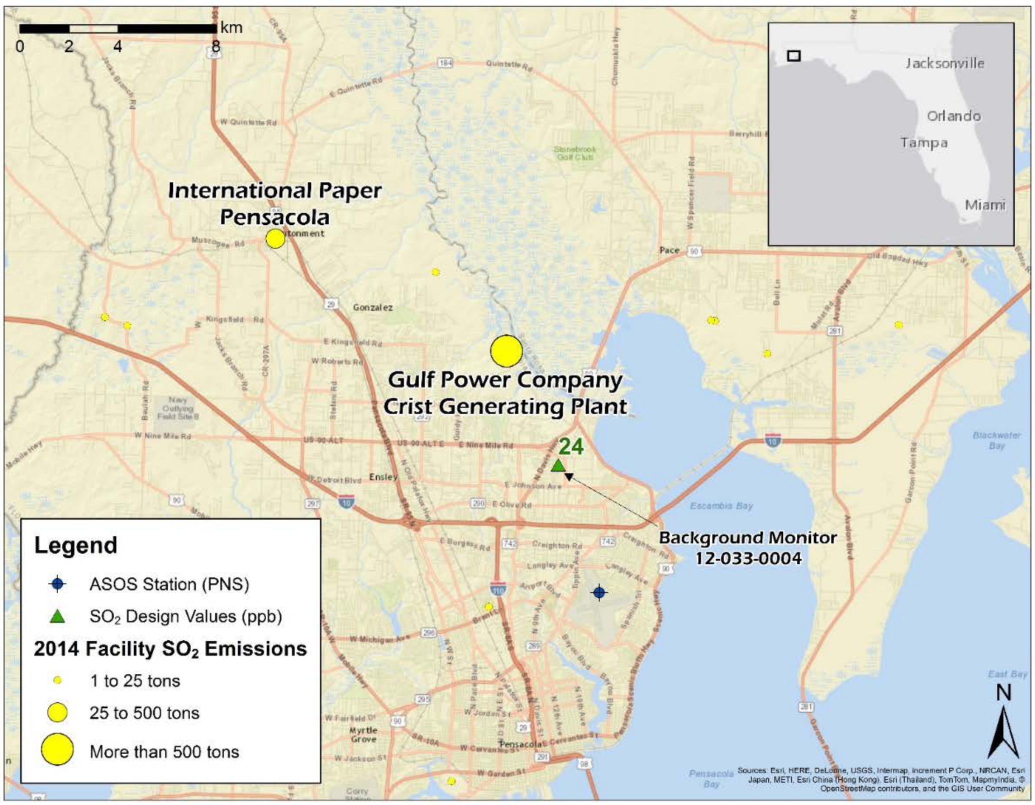


Table 1: Sources of SO_2 emissions greater than 1 ton in 2014 within 35km of Gulf Power's Crist Generating Plant.

Facility ID	Facility Name	Distance from Crist (km) (d)	20d	2014 SO_2 Emissions (tons) (Q)	Q > 20d
033-0045	Gulf Power Crist Plant [a]	0	0	2,819.60	Yes
033-0040	Ascend Performance Materials	5	100	15.72	No
113-0173	Gulf Power Pea Ridge Plant	8	160	2.58	No
113-0004	Taminco US Pace Plant	9	180	10.67	No
033-0042	International Paper Pensacola [a]	10	200	127.13	No
113-0168	Santa Rosa Energy Center	11	220	1.06	No
033-0286	Gulf Power Perdido Landfill	16	320	1.66	No
113-0014	Petro Blackjack Jay Facility	33	660	24.35	No

a. Explicitly modeled facility.

3.3. Meteorological Input Data

Florida has a relatively dense network of high-quality National Weather Service (NWS) Automated Surface Observing System (ASOS) stations for use in air dispersion modeling demonstrations. Hourly meteorological surface observations for 2012-2014 from the nearest representative NWS ASOS station at Pensacola International Airport (PNS) were processed with AERMET v.15181. The raw data were retrieved from the National Climatic Data Center's (NCDC) file transfer protocol site in the standard integrated surface hourly data format (ISHD) along with the TD-6405 ASOS 1-minute wind data. Upper air parameters were derived from twice daily radiosonde observations (RAOB) from the nearest NWS atmospheric sounding location in Slidell, Louisiana (LIX) downloaded from the National Oceanic and Atmospheric Administration's (NOAA) Earth System Research Laboratory (ESRL) website. Missing 12Z soundings were filled with archived modeled soundings from NOAA's Air Resources Laboratory (ARL) website prior to processing in AERMET.

Default options and settings were used when processing AERMET with the exception of the following:

- ASOS1MIN – Include ASOS 1-minute wind data processed by AERMINUTE v.14337
- THRESH_1MIN 0.5 – Minimum wind speed threshold: 0.5 m/s
- METHOD WIND_DIR RANDOM – Wind directions are randomized to correct rounding
- NWS_HGT WIND 10 – Sets ASOS anemometer height to 10m

EPA has established criteria for the use of meteorological data for modeling purposes that states that meteorological data should be 90% complete on a quarterly basis.[5] The 2012-2014 PNS dataset satisfies this completeness requirement.

3.3.1. Surface Characteristics

AERMET requires information about the surface characteristics of the land surrounding the meteorological station. The Department used the recommended AERMET preprocessing program AERSURFACE v.13016 to extract estimates of the Bowen ratio, surface roughness, and albedo from the 1992 National Land Cover Dataset (NLCD) for Florida. Per EPA guidance, because the Bowen ratio is dependent upon surface moisture and precipitation patterns, each year was classified as wet, dry, or average by comparing the annual precipitation to the 1981-2010 climatological record at the site. The

[5] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-454/R-99-005, *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* (February 2000).

default seasonal categories for each month were changed to reflect the subtropical climate of Escambia County. All inputs to AERSURFACE are summarized in **Table 2**.

Table 2: AERSURFACE inputs for 2012-2014 PNS AERMET dataset.

Parameter	Value
Coordinate System	LATLON
Meteorological Station Latitude (Degrees)	30.478
Meteorological Station Longitude (Degrees)	-87.1868
Horizontal Datum	NAD83
Radius of Study Area for Surface Roughness (km)	1
Number of Sectors	12
Temporal Resolution	Monthly
Continuous Snow Cover for at Least One Month	No
Late Autumn or Winter Without Snow	1,2
Transitional Spring	3,4
Midsummer	5,6,7,8,9
Autumn	10,11,12
Located at an Airport	Yes
Arid Region	No
Average Surface Moisture 2012	Average
Average Surface Moisture 2013	Wet
Average Surface Moisture 2014	Wet

3.3.2. Site Representativeness

The surface characteristics were also extracted for the area around Crist so that a comparison could be done to determine if the meteorological data recorded at PNS are representative of the meteorological conditions in the modeling domain. The resulting average surface characteristics at both sites are similar and are summarized in **Table 3**. Due to Florida's uniform flat topography, the most important geographical influence on mesoscale meteorological conditions is proximity to the coastline, and both Crist and PNS are located approximately the same distance from Escambia Bay. In addition, the airport is just 10 kilometers south-southeast of Crist, the land in between is generally flat, and both areas have similar topography. Based on this analysis, the PNS meteorological dataset was considered to be representative of the domain for this modeling demonstration.

Table 3: Average surface characteristics from AERSURFACE for Escambia County.

Location	Albedo	Bowen Ratio	Surface Roughness (z_o)
Pensacola International Airport	0.14	0.42	0.083
Gulf Power Crist Plant	0.14	0.35	0.342

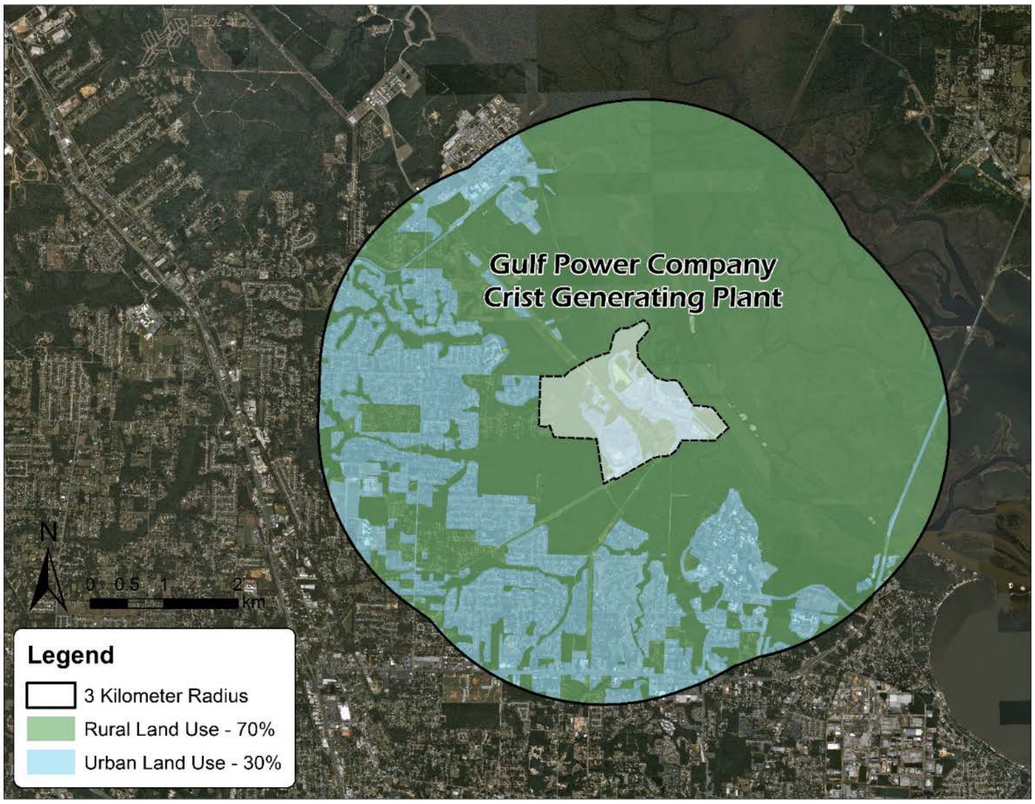
3.4. Rural/Urban Determination

AERMOD contains different dispersion coefficients for rural and urban settings. Appendix W outlines two methods for determining whether the area should be considered rural or urban. The Department chose the land-use classification approach employing Auer's method.[6] The Auer method requires an

[6] Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, 17:636-643 (1978).

analysis of the land use within a 3-km radius around a facility to determine whether the majority of the land is classified as rural or urban. If more than fifty percent of the area consists of Auer land-use industrial, commercial, or residential land types, then urban dispersion coefficients are used in the model; otherwise, rural dispersion coefficients are used. As shown in **Figure 2** below, rural land use constitutes a majority (70%) of the 3-km radius around Crist.

Figure 2: Land use classification around Gulf Power's Crist Plant in Escambia County.



3.5. Terrain Elevations

Terrain elevations were determined using the AERMOD terrain preprocessor AERMAP v.11103. AERMAP extracted elevations and hill heights for all sources, buildings, and receptors from the United States Geological Survey (USGS) National Elevation Dataset (NED) with a 10 m horizontal resolution.

3.6. Receptor Placement

According to EPA's March 2011 Memo *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard* and reiterated in the Modeling TAD, it is expected that the distance from the source to the area of the maximum ground-level

1-hour impact of SO_2 will be approximately 10 times the source release height.[7] Based on this guidance, the Department developed a uniform method for receptor grid placement for all DRR sources in Florida. As a conservative approach, a dense grid of receptors was placed from the primary facility's tallest stack (if multiple stacks are the tallest, the most centrally located was chosen) to the greater of 20 times the tallest stack height at the primary facility or 2500 m. Receptor density then decreased in 2500 m intervals. Receptors located within Crist's fenceline were removed and receptors were placed with 50 m spacing along the fenceline. This grid placement was sufficient to fully resolve the maximum modeled concentrations in the Escambia County modeling demonstration.

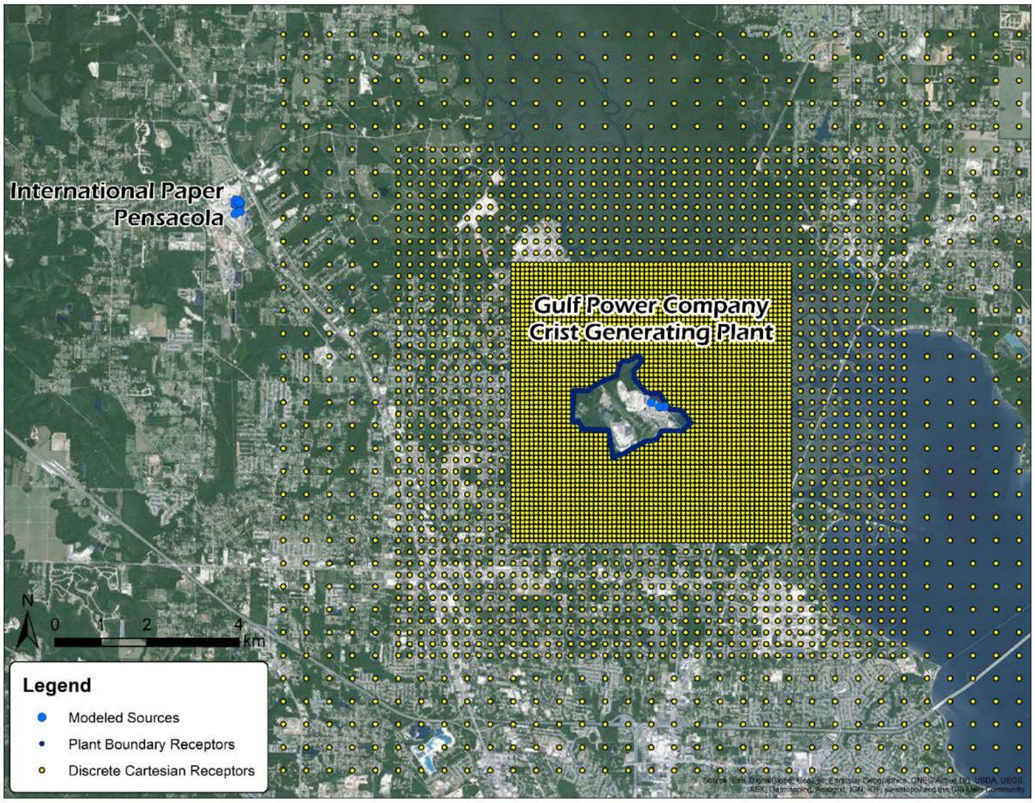
The Modeling TAD describes a process for removing receptors placed in areas that it would not be feasible to place an actual monitor, such as bodies of water, that is unique to the DRR. The Department chose not to employ this process and instead included receptors in all areas of ambient air within 8 km of Crist. The receptor grid used in the Escambia County DRR modeling demonstration is described below in **Table 4** and **Figure 3**.

Table 4: Escambia County DRR modeling demonstration receptor grid description.

Receptor Grid Parameter	Value/Description
Description of Unit at Grid Center	Boilers 4-7 Combined FGD Stack
Unit UTM Zone	16N
Unit UTM Easting (m)	478,250.42
Unit UTM Northing (m)	3,381,610.45
Actual Stack Height (m)	149.40
Expected Distance to Max Concentration (m)	1,494
20 Times Stack Height (m)	2,988
100 m Receptor Spacing - Extent from the Origin (m)	3,000
250 m Receptor Spacing - Extent from the Origin (m)	5,500
500 m Receptor Spacing - Extent from the Origin (m)	8,000
Plant Boundary Receptor Spacing (m)	50
Total Receptors	5,596

[7] Applicability of Appendix W Modeling Guidance for the 1-hr NO_2 National Ambient Air Quality Standard. Tyler Fox Memorandum dated June 28, 2010, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf.

Figure 3: Receptor grid placement for the Escambia County DRR modeling demonstration.



3.7. Building Downwash

Building downwash effects on emitted plumes were simulated using the Plume Rise Model Enhancements (PRIME) algorithm v.04274 in AERMOD. PRIME predicts concentrations in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the uncaptured primary plume, and reemitted to the far wake as a volume source. Eleven significant structures onsite at Crist were included in the downwash analysis. Direction-specific downwash parameters for all stacks at Crist were calculated and input to AERMOD by EPA's Building Profile Input Program for PRIME (BPIPPRM).

3.8. Source Parameters and Emissions Data

The Department chose to use actual hourly emissions data to characterize every explicitly modeled source in Escambia County. The hourly data for all units were requested from the facilities for the years 2012-2014 by the Department in July 2015. All data received were thoroughly checked for accuracy and representativeness and then included in the modeling demonstration using the AERMOD keyword HOUREMIS. Missing hourly data from Crist were substituted following the procedures outlined in 40 CFR 75.33(b). A variety of small, intermittent emissions sources including fire pumps and emergency generators at both facilities were not included because their emissions are not "continuous or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations."[8]

3.8.1. Crist Modeled Units

SO_2 emissions from Crist are from four predominantly coal-fired electric generating boilers. These four units emit through a common stack where the plume is scrubbed of SO_2 emissions via a flue-gas desulfurization (FGD) system. There are also two bypass stacks for use when the FGD system is not operational. Although emissions occurred from all three stacks during the modeled period, the bypass stacks were rarely utilized. SO_2 emissions from these units are monitored by in-stack continuous emissions monitoring systems (CEMS). The CEMS record total SO_2 emissions and stack exit velocity and temperature on an hourly basis.

Traditional modeling demonstrations require the use of the calculated good engineering practice (GEP)[9] stack height for all sources in the model. The DRR is different in that the purpose is to replicate actual ambient concentrations of SO_2. As such, the use of actual stack heights for those stacks that exceed their calculated GEP height is permitted if the source is characterized using actual hourly emissions data.[10] The FGD stack is the only stack at Crist that exceeds GEP height. A summary of the modeled stack parameters for Crist is presented below in **Table 5**.

Table 5: Crist units' Escambia County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate
Boilers 4-7 FGD Stack	149.4 [a]	10.7	CEMS	CEMS	CEMS
Boilers 4-5 Bypass Stack	137.2	5.5	CEMS	CEMS	CEMS
Boilers 6-7 Bypass Stack	137.2	7.1	CEMS	CEMS	CEMS
a. The calculated good engineering practice (GEP) stack height is 145.7 m.[11]					

3.8.2. IP Modeled Units

IP is a Kraft pulp and paper mill that has ten SO_2-emitting units on site including one unit, Power Boiler #5, that did not operate during the modeled period. SO_2 emissions from these units were either recorded with a CEMS or estimated using fuel throughput or heat input data and a variety of emission factors. All data were either recorded or estimated on an hourly basis. A summary of the modeled stack parameters for IP is presented below in **Table 6**. Actual stack heights are less than the calculated GEP stack height for all units.

[8] *See* Modeling TAD, Section 5.5.
[9] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-450/4-80-023R, *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (June 1985).
[10] *See* Modeling TAD, Section 6.1.
[11] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-450/4-80-023R, *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (June 1985).

Table 6: IP units' Escambia County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate Sources and Factors
Power Boiler 3	65.01	2.44	7.62	335.93	CEMS [a]
Power Boiler 4	67.36	3.66	10.21	335.37	CEMS [a]
Power Boiler 6	38.10	2.59	14.42	449.82	0.60 lb/MMscf Natural Gas [b]
Thermal Oxidizer	30.48	0.91	8.13	319.26	0.40 lb/hr [c]
Lime Kiln	41.45	1.98	8.53	342.59	0.38 lb/hr [c]
Recovery Boiler 1	55.41	2.74	27.18	516.48	0.60 lb/MMscf Natural Gas [b] 0.24 lb/ton Black Liquor Solids [d]
Recovery Boiler 2	55.41	2.74	24.38	499.82	0.60 lb/MMscf Natural Gas [b] 0.07 lb/ton Black Liquor Solids [d]
Smelt Dissolving Tank 1	52.40	1.22	8.53	349.82	0.006 lb/ton Black Liquor Solids [e]
Smelt Dissolving Tank 2	52.40	1.22	10.06	344.26	0.006 lb/ton Black Liquor Solids [e]

a. Short instances of missing data were filled using fuel usage data and AP-42 emission factors.
b. EPA AP-42 Table 1.4-2
c. Annual stack test emission rate applied to all hours operating.
d. Annual stack test emission factor.
e. NCASI emission factor.

3.9. Background Concentrations

A set of background concentrations to account for all SO_2 sources not explicitly modeled was developed for each hour of the day by season from local monitoring data.[12] The data used were obtained from the Florida Air Monitoring and Assessment System (FAMAS) for monitoring station No. 12-033-0004 for the period January 2012 to December 2014. As shown in **Figure 1**, the monitor is just 5 km southeast of Crist. In order to avoid double-counting the emissions from the explicitly modeled sources, Appendix W recommends filtering the data to remove measurements when the wind direction could transport pollutants from either Crist or IP. In this case, any measurement recorded when the wind direction was from 290° to 19° was removed from the background calculation as shown in **Figure 4**. The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input to AERMOD with the BACKGRND SEASHR keyword. The final set of background concentrations is summarized in **Table 7**.

[12] *See* Modeling TAD, Section 8.1

Figure 4: 2012-2014 average SO_2 concentrations by wind direction for monitor 12-033-0004.

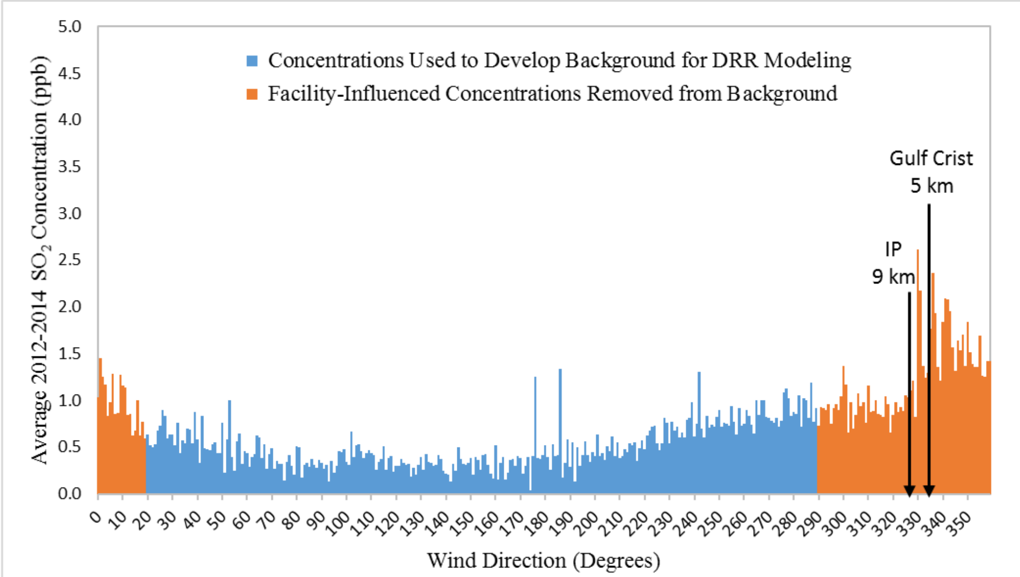


Table 7: 2012-2014 SO_2 background concentrations (ppb) by hour-of-day by season for the Escambia County DRR modeling demonstration.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	1.00	1.33	2.00	1.33	12:00	2.67	1.67	2.33	5.67
1:00	1.33	1.00	1.67	1.33	13:00	2.00	1.67	2.33	4.00
2:00	1.33	1.00	1.67	1.33	14:00	2.33	2.00	2.00	2.33
3:00	1.33	1.00	1.67	1.33	15:00	2.33	1.33	2.33	2.33
4:00	1.33	1.00	2.00	1.33	16:00	1.67	2.00	2.33	1.67
5:00	1.33	1.00	2.00	1.33	17:00	1.67	1.67	2.67	2.00
6:00	1.33	1.67	2.00	1.33	18:00	2.33	1.67	2.00	2.33
7:00	2.00	2.33	2.67	2.33	19:00	8.00	2.00	4.33	3.67
8:00	2.33	3.33	3.33	2.00	20:00	2.33	1.33	2.33	2.33
9:00	4.33	3.00	3.00	3.00	21:00	1.67	1.00	1.67	1.33
10:00	3.67	3.33	3.33	3.00	22:00	1.67	1.00	1.67	1.33
11:00	3.33	2.33	2.67	3.00	23:00	2.00	1.33	2.00	1.33

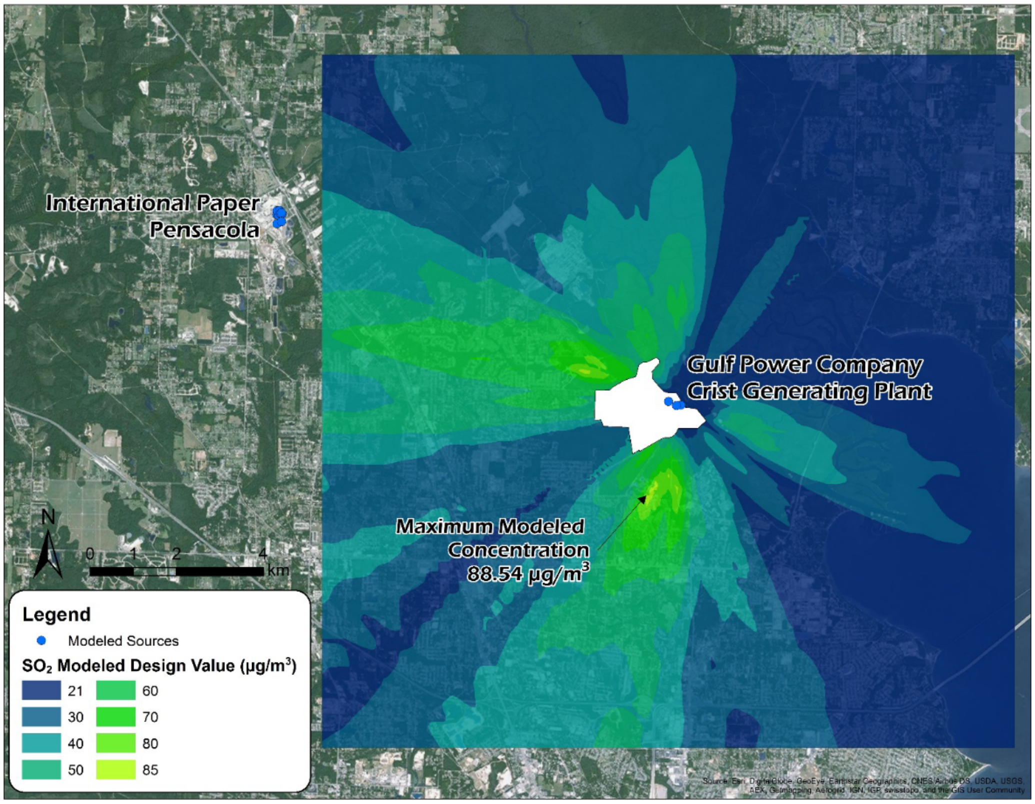
4. Modeling Summary and Results

The EPA-recommended dispersion model AERMOD was used to evaluate the area around Gulf Power Company's Crist Generating Station in Escambia County, Florida in order to satisfy the requirements of the DRR. The model was run from 2012-2014 using actual emissions data and monitored background concentrations. The 99^{th} percentile (4^{th} high) daily maximum one-hour average concentration for each year at each receptor was averaged across all three years. The highest modeled design value at any receptor was then compared to the 2010 one-hour SO_2 NAAQS. The results summarized in **Table 8** and **Figure 5** indicate that Escambia County is in attainment of the SO_2 NAAQS.

Table 8: Maximum modeled SO_2 design value in the Escambia County DRR modeling demonstration.

UTM 16N Easting (m)	UTM 16N Northing (m)	Max Modeled Design Value (µg/m³)				1-Hour SO_2 NAAQS	Percent of NAAQS
		Crist	IP	Background	Total		
477,850.41	3,379,510.50	80.69	0.00	7.85	88.54	196.4	45%

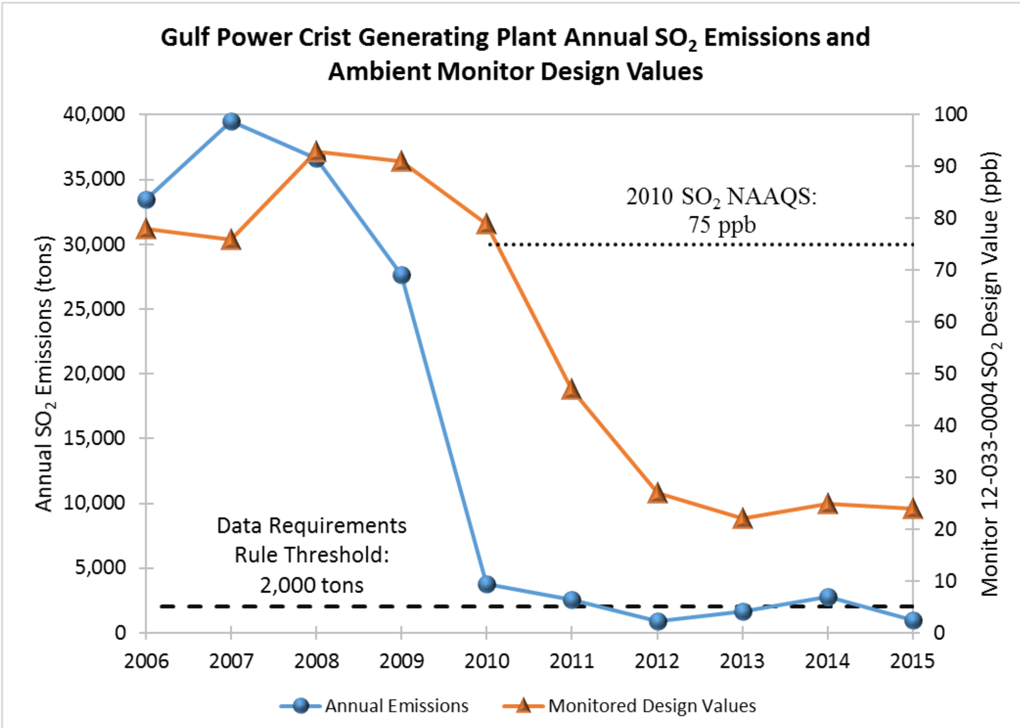
Figure 5: Modeled SO_2 design values in the Escambia County DRR modeling demonstration.



4.1. Continuing Review Obligations

The DRR modeling demonstration for Escambia County shows that the area is well within attainment of the 2010 SO_2 NAAQS, supporting the local ambient monitoring data. In fact, the modeled design value is so low – less than 50% of the NAAQS – that while the local SO_2 monitor will be maintained, the Department has no continuing obligation under the DRR to review and model the area annually. It should be noted that the Department used 2014 emissions to determine which sources were subject to the DRR and 2014 was the only year since 2011 that Crist exceeded the DRR threshold of 2,000 tons (**Figure 6**). 2015 emissions of SO_2 at Crist were 65% less than 2014. It is anticipated that the implementation of a variety of national rules and regulations (particularly the Mercury and Air Toxics Standard) and economic forcing will result in the maintenance or even further reduction of these low levels of SO_2 emissions ensuring continued compliance with the NAAQS.

Figure 6: 2006-2015 Crist SO_2 emissions and monitor 12-033-0004 SO_2 design values.



Appendix E

SO_2 Data Requirements Rule Modeling Report

Hamilton County, Florida

Division of Air Resource Management

Florida Department of Environmental Protection

January 13, 2017

2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400
www.dep.state.fl.us

Table of Contents

1. Background

On August 21, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule" (DRR) (80 Fed. Reg. 51,052; codified at 40 CFR Part 51, Subpart BB), which requires states to evaluate compliance with the 2010 one-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) in areas surrounding certain large SO_2 sources. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either air quality monitoring or air dispersion modeling.

2. Overview

PotashCorp owns and operates the White Springs Agricultural Chemicals Suwannee River/Swift Creek Complex (PCS), a phosphate fertilizer manufacturing plant, in White Springs, Florida under Title V Permit No. 0470002-095-AV issued by the Florida Department of Environmental Protection (Department). PCS emitted 2,487 tons of SO_2 in 2014, exceeding the DRR applicability threshold of 2,000 tons.[1] The Department has chosen to characterize the area around PCS in Hamilton County, Florida using air dispersion modeling following the approach outlined in the Department's modeling protocol submitted to EPA Region 4 on July 1, 2016, and in compliance with all applicable EPA rules and guidance including *Appendix W to 40 CFR Part 51: The Guideline on Air Quality Models*[2] (Appendix W) and the *SO_2 NAAQS Designations Modeling Technical Assistance Document*[3] (Modeling TAD). This report summarizes the Department's completed modeling efforts that indicate Hamilton County is in attainment of the 2010 SO_2 NAAQS.

3. Dispersion Modeling

3.1. Model Selection

EPA recommends the use of the American Meteorological Society/Environmental Protection Agency Regulatory Modeling System (AERMOD), including the pre-processing programs AERMET, AERMINUTE, AERMAP, and AERSURFACE, for all regulatory modeling of inert pollutants in the near field.[4] Accordingly, the Department utilized the latest version of AERMOD (v.15181) using the regulatory default options for characterizing the area around PCS for the DRR.

3.2. Modeled Facilities

PCS is the only DRR-applicable facility and only source of SO_2 emissions in Hamilton County since the Suwannee River side of the complex shutdown in 2014. There are, however, some small nearby SO_2 sources in neighboring Suwannee County. Appendix W states, and the Modeling TAD reiterates, that the number of sources to explicitly model should be small except in unusual cases. An analysis of emissions data and spatial proximity was performed for all nearby sources to determine which sources to explicitly include in the modeling demonstration. All sources within 20 km of the primary facility that had 2014 SO_2 emissions of at least 100 tons were automatically included. All other sources within 35 km were then subjected to a widely used screening procedure known as 20d. This method suggests that if a source's annual emissions in tons (Q) is less than its distance from the primary source in kilometers

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[1] *See* 40 CFR 51.1202.
[2] *Guideline on Air Quality Models.* 40 CFR Part 51 Appendix W.
[3] SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf.
[4] *See* Appendix W to 40 CFR 51, Section 3.2.

(d) multiplied by 20, then it is unlikely to have a significant concentration gradient in the area of concern. Finally, for all sources not already identified for inclusion, the Department considered emissions data, stack parameters, and spatial proximity (both to other sources and the background monitor), and used professional judgment to determine whether they should be included.

The Department determined that there are no other sources of SO_2 emissions that have the potential to cause a significant concentration gradient in the area of interest (**Figure 1**). All other sources within 35 km of PCS emitted less than six tons of SO_2 in 2014 (**Table 1**) and are represented in the added monitored background concentrations discussed in **Section 3.9**.

Figure 1: 2014 SO_2 emission sources in and around Hamilton County, Florida.

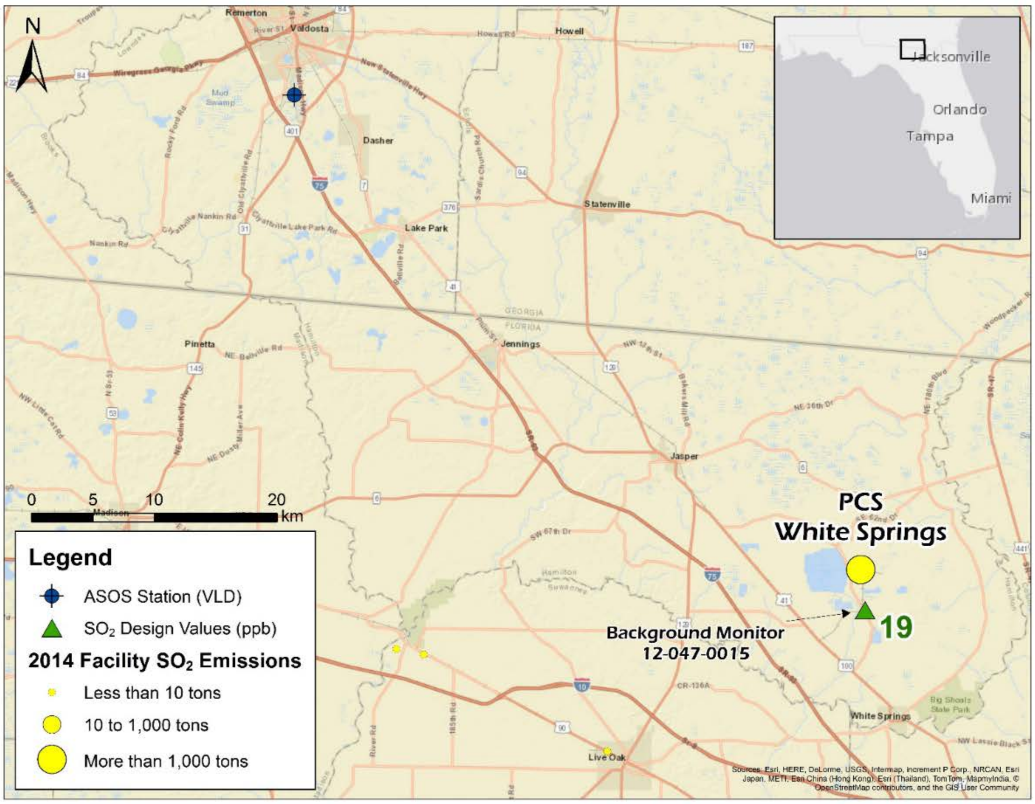


Table 1: Sources of SO_2 emissions within 35 km of PCS.

Facility ID	Facility Name	Distance from PCS (km) (d)	20d	2014 SO_2 Emissions (tons) (Q)	Q > 20d
047-0002	PCS White Springs	0	0	2,487.19	Yes
121-0007	Pilgrim's Pride Live Oak Feed Mill	21	420	0.01	No
121-0018	Pilgrim's Pride Live Oak Poultry Plant	30	600	5.50	No
121-0003	Duke Energy Suwannee River Plant	32	640	3.33	No

3.3. Meteorological Input Data

Florida has a relatively dense network of high-quality National Weather Service (NWS) Automated Surface Observing System (ASOS) stations for use in air dispersion modeling demonstrations. Hourly meteorological surface observations for 2012-2014 from the nearest representative NWS ASOS station at Valdosta Regional Airport (VLD) in Valdosta, Georgia were processed with AERMET v.15181. The raw data were retrieved from the National Climatic Data Center's (NCDC) file transfer protocol site in the standard integrated surface hourly data format (ISHD) along with the TD-6405 ASOS 1-minute wind data. Upper air parameters were derived from twice daily radiosonde observations (RAOB) from the nearest NWS atmospheric sounding location in Tallahassee, Florida (TAE) downloaded from the National Oceanic and Atmospheric Administration's (NOAA) Earth System Research Laboratory (ESRL) website. Missing 12Z soundings were filled with archived modeled soundings from NOAA's Air Resources Laboratory (ARL) website prior to processing in AERMET.

Default options and settings were used when processing AERMET with the exception of the following:

- ASOS1MIN – Include ASOS 1-minute wind data processed by AERMINUTE v.14337
- THRESH_1MIN 0.5 – Minimum wind speed threshold: 0.5 m/s
- METHOD WIND_DIR RANDOM – Wind directions are randomized to correct rounding
- NWS_HGT WIND 10 – Sets ASOS anemometer height to 10 m

EPA has established criteria for the use of meteorological data for modeling purposes that states that meteorological data should be 90% complete on a quarterly basis.[5] The 2012-2014 VLD dataset satisfies this completeness requirement.

3.3.1. Surface Characteristics

AERMET requires information about the surface characteristics of the land surrounding the meteorological station. The Department used the recommended AERMET preprocessing program AERSURFACE v.13016 to extract estimates of the Bowen ratio, surface roughness, and albedo from the 1992 National Land Cover Dataset (NLCD) for Florida. Per EPA guidance, because the Bowen ratio is dependent upon surface moisture and precipitation patterns, each year was classified as wet, dry, or average by comparing the annual precipitation to the 1981-2010 climatological record at the site. The default seasonal categories for each month were changed to reflect the subtropical climate of Hamilton County. All inputs to AERSURFACE are summarized in **Table 2**.

[5] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-454/R-99-005, *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* (February 2000).

Table 2: AERSURFACE inputs for 2012-2014 VLD AERMET dataset.

Parameter	Value
Coordinate System	LATLON
Meteorological Station Latitude (Degrees)	30.7830
Meteorological Station Longitude (Degrees)	-83.2770
Horizontal Datum	NAD83
Radius of Study Area for Surface Roughness (km)	1
Number of Sectors	12
Temporal Resolution	Monthly
Continuous Snow Cover for at Least One Month	No
Late Autumn or Winter Without Snow	1,2
Transitional Spring	3,4
Midsummer	5,6,7,8,9
Autumn	10,11,12
Located at an Airport	Yes
Arid Region	No
Average Surface Moisture 2012	Wet
Average Surface Moisture 2013	Wet
Average Surface Moisture 2014	Wet

3.3.2. Site Representativeness

The surface characteristics were also extracted for the area around PCS so that a comparison could be done to determine if the meteorological data recorded at VLD are representative of the meteorological conditions in the modeling domain. The resulting average surface characteristics at both sites are similar and are summarized in **Table 3**. In addition, the airport is 53 km northwest of PCS, the land in between is generally flat, and both areas have similar topography. Based on this analysis, the VLD meteorological dataset was considered to be representative of the domain for this modeling demonstration.

Table 3: Average surface characteristics from AERSURFACE for Hamilton County.

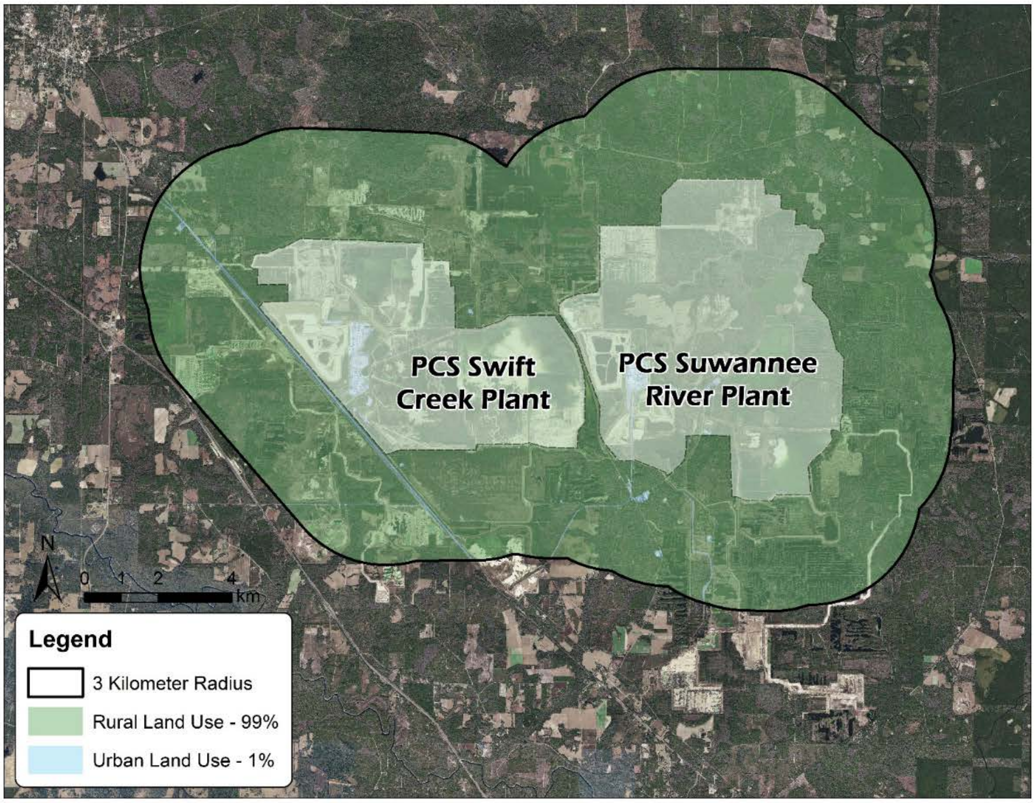
Location	Albedo	Bowen Ratio	Surface Roughness (z_0)
Valdosta Regional Airport	0.16	0.44	0.048
PCS White Springs	0.15	0.42	0.234

3.4. Rural/Urban Determination

AERMOD contains different dispersion coefficients for rural and urban settings. Appendix W outlines two methods for determining whether the area should be considered rural or urban. The Department chose the land-use classification approach employing Auer's method.[6] The Auer method requires an analysis of the land use within a 3-km radius around a facility to determine whether the majority of the land is classified as rural or urban. If more than fifty percent of the area consists of Auer land-use industrial, commercial, or residential land types, then urban dispersion coefficients are used in the model; otherwise, rural dispersion coefficients are used. As shown in **Figure 2** below, rural land use constitutes a majority (98%) of the 3-km radius around PCS.

[6] Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, 17:636-643 (1978).

Figure 2: Land use classification around PCS in Hamilton County.



3.5. Terrain Elevations

Terrain elevations were determined using the AERMOD terrain preprocessor AERMAP v.11103. AERMAP extracted elevations and hill heights for all sources, buildings, and receptors from the United States Geological Survey (USGS) National Elevation Dataset (NED) with a 10 m horizontal resolution.

3.6. Receptor Placement

According to EPA's March 2011 Memo *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard* and reiterated in the Modeling TAD, it is expected that the distance from the source to the area of the maximum ground-level 1-hour impact of SO_2 will be approximately 10 times the source release height.[7] Based on this guidance, the Department developed a uniform method for receptor grid placement for all DRR sources in Florida. As a conservative approach, a dense grid of receptors was placed from the primary facility's tallest stack (if multiple stacks are the tallest, the most centrally located was chosen) to the greater of 20 times the

[7] Applicability of Appendix W Modeling Guidance for the 1-hr NO_2 National Ambient Air Quality Standard. Tyler Fox Memorandum dated June 28, 2010, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf.

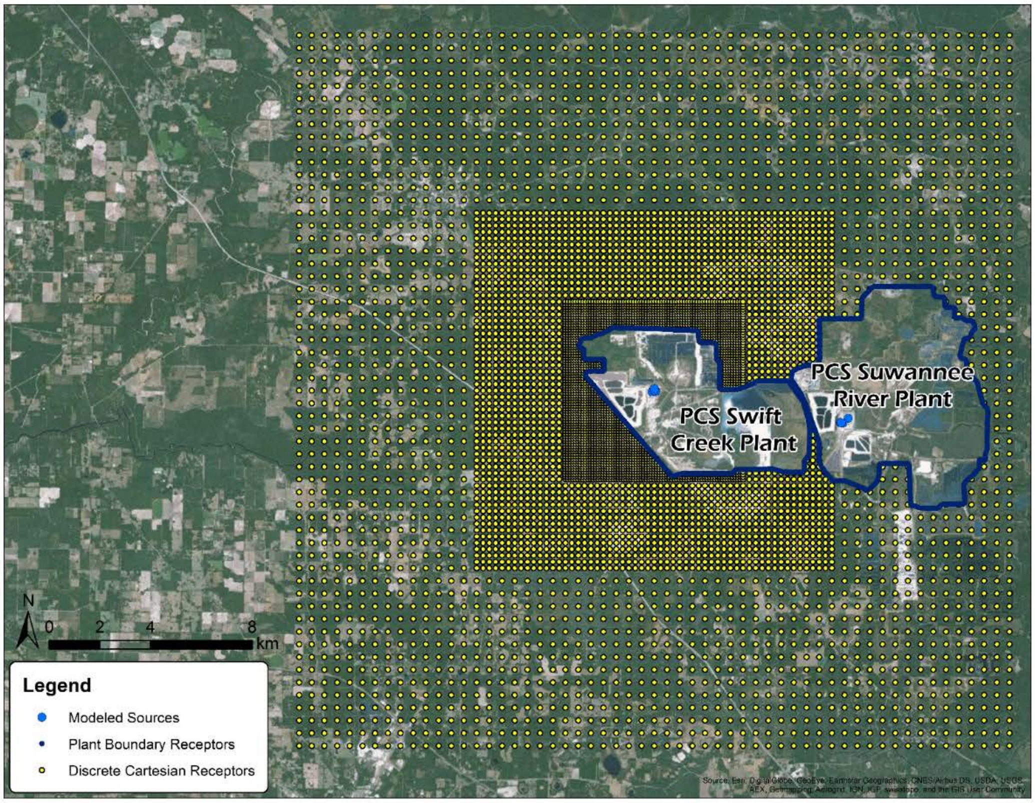
tallest stack height at the primary facility or 2500 m. Receptor density then decreased in 2500 m intervals. Receptors located within the PCS fenceline were removed and receptors were placed with 50 m spacing along the fenceline. Given the significant amount of contiguous mining land owned by PCS (the property boundaries encompass an area nearly 20 km across), this receptor spacing was not considered to be sufficient because it did not span the entire length of the property boundary. The receptor grid was then expanded to include all areas within 14 km of the largest emissions units at the PCS Swift Creek Plant.

The Modeling TAD describes a process for removing receptors placed in areas that it would not be feasible to place an actual monitor, such as bodies of water, that is unique to the DRR. The Department chose not to employ this process. The receptor grid used in the Hamilton County DRR modeling demonstration is described below in **Table 4** and **Figure 3**.

Table 4: Hamilton County DRR modeling demonstration receptor grid description.

Receptor Grid Parameter	Value/Description
Description of Unit at Grid Center	Sulfuric Acid Plant E
Unit UTM Zone	17N
Unit UTM Easting (m)	321,089.70
Unit UTM Northing (m)	3,370,331.20
Actual Stack Height (m)	59.50
Expected Distance to Max Concentration (m)	595
20 Times Stack Height (m)	1,190
100 m Receptor Spacing - Extent from the Origin (m)	3,500
250 m Receptor Spacing - Extent from the Origin (m)	7,000
500 m Receptor Spacing - Extent from the Origin (m)	14,000
Plant Boundary Receptor Spacing (m)	50
Total Receptors	8,164

Figure 3: Receptor grid placement for the Hamilton County DRR modeling demonstration.



3.7. Building Downwash

Building downwash effects on emitted plumes were simulated using the Plume Rise Model Enhancements (PRIME) algorithm v.04274 in AERMOD. PRIME predicts concentrations in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the uncaptured primary plume, and reemitted to the far wake as a volume source. 17 significant structures onsite at PCS were included in the downwash analysis. Direction-specific downwash parameters for all stacks at PCS were calculated and input to AERMOD by EPA's Building Profile Input Program for PRIME (BPIPPRM).

3.8. Source Parameters and Emissions Data

SO_2 emissions from the PCS Swift Creek Plant are mainly from two sulfuric acid plants (SAPs). The SAPs burn elemental sulfur to create SO_2 which is then oxidized to SO_3 over a catalyst bed and absorbed into sulfuric acid. A portion of the SO_2 is not oxidized and is emitted to the atmosphere. Emissions from both SAPs are monitored by in-stack continuous emissions monitors systems (CEMS). There is also a molten sulfur handling system and a new natural gas-fired auxiliary boiler that contribute a small amount of SO_2 emissions. The Department chose to characterize the SAPs using actual hourly emissions data and all other sources using their maximum permitted short-term emission limits.

The hourly data for all units were requested from the facility for the years 2012-2014 by the Department in July 2015. All data received were thoroughly checked for accuracy and representativeness and then included in the modeling demonstration using the AERMOD keyword HOUREMIS. Missing data were substituted with the unit's maximum permitted emission rate. A variety of small, intermittent emissions sources including fire pumps and emergency generators were not included because their emissions are not "continuous or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations."[8]

Traditional modeling demonstrations require the use of the calculated good engineering practice (GEP)[9] stack height for all sources in the model. The DRR is different in that the purpose is to replicate actual ambient concentrations of SO_2. As such, the use of actual stack heights for those stacks that exceed their calculated GEP height is permitted if the source is characterized using actual hourly emissions data.[10] The stack heights for all units at PCS are less than or equal to the GEP height for each. A summary of the modeled stack parameters for PCS is presented below in **Table 5**.

Table 5: PCS units' Hamilton County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
SAP E	59.50	2.59	10.54	342.0	CEMS
SAP F	59.50	2.59	10.54	342.0	CEMS
Aux Boiler E	15.24	1.62	15.42	466.48	0.15
Molten Sulfur Handling System	7.62	0.18	0.64	366.48	2.4
Aux Boilers C & D [a,b]	31.70	1.98	7.62	490.00	257.4
No. 1 (Y) DAP/MAP [a]	36.58	2.13	12.19	322.04	11.1
No. 2 (Z) DAP/MAP	42.67	2.44	9.45	322.04	11.8
X-Train Dical [a]	36.58	2.13	12.19	322.04	11.1

a. These four units are located at the Suwannee River Plant and were shut down in 2014.
b. Auxiliary boilers C & D share a common stack.

3.8.1. Suwannee River Plant

The Suwannee River Plant on the east side of the PCS White Springs Suwannee River/Swift Creek Complex mostly shutdown in 2014. The main sources of SO_2 at that facility, SAP C and SAP D, were permanently shut down and dismantled. There are four smaller SO_2 emission sources that are located at this plant that remain permitted but are permanently shut down and one very small active emission unit. Despite the fact that these units have not operated for over two years, the Department chose to include them in the modeling demonstration at their maximum permitted short-term emission rates given their current permitted status. This is of course a highly conservative approach.

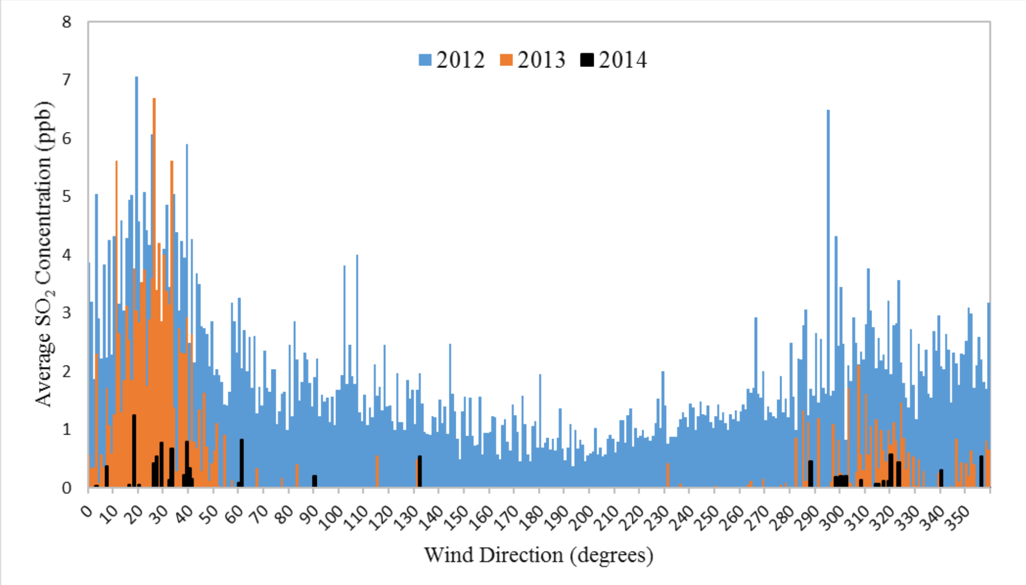
3.9. Background Concentrations

A set of background concentrations to account for all SO_2 sources not explicitly modeled was developed for each hour of the day by season from local monitoring data.[11] The data used were obtained from the

[8] *See* Modeling TAD, Section 5.5.
[9] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-450/4-80-023R, *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (June 1985).
[10] *See* Modeling TAD, Section 6.1.
[11] *See* Modeling TAD, Section 8.1

Florida Air Monitoring and Assessment System (FAMAS) for monitoring station No. 12-047-0015 for the period January 2014 to December 2015. EPA guidance recommends using three years of concurrent monitoring data to develop the background concentrations but that was deemed inappropriate for this situation as monitoring values decreased drastically in 2014 with the shutdown of the PCS Suwannee River Plant just 3 km from the monitor (**Figure 4**). As such, all available monitoring data that were not influenced by the closed plant, 2014-2015, were used to develop the background concentrations.

Figure 4: 2012-2014 average annual SO_2 concentrations by wind direction for monitor 12-047-0015.



As shown in **Figure 1**, the monitor is 9 km southeast of PCS. In order to avoid double-counting the emissions from the explicitly modeled sources, Appendix W recommends filtering the data to remove measurements when the wind direction could transport pollutants from PCS. In this case, any measurement recorded when the wind direction was from 256° to 344° was removed from the background calculation as shown in **Figure 5**. The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input to AERMOD with the BACKGRND SEASHR keyword. The final set of background concentrations is summarized in **Table 6**.

Figure 5: 2014-2015 maximum SO_2 concentrations by wind direction for monitor 12-047-0015.

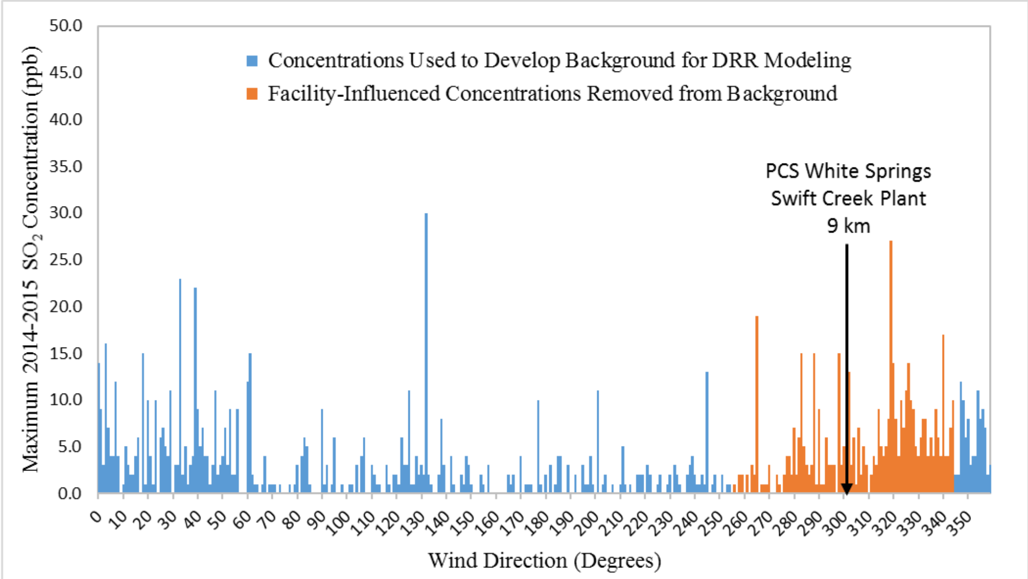


Table 6: 2014-2015 SO_2 background concentrations (ppb) by hour-of-day by season for the Hamilton County DRR modeling demonstration.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	1.50	0.00	0.00	0.00	12:00	2.50	2.00	2.00	1.00
1:00	1.50	0.00	0.00	0.00	13:00	4.00	3.50	0.50	0.50
2:00	1.00	0.00	0.00	0.00	14:00	2.00	2.50	1.50	0.00
3:00	1.50	1.00	1.00	0.00	15:00	1.50	1.50	0.50	0.00
4:00	1.00	3.00	1.00	0.00	16:00	0.50	1.00	0.50	0.00
5:00	1.50	3.50	5.50	0.00	17:00	0.50	1.00	1.00	0.00
6:00	1.00	1.50	5.50	0.00	18:00	0.00	0.50	0.50	0.00
7:00	2.00	2.00	4.00	0.00	19:00	0.50	0.00	1.50	0.50
8:00	1.00	2.00	4.00	0.50	20:00	1.00	0.00	1.00	1.00
9:00	2.50	3.00	3.00	0.50	21:00	1.50	0.00	0.50	0.00
10:00	2.50	3.50	3.00	1.00	22:00	1.00	0.00	0.50	0.50
11:00	4.00	2.50	3.50	0.50	23:00	2.50	0.00	0.00	0.00

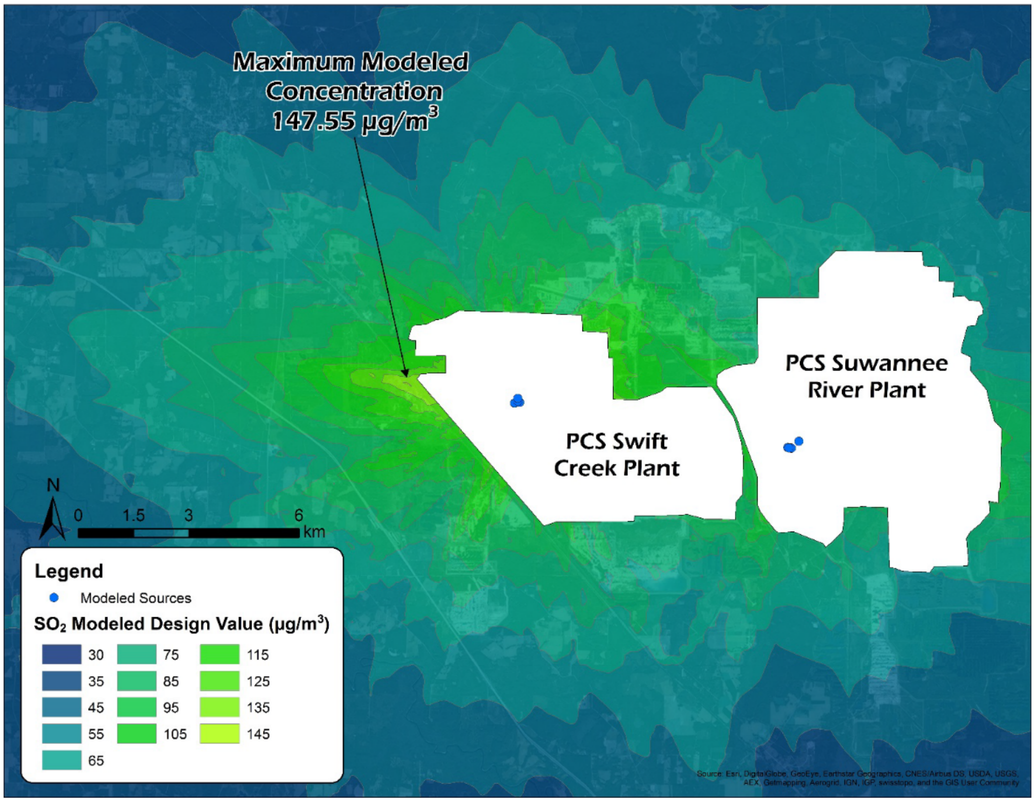
4. Modeling Summary and Results

The EPA-recommended dispersion model AERMOD was used to evaluate the area around the PCS Suwannee River/Swift Creek Complex in Hamilton County, Florida in order to satisfy the requirements of the DRR. The model was run from 2012-2014 using actual emissions data and monitored background concentrations. The 99th percentile (4th high) daily maximum one-hour average concentration for each year at each receptor was averaged across all three years. The highest modeled design value at any receptor was then compared to the 2010 one-hour SO_2 NAAQS. The results summarized in **Table 7** and **Figure 6** indicate that Hamilton County is in attainment of the SO_2 NAAQS.

Table 7: Maximum modeled SO_2 design value in the Hamilton County DRR modeling demonstration.

UTM 17N Easting (m)	UTM 17N Northing (m)	Max Modeled Design Value (µg/m³)			1-Hour SO_2 NAAQS	Percent of NAAQS
		PCS	Background	Total		
323,425.50	3,372,203.12	144.93	2.62	147.55	196.4	75.1%

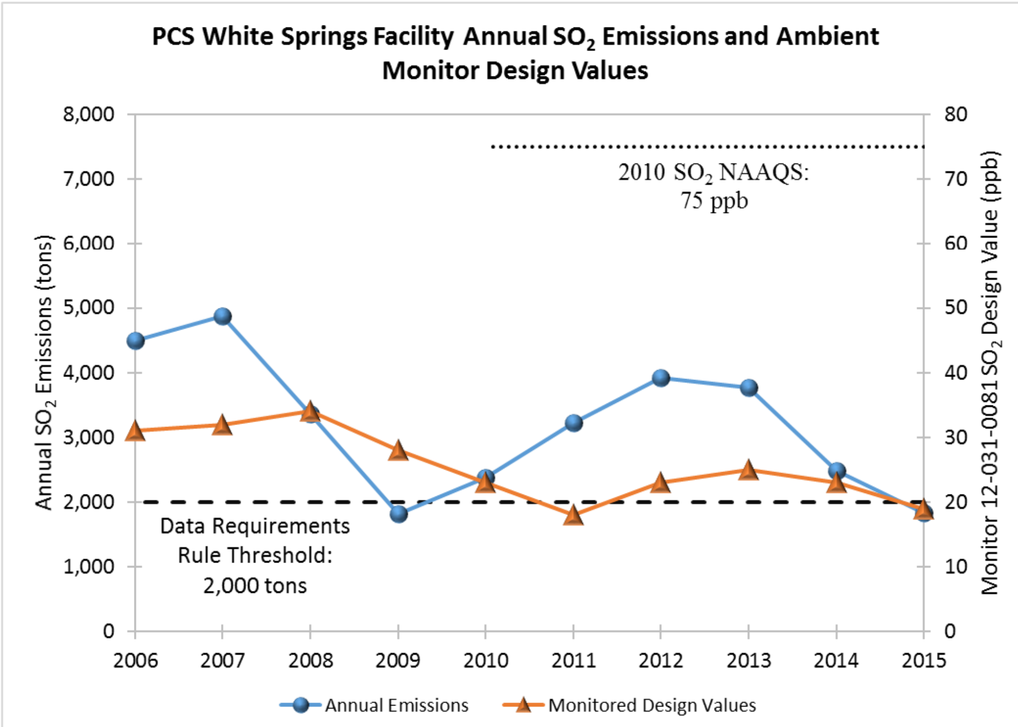
Figure 6: Modeled SO_2 design values in the Hamilton County DRR modeling demonstration.



4.1. Continuing Review Obligations

The DRR modeling demonstration for Hamilton County shows that the area is well within attainment of the 2010 SO_2 NAAQS, supporting the local ambient monitoring data. Under the DRR, the Department has a continuing obligation to review SO_2 emissions in the area annually for continued compliance with the NAAQS. It is anticipated that SO_2 concentrations in Hamilton County will continue to decrease as they have since the shutdown of the Suwannee River Plant. The facility's SO_2 emissions declined by more than 50% from 2013 to 2015 and actually fell below the DRR threshold of 2,000 tons in 2015 (**Figure 7**). In addition, the facility is scheduled to implement a significant SO_2 emissions reduction project over the next three years as part of a consent decree with EPA. Given these factors, the Department is confident that the downward trend of SO_2 emissions and concentrations in Hamilton County will continue into the foreseeable future.

Figure 7: 2006-2015 PCS SO_2 emissions and monitor 12-047-0015 SO_2 design values.



4.1.1. EPA Consent Decree SO_2 Reduction Project

The SO_2 reduction project required by PCS' consent decree with EPA involves upgrading the two SAPs to meet new emission limits that are more than 35% less than their current limits (**Table 8**). The fist SAP will be upgraded in 2017 followed by the second unit in 2019. An additional modeling demonstration characterizing the area using these new maximum permitted emission rates (**Table 9**) is provided here as evidence of the improving state of the air quality in Hamilton County and the continued compliance with the SO_2 NAAQS.

Table 8: Current and future SO_2 emission limits for PCS' SAPs.

Unit Description	Current Permitted Emission Limit (lb/ton H_2SO_4)	Future Consent Decree Emission Limit (lb/ton H_2SO_4)	Compliance Date
SAP E	4.0 24-hr Block Average	2.6 3-hr Rolling Average	1/1/2018
SAP F	4.0 24-hr Block Average	2.6 3-hr Rolling Average	1/1/2020

Table 9: PCS units' Hamilton County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
SAP E	59.5	2.59	10.54	342.0	278.64
SAP F	59.5	2.59	10.54	342.0	290.28
Aux Boiler E	15.24	1.615	15.42	466.48	0.15
Molten Sulfur Handling System	7.62	0.183	0.64	366.48	2.4
Aux Boilers C & D	31.70	1.98	7.62	490.00	257.4
No. 1 (Y) DAP/MAP	36.58	2.13	12.19	322.04	11.1
No. 2 (Z) DAP/MAP	42.67	2.44	9.45	322.04	11.8
X-Train Dical	36.58	2.13	12.19	322.04	11.1

4.1.1.1. Modeled Emission Rate Averaging Times

If a compliance averaging time for an emission limit is longer than the averaging time for the applicable NAAQS (here, one hour), EPA guidance provides a method of calculating an "equivalent" longer-term emission limit where appropriate.[12] The adjustment method suggested by EPA is to scale the longer-term average emission limit by the ratio of each source's historic 99th percentile one-hour average emission rate to its 99th percentile longer-term average emission rate. The premise of this method is that a longer-term emission limit allows a higher level of emissions variability than the short-term limit. Thus, a larger short-term limit needs to be input to the model in order to account for this variability. The new SO_2 emission limits on both SAPs are based on 3-hour averaging periods so this adjustment process was used. The analysis was performed using CEMS data from 2012-2014 and is summarized in **Table 10**.

Table 10: Emissions variability analysis and equivalent emission rate calculations.

Unit Description	99th Percentile Rate (lb/hr)		Ratio	Permitted	Equivalent
	1-hr	3-hr	1-hr/3-hr	Limit (lb/hr)	Limit (lb/hr)
SAP E	375.25	364.79	0.972	270.83	278.64
SAP F	405.94	378.77	0.933	270.83	290.28

4.1.2. Future Allowables Modeling Demonstration Results

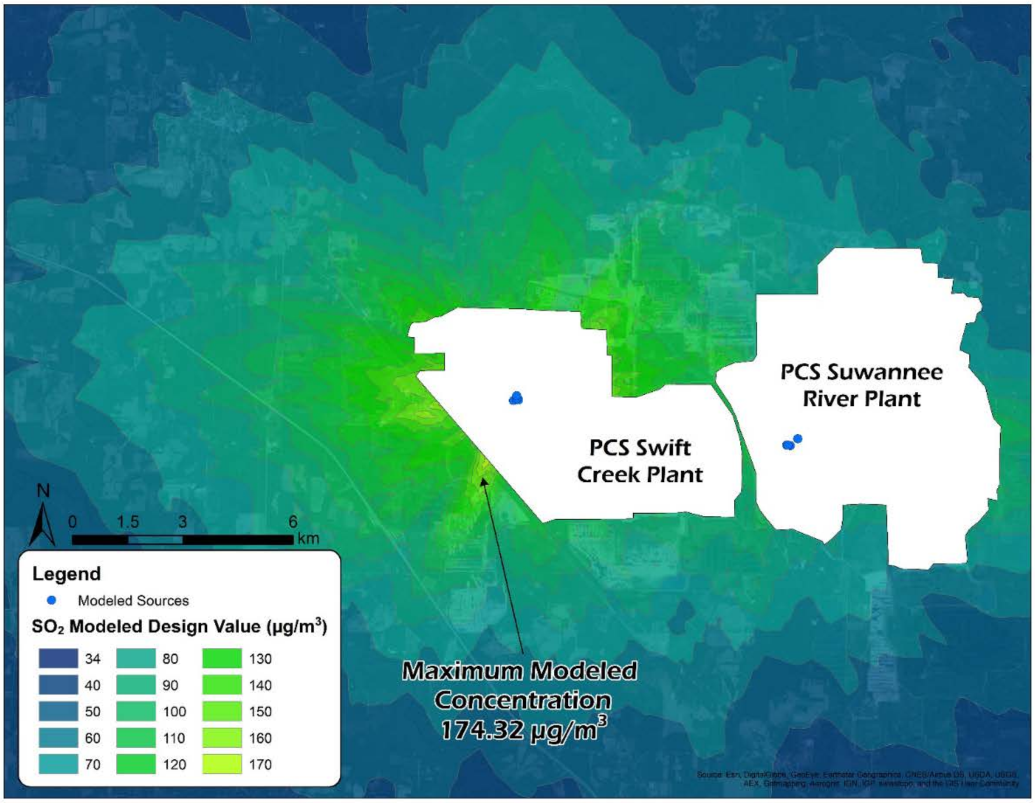
Once this project is complete, modeling indicates that the facility will be in compliance with the NAAQS at its maximum permitted short-term emission limits as shown in **Table 11** and **Figure 8**. The Department's continuing review obligations under the DRR will end at that time.

Table 11: Maximum modeled future SO_2 design value for PCS' consent decree emission limits.

UTM 17N Easting (m)	UTM 17N Northing (m)	Max Modeled Design Value (µg/m^3)			1-Hour SO_2 NAAQS	Percent of NAAQS
		PCS	Background	Total		
323,425.50	3,372,203.12	167.35	6.98	174.32	196.4	88.8%

[12] Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/oarpg/t1pgm.html

Figure 8: Modeled future SO_2 design values for PCS' consent decree emission limits.



Appendix G
SO_2 Data Requirements Rule Modeling Report
Nassau County, Florida

Division of Air Resource Management

Florida Department of Environmental Protection

January 13, 2017

2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400
www.dep.state.fl.us

Table of Contents

1. Background

On August 21, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule" (DRR) (80 Fed. Reg. 51,052; codified at 40 CFR Part 51, Subpart BB), which requires states to evaluate compliance with the 2010 one-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) in areas surrounding certain large SO_2 sources. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either air quality monitoring or air dispersion modeling.

2. Overview

WestRock CP, LLC's Fernandina Beach Mill (WestRock) is a fully integrated Kraft linerboard mill in Fernandina Beach, Florida operating under Title V Permit No. 0890003-048-AV issued by the Florida Department of Environmental Protection (Department). WestRock emitted 3,477 tons of SO_2 in 2014, exceeding the DRR applicability threshold of 2,000 tons.[1] The Department has chosen to characterize the area around WestRock in Nassau County, Florida using air dispersion modeling following the approach outlined in the Department's modeling protocol submitted to EPA Region 4 on July 1, 2016, and in compliance with all applicable EPA rules and guidance including *Appendix W to 40 CFR Part 51: The Guideline on Air Quality Models*[2] (Appendix W) and the *SO_2 NAAQS Designations Modeling Technical Assistance Document*[3] (Modeling TAD). This report summarizes the Department's completed modeling efforts that indicate Nassau County is in attainment of the 2010 SO_2 NAAQS.

2.1. Nassau County SO_2 Nonattainment Area

It should be noted that WestRock lies just outside of the Nassau County SO_2 nonattainment area (**Figure 1**). This nonattainment area was designated in 2013 based on ambient monitoring data in Fernandina Beach.[4] The Department worked in tandem with the facility identified as responsible for the elevated SO_2 concentrations at the monitor, Rayonier Performance Fibers Fernandina Sulfite Mill (Rayonier), and WestRock, identified as a significant contributor, to develop a comprehensive nonattainment area plan to bring the area back into attainment with the NAAQS as expeditiously as practicable. The plan was recently proposed for approval by EPA and has nearly been completed at both facilities.[5] This is reflected in the monitored concentrations at the nonattainment area reference monitor which have decreased over 50% since 2012 and have been in compliance with the NAAQS since 2013.

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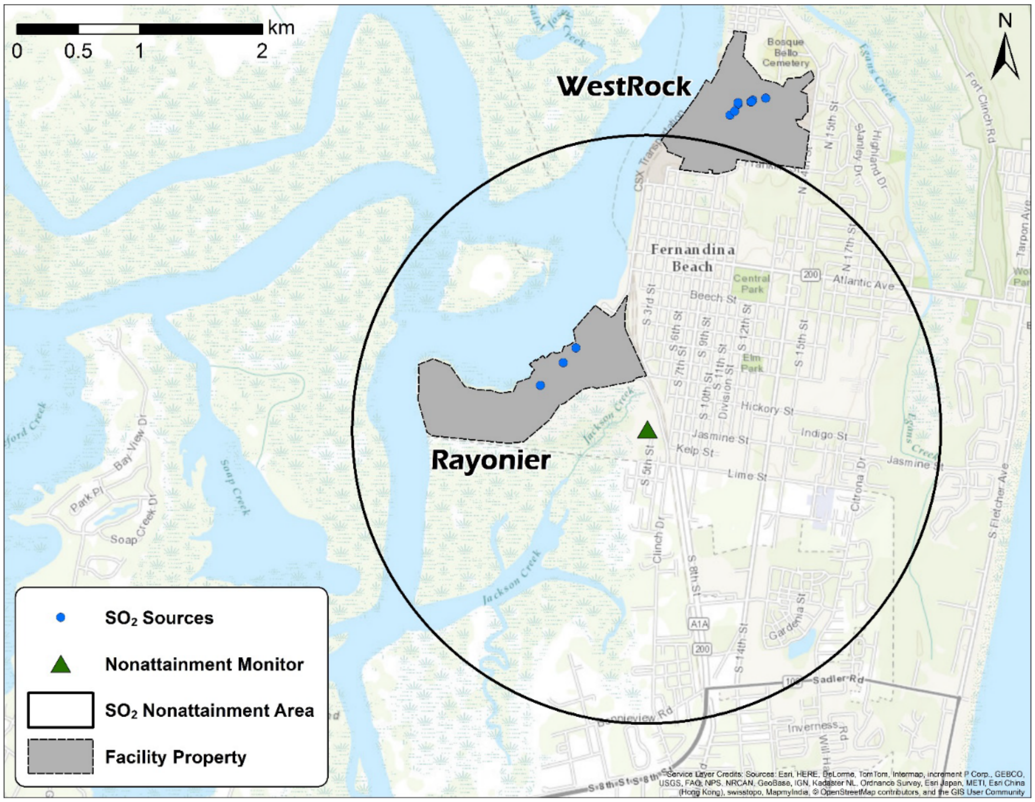
[1] *See* 40 CFR 51.1202.
[2] *Guideline on Air Quality Models*. 40 CFR Part 51 Appendix W.
[3] SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf.
[4] *See* 40 CFR 81.310.
[5] *See* 81 Fed. Reg. 57,535.

Figure 1: Nassau County, Florida 2013 SO_2 Nonattainment Area.



3. Dispersion Modeling

3.1. Model Selection

EPA recommends the use of the American Meteorological Society/Environmental Protection Agency Regulatory Modeling System (AERMOD), including the pre-processing programs AERMET, AERMINUTE, AERMAP, and AERSURFACE, for all regulatory modeling of inert pollutants in the near field.[6] Accordingly, the Department utilized the latest version of AERMOD (v.15181) using the regulatory default options for characterizing the area around WestRock for the DRR.

3.2. Modeled Facilities

WestRock is the only DRR-applicable facility and one of only three point sources of SO_2 in Nassau County. There are, however, a variety of nearby SO_2 sources in both Nassau County and adjacent Duval County. Appendix W states, and the Modeling TAD reiterates, that the number of sources to explicitly model should be small except in unusual cases. An analysis of emissions data and spatial proximity was performed for all nearby sources to determine which sources to explicitly include in the modeling

[6] *See* Appendix W to 40 CFR 51, Section 3.2.

demonstration. All sources within 20 km of the primary facility that had 2014 SO_2 emissions of at least 100 tons were automatically included. All other sources within 35 km were then subjected to a widely used screening procedure known as 20d. This method suggests that if a source's annual emissions in tons (Q) is less than its distance from the primary source in kilometers (d) multiplied by 20, then it is unlikely to have a significant concentration gradient in the area of concern. Finally, for all sources not already identified for inclusion, the Department considered emissions data, stack parameters, and spatial proximity (both to other sources and the background monitor), and used professional judgment to determine whether they should be included.

The Department determined that Rayonier, located approximately 3km to the southwest, is the only other significant source of SO_2 emissions within 30 km and the only one that has the potential to cause a significant concentration gradient in the area of interest (**Figure 2**). All other sources in the area (**Table 1**) are represented in the added monitored background concentrations discussed in **Section 3.9**. While the JEA Northside/St. Johns River Power Park (JEA) and Cedar Bay facilities, both more than 30 km to the south, are technically above the 20d threshold, they were not explicitly included in the modeling demonstration. The reasoning for this decision is based mainly on the fact that these facilities were included in the DRR modeling demonstration for Duval County with JEA being the primary facility in the demonstration. This demonstration is included as **Appendix C** to this submittal. In addition, an analysis of monitored ambient SO_2 concentrations between WestRock and these facilities indicates that there is essentially no measurable impact from these facilities in the area of interest. This is also discussed further in **Section 3.9.**

Figure 2: 2014 SO_2 emission sources greater than 1 ton in and around Nassau County.

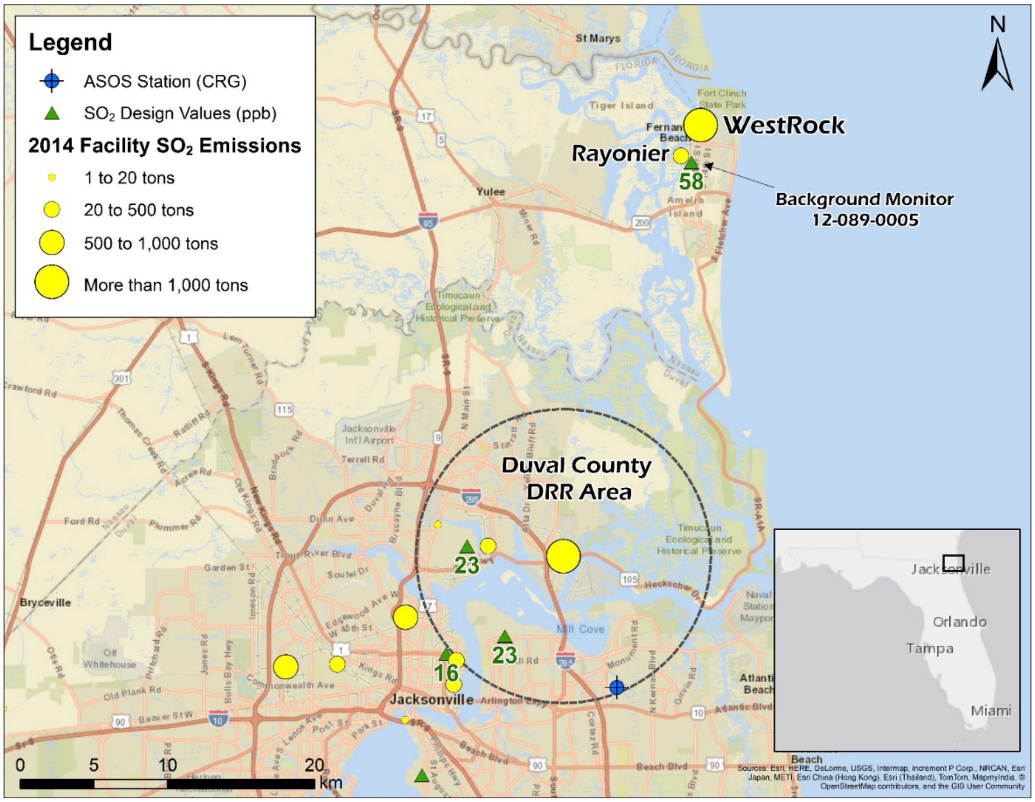


Table 1: All sources of SO_2 emissions greater than 1 ton in 2014 within 35 km of WestRock.

Facility ID	Facility Name	Distance from WestRock (km) (d)	20d	2014 SO_2 Emissions (tons) (Q)	Q > 20d
089-0003	WestRock [a]	0	0	3,477.17	Yes
089-0004	Rayonier [a]	3	60	354.82	Yes
031-0045	JEA NGS/SJRPP	30	600	20,978.32	Yes
031-0337	Cedar Bay Generating Plant	32	640	732.82	Yes
031-0006	Anheuser-Busch Jacksonville	33	660	8.76	No

a. Explicitly modeled facility.

3.3. Meteorological Input Data

Florida has a relatively dense network of high-quality National Weather Service (NWS) Automated Surface Observing System (ASOS) stations for use in air dispersion modeling demonstrations. Hourly meteorological surface observations for 2012-2014 from the nearest representative NWS ASOS station at Jacksonville's Craig Municipal Airport (CRG) were processed with AERMET v.15181. The raw data were retrieved from the National Climatic Data Center's (NCDC) file transfer protocol site in the standard integrated surface hourly data format (ISHD) along with the TD-6405 ASOS 1-minute wind data. Upper air parameters were derived from twice daily radiosonde observations (RAOB) from the nearest NWS atmospheric sounding location at Jacksonville International Airport (JAX) downloaded from the National Oceanic and Atmospheric Administration's (NOAA) Earth System Research Laboratory (ESRL) website. Missing 12Z soundings were filled with archived modeled soundings from NOAA's Air Resources Laboratory (ARL) website prior to processing in AERMET.

Default options and settings were used when processing AERMET with the exception of the following:

- ASOS1MIN – Include ASOS 1-minute wind data processed by AERMINUTE v.15272
- THRESH_1MIN 0.5 – Minimum wind speed threshold: 0.5 m/s
- METHOD WIND_DIR RANDOM – Wind directions are randomized to correct rounding
- NWS_HGT WIND 7.92 – Sets ASOS anemometer height to 7.92 m

EPA has established criteria for the use of meteorological data for modeling purposes that states that meteorological data should be 90% complete on a quarterly basis.[7] The 2012-2014 CRG dataset satisfies this completeness requirement.

EPA Region 4 suggested that the Department consider using meteorological data from the Northeast Florida Regional Airport (SGJ) in St. Augustine, FL due to its similar distance from the coastline. The Department compiled the 2012-2014 AERMET dataset for this site, which is an older automated weather observing system (AWOS) station, and found that it did not meet the 90% data completeness requirements for the second quarter of 2013. In addition, this site does not have the high resolution one-minute ASOS wind data that CRG has. Modeling demonstrations performed in Nassau County, including the previously discussed nonattainment area plan, have traditionally relied on meteorological data from JAX as that is the closest ASOS station. However, since the most important geographical influence on mesoscale meteorological conditions in Florida is proximity to the coastline (sea breeze influences), the Department opted to utilize the CRG dataset due to that site being significantly closer to the coast than JAX.

3.3.1. Surface Characteristics

AERMET requires information about the surface characteristics of the land surrounding the meteorological station. The Department used the recommended AERMET preprocessing program AERSURFACE v.13016 to extract estimates of the Bowen ratio, surface roughness, and albedo from the 1992 National Land Cover Dataset (NLCD) for Florida. Per EPA guidance, because the Bowen ratio is dependent upon surface moisture and precipitation patterns, each year was classified as wet, dry, or average by comparing the annual precipitation to the 1981-2010 climatological record at the site. The default seasonal categories for each month were changed to reflect the subtropical climate of Nassau County. All inputs to AERSURFACE are summarized in **Table 2**.

[7] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-454/R-99-005, *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* (February 2000).

Table 2: AERSURFACE inputs for 2012-2014 CRG AERMET dataset.

Parameter	Value
Coordinate System	LATLON
Meteorological Station Latitude (Degrees)	30.337
Meteorological Station Longitude (Degrees)	-81.5126
Horizontal Datum	NAD83
Radius of Study Area for Surface Roughness (km)	1
Number of Sectors	12
Temporal Resolution	Monthly
Continuous Snow Cover for at Least One Month	No
Late Autumn or Winter Without Snow	1,2
Transitional Spring	3,4
Midsummer	5,6,7,8,9
Autumn	10,11,12
Located at an Airport	Yes
Arid Region	No
Average Surface Moisture 2012	Average
Average Surface Moisture 2013	Dry
Average Surface Moisture 2014	Wet

3.3.2. Site Representativeness

The surface characteristics were also extracted for the area around WestRock so that a comparison could be done to determine if the meteorological data recorded at CRG are representative of the meteorological conditions in the modeling domain. The resulting average surface characteristics at both sites are similar and are summarized in **Table 3**. In addition, the airport is just 39 km southwest of WestRock, the land in between is generally flat, and both areas have similar topography. Based on this analysis, the CRG meteorological dataset was considered to be representative of the domain for this modeling demonstration.

Table 3: Average surface characteristics from AERSURFACE for Nassau County.

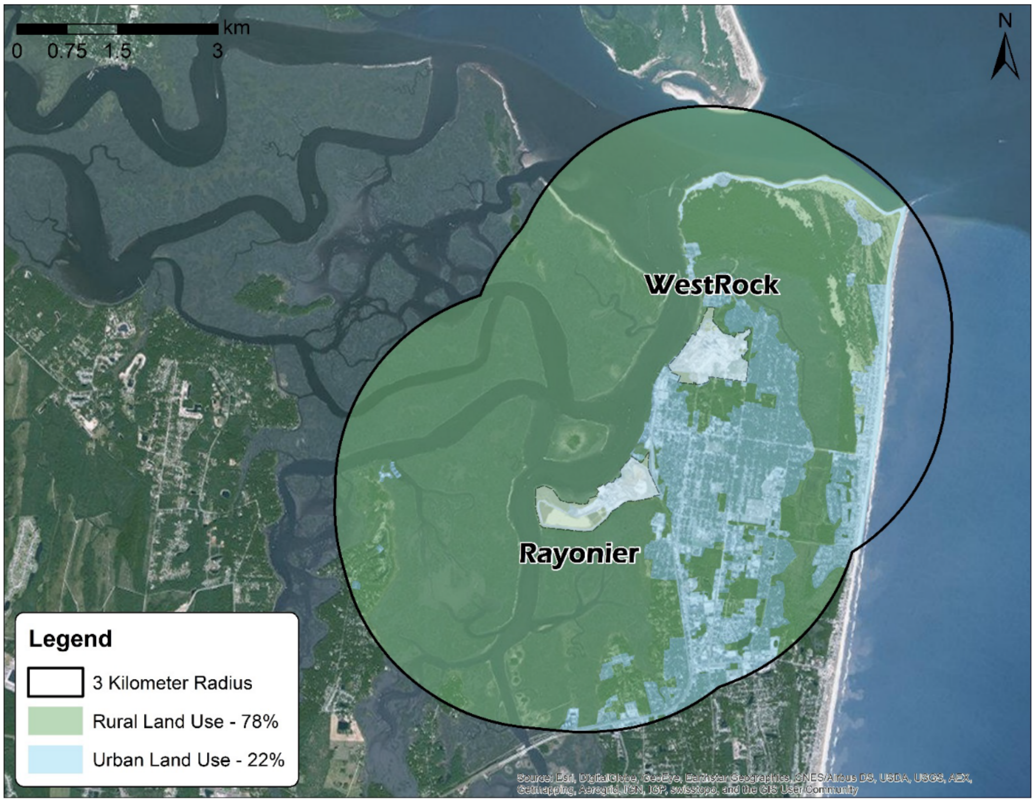
Location	Albedo	Bowen Ratio	Surface Roughness (z_0)
Craig Municipal Airport	0.15	0.51	0.114
WestRock	0.12	0.17	0.237

3.4. Rural/Urban Determination

AERMOD contains different dispersion coefficients for rural and urban settings. Appendix W outlines two methods for determining whether the area should be considered rural or urban. The Department chose the land-use classification approach employing Auer's method.[8] The Auer method requires an analysis of the land use within a 3-km radius around a facility to determine whether the majority of the land is classified as rural or urban. If more than fifty percent of the area consists of Auer land-use industrial, commercial, or residential land types, then urban dispersion coefficients are used in the model; otherwise, rural dispersion coefficients are used. As shown in **Figure 3** below, rural land use constitutes a majority (78%) of the 3-km radius around WestRock.

[8] Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, 17:636-643 (1978).

Figure 3: Land use classification around WestRock in Nassau County.



3.5. Terrain Elevations

Terrain elevations were determined using the AERMOD terrain preprocessor AERMAP v.11103. AERMAP extracted elevations and hill heights for all sources, buildings, and receptors from the United States Geological Survey (USGS) National Elevation Dataset (NED) with a 10 m horizontal resolution.

3.6. Receptor Placement

According to EPA's March 2011 Memo *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard* and reiterated in the Modeling TAD, it is expected that the distance from the source to the area of the maximum ground-level 1-hour impact of SO_2 will be approximately 10 times the source release height.[9] Based on this guidance, the Department developed a uniform method for receptor grid placement for all DRR sources in Florida. As a conservative approach, a dense grid of receptors was placed from the primary facility's tallest stack (if multiple stacks are the tallest, the most centrally located was chosen) to the greater of 20 times the

[9] Applicability of Appendix W Modeling Guidance for the 1-hr NO_2 National Ambient Air Quality Standard. Tyler Fox Memorandum dated June 28, 2010, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711, available at: http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf.

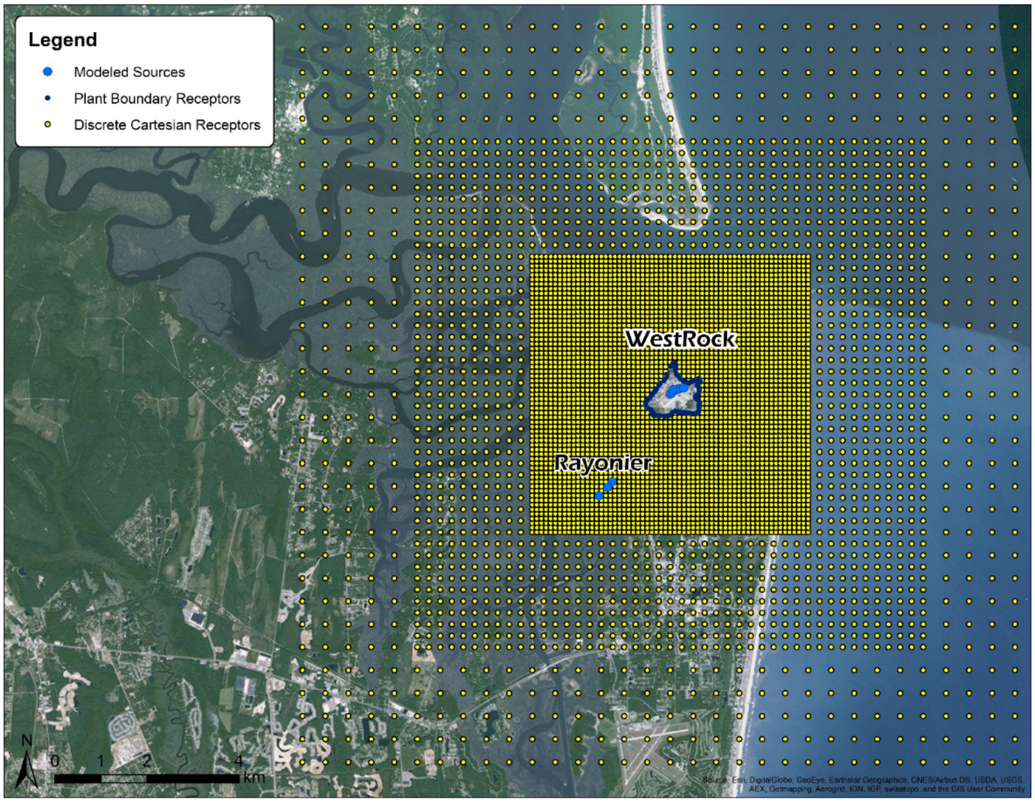
tallest stack height at the primary facility or 2500 m. Receptor density then decreased in 2500 m intervals. Receptors located within WestRock's fenceline were removed and receptors were placed with 50 m spacing along the fenceline. This grid placement was sufficient to fully resolve the maximum modeled concentrations in the Nassau County modeling demonstration.

The Modeling TAD describes a process for removing receptors placed in areas that it would not be feasible to place an actual monitor, such as bodies of water, that is unique to the DRR. The Department chose not to employ this process and instead included receptors in all areas of ambient air within 8 km of WestRock. The receptor grid used in the Nassau County DRR modeling demonstration is described below in **Table 4** and **Figure 4**.

Table 4: Nassau County DRR modeling demonstration receptor grid description.

Receptor Grid Parameter	**Value/Description**
Description of Unit at Grid Center	No. 7 Power Boiler
Unit UTM Zone	17N
Unit UTM Easting (m)	456,256.65
Unit UTM Northing (m)	3,394,391.51
Actual Stack Height (m)	104.44
Expected Distance to Max Concentration (m)	1,044
20 Times Stack Height (m)	2,089
100 m Receptor Spacing - Extent from the Origin (m)	3,000
250 m Receptor Spacing - Extent from the Origin (m)	5,500
500 m Receptor Spacing - Extent from the Origin (m)	8,000
Plant Boundary Receptor Spacing (m)	50
Total Receptors	5,718

Figure 4: Receptor grid placement for the Nassau County DRR modeling demonstration.



3.7. Building Downwash

Building downwash effects on emitted plumes were simulated using the Plume Rise Model Enhancements (PRIME) algorithm v.04274 in AERMOD. PRIME predicts concentrations in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the uncaptured primary plume, and reemitted to the far wake as a volume source. 42 structures onsite at WestRock and twelve structures at Rayonier were included in the downwash analysis. Direction-specific downwash parameters for all stacks at WestRock were calculated and input to AERMOD by EPA's Building Profile Input Program for PRIME (BPIPPRM).

3.8. Source Parameters and Emissions Data

The Department chose to use actual hourly emissions data to characterize every explicitly modeled source in Nassau County except for three units at WestRock. The hourly data for all units were requested from the facilities for the years 2012-2014 by the Department in July 2015. All data received were thoroughly checked for accuracy and representativeness. The hourly data were then included in the modeling demonstration using the AERMOD keyword HOUREMIS for the units that were characterized with actual emissions data. A variety of small, intermittent emissions sources including fire pumps and emergency generators at both facilities were not included because their emissions are not "continuous or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations."[10]

3.8.1. WestRock Modeled Units

SO_2 emissions from WestRock are mostly from a coal-fired power boiler, a carbonaceous fuel-fired power boiler, and two recovery boilers. Emissions from these units were characterized using actual hourly data. There are also two smelt dissolving tanks and a lime kiln that contribute a small amount of additional emissions. These units were characterized using their maximum permitted short-term emission rates. The previously mentioned nonattainment area plan involves a significant amount of work currently being done at the site to reduce SO_2 emissions under air construction permit 0890003-046-AC issued by the Department. Some of this work will not be completed until late 2017. Consequently, some of the lower emission limits imposed by this permit cannot be used in this demonstration because they will not be federally enforceable by January 13, 2017 as required by the DRR.

Traditional modeling demonstrations require the use of the calculated good engineering practice (GEP)[11] stack height for all sources in the model. The DRR is different in that the purpose is to replicate actual ambient concentrations of SO_2. As such, the use of actual stack heights for those stacks that exceed their calculated GEP height is permitted if the source is characterized using actual hourly emissions data.[12] The stack heights for all units at WestRock are less than or equal to the GEP height for each. A summary of the modeled stack parameters for WestRock is presented below in **Table 5**.

[10] *See* Modeling TAD, Section 5.5.
[11] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-450/4-80-023R, *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (June 1985).
[12] *See* Modeling TAD, Section 6.1.

Table 5: WestRock units' Nassau County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	SO_2 Emission Rate (lb/hr)
No. 4 Smelt Dissolving Tank	75.90	1.83	6.75	347.00	1.03
No. 5 Smelt Dissolving Tank	87.83	1.22	13.20	349.00	1.18
No. 4 Lime Kiln	30.63	1.52	23.00	466.00	21.00
No. 5 Recovery Boiler North Stack	87.98	2.74	15.20	495.00	0.22 lb/ton Black Liquor Solids [a] 266.9 lb/kgal Oil [b]
No. 5 Recovery Boiler South Stack	87.98	2.74	15.20	495.00	
No. 4 Recovery Boiler	76.30	3.51	15.40	501.00	
No. 7 Power Boiler	104.44	3.96	14.72	476.00	23.9 lb/ton Coal [c] 0.6 lb/MMscf Natural Gas [b] 142 lb/kgal Oil [b]
No. 5 Power Boiler	79.25	2.90	17.11	493.00	CEMS [d]

a. NCASI TB 1020
b. EPA AP-42
c. Stack Test Data
d. Several short instances of missing data were filled linearly using the bounding hours.

3.8.2. Rayonier Modeled Units

Rayonier is a unique chemical cellulose mill that has three SO_2-emitting units on site. The mill is subject to the previously mentioned nonattainment area plan and has fully implemented the required changes. Emissions from all three onsite sources are monitored by CEMS. Data from these CEMS from 2012-2014 were used to characterize Rayonier in the modeling demonstration. Actual stack heights are less than or equal to the calculated GEP stack height for all units. A summary of the modeled stack parameters for Rayonier is presented below in **Table 6**.

Table 6: Rayonier units' Nassau County DRR modeling parameters.

Unit Description	Stack Height (m)	Stack Diameter (m)	Exit Velocity [a] (m/s)	Exit Temp [a] (K)	SO_2 Emission Rate (lb/hr)
No. 6 Power Boiler	57.91	3.05	16.26	414.10	CEMS
Recovery Boiler	76.20	2.23	15.99	318.60	CEMS
Vent Gas Scrubber	54.86	1.52	5.64	299.70	CEMS
a. Values change annually based on latest stack test data.					

3.9. Background Concentrations

A set of background concentrations to account for all SO_2 sources not explicitly modeled was developed for each hour of the day by season from local monitoring data.[13] The data used were obtained from the Florida Air Monitoring and Assessment System (FAMAS) for monitoring station No. 12-089-0005 for the period January 2012 to December 2014. As shown in **Figure 2**, the monitor is just 2.5 km south of WestRock. In order to avoid double-counting the emissions from the explicitly modeled sources, Appendix W recommends filtering the data to remove measurements when the wind direction could transport pollutants from WestRock or Rayonier. In this case, any measurement recorded when the wind direction was from 263° to 62° was removed from the background calculation as shown in **Figure 5**. The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input to AERMOD with the BACKGRND SEASHR keyword. The final set of background concentrations is summarized in **Table 7**. As previously mentioned, **Figure 5** indicates that given the placement of the monitor between WestRock and JEA and Cedar Bay, during the 2012-2014 period there was essentially no measurable ambient SO_2 impact in the modeled area from these facilities.

[13] *See* Modeling TAD, Section 8.1

Figure 5: 2012-2014 average SO_2 concentrations by wind direction for monitor 12-107-1008.

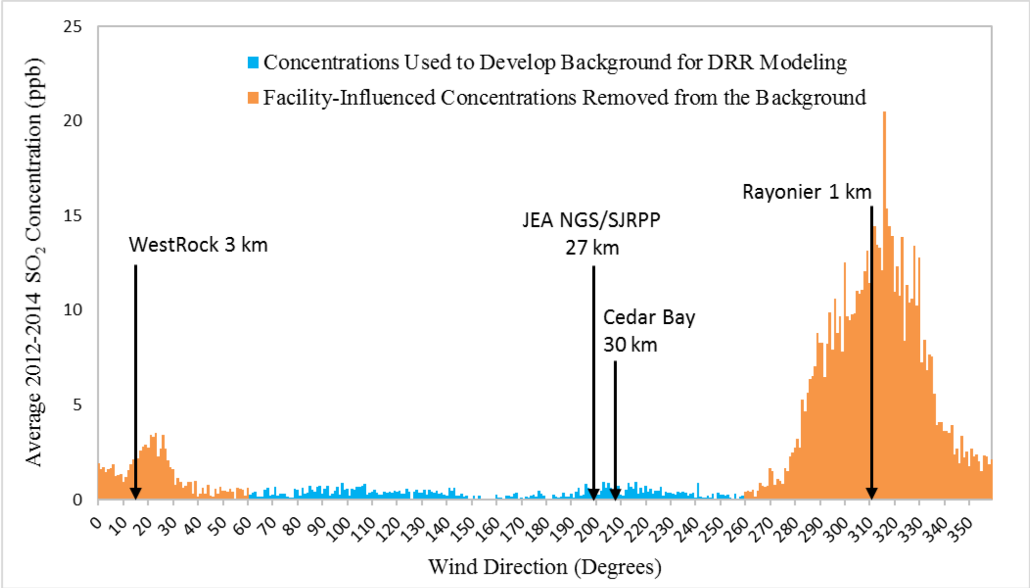


Table 7: 2012-2014 SO_2 background concentrations (ppb) by hour-of-day by season for the Nassau County DRR modeling demonstration.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	2.0	1.3	2.3	4.3	12:00	4.7	3.0	4.0	4.3
1:00	2.3	1.7	2.0	4.7	13:00	3.3	3.0	2.7	3.0
2:00	3.0	1.3	2.0	2.7	14:00	2.7	3.3	2.3	3.3
3:00	3.3	1.3	2.0	3.0	15:00	3.7	2.0	2.3	3.7
4:00	2.3	1.7	2.3	4.0	16:00	2.7	2.3	2.7	2.7
5:00	2.7	1.3	2.7	5.0	17:00	1.7	1.3	2.0	3.0
6:00	2.7	1.7	2.3	6.7	18:00	2.3	2.0	2.7	2.7
7:00	2.7	1.7	4.0	4.3	19:00	1.7	1.7	2.3	2.7
8:00	2.3	3.3	3.7	4.0	20:00	2.0	1.7	1.7	2.3
9:00	3.7	5.0	6.7	4.0	21:00	2.0	1.3	2.3	3.0
10:00	4.0	4.0	5.3	5.7	22:00	2.3	1.3	1.3	3.3
11:00	5.7	4.0	6.0	4.7	23:00	2.0	1.7	3.0	2.7

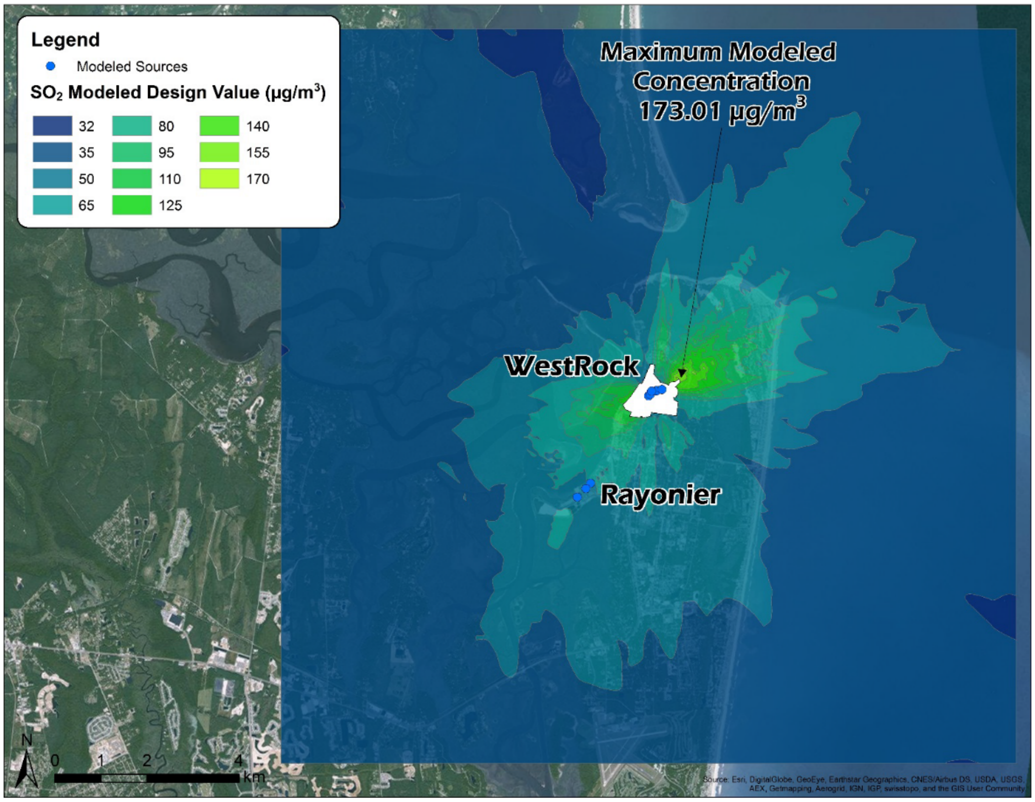
4. Modeling Summary and Results

The EPA-recommended dispersion model AERMOD was used to evaluate the area around WestRock's Mill in Nassau County, Florida in order to satisfy the requirements of the DRR. The model was run from 2012-2014 using actual emissions data and monitored background concentrations. The 99th percentile (4th high) daily maximum one-hour average concentration for each year at each receptor was averaged across all three years. The highest modeled design value at any receptor was then compared to the 2010 one-hour SO_2 NAAQS. The results summarized in **Table 8** and **Figure 6** indicate that Nassau County is in attainment of the SO_2 NAAQS.

Table 8: Maximum modeled SO_2 design value in the Nassau County DRR modeling demonstration.

UTM 17N Easting (m)	UTM 17N Northing (m)	Max Modeled Design Value (μg/m³)				1-Hour SO_2 NAAQS	Percent of NAAQS
		WestRock	Rayonier	Background	Total		
456,931.69	3,394,729.11	159.82	0.02	13.17	173.01	196.4	88.1%

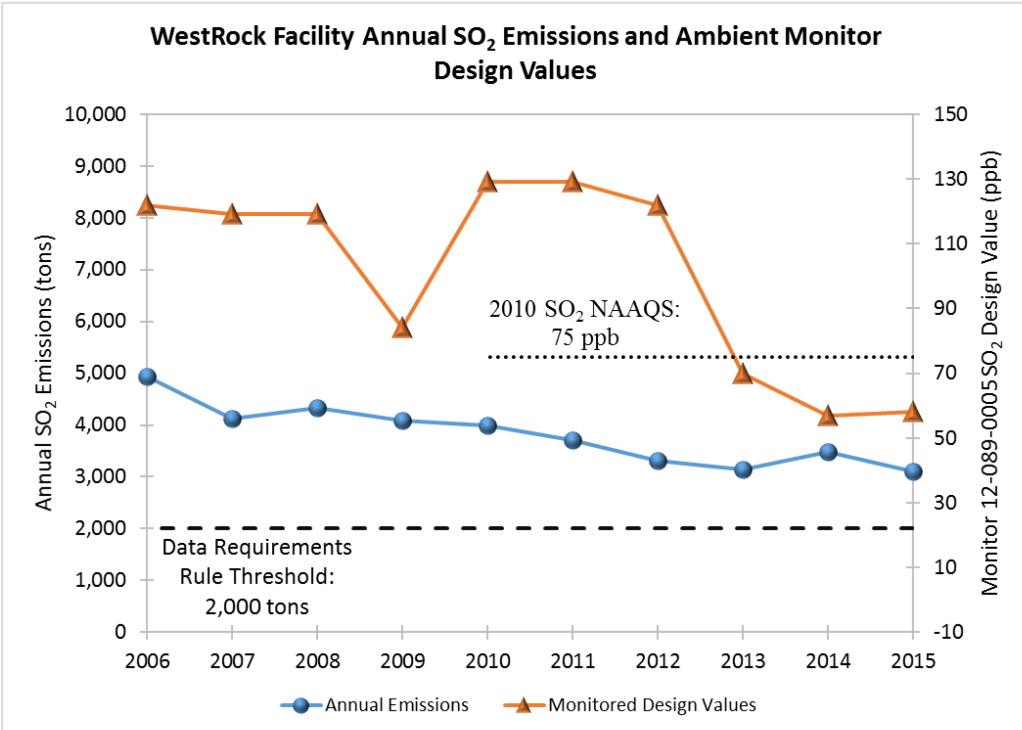
Figure 6: Modeled SO_2 design values in the Nassau County DRR modeling demonstration.



4.1. Continuing Review Obligations

The DRR modeling demonstration for Nassau County shows that the area is well within attainment of the 2010 SO_2 NAAQS, supporting the local ambient monitoring data. Under the DRR, the Department has a continuing obligation to review SO_2 emissions in the area annually for continued compliance with the NAAQS. It is expected that the ambient concentrations and emissions of SO_2 in Nassau County will continue to fall as they have for at least the past decade (**Figure 7**). 2015 emissions of SO_2 at WestRock were 11% less than in 2014. It is anticipated that the continued implementation of the Nassau County SO_2 nonattainment area plan through 2017 and the recently permitted construction of the LignoTech Facility at Rayonier (that will sequester much of Rayonier's sulfur into a commercial product) will result in further reductions of these lower levels of SO_2 emissions ensuring continued compliance with the NAAQS.

Figure 7: 2006-2015 WestRock SO_2 emissions and monitor 12-107-1008 SO_2 design values.



4. Air Quality Modeling Demonstration

4.1 Model Selection and Control Options

The AERMOD modeling system (including the terrain processor, AERMAP, and the meteorological data processor, AERMET) was used to analyze the impact of the modified facilities on the ambient SO_2 concentrations in the nonattainment area. Federally enforceable permit emission limits were used as model inputs. The modeling demonstration utilized the most current versions of the AERMOD models available at the time the modeling demonstration was performed. The model versions used are listed below in **Table 6**.

Table 6

Model Versions Used in the SO_2 Air Quality Modeling Attainment Demonstration	
Model	**Version**
AERMOD	14134
AERMET	14134
AERMAP	11103

A series of specific model features in AERMOD recommended by EPA, referred to as the regulatory options, were used in the modeling analysis.

4.2 Modeled Sources

This air quality modeling demonstration includes all SO_2-emitting sources for the Rayonier facility as well as the RockTenn facility, the only significant sources of SO_2 emissions within 25 km of the nonattainment area (**Figure 1**). A number of other sources in the area were considered for inclusion but were determined to not have a significant contribution to SO_2 levels in the nonattainment area based on monitoring data**.** These sources are accounted for in the added background concentration. Stack parameters and other source characteristics for Rayonier and RockTenn were obtained from the construction permits. **Table 7** and **Table 8** summarize the source parameters and SO_2 emission rates for all modeled point sources at the Rayonier and RockTenn facilities.

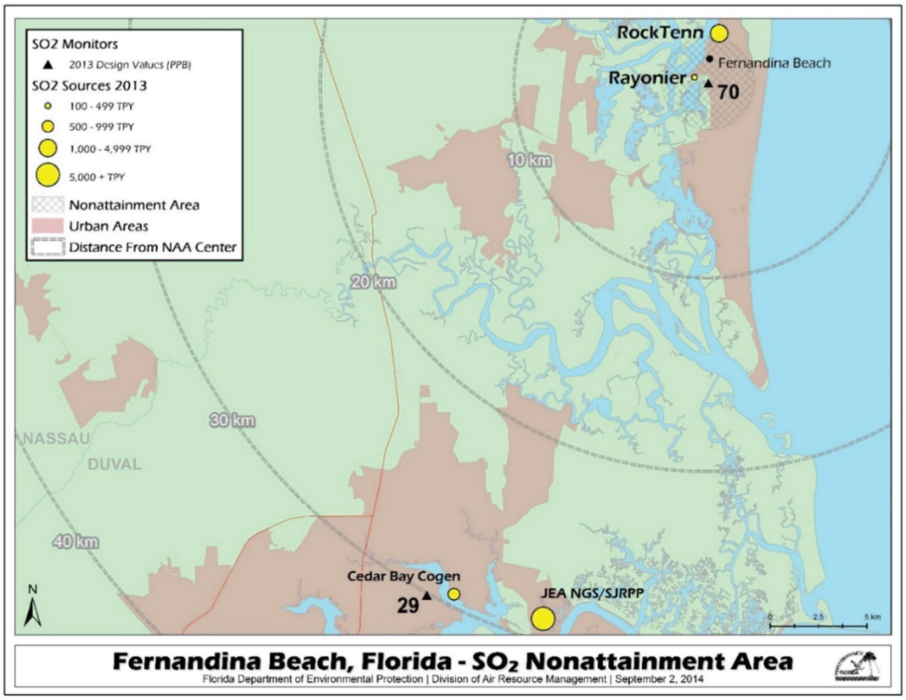


Figure 1. Nassau County, Florida SO_2 Nonattainment Area

Table 7

Fernandina Beach SO_2 Attainment Demonstration – Modeled SO_2 Emission Rates						
Source ID	**Type**	**Company**	**Description**	**EU ID**	**Modeled Emission Rate**	
					grams/second	**pounds/hour**
RAYVGS	Point	Rayonier	Vent Gas Scrubber	5	4.99	39.62
RAYRECB	Point	Rayonier	Sulfite Recovery Boiler	6	38.26	303.68
RAY6	Point	Rayonier	No. 6 Power Boiler	22	24.05	190.88
RTN6	Point	RockTenn	No. 5 Power Boiler	6	2.04	16.20
RTN15	Point	RockTenn	No.7 Power Boiler	15	156.09	1238.85
RTN7	Point	RockTenn	No. 4 Recovery Boiler	7	18.98	150.60
RTN11S	Point	RockTenn	No. 5 Recovery Boiler South Stack	11	9.47	75.15
RTN11N	Point	RockTenn	No. 5 Recovery Boiler North Stack	11	9.47	75.15
RTN21	Point	RockTenn	No. 4 Lime Kiln	21	2.65	21.00
4SDT	Point	RockTenn	No. 4 Smelt Dissolving Tank	13	0.13	1.03
5SDT	Point	RockTenn	No. 5 Smelt Dissolving Tank	14	0.15	1.18

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Table 8

Fernandina Beach SO_2 Attainment Demonstration – Modeled Source Parameters																
Source	Coordinates		Base Elevation		Flowrate		Diameter		Exit Velocity		Temperature		Stack Height	
	UTM_x (m)	UTM_y (m)	(ft)	(m)	(ft^3/min)	(m^3/sec)	(in)	(m)	(ft/sec)	(m/sec)	(F)	(K)	(ft)	(m)
RAYVGS	454,896.18	3,392,372.58	7.55	2.30	28,331.54	13.37	60.00	1.52	24.05	7.33	122.09	323.20	180.00	54.86
RAYRECB	454,709.49	3,392,187.40	9.32	2.84	144,004.78	67.89	88.00	2.23	56.82	17.32	113.99	318.70	250.00	76.20
RAY6	454,998.57	3,392,492.97	12.47	3.80	256,955.08	121.27	120.00	3.05	54.53	16.62	286.97	414.80	190.00	57.91
RTN6	456,293.23	3,394,423.21	12.99	3.96	238,739.02	112.70	114.00	2.90	56.14	17.11	427.73	493.00	260.00	79.25
RTN15	456,256.65	3,394,391.51	13.32	4.06	384,610.11	181.48	156.00	3.96	48.29	14.72	397.13	476.00	342.65	104.44
RTN7	456,320.64	3,394,493.25	14.67	4.47	314,878.19	148.59	138.00	3.51	50.52	15.40	442.13	501.00	250.33	76.30
RTN11S	456,430.12	3,394,501.18	15.85	4.83	190,350.84	89.82	108.00	2.74	49.87	15.20	431.33	495.00	288.65	87.98
RTN11N	456,441.28	3,394,514.19	15.85	4.83	190,350.84	89.82	108.00	2.74	49.87	15.20	431.33	495.00	288.65	87.98
RTN21	456,547.48	3,394,530.29	12.63	3.85	88,898.42	41.96	60.00	1.52	75.46	23.00	379.13	466.00	100.49	30.63
4SDT	456,320.58	3,394,479.65	14.67	4.47	37,569.24	17.73	72.00	1.83	22.15	6.75	164.93	347.00	249.00	75.90
5SDT	456,424.65	3,394,499.68	15.85	4.83	32,652.78	15.41	48.00	1.22	43.31	13.20	168.53	349.00	288.16	87.83

4.3 Modeled Emission Rate Averaging Times

If a compliance averaging time for a SIP emission limit is longer than the averaging time for the applicable NAAQS (here, one hour), EPA guidance provides a method of calculating an "equivalent" longer-term emission limit where appropriate.[5] The method involves finding the "critical emission value" – the emission rate at which the model would predict ambient SO_2 concentrations at the level of the one-hour SO_2 NAAQS – then adjusting this rate downward so as to achieve a comparable stringency to the modeled one-hour average emission limit. The premise of this approach is that a lower limit will sufficiently constrain the frequency and magnitude of occasional high emission rates within the chosen longer-term averaging period. The adjustment method suggested by EPA is to scale the longer-term average emission limit by the ratio of each source's historic 99^{th} percentile one-hour average emission rate to its 99^{th} percentile longer-term average emission rate. Further, the guidance states that ". . . if the new emission limit requires more stringent emission control than is currently in place at a source, the analyses should be designed, to the extent practicable, to reflect the hourly emissions variability that can be expected once the emission limit is in place." With specific regard to RockTenn's Recovery Boilers No. 4 and No. 5, compliance with the new emissions limits will require the exclusive use of ultra-low sulfur diesel (ULSD), with a maximum sulfur content of 15 parts per million (0.0015 percent), as a fuel oil. The facility is allowed by permit to burn ULSD, and the use of ULSD was used in determining the critical emissions values for Recovery Boilers No. 4 and No. 5.[6]

This analysis along with an overall analysis of each unit's emissions variability was completed for both facilities and is summarized in **Table 9**. Based on this analysis, consistent with EPA's Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, DEP has adjusted both

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[5] Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. *http://www.epa.gov/ttn/oarpg/t1pgm.html*

[6] As noted in the "Materials to be Incorporated into the SIP" section of this submittal, effective January 1, 2018, fuel oil usage at Recovery Boilers No. 4 and No. 5 will be limited to ULSD.

Rayonier's and RockTenn's 1-hour modeled emission rates in **Table 7** down to the "equivalent" longer-term compliance average emission limits given in **Table 4** and **Table 5**. For reference, **Table 10** provides a summary of this adjustment calculation.

Table 9

Source Emission Rate Variability Analysis				
Company	Source	99th Percentile Rate (grams/sec)		Ratio
		1-Hr Average	3-Hr Average	3-Hr/1-Hr
Rayonier	Vent Gas Scrubber*	3.56	2.27	0.639
Rayonier	Sulfite Recovery Boiler*	37.17	36.36	0.978
Rayonier	No. 6 Power Boiler*	6.96	6.56	0.943
RockTenn	No. 5 Power Boiler^	55.07	51.00	0.926
RockTenn	No. 7 Power Boiler`	106.83	105.64	0.989
RockTenn	No. 4 Recovery Boiler`	1.99	1.99	0.999
RockTenn	No. 5 Recovery Boiler`	2.06	2.05	0.998

*Calculations based on CEMS data from 1/1/2010 – 12/31/2012.
^Calculations based on CEMS data from 1/1/2010 – 10/14/2013.
`Calculations based on calculated emission rates from 1/1/2010 – 10/14/2013.
See Appendix B

Table 10

Derivation of Compliance Emission Limits					
Source	Modeled Emissions Rate (lb/hr)	Averaging Time Adjustment Factor	Based on:	Compliance (Permitted) Limit (lb/hr)	Averaging Time
Rayonier					
Vent Gas Scrubber	39.62	0.639	hourly CEMS	25.3	3-hour
Sulfite Recovery Boiler	303.68	0.978	hourly CEMS	297	3-hour
No. 6 Power Boiler	190.88	0.943	hourly CEMS	180	3-hour
Rock Tenn					
No. 5 Power Boiler	16.2	0.926	hourly CEMS	15	3-hour
No. 7 Power Boiler	1238.85	0.989	hourly fuel use and emis. Factor	1225.25	3-hour
No. 4 Recovery Boiler	150.6	0.999	hourly fuel use and emis. Factor	150	3-hour
No. 5 Recovery Boiler	150.3	0.998	hourly fuel use and emis. Factor	150	3-hour
2-unit cap	300.9	0.997	hourly fuel use and emis. Factor	300	3-hour

Note: Compliance emission limits are less than or equal to the modeled rate x adjustment factor.

4.4 Meteorological Data Selection

The AERMET meteorological data used for this analysis consisted of a continuous five-year period of hourly surface weather observations and twice-daily upper air soundings from the Jacksonville National Weather Service Office at Jacksonville International Airport; the nearest surface weather observing station with a complete five-year dataset.[7] The five-year period of meteorological data was from 2008 through 2012. This meteorological data set was compiled by

[7] Although there are some meteorological data available from a location in Fernandina Beach, DEP elected not to utilize these data in its analysis for a number of reasons. Data prior to 2011 are not available from this location, and one-minute data are not available. The Jacksonville International airport data are the only complete available data representative of the Fernandina Beach area.

DEP and processed using AERMINUTE in order to reduce the number of calms and missing winds in the surface data. EPA has established criteria for the use of meteorological data for modeling purposes that states that meteorological data should be 90% complete on a quarterly basis before any substitutions are made.8 The 2008-2012 dataset satisfies the 90% completeness requirement.

4.5 Surface Characteristics

Prior to running AERMET, it is necessary to specify the surface characteristics of the location being modeled. For this task, DEP used the AERMET preprocessor AERSURFACE. AERSUFACE utilized the 1992 National Land Cover Dataset (NLCD) for Florida to extract surface characteristics for a one-kilometer radius area around both the Jacksonville International Airport and the nonattainment area. Surface characteristics were computed monthly and surface roughness was varied over 12 sectors. The resulting average surface characteristics are summarized in **Table 11**. The values at both sites are very similar. In addition, the airport is just 28 kilometers southwest of the nonattainment area, the land in between is generally flat, and both areas have similar rural topography. Based on this analysis, the Jacksonville International Airport surface dataset was considered to be representative of the domain for this modeling demonstration.

Table 11

Average Surface Characteristics Computed by AERSURFACE			
Location	**Albedo**	**Bowen Ratio**	**Surface Roughness (z_o)**
Jacksonville International Airport	0.14	0.44	0.058
Fernandina Beach SO_2 Nonattainment Area	0.13	0.21	0.321

4.6 Land Use Classification

Land-use classification was determined using Auer's[9] method and confirmed with population density data. The Auer method requires an analysis of the land use within a three-kilometer radius around a facility to determine if the majority of the land can be classified as either rural or urban. If more than fifty percent of the area consists of Auer land-use industrial, commercial, or residential land types, then urban dispersion coefficients are used in modeling; otherwise, rural dispersion coefficients are used. As shown in **Figure 2** below, rural land use constitutes a majority (80%) of the combined three-kilometer radii around each facility. According to the U.S. Census Bureau, the population density of the city of Fernandina Beach was approximately 408 people/km^2 in 2013 which is below the EPA suggested urban threshold of 750 people/km^2. Based on this analysis, the rural dispersion coefficients were used in AERMOD.[10]

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[8] Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, EPA-454/R-99-005, *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* (February 2000).
[9] Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies". Journal of Applied Meteorology, 17:636-643, 1978.
[10] State & County QuickFacts, United States Census Bureau. *http://quickfacts.census.gov/qfd/states/12/1222175.html*

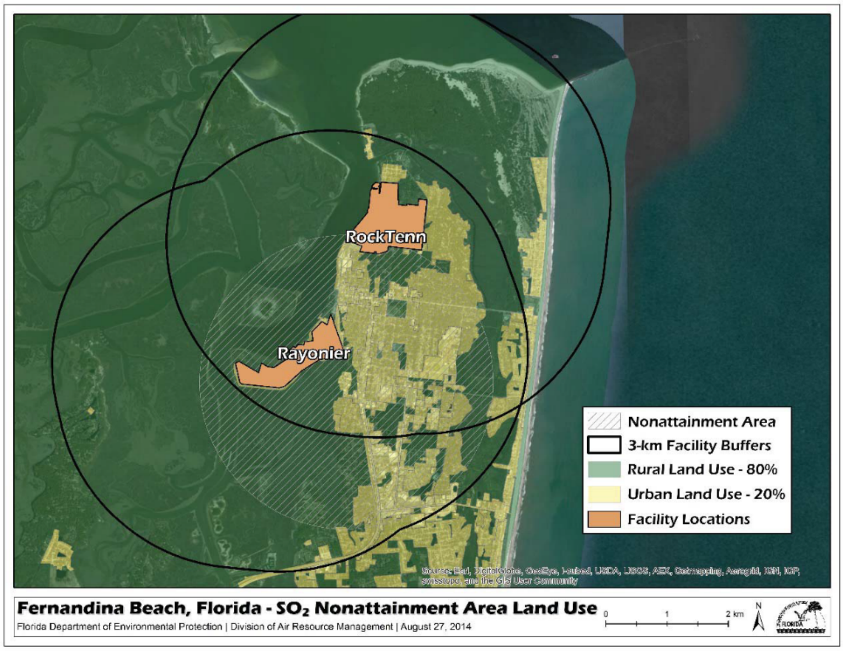

Figure 2. Nassau County, Florida – SO_2 Nonattainment Area Land Use

4.7 Terrain Data

Terrain elevations were incorporated into the modeling using AERMAP. For this modeling exercise, terrain data were extracted from National Elevation Dataset (NED) GeoTIFF files with a 1/3 arcsecond (~10m) grid spacing that were produced by the United States Geological Survey (USGS).

4.8 Building Downwash

For this air quality modeling demonstration, the EPA-approved Plume Rise Model Enhancements (PRIME) algorithm was utilized to determine the direction-specific building downwash parameters. Concentrations were predicted in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the uncaptured primary plume, and reemitted to the far wake as a volume source. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with the project all satisfied the GEP stack height criteria. Modeled building parameters are available upon request.

4.9 Receptor Grid

A discrete Cartesian grid of 2,329 receptors with 100 meter spacing (50 meters along property boundaries) was used. The grid encompasses the entire nonattainment area, except facility property, extending up to 2.4 kilometers away from the nonattainment monitor in all directions as depicted in **Figure 3**. The RockTenn facility property boundary is completely fenced on the north, south, and east sides, and is bounded on the west by a secured frontage on the Amelia River, precluding the general public from accessing the facility. The Rayonier facility property boundary is comprised of fencing and natural barriers such as wetlands and dikes that preclude public access. A large area of adjacent Rayonier-owned property to the south of the facility was modeled as ambient air due to a lack of physical boundaries to prevent public access to the property.

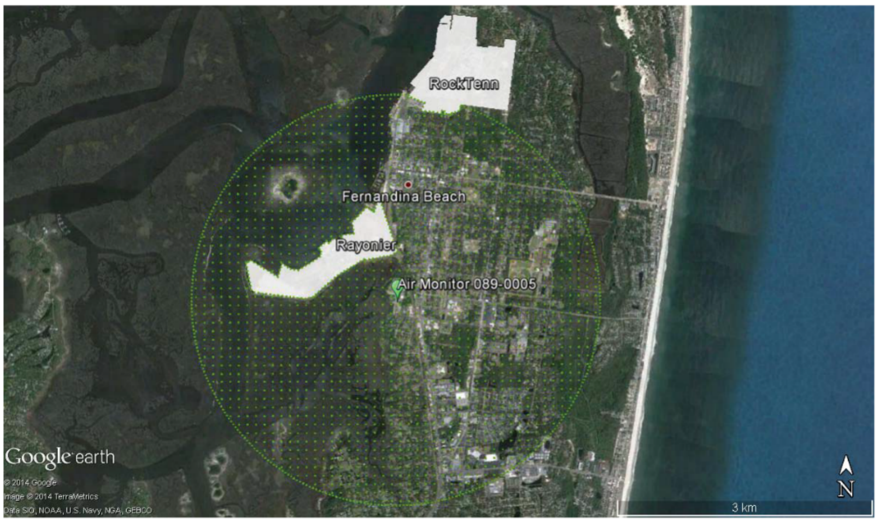

Figure 3. Nassau County, Florida Nonattainment Area Receptor Grid

4.10 Background Concentration

A set of background concentrations to account for all SO_2 sources not explicitly modeled was developed for each hour of the day by season from local monitoring data. The procedure followed is outlined in EPA's SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document.[11] The data used were obtained from the Florida Air Monitoring and Assessment System (FAMAS) from monitoring station No. 12-089-0005 for the period January 2012 to December 2013. Due to a significant, multi-year decline in monitored SO_2 concentrations at this site – illustrated in **Table 12** – only the most recent two years of data were used rather than the recommended three years.

[11] SO_2 National Ambient Air Quality Standards Designations Modeling Technical Assistance Document. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. *http://epa.gov/airquality/sulfurdioxide/pdfs!S02ModelingTAD.pdf*

Table 12

2003 – 2014 Monitored SO_2 Design Values for Monitor ID: 12-089-0005-42401-1																
Year	Ranked 1-hr Averages				Ranked 3-hr Averages				Ranked 24-hr Averages				Annual Average	99th Percentile		Design Value
	1st		2nd		1st		2nd		1st		2nd			Complete	Valid	
2003	204	(04/22)	150	(05/12)	171	(04/22:21)	137	(05/12:21)	42	(04/22)	30	(05/12)	3.3	115	115	135
2004	103	(04/27)	97	(04/04)	75	(04/04:18)	67	(03/17:09)	30	(03/17)	30	(04/01)	3.0*	91*	91*	128*
2005	173	(04/13)	132	(02/12)	90	(04/13:18)	73	(02/12:00)	41	(09/13)	34	(02/11)	3.9*	98*	98*	101*
2006	278	(03/03)	273	(03/25)	157	(03/25:18)	149	(03/03:15)	63	(03/03)	40	(03/25)	4.5	176	176	122
2007	203	(03/22)	101	(03/04)	102	(03/22:21)	60	(03/04:06)	28	(03/04)	27	(01/25)	3.9	82	82	119
2008	146	(12/12)	100	(01/13)	83	(12/12:18)	79	(01/13:21)	30	(01/14)	28	(01/01)	3.3*	98*	98*	119*
2009	145	(03/02)	121	(09/29)	52	(03/03:00)	49	(09/29:18)	22	(12/20)	21	(12/26)	2.2	73	73	84
2010	345	(01/12)	344	(02/13)	317	(02/13:18)	159	(02/16:03)	68	(02/13)	58	(02/16)	4.3	216	216	129
2011	194	(01/12)	100	(02/13)	80	(10/28:06)	74	(06/01:06)	31	(01/12)	24	(11/10)	3.4	97	97	129
2012	117	(01/03)	88	(01/18)	58	(01/18:21)	56	(01/03:06)	23	(10/28)	19	(01/03)	2.1	54	54	122
2013	76	(05/24)	70	(02/01)	64	(05/24:12)	58	(02/01:18)	20	(05/24)	14	(01/21)	0.9	60	60	70
2014	48	(06/28)	40	(01/22)	28	(01/22:00)	26	(01/12:03)	13	(03/30)	12	(01/22)	2.2*	36*	36*	50*
* DEP anticipates that the complete design value for 2012-2014 will be available at the end of calendar year 2014.																

As shown in **Figure 3**, the monitor is approximately 0.9 km to the southeast of Rayonier and is also the nonattainment monitor. Due to its close proximity to the Rayonier facility, monitored concentrations at this station are strongly influenced by facility emissions as illustrated in **Figure 4**. The RockTenn facility is just 2.5 km to the north of the monitor and has a significant impact on recorded concentrations as well. As a result, the data were filtered to remove measurements where the wind direction could transport pollutants from either Rayonier or RockTenn to the station.[12] More specifically, the data were filtered to remove measurements where the hourly wind direction was in the range of 263° to 61° as shown in **Figure 5**. The 99^{th} percentile concentration for each hour by season was then averaged across the two years and the resulting array was input to AERMOD with the BACKGRND SEASHR keyword. The final set of background concentrations is summarized in **Table 13**.

[12] This is a common practice used for developing background concentrations. Details of the procedures are outlined in 40 CFR Part 51 Appendix W – EPA's *Guideline on Air Quality Models*.

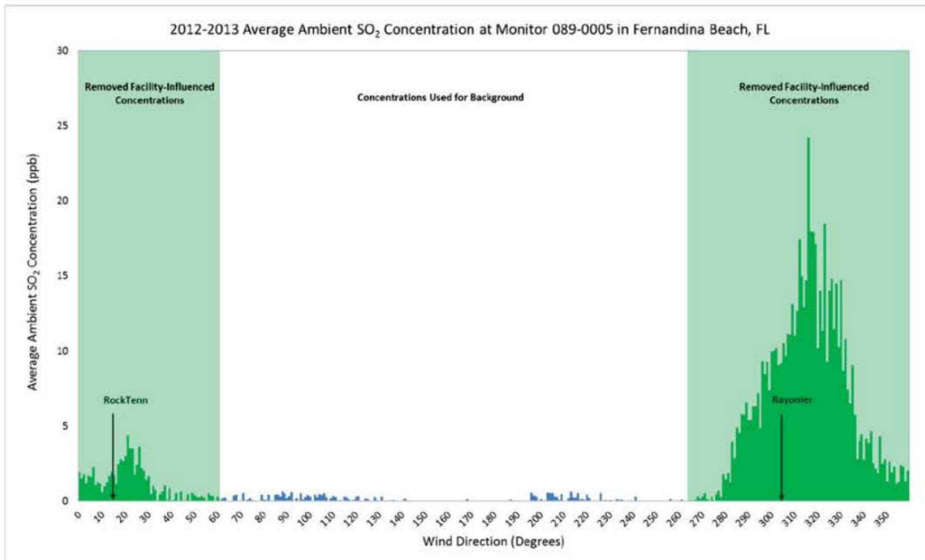

Figure 4. 2012-2013 Average Ambient SO_2 Concentration by Wind Direction at Monitor 089-005 in Fernandina Beach, Florida

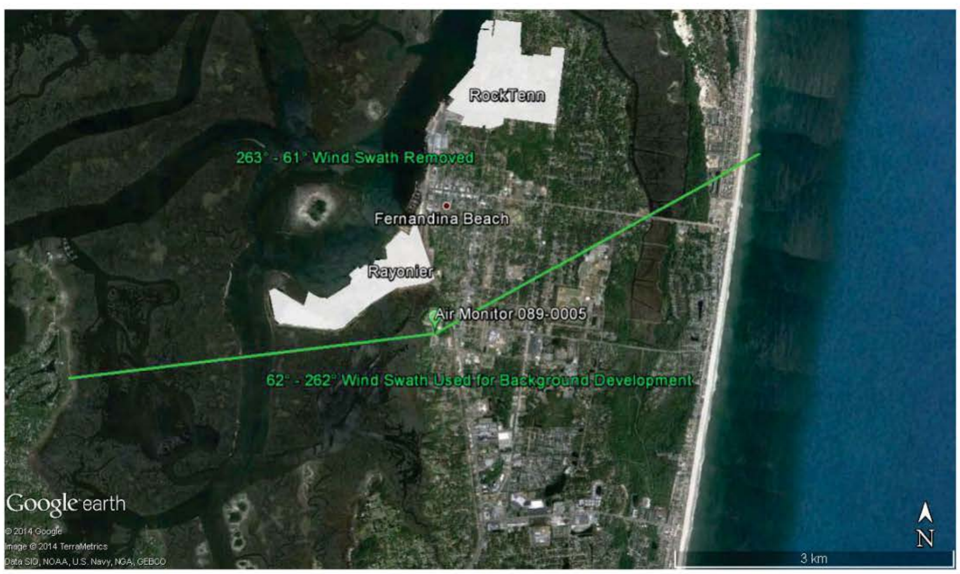

Figure 5. Data filtered to remove measurements where the hourly wind direction was in the range of 263° to 61°.

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Table 13

SO₂ Background Concentrations by Hour-of-Day by Season for Monitor 089-0005 (ppb)									
Hour	Winter	Spring	Summer	Fall	Hour	Winter	Spring	Summer	Fall
0:00	2.0	1.0	2.0	4.5	12:00	4.0	3.0	3.0	3.0
1:00	2.0	1.0	1.0	3.5	13:00	3.0	3.0	2.0	2.0
2:00	3.0	1.0	1.5	2.5	14:00	2.5	3.5	2.0	2.5
3:00	2.5	1.0	1.5	1.5	15:00	2.5	2.0	2.0	2.5
4:00	2.5	1.0	1.5	2.5	16:00	2.0	1.5	2.5	2.5
5:00	2.0	1.5	2.5	4.5	17:00	1.0	1.0	1.5	3.0
6:00	3.0	1.5	2.0	4.0	18:00	2.0	2.0	3.0	2.5
7:00	2.0	1.5	3.0	4.5	19:00	1.0	1.5	1.5	2.5
8:00	2.0	1.5	3.5	5.0	20:00	1.0	1.5	1.0	1.5
9:00	4.0	2.0	7.5	4.5	21:00	2.0	1.0	1.0	3.0
10:00	4.5	4.0	6.0	4.5	22:00	1.0	1.0	1.0	3.5
11:00	6.0	2.5	6.0	4.5	23:00	1.5	1.5	3.0	2.5

4.11 Summary of Modeling Results

The EPA-recommended dispersion model AERMOD was used to evaluate the impact of the modified facilities on the ambient SO_2 values within the nonattainment area. The model was run from 2008-2012 and the 99th percentile (4th high) maximum daily one-hour average concentration for each year at each receptor was averaged across all five years.

As detailed previously, DEP established individual emission limits for most emission sources at Rayonier and RockTenn. However, a two-unit emissions cap was developed for RockTenn's two recovery boilers in order to provide the facility with increased operational flexibility while simultaneously reducing SO_2 emissions from these two units. To ensure protection of the NAAQS, DEP identified the worst case scenario of emissions distributions from these two units by performing three distinct modeling scenarios: the entire emissions cap emitted from the No. 4 Recovery Boiler, the entire emissions cap emitted from the No. 5 Recovery Boiler, and the emissions cap distributed equally between the two units. Each of these scenarios was modeled with all other parameters remaining the same. The maximum predicted impact from each of the three model runs is summarized in **Table 14**.

Table 14

Maximum Modeled SO_2 Impact in Nonattainment Area (µg/m³)							
Model Scenario	Averaging Time	Max Predicted Impact		Background	Total Impact	SO_2 1-Hour NAAQS	Greater Than NAAQS?
		Rayonier	RockTenn				
Unmodified	1-Hour	0.00*	2,957.80	4.19	2,961.99	196.4	Yes
Equal Cap Distribution	1-Hour	114.45	67.69	10.72	192.87	196.4	No
Entire Cap – No. 4 RB	1-Hour	110.93	71.56	9.16	191.65	196.4	No
Entire Cap – No. 5 RB	1-Hour	117.51	63.79	12.82	194.11	196.4	No

*The area of maximum impact contains no contribution from Rayonier at the time of the predicted maximum impact.

Due to the close proximity of the RockTenn recovery boiler stacks and their distance from the nonattainment area, it was determined that modeled compliance is maintained regardless of the distribution of the emissions cap between these units. **Figure 6** presents the maximum of the five-year average of 99th percentile maximum daily concentrations at each receptor in the nonattainment area for the equal cap distribution scenario – the scenario most representative of day-to-day operations. The area of highest concentration is found adjacent to the southwest corner of the Rayonier facility, on Rayonier-owned property, where emissions from sources at both facilities align. Under the scenario where the entire cap is shifted to the No. 5 Recovery Boiler, the area of maximum concentration occurs north of Rayonier near the RockTenn facility.[13]

In accordance with EPA's Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, (April 2014), DEP modeled a suitable network of receptors representing the entire nonattainment area and included the sources both inside and outside the nonattainment area that were significant contributors to elevated SO_2 levels in the area.[14] As shown, the modeling results predict no violations of the revised SO_2 NAAQS within the nonattainment area. For comparison, **Figure 7** shows a plot of the pre-modification potential emissions in the area on the same scale as **Figure 6** indicating a decrease in modeled ambient SO_2 concentrations of more than 90%.

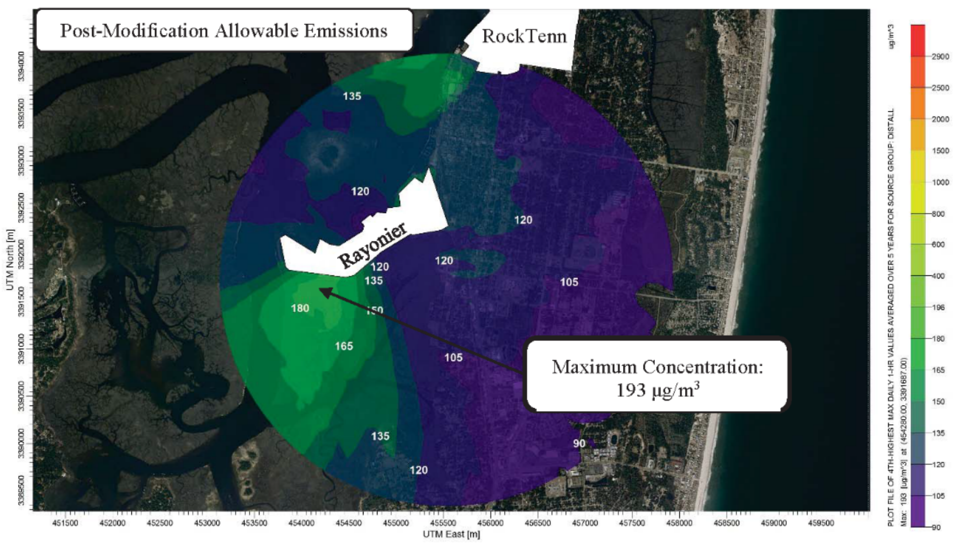

Figure 6. Post-Modification Modeling Maximum Allowable SO_2 Emissions

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[13] A secondary maximum is located near the edge of the modeled area. DEP notes that EPA's proposed Data Requirements Rule (79 FR 27446) sets forth a regulatory process to address modeled SO_2 concentrations outside of designated nonattainment areas.

[14] "The modeling for the attainment demonstration should include results for a suitable network of receptors representing the entire nonattainment area, and should exhibit modeling showing attainment of the NAAQS for the entire area by the statutory attainment date." Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions (April 2014), Section V.C. Attainment Demonstration, p. 12. "The modeling domain should at a minimum encompass the nonattainment area and include the sources thought most likely to cause or contribute to NAAQS violations in and around the nonattainment area." Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions (April 2014), Appendix A, Section 5. Modeling Domain, p. A-7.

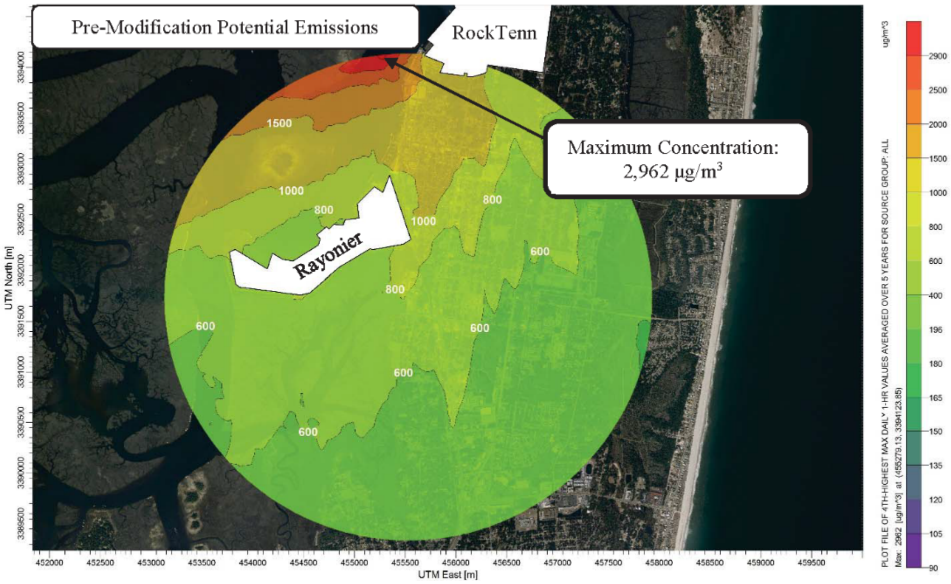

Figure 7. Pre-Modification Modeling Maximum Allowable SO_2 Emissions

5. Conformity

CAA Section 176(c) requires that federal actions not cause or worsen air quality violations or delay attainment of a relevant NAAQS. This General Conformity Rule applies to any federal action within a nonattainment or maintenance area. Florida seeks through this SIP submittal approval of the state's nonattainment area plan for Nassau County, in the form of federally-enforceable air permit conditions addressing SO_2 emissions from two facilities, as detailed above. EPA's approval of this SIP will not cause or contribute to a violation of any NAAQS. On the contrary, EPA's approval of this SIP will provide assurance that the Nassau County nonattainment area attains the standard as expeditiously as practicable.

6. Reasonable Further Progress

Reasonable further progress (RFP) generally applies to regional air pollutants that are emitted by numerous sources where the relationship between these sources and pollutant concentrations is indirect and/or poorly understood. EPA has stated that the RFP concept is less applicable to SO_2, as SO_2 is a localized pollutant with limited sources.[15] Data from the reference monitor for the Nassau County nonattainment area already show that the area is in compliance with the revised SO_2 standard. As previously mentioned, Rayonier has completed its SO_2 reduction project, and RockTenn is on a strict compliance schedule, as detailed in the construction permit attached to this SIP revision, which will ensure continued attainment of the revised SO_2 standard. By

[15] SO_2 Guideline Document. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.