Technical Support Document:

Chapter 9
Final Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for Florida

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS) (2010 SO_2 NAAQS). Our Notice of Availability (NOA)[1] and our Technical Support Document (TSD)[2] for our intended designations for the round of designations we are required to complete by December 31, 2017, provided background on the relevant CAA definitions and the history of the designations for this NAAQS. Chapter 1 of this TSD for the final designations explains the definitions we are applying in the final designations. The TSD for the intended Round 3 area designations also described Florida's recommended designations, assessed the available relevant monitoring, modeling, and any other information, and provided our intended designations.

This TSD for the final Round 3 area designations for Florida addresses any change in Florida's recommended designations since we communicated our intended designations for areas in Florida. It also provides our assessment of additional relevant information that was submitted too close to the signature of the NOA to have been considered in our intended designations, or that has been submitted by Florida or other parties since the publication of the NOA. This TSD does not repeat information contained in the TSD for our intended designations except as needed to explain our assessment of the newer information and to make clear the final action we are taking and its basis, but that information is incorporated as part of our final designations. If our assessment of the information already considered in our TSD for our intended designations has changed based on new information and we are finalizing a designation based on such change in our assessment, this TSD also explains that change. For areas of Florida, not explicitly addressed in this chapter, we are finalizing the designations described in our 120-day letters and the TSD for the intended Round 3 area designations. All the final designations are listed in Table 1 below.

Florida responded to the EPA's August 22, 2017, intended designations for the 2010 SO_2 NAAQS by providing additional information, including alternative recommendations from the State, on October 20, 2017.

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[1] EPA Responses to Certain State Designation Recommendations for the 2010 Sulfur Dioxide Primary National Ambient Air Quality Standard: Notification of Availability and Public Comment Period, September 5, 2017 (82 FR 41903)

[2] Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard Technical Support Document, August 2017. https://www.epa.gov/sulfur-dioxide-designations/initial-technical-support-documents-area-designations-round-3

Additionally, on October 5, 2017, the Sierra Club submitted air quality modeling for the Citrus County Area. All of the additional information received by the EPA was reviewed and is discussed in the relevant sections below.

For the areas in Florida that are part of the Round 3 designations process, Table 1 identifies the EPA's final designations and the counties or portions of counties to which they apply. It also lists Florida's current recommendations. The EPA's final designations for these areas are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Summary of the EPA's Final Designations and the Designation Recommendations by Florida

Area/County	Florida's Recommended Area Definition	Florida's Recommended Designation	The EPA's Intended Designation	The EPA's Final Area Definition	The EPA's Final Designation[3]
Citrus County	None	Attainment or Unclassifiable	Nonattainment	Citrus County (p)[4]	Unclassifiable
Duval County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Duval County	Attainment/ Unclassifiable
Escambia County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Escambia County	Attainment/ Unclassifiable
Hamilton County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Hamilton County	Attainment/ Unclassifiable
Hillsborough-Polk County	None	Attainment or Unclassifiable	Nonattainment	Hillsborough County (p); Polk County (p)	Nonattainment
Mulberry	None	Attainment or Unclassifiable	Unclassifiable	Hillsborough County (p); Polk County (p)	Unclassifiable
Nassau County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Nassau County (p)	Attainment/ Unclassifiable
Orange County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Orange County	Attainment/ Unclassifiable
Putnam County	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Putnam County	Attainment/ Unclassifiable
Remaining Undesignated Areas to Be Designated in this Action*	None	Attainment or Unclassifiable	Unclassifiable/ Attainment	Rest of State	Attainment/ Unclassifiable

* The EPA is designating the remaining undesignated counties (or portions of counties) in Florida as "attainment/unclassifiable." These areas that we are designating as attainment/unclassifiable (those to which this row of this table is applicable) are identified more specifically in Section 12 of Chapter 9 (addressing Florida) of the TSD for our intended designations.

[3] Refer to Chapter 1 of Technical Support Document: Final Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for definitions of the designation categories and the terminology change from Unclassifiable/Attainment to Attainment/Unclassifiable.

[4] (p) = partial county designation.

2. Technical Analysis of New Information for the Citrus County Area

2.1. Introduction

The EPA must designate the Citrus County area by December 31, 2017, because the area has not been previously designated and Florida has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Citrus County.

On October 20, 2017, Florida responded to the EPA's August 22, 2017, intended designations for the 2010 SO_2 NAAQS by providing additional information, including updated modeling for the Citrus County Area. In response to additional questions from the EPA regarding the receptor grid used in the modeling submitted on October 20, 2017, Florida provided revised modeling on November 2, 2017[5]. The details regarding Florida's revised modeling are provided in Section 2.4.2.4 of Chapter 9 of this Final TSD. Additionally, on December 14, 2017, Florida submitted a certified report indicating that air quality monitoring data for the period January 1 through December 9, 2017 had a fourth highest value of 37 ppb.

2.2. Summary of Information Reviewed in the TSD for the Intended Round 3 Area Designations

In the 120-day letter notification to the governor of Florida, and further explained in Chapter 9 of the TSD for the intended Round 3 area designations, the EPA proposed a designation of nonattainment based on all available information, including modeling information and all relevant monitoring information.

The following Table 1 identifies all the modeling assessments evaluated for the 120-day letters and discussed in the TSD for the intended Round 3 area designations. Additional details can be found in the TSD for the Intended Round 3 Area Designations, Chapter 9.

[5] Email from Brian Himes, Florida Department of Environmental Protection, to Rick Gillam, U.S. EPA Region 4, dated November 2, 2017, transmitting revised modeling documentation.

Table 1 – Modeling Assessments Evaluated in the TSD for the Intended Designation for the Citrus County Area

Organization Submitting Assessment	Date of the Assessment	Identifier used in the TSD for the Intended Round 3 Area Designations, Chapter 9	Distinguishing or Otherwise Key Features
Florida	1/13/2017	Citrus County Modeling Report	Report
Florida	6/30/2016	Florida Modeling Protocol	Protocol

The EPA considered all available information for the Citrus County area, including ambient air monitoring data collected by the Crystal River Preserve SO_2 monitor (AQS ID: 12-017-0006) and the modeling assessment provided by the State. Data collected by the Crystal River Preserve SO_2 monitor is comparable to the 2010 SO_2 NAAQS. The most recent three calendar years of complete, quality-assured, certified data from this monitor (2014-2016) indicate a violating 1-hr SO_2 design value of 81 parts per billion (ppb). The monitor is located 3.4 miles east of Crystal River Power Plant (CRPP). The monitor has not been demonstrated to be located to characterize the maximum 1-hour SO_2 concentrations near CRPP or the area. Prior to the EPA announcing intended designations on August 22, 2017, Florida also provided an air quality modeling analysis to characterize the maximum 1-hour SO_2 concentrations in the area; however, that modeling improperly utilized simulated actual emissions that are neither representative of actual emissions or federally- enforceable and effective allowable emissions, nor of corresponding estimated SO_2 air quality impacts. Therefore, the modeling was not reliable for designations purposes. Based on this information, the EPA announced that it intended to designate a portion of Citrus County as nonattainment for the 2010 SO_2 NAAQS at the time, with the remainder of Citrus County being designated as unclassifiable/attainment.

The EPA included a condition in the 120-day letter that if, prior to the effective date of designations, the Citrus County SO_2 monitor produces a valid attaining design value for the 2015-2017 period and no other information indicates there is a NAAQS violation for the 2015-2017 period attributable to CRPP, then the EPA would change the designation of the area to unclassifiable. This was contingent on Florida early-certifying their data in advance of the effective date of this final rule in early 2018 instead of the EPA's standard May 1, 2018 certification deadline. The unclassifiable designation would be consistent with designations for other areas around sources for which the EPA has no modeled violation. The designated area (to be determined) would be based on clearly defined, legal, jurisdictional boundaries that encompasses CRPP. Alternatively, prior to the effective date of the designation, if the Citrus County SO_2 monitor produces a valid attaining design value for the 2015-2017 period, and

credible modeling was provided for CRPP that indicates attainment for the current 3-year period, then the EPA announced that it would change the designation of the area to unclassifiable/attainment. The designated area would be Citrus County in its entirety.

2.3. Assessment of New Air Quality Monitoring Data for the Citrus County Area

This factor considers the SO_2 air quality monitoring data in the area of Citrus County. Our TSD for the intended area designations considered available data through 2016 for one monitoring site (AQS ID: 12-017-0006). On December 14, 2017, EPA received a letter from the Florida Department of Environmental Protection (DEP) regarding the ambient air quality data measured at monitoring site 120170006 in Citrus County, Florida. Specifically, DEP indicated that, to the best of their knowledge, the data in the Air Quality System (AQS) for SO_2 concentrations as of December 9, 2017, are accurate and meet the criteria in 40 CFR Part 58, Appendix A.

According to information in a December 19, 2017 memorandum, EPA has independently reviewed the data available in AQS for Citrus County.[6] Since more than 301 daily values have been collected for 2017, the 99th percentile value is equal to the 4th highest value. The 4th highest value is the value used for the design value calculation. Therefore, if 37 ppb - the 4th highest value recorded thus far in 2017 - was used to calculate a three-year design value (2015-2017), the monitor would produce a design value that is lower than the SO_2 NAAQS. After considering the 4th highest values recorded in 2015 and 2016, we have determined that if the Citrus County monitor does not record 4 daily maximum 1-hour averages of 90 ppb or higher between December 10 and December 31, 2017, then the 4th highest value would be 89 ppb or less and the design value calculation for 2015-2017 would be lower than the NAAQS. However, since a design value is based upon three years of data, EPA cannot officially calculate a design value for 2015-2017 to determine whether the monitor is officially attaining until the 2017 data are complete and certified by DEP after December 31, 2017 (per EPA regulations at 40 CFR Part 58).

2.4. Assessment of New Air Quality Modeling Analysis for the Citrus County Area Addressing Duke Energy Florida CRPP

2.4.1. Introduction

This section 2.4 presents all the newly available air quality modeling information for a portion of Citrus County that includes CRPP. (This portion of Citrus County will often be referred to as "the Citrus County area" within this section 2.4.) This area contains the following SO_2 source, principally the source around which Florida was required by the DRR to characterize SO_2 air quality:

- CRPP emitted 2,000 tons or more annually. Specifically, CRPP emitted 32,545.10 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Florida has chosen to characterize it via modeling.

[6] Memorandum dated December 19, 2017 from Liz Naess of U.S. EPA's Air Quality Analysis Group regarding sulfur dioxide air quality data for Citrus County, Florida.

On October 20, 2017, Florida submitted new modeling analyzing air quality in the area surrounding the CRPP. This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. The area that Florida assessed via air quality modeling is located on the western coast line of the State. Florida's analysis supports a different designation than the EPA's intended designation for this area. The EPA expressed an intent to designate the area as nonattainment, whereas Florida's recommendation based on their analysis is a designation of attainment for the entire county.

In addition, on October 5, 2017, Sierra Club submitted new modeling analyzing air quality in the area surrounding the CRPP. This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. The area that Sierra Club assessed via air quality modeling is located on the western coast line of the State of Florida. Sierra Club's analysis is consistent with the EPA's intended designation for this area as nonattainment. After careful review of Florida's and Sierra Club's new assessments, supporting documentation, and all available data, the EPA is relying on Florida's analysis, and is designating the area as unclassifiable. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

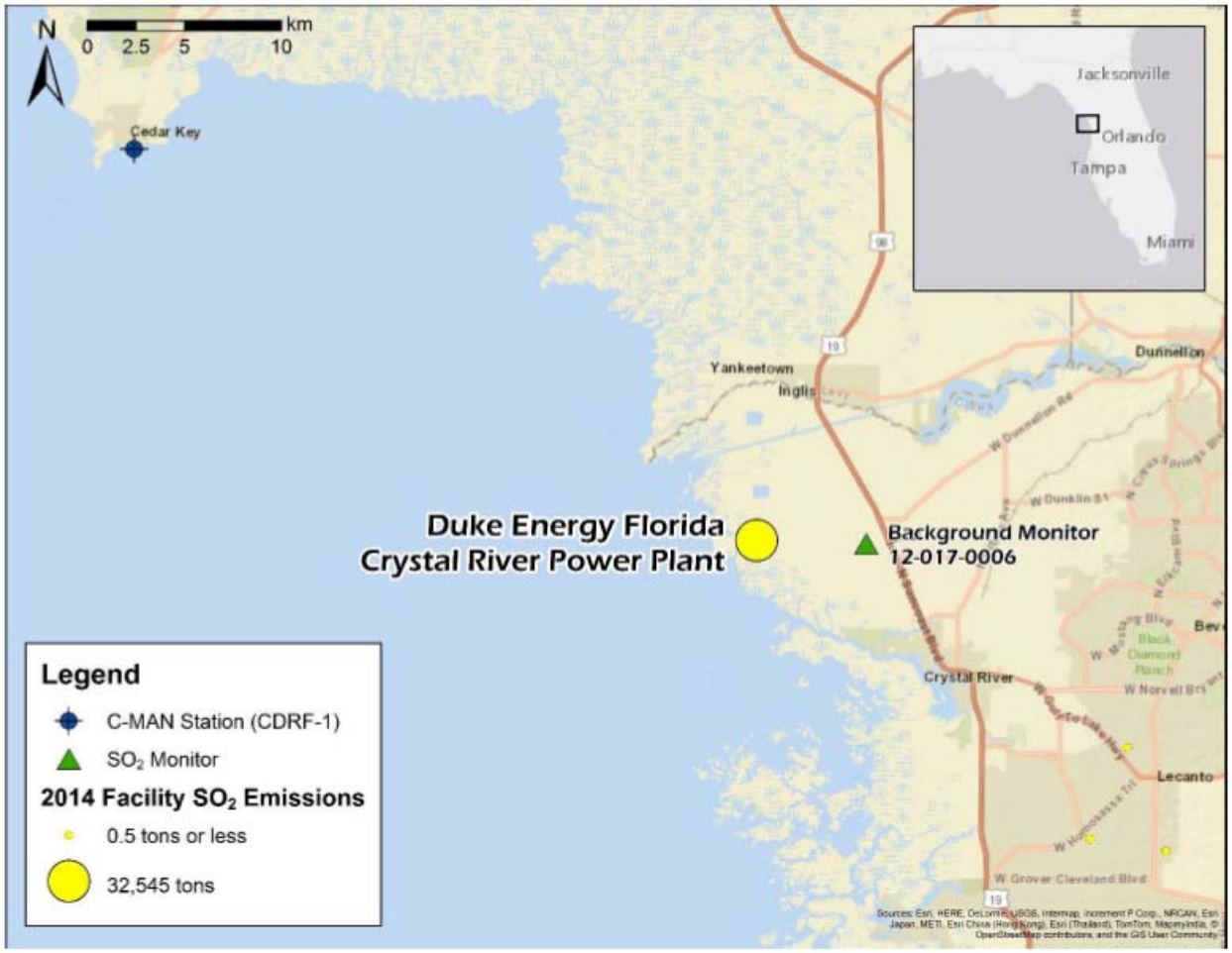
As seen in Figure 1 below, CRPP is located on the western coast line of Florida in the City of Crystal River. The facility is adjacent to Rocky Creek.

Also included in the figure are other nearby emitters of SO_2.[7] These are Precision Grading, Florida Gas Transmission Station 26, and Central Materials. The other sources near CRPP are within 35 kilometers (km) and still within Citrus County.

The EPA's final designation boundary for the Citrus County area is not shown in this figure, but is shown in a figure in the section below that summarizes our final designation.

[7] All other SO_2 emitters (based on information in the 2014 Florida Emissions Inventory) are shown in Figure 1. If no sources not named previously are shown, there are no additional SO_2 emitters above this emission level in the vicinity of the named source(s).

Figure 1. Map of the Citrus County, Florida Area Addressing CRPP. Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.



The discussion and analysis that follows below will reference the EPA's Modeling Technical Assistance Document (Modeling TAD) and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered different new modeling assessments, beyond those identified above in Table 2 that were reviewed in its TSD for its intended designations, including one assessment from the State and one assessment from other parties. To avoid confusion in referring to these assessments, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 2 –New Modeling Assessments for the Citrus County Area

Organization Submitting Assessment	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Sierra Club	10/5/2017	Sierra Club	3rd Party Modeling
Florida	10/20/2017	Florida supplemental modeling	Response to 120-day intended designation
Florida	11/2/2017	Florida revised supplemental modeling	Revised receptor grid

2.4.2. Modeling Analysis Provided by the State

2.4.2.1.Differences Among and Relevance of the Modeling Assessments

Florida submitted revised modeling, "SO_2 Data Requirements Rule Supplemental Modeling Report Citrus County, Florida" during the comment period on October 20, 2017, that supersedes their prior 120-day, original January 13, 2017, modeling analysis. In this supplemental modeling, the State modeled with the most recently available three-years of actual emissions (July 2014 – June 2017) for all facility sources. This corresponded with updated, current meteorology from the same National Weather Station (NWS) stations. The State modeled with the most recent version of AERMOD and AERMET, v16216r. In addition, the State revised their receptor grid from the original analysis and removed receptors over water bodies, namely the Gulf of Mexico. In response to additional questions from the EPA regarding the receptor grid used in the modeling submitted on October 20, 2017, Florida provided revised modeling on November 2, 2017[8]. The details regarding Florida's revised modeling are provided Section 2.4.2.4 of Chapter 9 of this Final TSD. All further discussion of State modeling results reflects evaluation of this newer analyses.

2.4.2.2. Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET

[8] Email from Brian Himes, Florida Department of Environmental Protection, to Rick Gillam, U.S. EPA Region 4, dated November 2, 2017, transmitting revised modeling documentation.

- AERSCREEN: a screening version of AERMOD

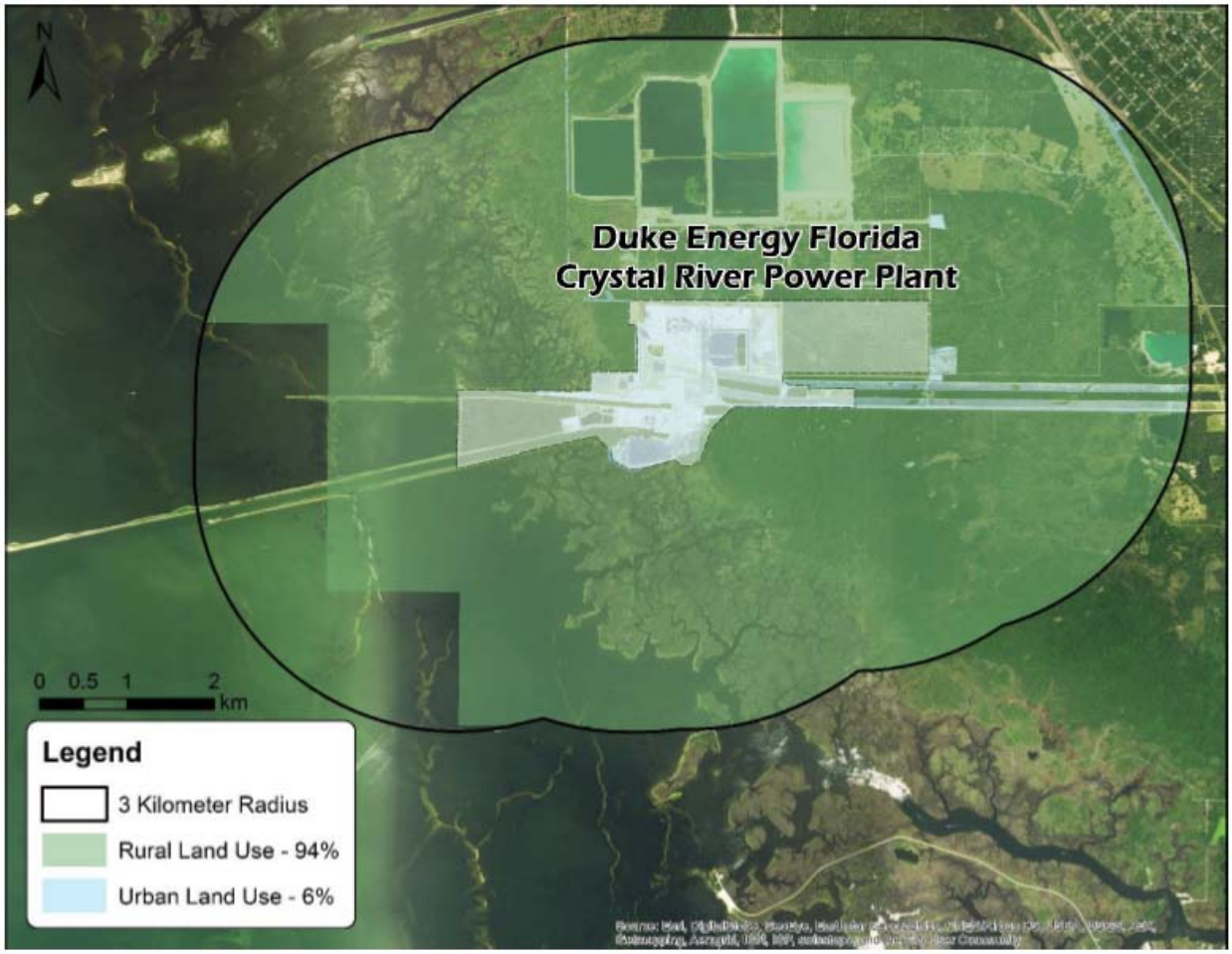
The State used AERMOD version 16216r. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

2.4.2.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the State determined that it was most appropriate to run the model in rural mode. This determination was made by Florida for both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017. 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 State chose the land-use classification approach, by employing Auer's method. Rural land use constitutes a majority (94 percent) of the 3-km radius around CRPP as seen in Figure 2. Auer's 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.

Figure 2. Land use around Crystal River Power Plant. Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.



The EPA agrees with Florida's analysis and the State's decision to apply rural dispersion characteristics for both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017.

2.4.2.4. Modeling Parameter: Area of Analysis (Receptor Grid)

The Modeling TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The source of SO_2 emissions subject to the DRR in this area is described in the introduction to this section. For the Citrus County area, in both the October 20, 2017, modeling and the revised

modeling provided on November 2, 2017, the State has explicitly modeled no other emitters of SO_2 within 35 km of CRPP in any direction. All other sources within 35 km of CRPP emitted less than 1 ton of SO_2 in 2014 and are represented in the added monitored background concentrations. The State determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. No other sources beyond 35 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis. The EPA believes that Florida's 35 km area of analysis is appropriate for both the October 20, 2017, and November 2, 2017, modeling because there are no large sources of SO_2 emissions located beyond this distance that would be expected to have significant impacts in the area.

The State developed a dense grid of receptors placed from the CRPP'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 2,500 meters (m). Receptor density then decreased in 2,500-m intervals. Preliminary modeling performed by Florida that was not provided to the EPA indicated that high concentrations were found in areas of insufficiently dense receptor placement. Accordingly, the grid was expanded to fully resolve the highest concentrations. In both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, receptors located within CRPP's fence line were removed and receptors were placed with 50-m spacing along the fence line. Receptor grid parameters for both sets of modeling are listed in Table 3. The extent of the receptor grids are similar, except that the November 2, 2017, modeling grid contains additional receptors located in the coastal areas that Florida had removed in the October 20, 2017 modeling.

Table 3. Dense Receptor Grid Parameter

Receptor Grid Parameter	October 20, 2017 Modeling Value	November 2, 2017 Modeling Value
100 m Receptor Spacing – Extent from the Origin (m)	5,000	5,000
250 m Receptor Spacing – Extent from the Origin (m)	6,500	6,500
500 m Receptor Spacing – Extent from the Origin (m)	8,000	8,000
Total Boundary Receptor Spacing (m)	50	50
Total Receptors	7,041	9,965

In Florida's modeling provided on October 20, 2017, the receptor network contained 7,041 receptors, and the network covered the northeastern portion of Citrus County in Florida completely surrounding the facility. Florida's November 2, 2017, modeling expanded the receptor grid to include 9,965 receptors by adding receptors in some of the intertidal/wetlands areas.

Figure 3, included in the State's recommendation, shows the State's chosen area of analysis surrounding CRPP. Figure 4 from Florida's October 20, 2017, modeling submittal displays the receptor grid for the area of analysis. Figure 5 from Florida's November 2, 2017, modeling submittal displays Florida's final revised receptor grid used in the modeling.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property with the exceptions of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor. Due to the complicated intertidal area surrounding the CRPP, the State decided to include all receptors located over surrounding waterbodies in their original submittal on January 13, 2017. In the October 20, 2017, supplemental modeling, Florida elected to use high-resolution land use classification data to remove receptors located in areas that are predominantly water such as the Gulf of Mexico, streams, marshes, and swamps. Florida established a delineation line, broadly separating areas that are a mix of land and water from areas that are entirely water. The results can be seen below in Figure 4. The dataset used for this analysis is a compilation of the Land Use/Land Cover datasets created by the five Water Management Districts in Florida based on imagery – North West Florida Water Management District (NWFWMD), Suwannee River Water Management District (SRWMD), St. John's River Water Management District (SJRWMD), South West Florida Water Management District (SWFWMD), and South Florida Water Management District (SFWMD). The data are based on the Florida Land Use, Cover, and Forms Classification System.

Following review of the October 20, 2017, modeling, the EPA verbally contacted Florida with questions related to the removal of some receptors near the previous maximum concentration area from the January 2017 modeling, that appeared to be located over land where a monitor could be sited. Florida responded via email[9] on November 2, 2017, with an updated receptor grid and modeling results that cover significantly more of the complex intertidal region. In this updated receptor grid, as shown in Figure 5, Florida only removed receptors over the Gulf of Mexico to the southwest of the facility. Based upon a technical review of the documentation provided by Florida, the EPA agrees that Florida's decision in the November 2, 2017, modeling to remove receptors from this area is justified because the receptors that have been removed are either located over the Gulf of Mexico or the intertidal wetlands areas, both of which are not feasible for placement of a monitor.

After review of all available information, the EPA believes that Florida's final receptor grid in the November 2, 2017, modeling (displayed in Figure 5) is appropriate for the characterization of the area, considering the impact of SO_2 from the modeled facilities.

[9] Email from Brian Himes with FDEP, to Rick Gillam with the EPA on November 2, 2017.

Figure 3. Area of Analysis for the Citrus County Area. Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.

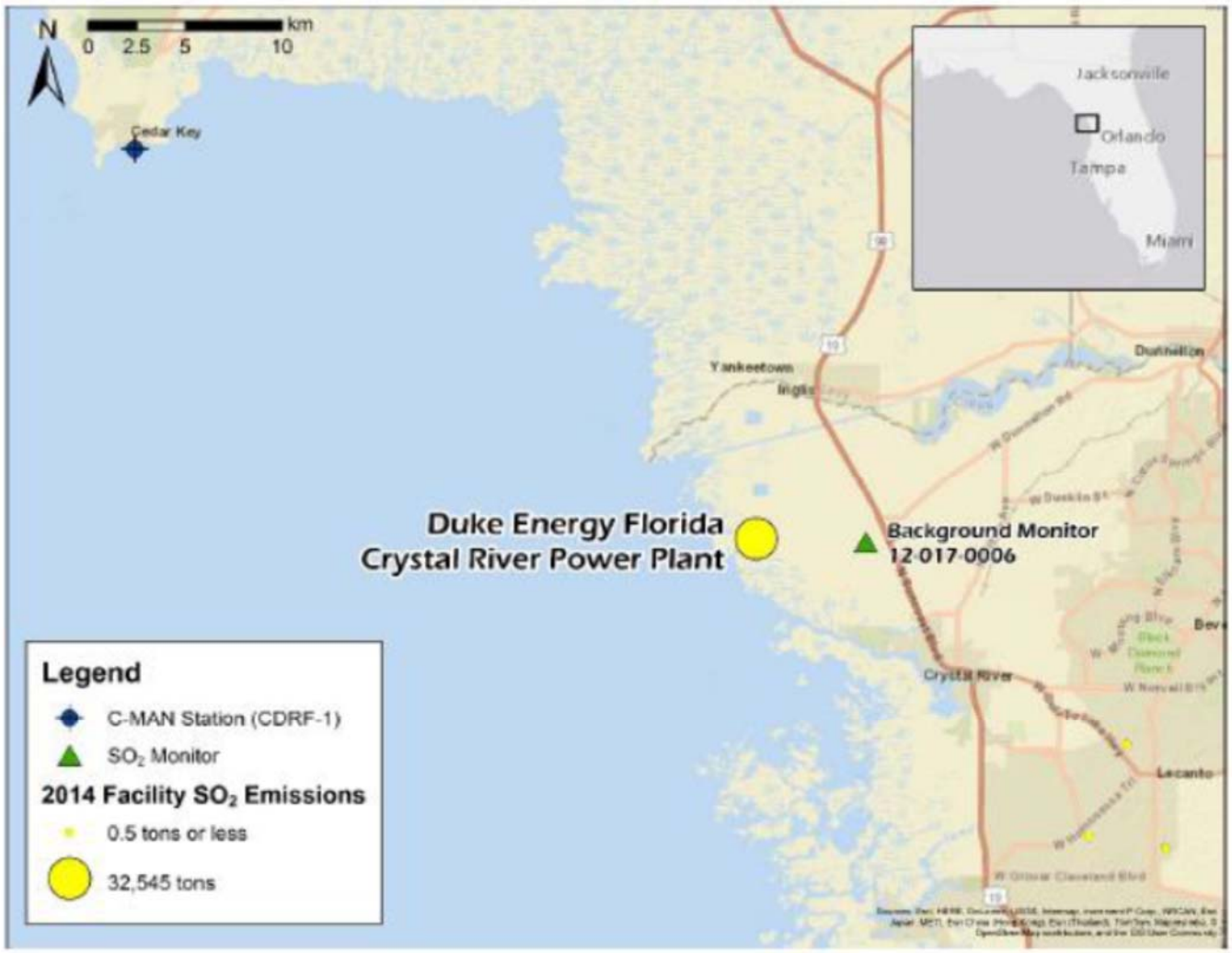


Figure 4. Receptor grid placement for the Citrus County Supplemental DRR modeling demonstration. Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.

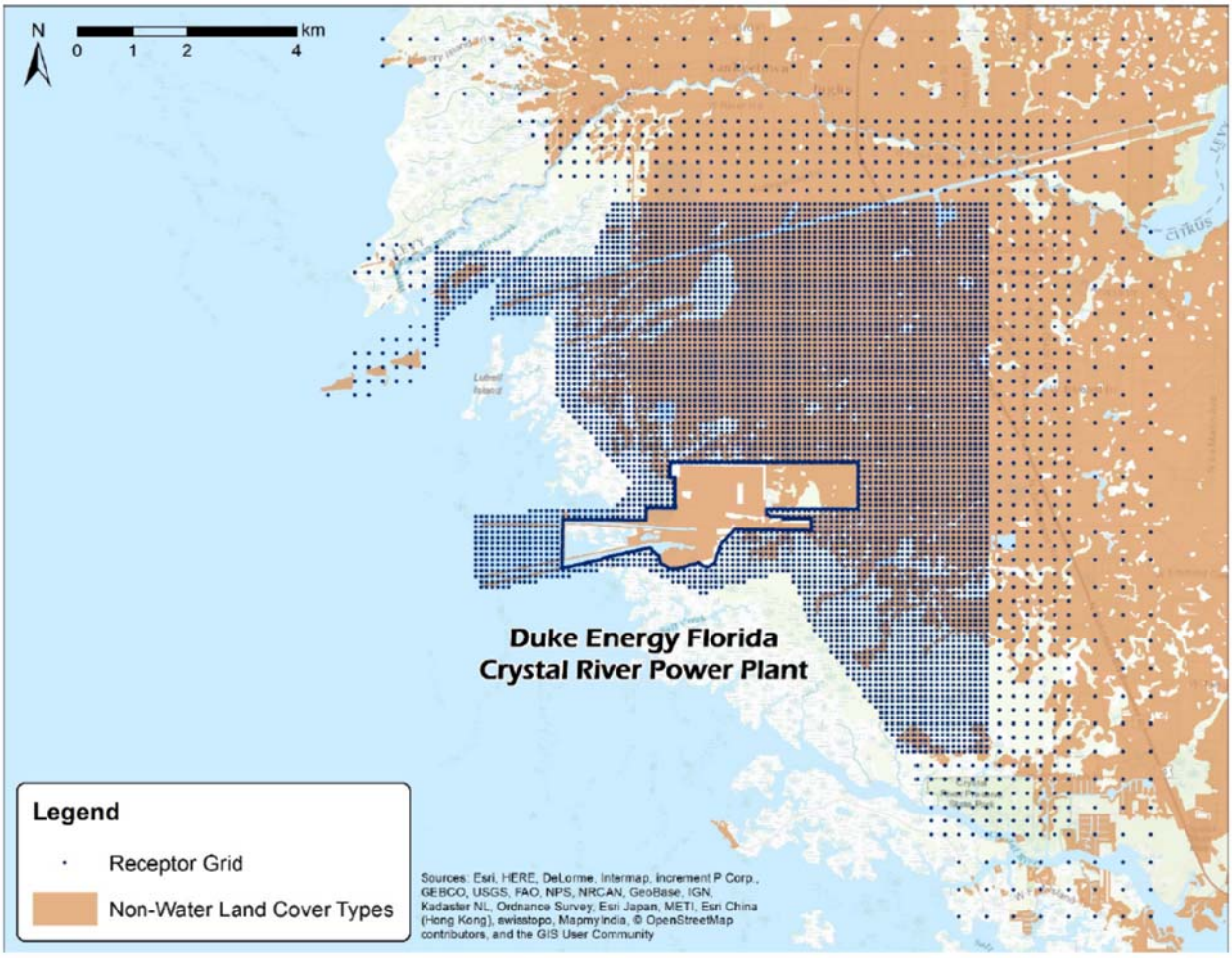
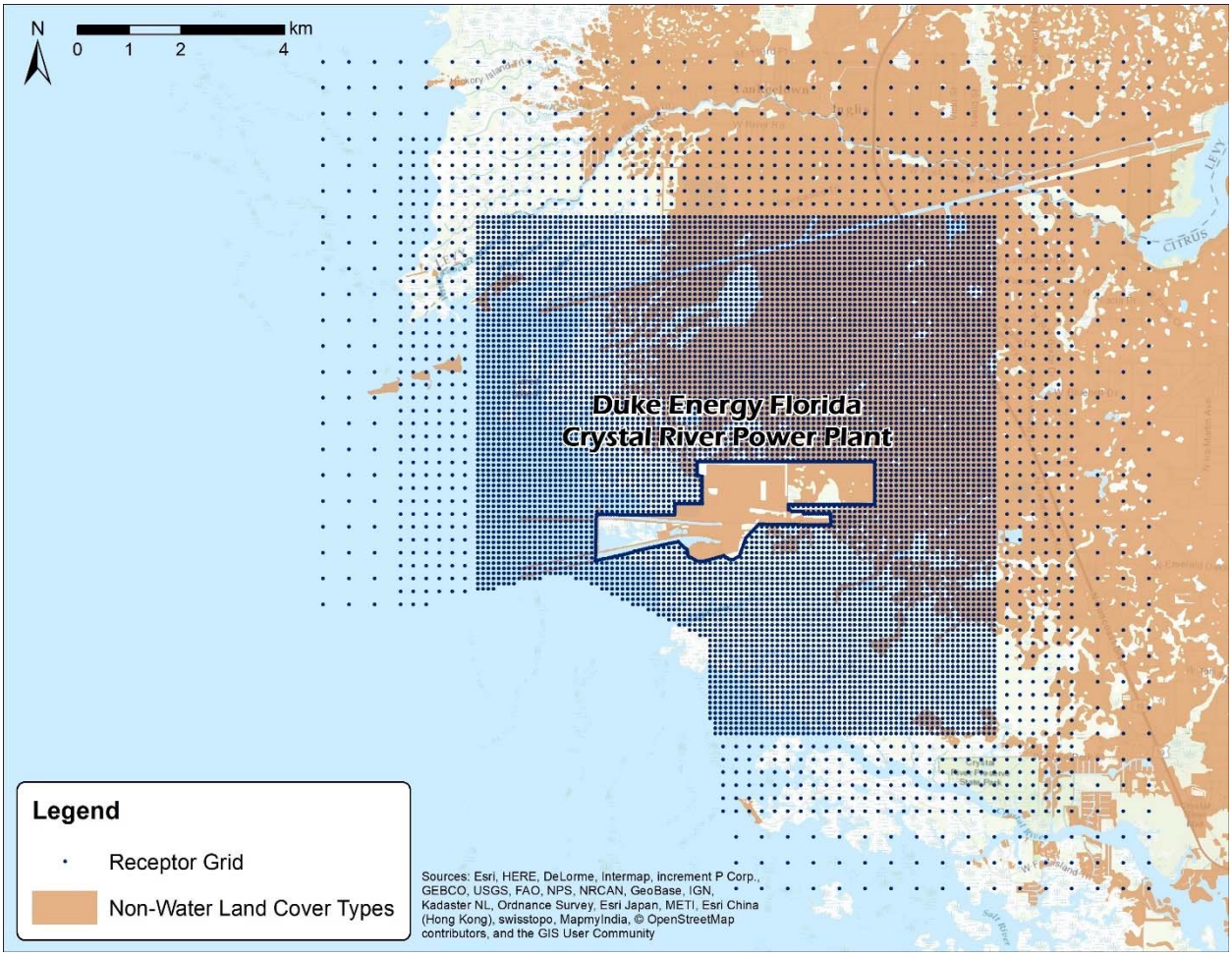


Figure 5. Receptor grid placement for the Citrus County Supplemental DRR modeling demonstration. Source: Data Requirements Rule Revised Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, November 2, 2017.



No information was provided in Florida's original January 2017 Modeling Report for the Citrus County area to document that public access to the facility property is prevented by a fence or some other physical barrier. The EPA contacted Florida regarding this issue. Florida responded via email[10] that they closely examined the fence line boundaries used in the modeling to ensure that public access is precluded from all areas that are being treated as non-ambient air. Hence, the EPA believes that Florida's decision to remove receptors from within the fence line boundaries is acceptable.

2.4.2.5. Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building

[10] Email from Brian Himes with FDEP to Rick Gillam with the EPA on August 9, 2017.

downwash (if warranted), and the use of actual stack heights with actual emissions or following good engineering practices (GEP) policy with allowable emissions.

For both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, the State characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the State used actual stack heights in conjunction with actual emissions. The State also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash. The EPA agrees with Florida DEP's building downwash methodology associations for CRPP's sources and agrees with their source characterization for the area.

2.4.2.6. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the Modeling TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as potential to emit (PTE) or allowable) emissions rate that is federally-enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally-enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or state implementation plan (SIP) demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, for both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, the State included only CRPP as a modeled source within the 35 km area

of analysis. The State has chosen to model the facility using actual emissions. For CRPP, the State provided annual actual SO_2 emissions from the most recent three-year period between July 2014 through June 2017. This information is summarized in Table 4. A description of how the State obtained hourly emission rates is given below this table.

Table 4. Actual SO_2 Emissions Between 2014 – 2017 from Facilities in the Citrus County Area

	SO_2 Emissions (tpy)			
Facility Name	**2014 Q3-Q4**	**2015**	**2016**	**2017 Q1-Q2**
CRPP	14,640	23,233	12,104	6,669
Total Emissions from All Modeled Facilities in the State's Area of Analysis	14,640	23,233	12,104	6,669

For CRPP, the actual hourly emissions data were obtained from CEMS from the EPA's Clean Air Markets Database (CAMD) for all units: Units 1, 2 and 3. Missing data were substituted following the procedures outline in 40 CFR 75.33(b). In both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, the State modeled with the most recent three-year period of data beginning in July 2014 through June of 2017.

Previously, in Florida's original modeling demonstration dated January 17, 2017, the State modeled for the 2012-2014 time period using a combination of actual and "simulated actual" emissions. Florida asserted that sufficient data was not available to characterize the current emissions regime for Units 1 and 2 using actual hourly data. In order to resolve this matter, the State developed an emissions estimate for modeling purposes. Florida closely analyzed emissions data for Units 1 and 2 from the periods of 2012-2014 and 2016 and determined that the average SO_2 emission rate for Unit 1 decreased from 1.487 pounds per million british thermal units (lb/MMBtu) to 0.766 lb/MMBtu and Unit 2 decreased from 1.528 lb/MMBtu to 0.713 lb/MMBtu, when the fuel switched to lower sulfur coal was finalized in February 2016. In the January 13, 2017, modeling, the State omitted 2015 data from the averaging, claiming these data included long periods during which low-sulfur coal was burned for testing purposes. These average rates of decrease – 48.5 percent for Unit 1 and 53.3 percent for Unit 2 – were then applied to the emission rates for all hours operated over the period of 2012-2014 to create a file of simulated-actual, low-sulfur coal emissions.

The EPA communicated to Florida that the use of "simulated actual emissions" was not consistent with a technical analysis to demonstration that the area is attaining the NAAQS. We suggested that the modeling be revised to either use three years of non-modified actual emissions or current allowable limits for Units 1 & 2. In response to EPA's intended designation TSD, Florida has submitted supplemental modeling (October 20, 2017, and November 2, 2017 modeling) which uses the most recent three years of non-modified actual emissions. The EPA agrees with Florida's use of actual emissions for the CRPP facility. We believe that Florida has proved adequate documentation that these emissions for these sources were applied appropriately in the modeling.

2.4.2.7. Modeling Parameter: Meteorology and Surface Characteristics

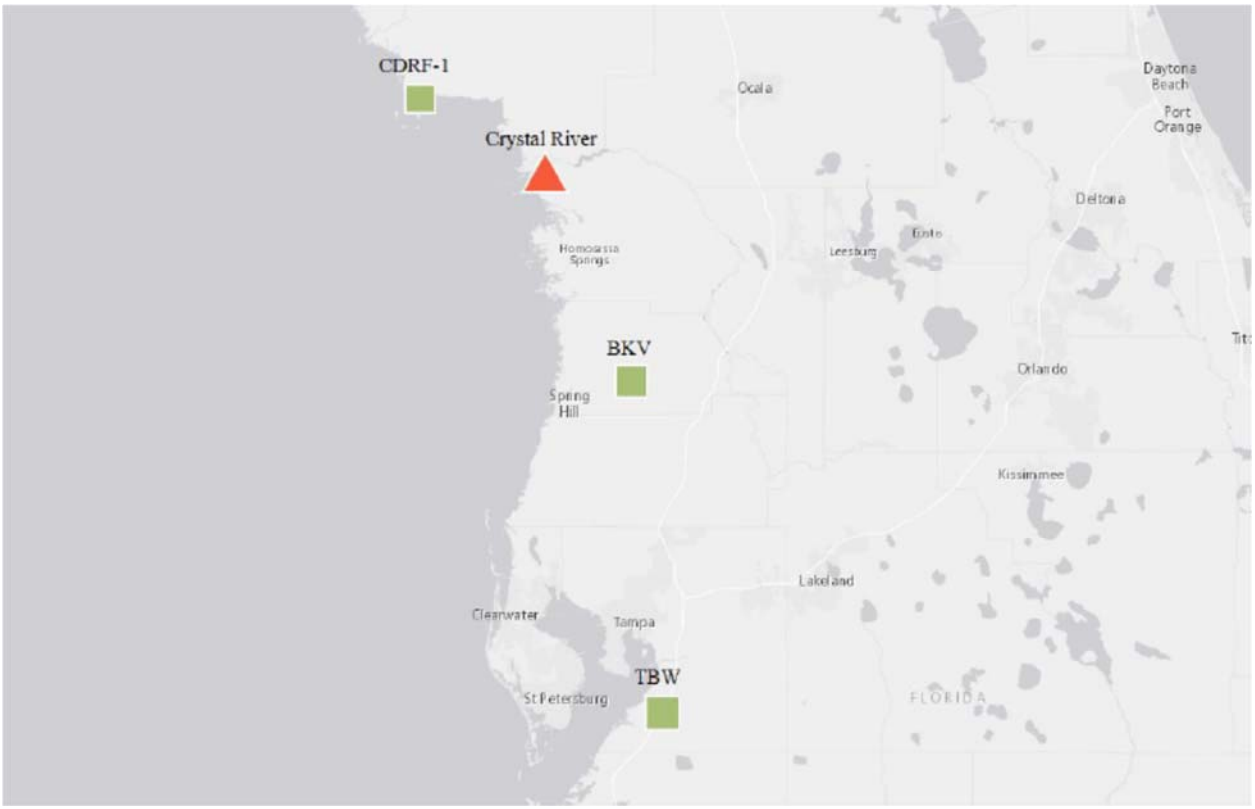
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include NWS stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

For both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, the area of analysis for the Citrus County, Florida, area, the State selected the surface meteorology from Cedar Key Coastal-Marine Automated Network (C-MAN) station (CDRF-1), operated by the National Data Buoy Center (NDBC). This land based station is located approximately 38 km northwest of CRPP in a similar coastal environment. CDRF-1 is a limited station that records only temperature, dew point, atmospheric pressure, and wind speed and direction. The Hernando County Airport (BKV) which is nearly 60 km southeast CRPP was an additional NWS data set used with ONSITE and SURFACE keywords to fill in missing data for CDRF-1. The coincident upper air observations from Ruskin, Florida, (TBW) at best represents meteorological conditions within the area of analysis.

The State used AERSURFACE version 13016 using data from CDRF-1 to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [zo]) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space. The Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance. The surface roughness is sometimes referred to as "zo." The State estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for wet and average conditions.

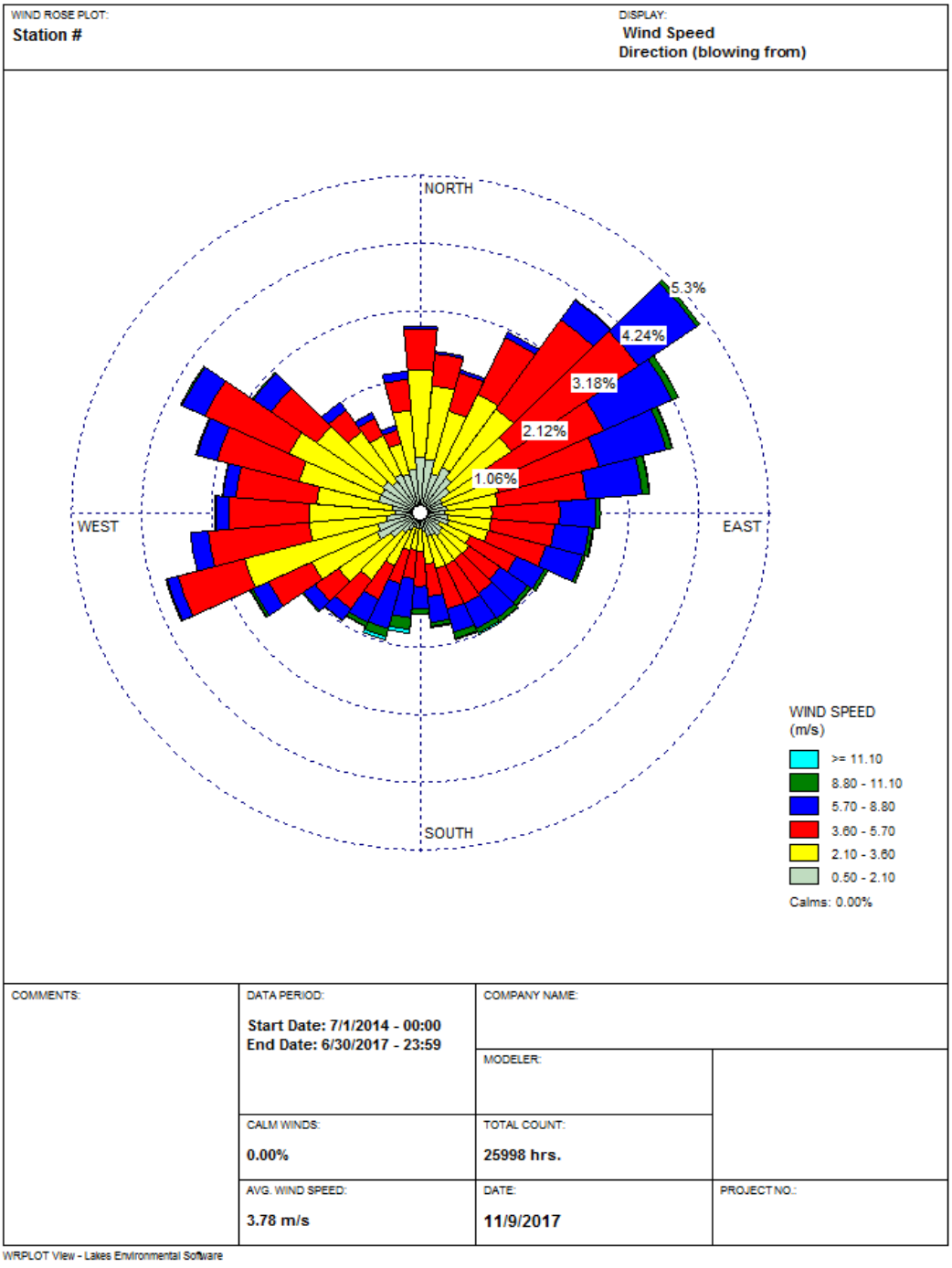
In the EPA generated figure below, the location of the NWS station CDRF-1 is shown relative to the area of analysis.

Figure 6. Area of Analysis and the NWS station in the Citrus County, Florida Area



The EPA generated a wind rose for the C-MAN station (CDRF-1) for the July 2014 through June 2017 period. In Figure 7, the frequency and magnitude of wind speed and direction are defined from where the wind is blowing. Analysis of the NWS data indicate winds predominately blow from the northeast, north, northwest, and west directions.

Figure 7. Citrus County Cumulative Annual Wind Rose for Years July 2014 – June 2017



Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The State followed the methodology and settings presented in in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from C-MAN station (CDRF-1) operated by the NDBC supplemental with along with the BKV dataset as NWS data using the ONSITE and SURFACE keywords. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the State set a minimum threshold of 0.5 meters per second (m/s) in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data. In both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017, the State used the ADJ_U* option when processing AERMET (version 16216) to adjust the surface friction velocity under low wind, stable conditions to avoid over-prediction.

The EPA believes the meteorology and surface characteristics used in both the State's October 20, 2017, and November 2, 2017, modeling submittals are acceptable. The meteorology in the final modeling report made use of the surface meteorology from C-MAN station located approximately 38 km northwest of CRPP in a similar coastal environment, with coincident upper air observations from Ruskin, Florida, (TBW) as best representative of meteorological conditions within the area of analysis. The EPA believes that the meteorological data reasonably shows that impacts from CRPP can be expected to the southwest of the facility. The surface characteristics were properly evaluated using AERSURFACE. Florida complied with the EPA guidance in developing this aspect of its modeling parameters.

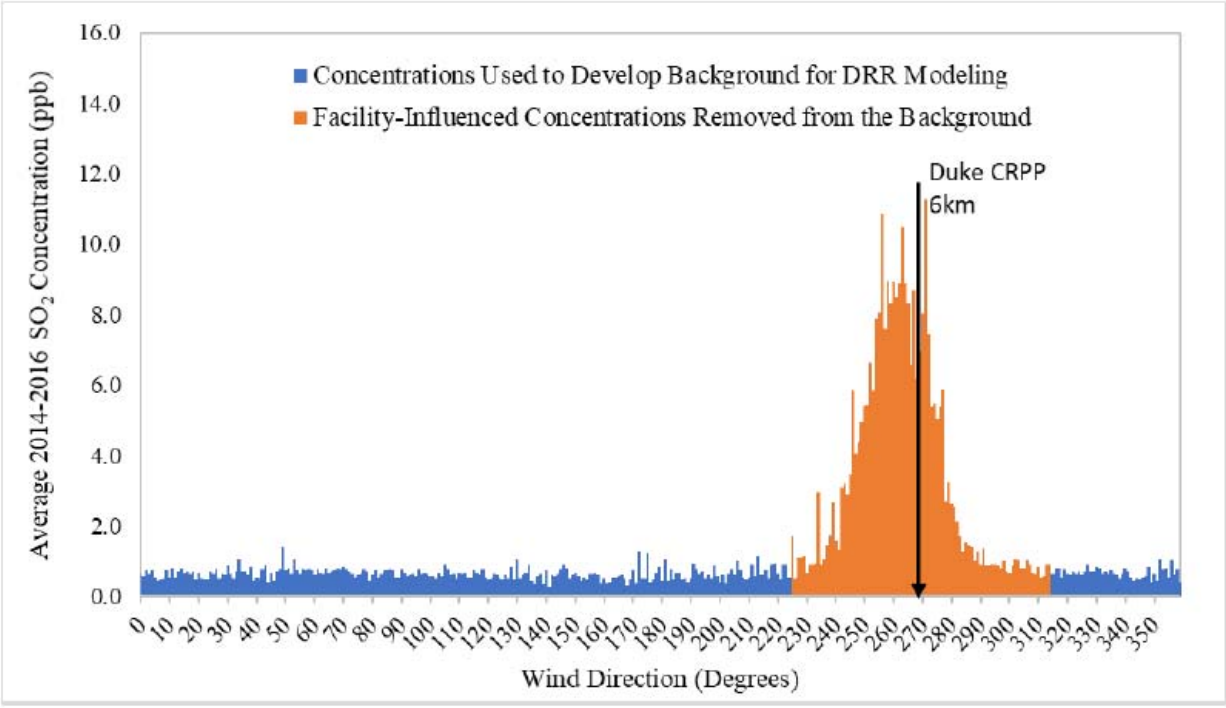
2.4.2.8. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is best described as flat. While Citrus County, Florida, is generally flat, the State nevertheless used the AERMAP terrain program to ensure all terrain changes were addressed in both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017. The source of the elevation data incorporated into the model is from the United State Geological Survey (USGS) National Elevation Database (NED). The EPA agrees that this approach is acceptable.

2.4.2.9. *Modeling Parameter: Background Concentrations of SO_2*

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State chose to use a tier 2 approach in both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017. Data were obtained from 2014-2016, time period from the Crystal River Preserve monitor (AQS Site: AQS site ID # 12-017-0006), approximately 5.5 km east of CRPP facility. 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 CRPP. In this case, any measurement recorded when the wind direction was from 225° to 314° was removed from the background calculation as shown in Figure 8.

Figure 8. 2014-2016 average SO_2 concentrations by wind direction for monitor 12-017-0006. Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.



The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input into AERMOD with the BACKGRND SEASHR keyword (see below). The data used were obtained from the Florida Air Monitoring and Assessment System (FAMAS) for monitoring station No. 12-017-0006 for the most recent three-year period 2014-2016. Table 5 contained in the Florida Supplemental Modeling Report provides the temporally varying background concentrations used in the modeling.

Table 5. Tier 2 Temporally Varying Background Concentrations from the Crystal River Preserve monitor (AQS Site: AQS site ID # 12-017-0006.) Source: Data Requirements Rule Supplemental Modeling Report, provided by the Florida Department of Environmental Protection, October 20, 2017.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	1.00	1.33	1.67	2.00	12:00	1.67	1.67	7.33	2.33
1:00	1.00	1.33	1.67	2.00	13:00	1.67	1.33	7.00	2.33
2:00	1.00	1.33	1.67	2.00	14:00	1.33	1.67	1.33	3.00
3:00	1.00	1.33	1.67	2.00	15:00	1.67	1.67	5.33	2.00
4:00	1.00	1.33	1.67	2.00	16:00	1.00	1.33	1.33	1.67
5:00	1.00	1.67	1.67	2.00	17:00	1.00	1.33	1.67	2.00
6:00	1.33	2.00	1.67	2.33	18:00	1.00	1.00	3.00	1.67
7:00	1.00	1.33	1.67	2.00	19:00	1.00	1.33	2.00	2.00
8:00	1.00	2.33	2.00	2.00	20:00	1.33	5.00	1.67	2.67
9:00	1.67	2.33	6.00	2.33	21:00	1.67	3.00	2.00	3.00
10:00	2.00	4.33	4.33	3.00	22:00	1.67	2.00	3.00	2.67
11:00	2.00	2.00	2.67	2.67	23:00	1.67	1.33	1.67	2.00

The EPA agrees that Florida has appropriately chosen the background concentrations in accordance with the Modeling TAD for both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017. The State has chosen a monitor that is near the modeled source and is adequate for modeling purposes, with complete data for the 2014-2016, time period. The EPA believes that the chosen background monitored concentration is representative of the area.

2.4.2.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Citrus County area of analysis are summarized below in Table 6.

Table 6. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Citrus County Area in Florida's October 20, 2017 and November 2, 2017, modeling submittals.

Input Parameter	Value
AERMOD Version	16216r
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	20
Modeled Fencelines	1
Total receptors	7,041 (10/20/17 modeling) 9,965 (11/2/17 modeling)
Emissions Type	Actual
Emissions Years	July 2014 – June 2017
Meteorology Years	July 2014 – June 2017
NWS Station for Surface Meteorology	Cedar Key Coastal-Marine (CDRF-1) Hernando County Airport (BKV)
NWS Station Upper Air Meteorology	Ruskin, Florida (TBW)
NWS Station for Calculating Surface Characteristics	Cedar Key Coastal-Marine (CDRF-1)
Methodology for Calculating Background SO_2 Concentration	AQS ID 12-017-0006, 2014-2016 Season by Hour option in AERMOD
Calculated Background SO_2 Concentration	Temporally Varying

The results presented below in Table 7 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters for the final November 2, 2017, modeling. The results of the October 20, 2017, modeling are not presented as they have been superseded by the November 2, 2017 modeling results.

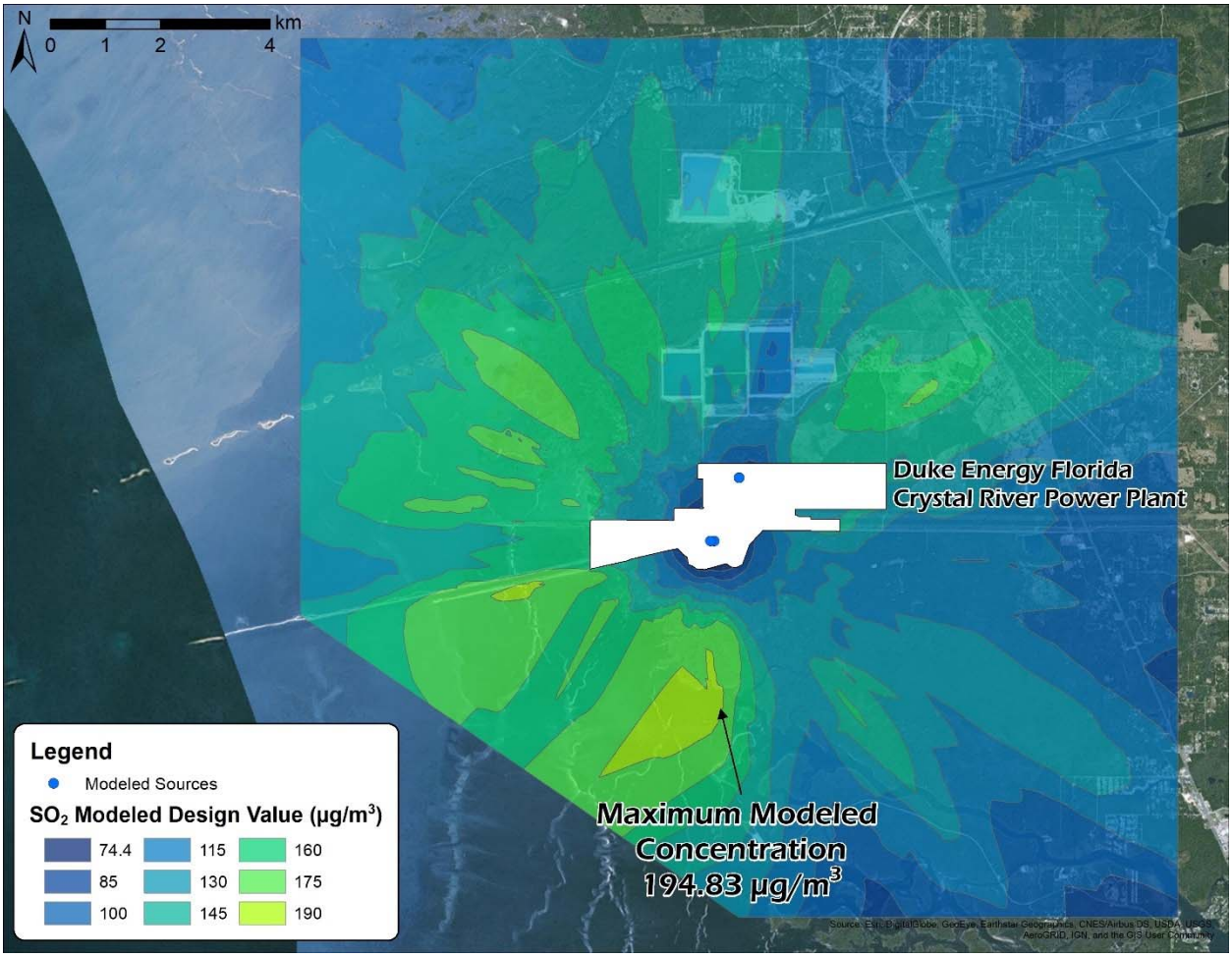
Table 7. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over Three Years for the Area of Analysis for the Citrus County Area in Florida's November 2, 2017, modeling submittal.

Averaging Period	Data Period	Receptor Location 17N		99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$)	
		UTM Easting	UTM Northing	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	July 2014 – June 2017	334380.00	3201467.00	194.83	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb reflecting a 2.619 microgram per cubic meter ($\mu g/m^3$) conversion factor

The State's final November 2, 2017, modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 194.27 $\mu g/m^3$, equivalent to 74 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 9 below was included as part of the State's recommendation, and indicates that the predicted value occurred south of CRPP. The State's receptor grid is also shown in the figure.

Figure 9. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Citrus County Area in Florida's November 2, 2017, modeling submittal.



The modeling submitted by the State indicates that the 1-hour SO_2 NAAQS is attained at all receptors in the area.

2.4.2.11. The EPA's Assessment of the Modeling Information Provided by the State

The EPA agrees with the modeling methodology used by Florida to characterize the area surrounding the facility in their final November 2, 2017, modeling submittal. Given the criteria for selecting nearby sources, we believe that the decision to include only the CRPP facility, and excluding all other sources from the modeling analysis was appropriate. All other nearby sources not included in the modeling were addressed with the background concentrations used in the modeling. With regards to the background concentrations, the State chose the nearest monitor with valid data for the 2014-2016, time period for both the October 20, 2017, modeling and the revised modeling provided on November 2, 2017. The EPA agrees with the monitor chosen for background concentrations and the 2014-2016 data period for both the October 20, 2017, and

November 2, 2017 modeling. The EPA also agrees that the surface and upper air meteorological data used in the October 20, 2017, and November 2, 2017, modeling analyses are appropriate for performing a valid modeling assessment.

The State has addressed the EPA's original comments in the 120-day intended designation letters that the modeling be revised to use three years of non-modified actual emissions. The EPA agrees with Florida's use of the most recent, available actual emissions from July 2014 – June 2017. With regards to the receptor grid, the EPA agrees that removing receptors from the Gulf of Mexico and wetlands areas in the final November 2, 2017, modeling is appropriate because they are areas where it is not feasible to site a monitor. The EPA is in agreement that the final November 2, 2017, modeling submitted by the State does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration.

2.4.3. Modeling Analysis Provided by Sierra Club

The Sierra Club provided modeling in response to the EPA's determination in the 120-day letter that Florida DEP used inappropriate "simulated actual" emission values for its 2012-2014 modeling. The Sierra Club modeled CRPP emissions using the actual reported emissions for the time period, retaining all of the other inputs that Florida used in their modeling submitted on January 13, 2017. In addition, the Sierra Club also provided modeled results for 2013-2015 and 2014-2016 using actual emissions.

Florida commented on the Sierra Club's modeling in their response to the 120-day letter dated October 20, 2017 with the following comment:

> "The Department recognizes that a third party has submitted a modeling demonstration for this area and recommended a designation of "nonattainment." The Department has reviewed this modeling and identified one technical issue. The third party did not disregard modeled receptors over water (the Gulf of Mexico) as is allowed in the DRR. More importantly, however, this modeling did not reflect the most recent operating data from the CRPP. The Department's modeling included in Appendix B to this letter utilizes the most recent operating data and reflects the recent changes at the facility, which have yielded permanent reductions in SO_2 emissions and significant improvement in air quality, such that the area is now attaining the 2010 SO_2 NAAQS."

2.4.3.1. Differences Between and Relevance of the Modeling Assessment Submitted by Sierra Club and Modeling Assessment Submitted by Florida

The Sierra Club provided an updated modeling analysis for the 2012-2014, time period using the supporting modeling files used by Florida in their Citrus County Modeling report submitted on January 13, 2017. The changes from the original Florida modeling procedures were as follows:

- Use of actual hourly emissions for Units 1, 2, 4 and 5 as reported to the EPA for 2012-2014, 2013-2015, and 2014-2016, time periods
- Use of current versions of the AERMOD modeling system (v16216r)

- Use of meteorological data processed with the current version of AERMET (v16216)

In their January 13, 2017, modeling, Florida modeled units 1 and 2 using 'simulated actual emissions' for the 2012-14 modeling period based on a current fuel switch to burning low-sulfur coal. Sierra Club modeled these units using their actual hourly emissions for the 2012-2014, time period as reported to the EPA and then for the more recent 2013-2015, and 2014-2016 time periods. Sierra Club's modeling for the 2012-2014, 2013-2014, and 2014-2016, time periods used identical model inputs for all parameters with the exception of the actual emissions and meteorology corresponding to these three time periods.

2.4.3.2. Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

Sierra Club used AERMOD version 16216r. A discussion of Sierra Club's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

2.4.3.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the Sierra Club determined that it was most appropriate to run the model in rural mode.

The EPA has assessed this component of the Sierra Club's modeling and concludes that it is consistent with Florida's modeling analysis and is appropriate.

2.4.3.4. Modeling Parameter: Area of Analysis (Receptor Grid)

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the

spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The source of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Citrus County area, the Sierra Club has explicitly modeled no other emitters of SO_2 within 35 km of CRPP in any direction. The Sierra Club was consistent with Florida's original source evaluation and determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. No other sources beyond 35 km were determined by Sierra Club to have the potential to cause concentration gradient impacts within the area of analysis. The EPA believes that the 35 km area of analysis is appropriate because there are no large sources of SO_2 emissions located beyond this distance that would be expected to have significant impacts in the area.

The Sierra Club made no changes to the receptor grid used by Florida in their original January 13, 2017, modeling analysis. The State developed a dense grid of receptors 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 2,500 m. Receptor density then decreased in 2,500 m intervals. Receptors located within CRPP's fence line were removed and receptors were placed with 50-m spacing along the fence line. Receptor grid parameters are listed in Table 8.

Table 8. Grid Parameter. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.

Receptor Grid Parameter	Value/Description
Description of Unit at Grid Center	Units 4 & 5 Stack
Unit UTM Zone	17N
Unit UTM Easting (m)	334,780.00
Unit UTM Northing (m)	3,205,567.00
Actual Stack Height (m)	167.60
Expected Distance to Max Concentration (m)	1,676
20 Times Stack Height (m)	3,352
100 m Receptor Spacing - Extent from the Origin (m)	5,000
250 m Receptor Spacing - Extent from the Origin (m)	6,500
500 m Receptor Spacing - Extent from the Origin (m)	8,000
Plant Boundary Receptor Spacing (m)	50
Total Receptors	11,460

The receptor network contained 11,460 receptors, and the network covered the northeastern portion of Citrus County in Florida completely surrounding the facility.

Figures 10 and 11, included in the State's January 13, 2017, modeling report, show the Sierra Club's chosen area of analysis surrounding the CRPP, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the Sierra Club placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to CRPP. The Sierra Club used Florida's receptor grid from the State's original modeling analysis which is described in detail in the 120-day letter. The Sierra Club elected to not remove any receptors outside of the facility property. This includes receptors that are located over bodies of water, namely the Gulf of Mexico. In the October 20, 2017, and November 2, 2017, modeling submitted by Florida in response to the EPA's 120-day letter, the receptor grid was modified by removing receptors from locations that are not feasible for placing a monitor, consistent with Section 4.2 of the Modeling TAD. The complete details of the modifications to the receptor grid are discussed in Section 2.4.2.4 of this final TSD document. The EPA believes that Florida's modified receptor grid used in their November 2, 2017, modeling analysis is more appropriate for the characterization of the area, because the Sierra Club's modeling includes receptors located over water and wetlands where it is not feasible to site a monitor.

Figure 10. Area of Analysis for the Citrus County Area. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.

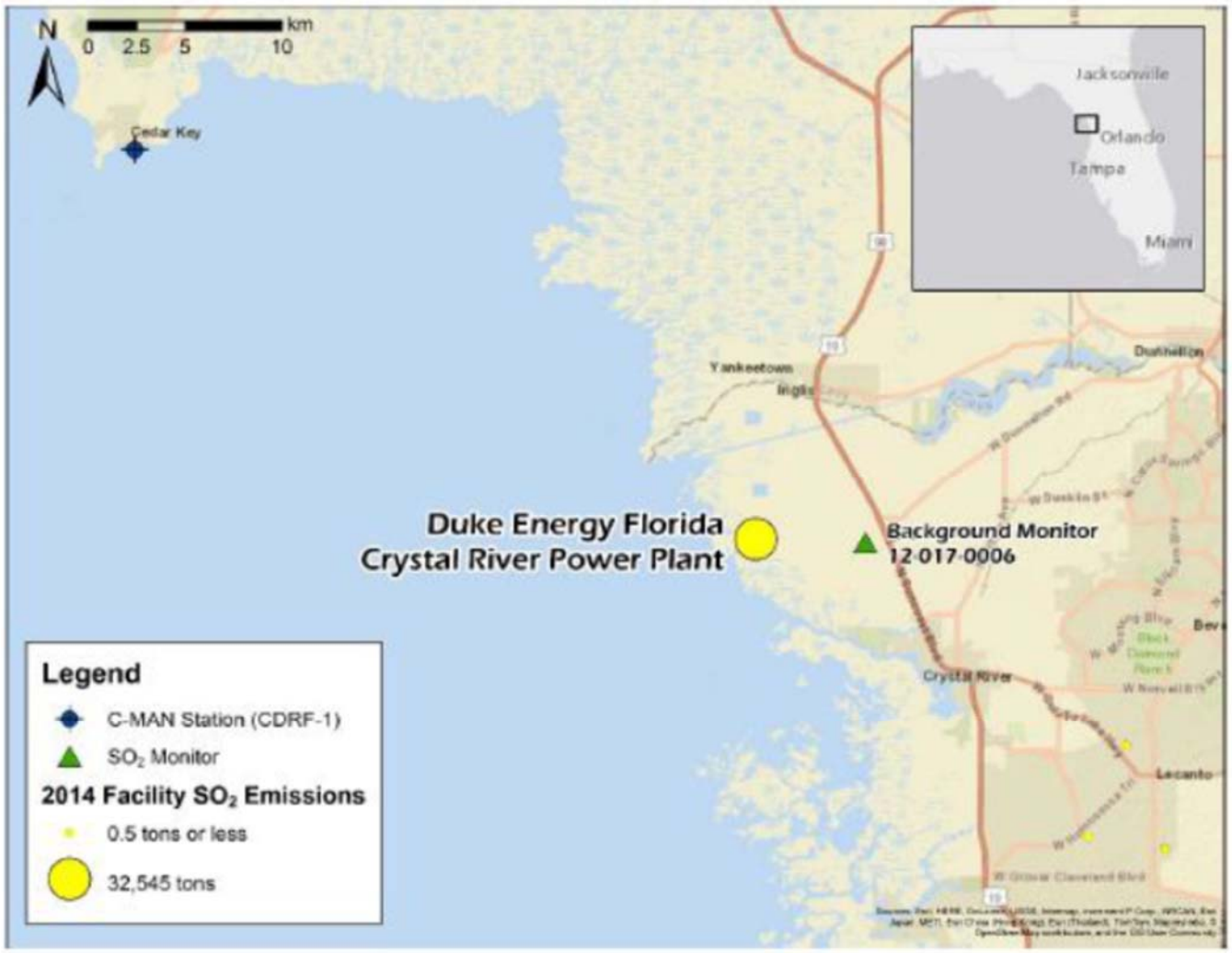
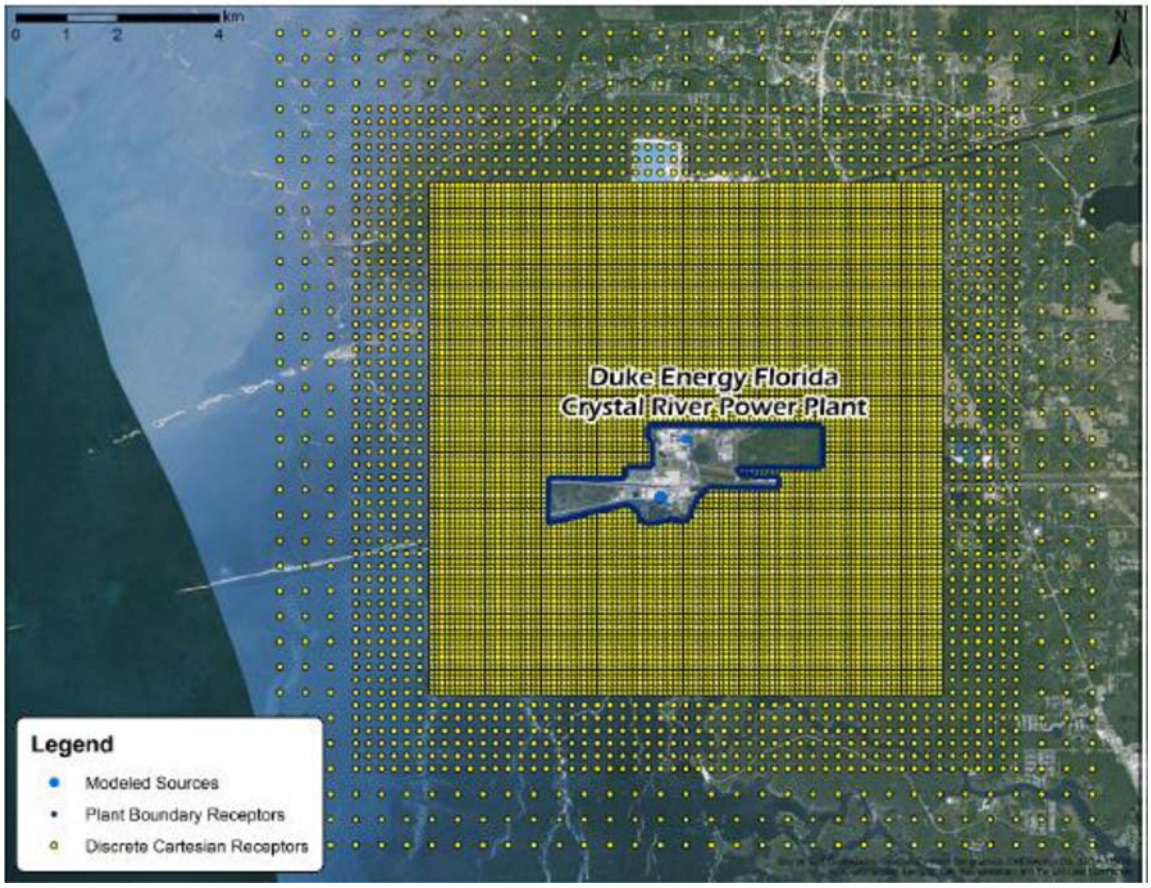


Figure 11. Receptor Grid for the Citrus County Area. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.



No information was provided in Florida's original January 2017 Modeling Report for the Citrus County area to document that public access to the facility property is prevented by a fence or some other physical barrier. The EPA contacted Florida regarding this issue. Florida responded via email[11] that they closely examined the fence line boundaries used in the modeling to ensure that public access is precluded from all areas that are being treated as non-ambient air. Hence, the EPA believes that Florida's decision to remove receptors from within the fence line boundaries is acceptable. Since Sierra Club's modeling receptor grid removed the same receptors from within the CPPP fenceline, the EPA agrees that the ambient air fenceline boundary is appropriate.

2.4.3.5. Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building

[11] Email from Brian Himes with FDEP to Rick Gillam with EPA on August 9, 2017.

downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

The Sierra Club characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the Sierra Club used actual stack heights in conjunction with actual emissions. The Sierra Club also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash. The EPA agrees with Sierra Club's building downwash methodology associations for CRPP's sources and agrees with their source characterization for the area.

2.4.3.6. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, organizations may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that an organization should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the Sierra Club included only CRPP as a modeled source within the 35 km area of analysis. The Sierra Club has chosen to model this facility using actual emissions.

For CRPP, the Sierra Club provided annual actual SO_2 emissions between 2012-2014, 2013-2015, and 2014-2016. This information is summarized in Table 9. A description of how the Sierra Club obtained hourly emission rates is given below this table.

Table 9. Actual SO_2 Emissions Between 2012 – 2016 from Facilities in the Citrus County Area

Facility Name	SO_2 Emissions (tpy)				
	2012	**2013**	**2014**	**2015**	**2016**
CRPP	26,674	28,845	32,550	23,234	12,104
Total Emissions from All Modeled Facilities in the Sierra Club's Area of Analysis	26,674	28,845	32,550	23,234	12,104

For CRPP, the actual hourly emissions data were obtained from CEMS for all years.

For the 2012-14 period, the same hourly stack exit velocities and temperatures from Florida's original modeling analysis were used. These had been obtained from measurements from the CEMS used at CRPP. The only change to the hourly stack information was the use of actual hourly SO_2 emissions as reported to the EPA. Previously, in Florida's original modeling demonstration dated January 17th, 2017, the State modeled for the 2012-2014 time period using a combination of actual and "simulated actual" emissions. Florida asserted that sufficient data was not available to characterize the current emissions regime for Units 1 and 2 using actual hourly data. Unlike Florida's analysis, no changes were made to the CEMS emissions in Sierra Club's modeling.

For the 2015-16 years, CEM measured hourly stack exit velocities and temperatures were not available. The Sierra Club estimated the hourly exit velocity of each stack using the hourly heat input (mmBTU – million British thermal units) and flow rate (scf - standard cubic feet) information from the CEMS for the 2012-14 period. A correlation was derived based on scf)) of stack exhaust flow rate per mmBTU) heat input for Units 1, 2, 4 and 5. These correlations were determined to be as follows: Unit 1 – 17,744 scf per mmBTU, Unit 2 – 17,223 scf per mmBTU and Units 4 and 5 combined – 19,124 scf per mmBTU. These correlations were applied to the hourly heat input reported for each unit.

Since the stack exit temperature could not be estimated, a fixed value was used for each hour. These were based on the median determined from the CEM measurements for 2012-14 and were as follows: Unit 1 – 419 °K, Unit 2 - 401 °K and Units 4 and 5 combined – 331 °K

The estimated hourly flow rate, fixed exit temperature and stack diameter were then combined to calculate the exit velocity for each hour during the 2015-16 years. To assess the accuracy of their approach, Sierra Club used the same methodology to estimate the stack parameters for the 2012-2014, time period. The modeling results for this period using the estimated stack parameters

were within 0.2 percent of the results based on the original CEM measurements. The EPA believes that Sierra Club's use of actual emissions and estimated stack parameters for the CRPP facility were appropriate for their modeling analysis. However, the EPA believes that Florida's use of the most recent 3-year period of actual emissions (July 2014 – June 2017) from CRPP and concurrent meteorology provides the best information for making the final designation because it is the most reflective of the current air quality in the area.

2.4.3.7. Modeling Parameter: Meteorology and Surface Characteristics

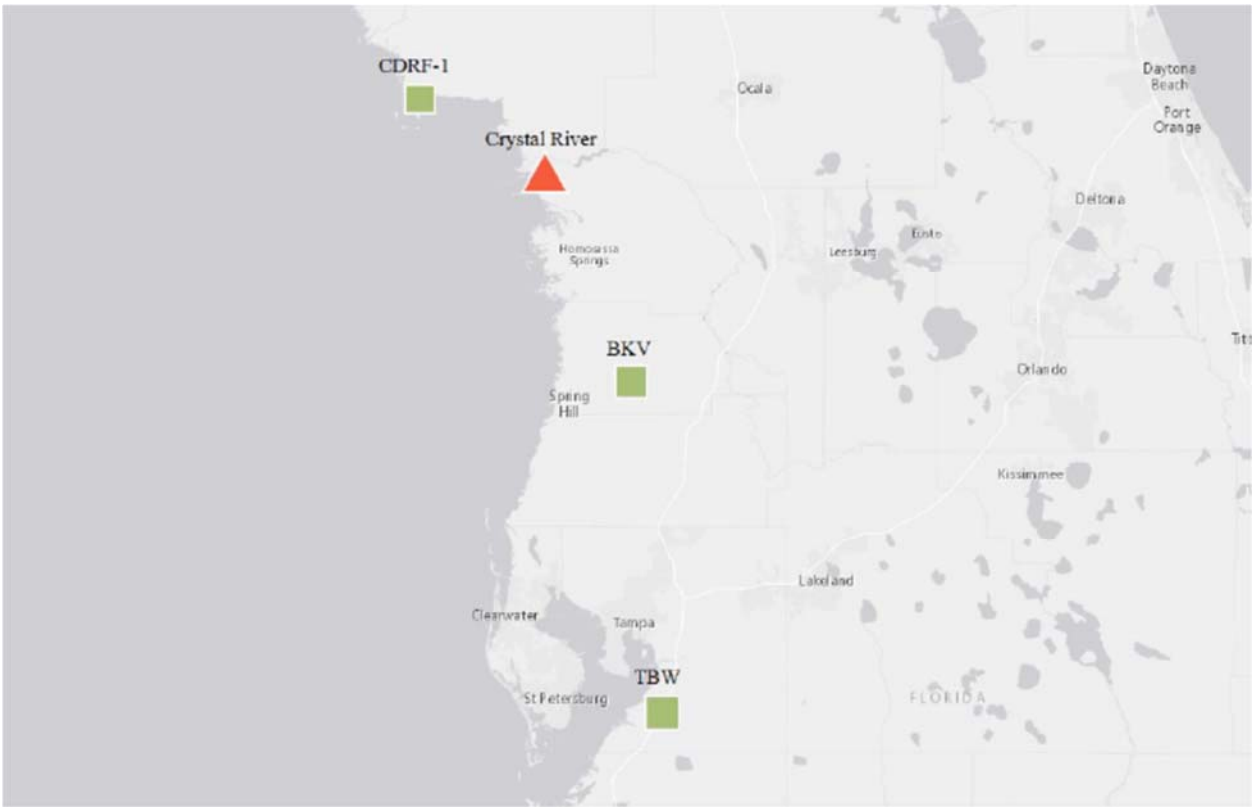
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include NWS stations, site-specific or onsite data, and other sources such as universities, FAA, and military stations.

For the area of analysis for the Citrus County, Florida, area, the Sierra Club was consistent with the State and selected the surface meteorology from Cedar Key Coastal-Marine Automated Network (C-MAN) station (CDRF-1), operated by the National Data Buoy Center (NDBC). This land based station is located approximately 38 km northwest of CRPP in a similar coastal environment. CDRF-1 is a limited station that records only temperature, dew point, atmospheric pressure, and wind speed and direction. The Hernando County Airport (BKV) which is nearly 60 km southeast CRPP was an additional NWS data set used with ONSITE and SURFACE keywords to fill in missing data for CDRF-1. The coincident upper air observations from Ruskin, Florida, (TBW) at best represents meteorological conditions within the area of analysis.

The State used AERSURFACE version 13016 using data from CDRF-1 to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [zo]) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space. The Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance. The surface roughness is sometimes referred to as "zo." The State estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for wet and average conditions.

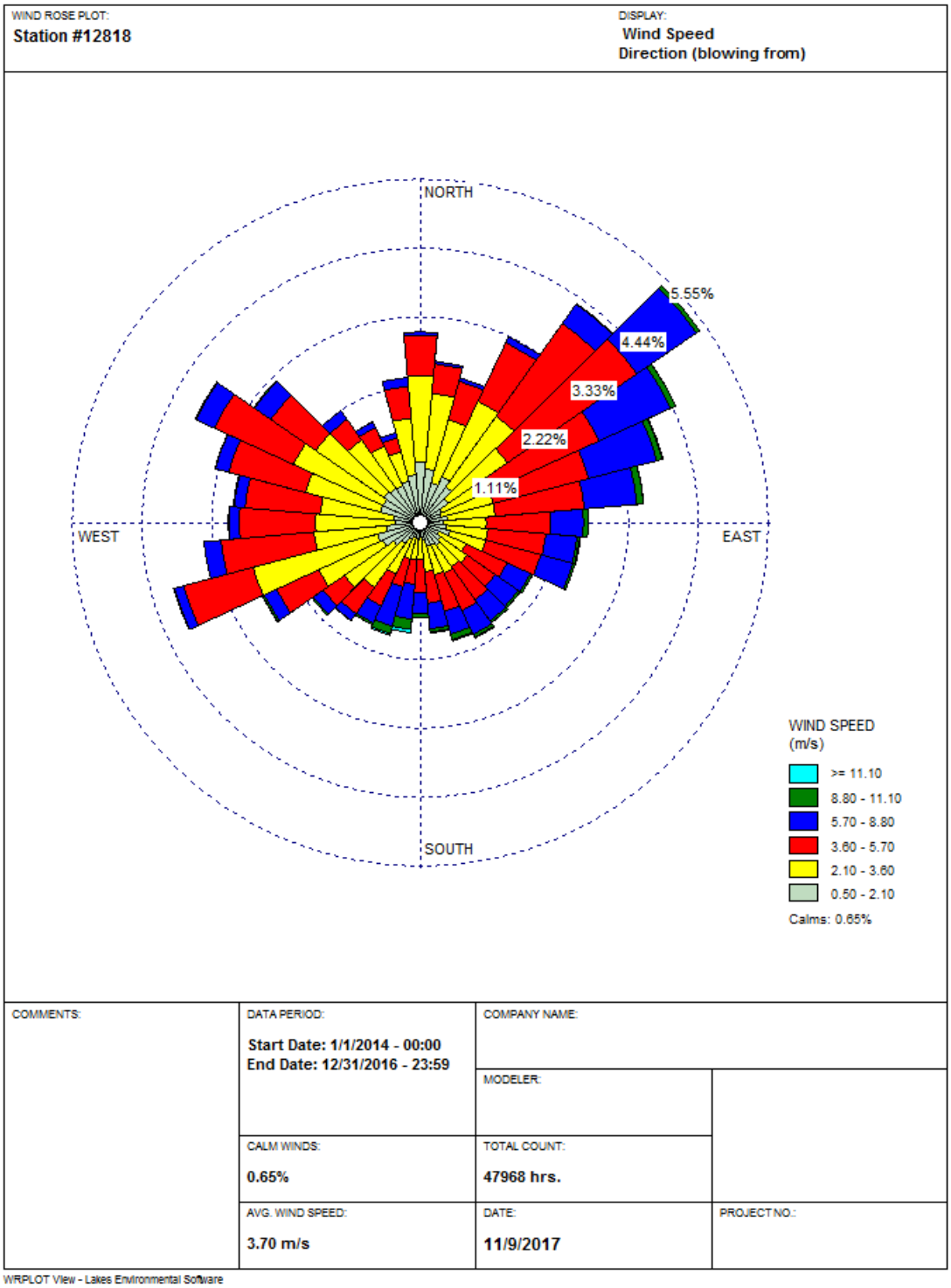
In the EPA generated figure below, the location of the NWS station CDRF-1 is shown relative to the area of analysis.

Figure 12. Area of Analysis and the NWS station in the Citrus County, Florida Area



The EPA generated a wind rose for the Cedar Key Coastal-Marine Automated Network (C-MAN) station (CDRF-1) for the July 2014 through June 2017 period. In Figure 13, the frequency and magnitude of wind speed and direction are defined from where the wind is blowing. Analysis of the NWS data indicate winds predominately blow from the northeast, north, northwest, and west directions.

Figure 13. Citrus County Cumulative Annual Wind Rose for Years 2014 – 2016



The Sierra Club obtained pre-processed meteorological data for the 2012 to 2016 period from Florida DEP staff. This ensured consistency with the State's choice of data. These data were processed using the most recent version of AERMET, v. 16216. The data used for the original modeling analysis by the State were processed with an earlier version of AERMET, v.15181.

Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The State followed the methodology and settings presented in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from Cedar Key Coastal-Marine Automated Network (C-MAN) station (CDRF-1) operated by the NDBC supplemental with along with the BKV dataset as NWS data using the ONSITE and SURFACE keywords. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the State set a minimum threshold of 0.5 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA believes the meteorology and surface characteristics used in the Sierra Club's modeling are acceptable and consistent with Florida's. The meteorology made use of the surface meteorology from Cedar Key Coastal-Marine Automated Network (C-MAN) station located approximately 38 km northwest of CRPP in a similar coastal environment, with coincident upper air observations from Ruskin, Florida, (TBW) as best representative of meteorological conditions within the area of analysis. The EPA believes that the meteorological data reasonably shows that impacts from Crystal River Power Plant can be expected to the southwest of the facility.

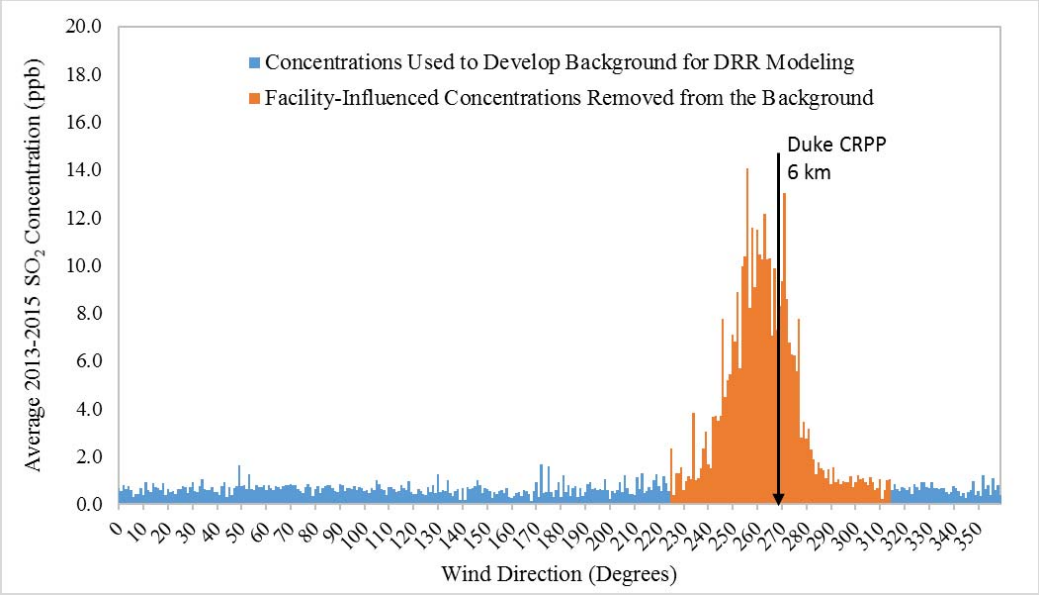
2.4.3.8. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is best described as flat. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS NED. The EPA has assessed this component of Sierra Club's modeling and concludes that it is consistent with Florida's January 13, 2017, October 20, 2017, and November 2, 2017, modeling and is appropriate.

2.4.3.9. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. The Sierra Club used background concentrations that were developed by Florida DEP for their original January 13, 2017, modeling analysis. For this area of analysis, the State chose to use a tier 2 approach. Data were obtained from 2013-2015, time period from the Crystal River Preserve monitor (AQS Site: AQS site ID # 12-017-0006), approximately 5.5 km east of CRPP facility. 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 CRPP. In this case, any measurement recorded when the wind direction was from 225° to 314° was removed from the background calculation as shown in Figure 14.

Figure 14. 2013-2015 average SO_2 concentrations by wind direction for monitor 12-017-0006. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.



The 99th percentile (2nd high) concentration for each hour by season was then averaged across the three years and the resulting array was input into AERMOD with the BACKGRND SEASHR keyword (see below). The data used were obtained from the FAMAS for monitoring station No. 12-017-0006 for the period December 2013 to December 2015. The EPA guidance recommends using three years of concurrent monitoring data to develop the background concentrations. For all of their modeling runs, the Sierra Club did not use the most recently available concurrent data from this monitor (2014 – 2016). The revised modeling submitted by FDEP on November 2, 2017, used more recent 2014-2016 background data (see Section 2.4.2.9 of this TSD), and therefore is more appropriate for evaluating the current air quality in the area.

Table 10 contained in the January 13,2017, Florida Modeling Report provides the temporally varying background concentrations used in Sierra Club's modeling.

Table 10. Tier 2 Temporally Varying Background Concentrations from the Crystal River Preserve monitor (AQS Site: AQS site ID # 12-017-0006.) Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.

Hour	Winter	Spring	Summer	Autumn	Hour	Winter	Spring	Summer	Autumn
0:00	1.00	1.50	1.50	2.00	12:00	1.67	1.50	10.50	2.50
1:00	0.67	1.50	1.50	2.00	13:00	1.33	1.50	10.00	2.50
2:00	0.67	1.50	1.50	2.00	14:00	1.00	2.00	1.50	3.50
3:00	0.67	1.50	1.50	2.00	15:00	1.67	2.00	7.50	2.00
4:00	0.67	1.50	1.50	2.00	16:00	1.00	1.50	1.50	2.00
5:00	0.67	1.50	1.50	2.00	17:00	0.67	1.50	1.50	2.00
6:00	1.00	2.00	1.50	2.50	18:00	0.67	1.00	4.00	2.00
7:00	0.67	1.50	1.50	2.00	19:00	0.67	1.50	2.50	2.50
8:00	0.67	2.50	2.00	2.00	20:00	1.00	7.00	2.00	3.50
9:00	1.00	2.50	7.50	2.50	21:00	0.67	3.50	1.50	2.50
10:00	2.00	5.50	4.50	3.50	22:00	1.33	2.50	3.50	3.00
11:00	2.00	2.00	3.00	3.00	23:00	1.33	1.50	1.50	2.00

2.4.3.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Citrus County area of analysis are summarized below in Table 11.

Table 11. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Citrus County Area

Input Parameter	Value
AERMOD Version	16216r
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	20
Modeled Fencelines	1
Total receptors	11,460
Emissions Type	Actual
Emissions Years	2012-2014, 2013-2015, 2014-2016
Meteorology Years	2012-2014, 2013-2015, 2014-2016
NWS Station for Surface Meteorology	Cedar Key Coastal-Marine (CDRF-1) Hernando County Airport (BKV)
NWS Station Upper Air Meteorology	Ruskin, Florida (TBW)
NWS Station for Calculating Surface Characteristics	Cedar Key Coastal-Marine (CDRF-1)
Methodology for Calculating Background SO_2 Concentration	12-017-0006, 2013-2015 Season by Hour option in AERMOD
Calculated Background SO_2 Concentration	Temporally Varying

The results presented below in Table 12 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 12. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over Three Years for the Area of Analysis for the Citrus County Area

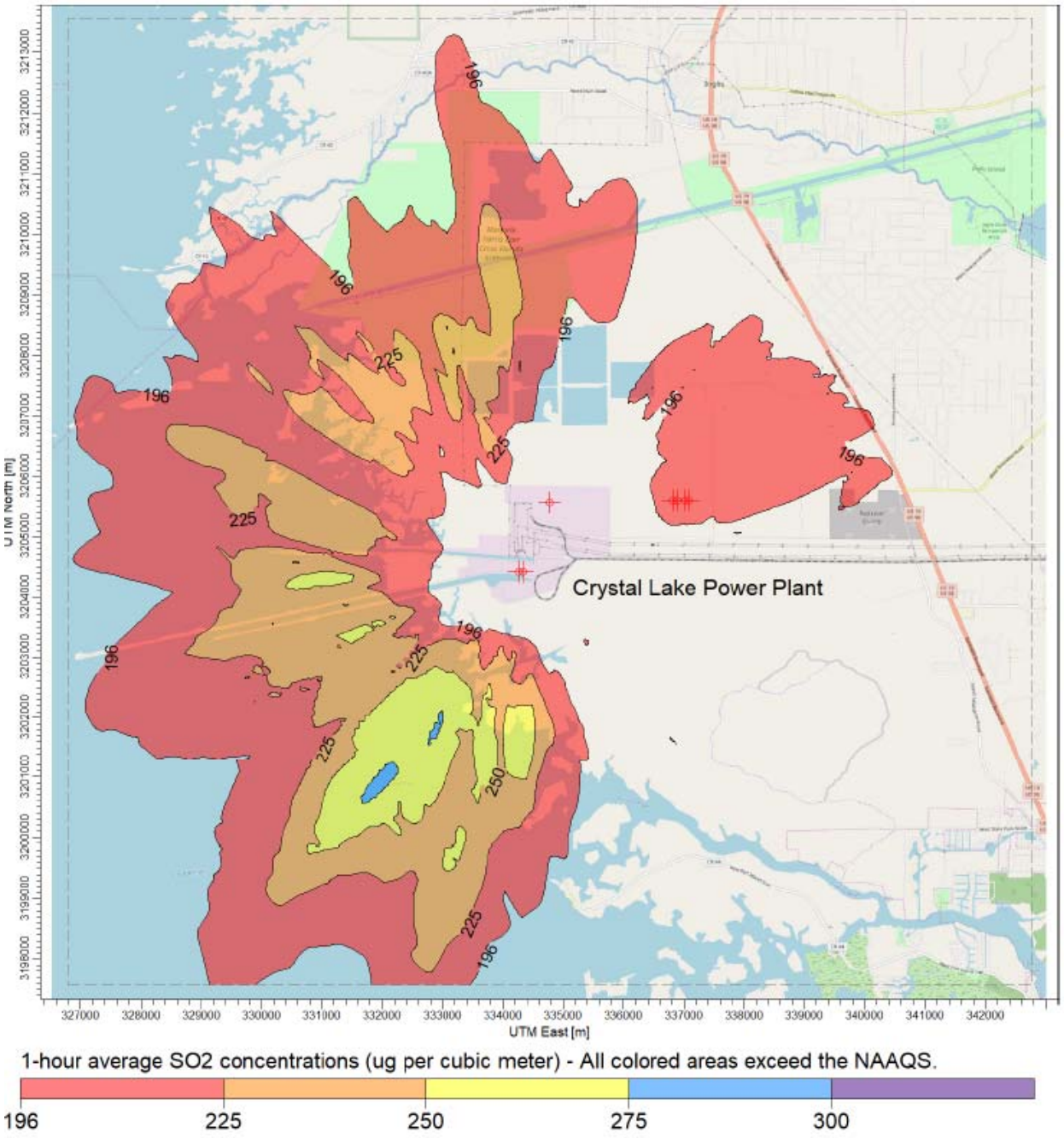
Averaging Period	Data Period	Receptor Location 17N		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m^3)	
		UTM Easting	UTM Northing	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012-2014	332880	3201567	341.8	196.4*
99th Percentile 1-Hour Average	2013-2015	331780	3201167	326.7	196.4*
99th Percentile 1-Hour Average	2014-2016	332080	3201067	282.5	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb reflecting a 2.619 µg/m^3 conversion factor
** UTM stands for Universal Transverse Mercator

The Sierra Club's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain for the 2014-2016[12] timeframe is 282.5 µg/m^3, equivalent to 108 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 15 below was included as part of the Sierra Club's recommendation, and indicates that the predicted value occurred southwest of CRPP, over the Gulf of Mexico. The State's receptor grid is also shown in the figure.

[12] The EPA believes the 2014-2016 results from the Sierra Club's modeling is the most relevant for this analysis, because it is most reflective of the current conditions from the 3 modeling runs they performed and is most comparable to the supplemental modeling provided by Florida on October 20, 2017, and November 2, 2017.

Figure 15. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years (2014-2016) for the Area of Analysis for the Citrus County Area



The modeling submitted by the Sierra Club indicates that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. The modeling results also include the area in which a NAAQS violation was modeled.

2.4.3.11. The EPA's Assessment of the Modeling Information Provided by Sierra Club

The EPA believes that the modeling methodology used by the Sierra Club to characterize the area surrounding the facility is appropriate for the data that was used and considered. However, the modeling provided by FDEP in response to the EPA's 120-day letter used a more recent set of actual emissions (July 2014-June 2017), meteorology (July 2014-June 2017) and background concentrations (January 2014-December 2016), and is therefore more appropriate for characterizing the current air quality in the Citrus County area. The Sierra Club relied heavily on Florida's original January 13, 2017, modeling analysis, using the same modeling inputs provided by Florida, with the exception of using 2012-2014, 2013-2015, and 2014-2016 actual emissions and concurrent meteorology. Given the criteria for selecting nearby sources, we believe that the decision to include only the CRPP facility, and excluding all other sources from the modeling analysis was appropriate. All other nearby sources not included in the modeling were accounted for in the background concentrations used in the modeling. With regards to the background concentrations, the Sierra Club chose the nearest monitor with valid data for the 2013-2015, time period. The EPA agrees with the monitor chosen for background concentrations; however, the Sierra Club did not use the most recently available data from the monitor (2014-2016). The EPA also agrees that the surface and upper air meteorological data used in this analysis is appropriate for performing a valid modeling assessment. However, the EPA believes that Florida's use of the most recent 3-year period of actual emissions (July 2014 – June 2017) from CRPP and concurrent meteorology provides the best information for making the final designation because it is the most reflective of the current air quality in the area.

With regards to the receptor grid, the Sierra Club did not remove any receptors from locations not feasible for placing a monitor, as discussed in EPA's guidance. Specifically, they did not remove receptors over the Gulf of Mexico which is where the maximum concentrations were located. In the October 20, 2017, and November 2, 2017, modeling submitted by Florida in response to the EPA's 120-day letter, the receptor grid was modified by removing receptors from locations that are not feasible for placing a monitor, consistent with Section 4.2 of the Modeling TAD. The complete details of the modifications to the receptor grid are discussed in Section 2.4.2.4 of this final TSD document. The EPA believes that Florida's modified receptor grid used in their November 2, 2017, modeling analysis is the most appropriate for the characterization of the area, because the Sierra Club's modeling includes receptors located over water and wetlands where it is not feasible to site a monitor.

2.5. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Citrus County Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

2.6. Jurisdictional Boundaries in the Citrus County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Citrus County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

Florida did not provide any jurisdictional information that the EPA used in the intended designation action for Citrus County. This factor, however, did play a significant role in the EPA's analysis. Since Florida recommended a designation of "attainment" or "unclassifiable" for Citrus County, the EPA determined that a boundary based on jurisdictions such as census block groups is appropriate for the area surrounding the source and monitor. Additionally, the EPA could not rely on modeling provided by Florida to inform the unclassifiable boundary that used simulated actual emissions.

2.7. Other Additional Information Relevant to the Designations for the Citrus County Area

In its January 13, 2017 submission, Florida noted that the largest sources of SO_2 at CRPP, Units 1 and 2, have recently begun burning low-sulfur coal resulting in significant SO_2 emissions reductions. The switch from coal with an average sulfur content of 1.02 percent to coal with an average sulfur content of 0.41 percent in February 2016 has resulted in an SO_2 emission rate reduction of more than 50 percent. Florida stated that the recent significant change in emissions from Units 1 and 2 means that the actual emissions data from 2012-2014 are no longer representative of the ambient concentrations in the area around CRPP and should not be used to characterize the area. Both units have an electrostatic precipitator for controlling particulate matter emissions. The facility is expected to continue to use the low-sulfur coal in Units 1 and 2 for the remainder of their lifespans (through 2018) in order to comply with the EPA's Mercury Air Toxics rule.

2.8. The EPA's Assessment of the Available Information for the Citrus County Area

Data collected by the Crystal River Preserve SO_2 monitor (AQS ID: 12-017-0006) in Citrus County is comparable to the 2010 SO_2 NAAQS. The most recent three calendar years of complete, quality-assured, certified data from this monitor (2014-2016) indicate a violating 1-hour SO_2 design value of 81 ppb. The monitor is located 3.4 miles east of CRPP. The monitor has not been demonstrated to be located to characterize the maximum 1-hour SO_2 concentrations near CRPP or the area. On December 14, 2017, EPA received a letter from the Florida Department of Environmental Protection (DEP) regarding the ambient air quality data measured at monitoring site 120170006 in Citrus County, Florida. Specifically, DEP indicated that, to the best of their knowledge, the data in the Air Quality System (AQS) for SO_2 concentrations as of December 9, 2017, are accurate and meet the criteria in 40 CFR Part 58, Appendix A.

EPA has independently reviewed the data available in AQS for Citrus County. Since more than 301 daily values have been collected for 2017, the 99th percentile value is equal to the 4th highest value. The 4th highest value is the value used for the design value calculation. Therefore, if 37 ppb - the 4th highest value recorded thus far in 2017 - was used to calculate a three-year design value (2015-2017), the monitor would produce a design value that is lower than the SO_2 NAAQS. After considering the 4th highest values recorded in 2015 and 2016, we have determined that if the Citrus County monitor does not record 4 daily maximum 1-hour averages of 90 ppb or higher between December 10 and December 31, 2017, then the 4th highest value would be 89 ppb or less and the design value calculation for 2015-2017 would be lower than the NAAQS. However, since a design value is based upon three years of data, EPA cannot officially calculate a design value for 2015-2017 to determine whether the monitor is officially attaining until the 2017 data are complete and certified by DEP after December 31, 2017 (per EPA regulations at 40 CFR Part 58).

Florida also provided a new air quality modeling analysis to characterize the maximum 1-hour SO_2 concentrations in the area. That modeling utilized emissions that are representative of actual emissions from the most recent three-year period, July 2014 through June 2017. Therefore, the modeling is reliable for designations purposes.

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA has reached the conclusion that there is uncertainty whether the area is meeting the 2010 SO_2 NAAQS based on the available reliable monitoring data and modeling analyses. After careful evaluation of the State's recommendation and supporting information, as well as all available information, the EPA has reached the conclusion that there is uncertainty whether the area is currently meeting the 2010 SO_2 NAAQS based on the most recent certified monitoring data supporting a complete 3-year period's design value, newer available reliable monitoring data, and modeling analyses. Although the modeled design value is below the NAAQS, we do not yet have a valid, certified three-year (2015-2017) monitored design value that attains the NAAQS and supersedes the most recent certified design value that does not meet the NAAQS. Consequently, we are designating the area as unclassifiable.

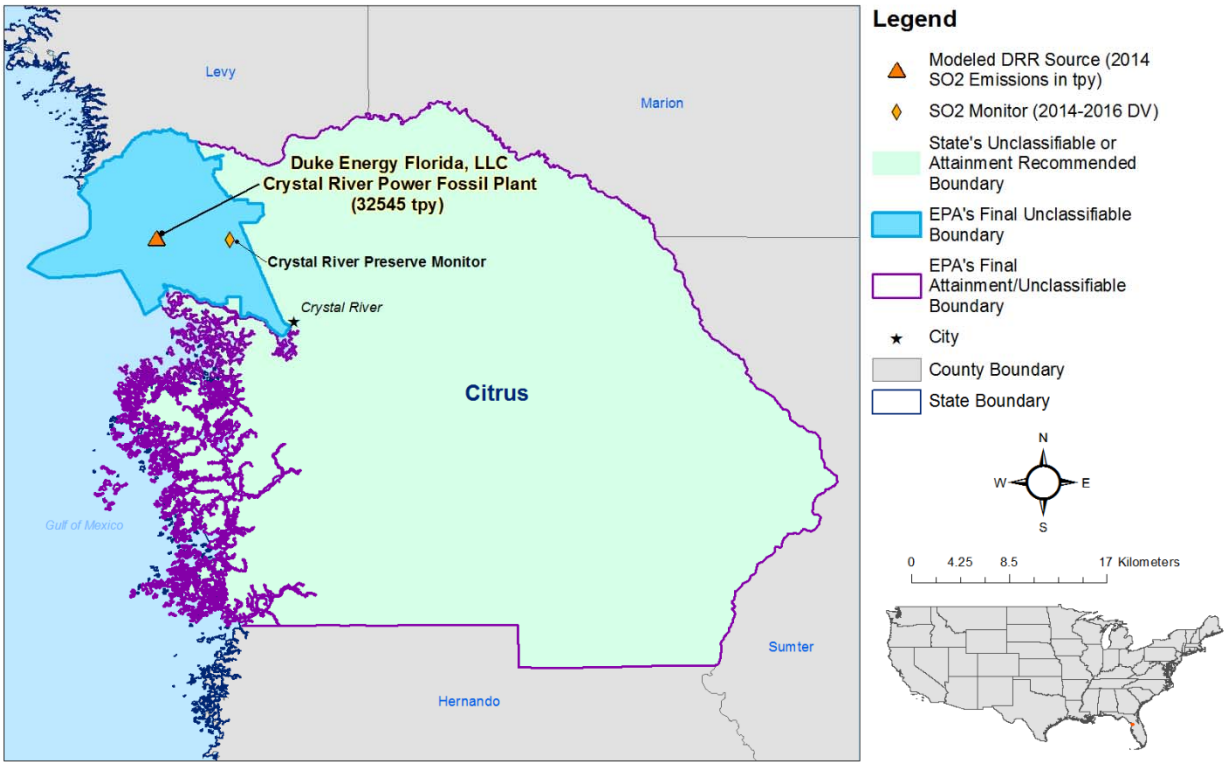
Further, the EPA finds it appropriate to consider, in addition to the air quality monitoring data, sources of emissions and jurisdictional boundaries to inform a boundary for the unclassifiable area.

The EPA believes that our final unclassifiable area, including census block groups that contain CRPP, the monitor, and the area in between the two, will have a clearly defined legal boundary, and we intend to find this boundary to be a suitable basis for defining our final unclassifiable area.

2.9. Summary of Our Final Designation for the Citrus County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA is designating a portion of Citrus County as unclassifiable for the 2010 SO_2 NAAQS at this time, with the remainder of Citrus County being designated as attainment/unclassifiable. Specifically, the boundary is comprised of census block groups 4504004 and 4505002. The State recommended that the area surrounding CRPP be designated "attainment" or "unclassifiable," and the EPA's final partial county unclassifiable boundary is consistent with the approach used in prior designations for areas without modeling suitable to inform the boundary. Figure 16 shows the boundary of this intended designated area.

Figure 16. Boundary of the Citrus County Unclassifiable Area



In our August 22, 2017 intended designations, the EPA provided two options to Florida in order to change the designation for Citrus County prior to the effective date of designations. In the first

option, the EPA provided that if the Citrus County SO_2 monitor produces a valid attaining design value for the 2015 – 2017 period and no other information indicates there is a NAAQS violation for the 2015 - 2017 period attributable to CRPP, then the EPA will change the designation of the area to unclassifiable. This was contingent on Florida early-certifying their data in advance of the effective date in early 2018 instead of the standard May 1, 2018 deadline. The unclassifiable designation would be consistent with designations for other areas around sources for which the EPA has no modeled violation. The designated area (to be determined) would be based on clearly defined, legal, jurisdictional boundaries that encompasses CRPP.

In the second option, the EPA provided that if, prior to the effective date of designations, the Citrus County SO_2 monitor produces a valid attaining design value for the 2015 – 2017 period, and credible modeling is provided for CRPP that indicates attainment for the current 3-year period, then the EPA will change the designation of the area to unclassifiable/attainment. The designated area would be Citrus County in its entirety. Since Florida has already provided such modeling, the EPA will change the designation of the area from unclassifiable to attainment/ unclassifiable if before the effective date of the designation Florida provides a valid attaining design value for the 2015 – 2017 period that supersedes the currently monitored violation.

3. Technical Analysis of New Information for the Polk County Area

3.1. Introduction

The EPA must designate the Polk County area by December 31, 2017, because the area has not been previously designated and Florida has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Polk County.

There were three separate modeling areas within Polk County that were assessed as part of the intended designations:

a) The Polk County area addressing Mosaic Fertilizer, LLC., (New Wales) Mulberry Facility
b) The Polk County area addressing Mosaic Fertilizer, LLC Bartow Facility
c) The Polk County area addressing Lakeland Electric-C.D. McIntosh, Jr. Power Plant.

Florida had grouped and/or separated sources as appropriate for this purpose, and the available modeling analysis for each area of analysis was discussed in Chapter 9 of the TSD for the intended Round 3 area designations. The EPA received additional information from Florida DEP on October 20, 2017 for the Polk County area addressing Mosaic-New Wales in response to the EPA's intended nonattainment designation identified in the 120-day intended designations. This new analysis for the Mosaic-New Wales area is addressed in the following sections of this TSD. The other modeled areas for Polk County (i.e. the areas around Mosaic-Bartow and McIntosh) were not addressed in Florida's October 2017 submission and the analysis remains as described in Chapter 9 of the TSD for the intended Round 3 area designations.

On October 20, 2017, Florida transmitted a letter and supporting information responding directly to the EPA's intended designation recommendations[13] which includes a source specific pre-hearing state implementation plan (SIP) revision requesting EPA to incorporate new SO_2 emissions limits for two facilities in Polk County, Florida (the Mosaic New Wales and Mosaic Bartow facilities).[14] Florida's intended designation response relies on dispersion modeling using future new allowable SO_2 emission limits for the two Mosaic Fertilizer sources in Polk County. The intended designation response letter reaffirms the state's designation recommendations, as well as provides an alternative nonattainment boundary around the Mosaic New Wales facility. Additionally, the letter references Florida's January 13, 2017, modeling that was submitted to comply with the Data Requirements Rule (DRR). The results of the January 2017 modeling show an area of modeled violations of the 1-hour SO_2 NAAQS in the vicinity of the Mosaic New Wales facility based upon 2012-2014 actual emissions. EPA's analysis and proposed

[13] Letter from Jeffery F. Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, to Trey Glenn, Regional Administrator, U.S. EPA Region 4, dated October 20, 2017, regarding area designations for the State of Florida for the 2010 sulfur dioxide NAAQS.
[14] Letter from Jeffery F. Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, to Trey Glenn, Regional Administrator, U.S. EPA Region 4, dated October 20, 2017, providing a pre-hearing source-specific SIP revision for the Mosaic New Wales and Mosaic Bartow facilities.

conclusions regarding the January 2017 modeling was provided in Chapter 9 of the TSD for the intended Round 3 area designations.

The source specific pre-hearing SIP revision requests that EPA approve the into the FL SIP the new SO_2 emissions limits for two facilities in Polk County, Florida (the Mosaic New Wales and Mosaic Bartow facilities)[15]. These new permit limits for the two facilities reflect projected lower SO_2 emissions resulting from catalyst upgrades on the sulfuric acid plants at both facilities, which began in January 2017 and are required by permits to be completed by August 31, 2019. Florida's pre-hearing submittal includes the same future allowable modeled analysis mentioned above using the new permitted allowable emissions rates for both Mosaic New Wales and Mosaic Bartow facilities. The results of this modeling show that the new permit limits may resolve all of the previous modeled violations, and may result in the area attaining the NAAQS once all of the catalyst upgrades are completed by August 31, 2019.[16] The modeling provided in the October 20, 2017, 120-day response and pre-hearing SIP package is an update to a supplemental Data Requirements Rule (DRR) modeling report prepared by Florida and provided to the EPA on June 23, 2017[17]. This June 2017 modeling was based upon proposed SO_2 emission limits for the two facilities. The EPA reviewed the June 2017 modeling and supporting documentation and provided comments to Florida in an email dated September 27, 2017[18]. The modeling provided by Florida in the October 20, 2017 submittal incorporated revisions to the June 2017 modeling to address the EPA's comments and is based upon final emissions limits that were incorporated into construction permits for the Mosaic New Wales and Mosaic Bartow facilities.

In November 2017, the EPA reviewed the pre-hearing SIP submittal and provided comments on the package to Florida in a letter dated November 17, 2017[19], including comments on the updated modeling. On December 1, 2017, Florida submitted a final source-specific SIP revision incorporating the new SO_2 emissions limits for the Mosaic New Wales and Mosaic Bartow facilities.[20] The SIP revision includes revised modeling that addresses the EPA's comments on

[15] Letter from Jeffery F. Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, to Trey Glenn, Regional Administrator, U.S. EPA Region 4, dated October 20, 2017, providing a pre-hearing source-specific SIP revision for the Mosaic New Wales and Mosaic Bartow facilities.

[16] EPA is not at this time reaching a judgment about whether Florida's SIP submission associated with this modeling can be approved under section 110 of the Clean Air Act. Such a judgment will occur in a separate and future notice and comment rulemaking.

[17] Letter from Jeffery F. Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, to V. Anne Heard, Acting Regional Administrator, U.S. EPA Region 4, transmitting supplemental air modeling for the Polk County area.

[18] Email from Rick Gillam, Senior Air Modeler, U.S. EPA Region 4 to Brian Himes, Air Modeler, Florida Department of Environmental Protection, dated September 25, 2017, regarding comments on Florida's June 2017 Supplemental DRR Modeling for the Polk County area.

[19] Letter from R. Scott Davis, Chief of the Air Planning and Implementation Branch, U.S. EPA Region 4, to Jeff Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, dated November 17, 2017, regarding comments on Florida's October 20, 2017, pre-hearing SIP submittal.

[20] Letter from Jeffery F. Koerner, Director, Division of Air Resource Management, Florida Department of Environmental Protection, to Trey Glenn, Regional Administrator, U.S. EPA Region 4, dated December 1, 2017, transmitting Florida's proposed SIP revision.

the modeling provided in the state's October 20, 2017 submittal (i.e. intended designation response and source-specific pre-hearing SIP submittal).

The following sections of this TSD provide a summary of the EPA's analysis and conclusions related to the information provided by Florida on October 20, 2017, and December 1, 2017, to the extent relevant to conducting an analysis of current air quality. This TSD in no way represents a proposed or final determination by EPA regarding the approvability of Florida's submitted SIP revision. Florida has not provided information to demonstrate that the new permit limits for the Mosaic New Wales and Mosaic Bartow facilities are currently being met, only that the facilities will be complying with the new limits by August 30, 2019. Area designations cannot be based upon projected future ambient concentrations. Therefore, the EPA is basing our final nonattainment designation for the area on the January 2017 modeling which shows modeled violations of the 1-hour SO_2 NAAQS, as this remains the best available information to inform a judgment about current air quality in the area.

3.2. Summary of Information Reviewed in the TSD for the Intended Round 3 Area Designations

In the 120-day letter notification to the governor of Florida, and further explained in Chapter 9 of the TSD for the intended Round 3 area designations, the EPA announced an intended designation of nonattainment for the area based on all available information, including modeling information and all relevant monitoring information. Specifically, the nonattainment boundary was comprised of the area of modeled violation in Polk County and eastern portion of Hillsborough County surrounding the Mosaic – New Wales facility.

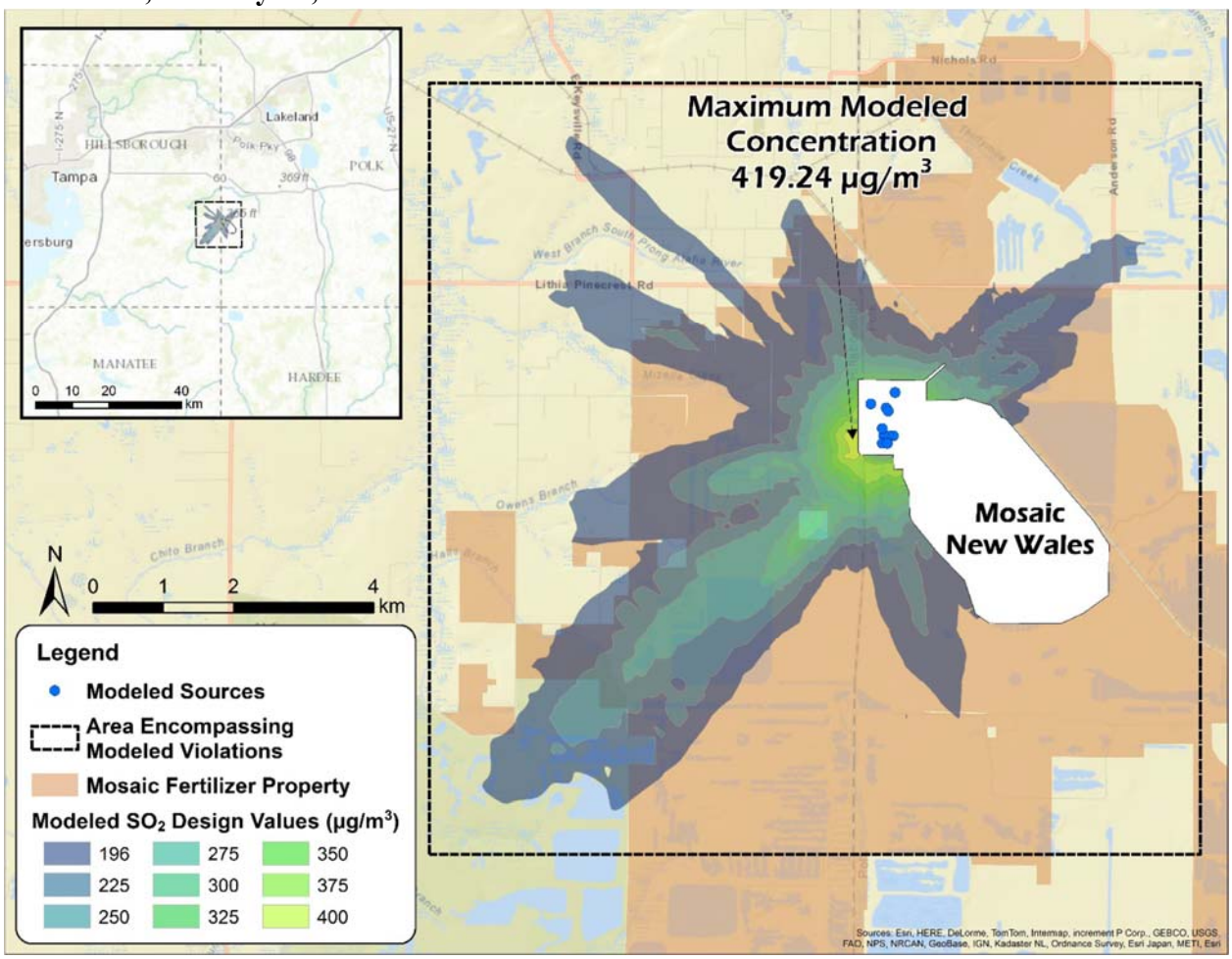
The following Table 13 identifies all the modeling assessments evaluated for the 120-day letters and discussed in the TSD for the intended Round 3 area designations. Additional details can be found in the TSD for the Intended Round 3 Area Designations, Chapter 9.

Table 13. Modeling Assessments Evaluated in the TSD for the Intended Designation for the Polk County Area

Organization Submitting Assessment	Date of the Assessment	Identifier used in the TSD for the Intended Round 3 Area Designations, Chapter 9	Distinguishing or Otherwise Key Features
Florida DEP	6/23/2017	Supplemental New Wales Modeling	Modeling using future allowable emissions not currently in effect
Florida DEP	01/13/2017	Polk County (New Wales) Modeling Report	Report
Florida DEP	06/30/2016	Florida Modeling Protocol	Protocol

For the intended designation, the EPA considered all available information for the Polk County area, excluding the supplemental New Wales modeling submitted by Florida on June 23, 2017. This supplemental modeling was extensive and included over 300 AERMOD modeling runs. Due to the timing of the submittal, the EPA was still reviewing the supplemental modeling demonstration to evaluate whether it was appropriate to inform the designation recommendation for the area. Therefore, the January 13, 2017, modeling report was used as the basis for the EPA's intended designation. Based on this report, the EPA agreed that Florida appropriately characterized the area surrounding the Mosaic-New Wales facility. The modeling submitted by the State indicated that the 1-hour SO_2 NAAQS was violated at the receptor with the highest modeled concentration of 419.24 $\mu g/m^3$. Figure 16 shows the extent of modeled violations using 2012-2014 actual emissions from the Mosaic-New Wales and Mosaic-Bartow facilities. Based upon a thorough evaluation of the information provided by Florida, the EPA concluded there were modeled violations of the 1-hour SO_2 NAAQS in ambient air locations near the Mosaic-New Wales facility.

Figure 16. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Area of Analysis for the Polk County, Florida Area. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.



3.3. Assessment of New Air Quality Monitoring Data for the Polk County Area

This factor considers the SO_2 air quality monitoring data in the area of Polk County. Our TSD for the intended area designations considered available data through 2016 for one monitoring site (AQS ID: 12-057-0081) in Polk County. We do not have certified data for any additional complete calendar years at any site, and we have no new monitoring information of any other type that warrants revising our prior analysis of available monitoring data.

3.4. Assessment of New Air Quality Modeling Analysis for the Polk County Area Addressing Mosaic Fertilizer, LLC., (New Wales) Mulberry Facility

3.4.1. Introduction

This section 3.4 presents all the newly available air quality modeling information for a portion of Polk County that includes Mosaic Fertilizer Mulberry (New Wales) Facility that was submitted by Florida in their October 20, 2017, response to the EPA's intended designations and in their December 1, 2017, proposed SIP revision.[21] (This portion of Polk County will often be referred to as "the Polk County area" within this section 3.4.) This area contains the following SO_2 sources, principally the source(s) around which Florida was required by the DRR to characterize SO_2 air quality:

- The Mosaic-New Wales and Mosaic Fertilizer – Bartow facilities emitted 2,000 tons or more annually. Specifically, Mosaic New Wales emitted 7,126.50 tons of SO_2 in 2014, and Mosaic Bartow emitted 4,045.72 tons of SO_2 in 2014. These sources meet the DRR criteria and thus are on the SO_2 DRR Source list. Florida has chosen to characterize them via modeling.

- The Mosaic Fertilizer South Pierce and Tampa Electric Company (TECO) Polk Power Station facilities do not emit 2,000 tons or more annually, but were included in the modeling assessment.

Because we have available results of air quality modeling in which these sources are modeled together, the area around this group of sources is being addressed in this section with consideration given to the impacts of all these sources.

On June 23, 2017, Florida submitted new modeling analyzing air quality in the area surrounding the New Wales facility. Although this analysis was submitted before the EPA issued its intended designations, this analysis is being addressed as a "new modeling analysis" because the EPA did not have the opportunity to review the analysis before issuing its intended designations. This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing a set of lower, future allowable emission limits and the development of a new property fenceline.

On December 1, 2017, Florida submitted additional modeling analyzing air quality in the area surrounding the New Wales facility as part of their proposed revision to the SIP. This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, that analyzed the lower, future allowable emission limits and new facility fenceline as described in the June 23, 2017, supplemental New Wales modeling. The only significant difference with this newest modeling is that it includes an updated future fenceline due to a recent land acquisition by the Mosaic New Wales facility. Details regarding the new future

[21] Note that by discussing the information submitted in Florida's SIP submission, the EPA is not proposing to take or taking final action regarding the SIP submission itself. Any such actions will be the subject of their own separate notices of proposed and final rulemaking published in the *Federal Register*.

fenceline are provided in the discussions of receptors in Section 2.4.5 of this TSD. The EPA considers this revised modeling assessment to completely supersede the prior assessment, as it reflects changes to the June 2017 modeling resulting from EPA comments. Moving forward, all modeling analysis discussed in the following sections will address this most recent, December 1, 2017 modeling submittal, except as otherwise specified.

On October 30, 2017, the Florida DEP issued an air construction permit to Mosaic-New Wales (New Wales Permit) that will require the facility to comply with a 1,090 lb/hr emissions cap for the five sulfuric acid plants (SAPs) based on a 24-hour average as determined by CEMS data. Compliance with the cap will be determined through reported CEMS data. The five-unit emissions cap of 1,090 lb/hr will be incorporated into the facility's title V permit. The facility began implementing physical changes to upgrade the catalysts used in their sulfuric acid plant (SAP) units in January 2017. The permitted schedule sets completion of this work and construction of the new fenceline by August 30, 2019. On July 3, 2017, the Florida DEP issued an air construction permit to Mosaic-Bartow (Bartow Permit) that requires the facility to comply with a 1,100 lb/hr emissions cap for the three SAPs based on a 24-hour average as determined by CEMS data. Similar to the New Wales facility, the Bartow facility will be installing new more efficient catalysts on the sulfuric acid plant units. Compliance with the cap will be determined through reported CEMS data. The permitted schedule sets completion of this work by August 30, 2019. The three-unit emissions cap of 1,100 lb/hr has been incorporated into the facility's title V permit.

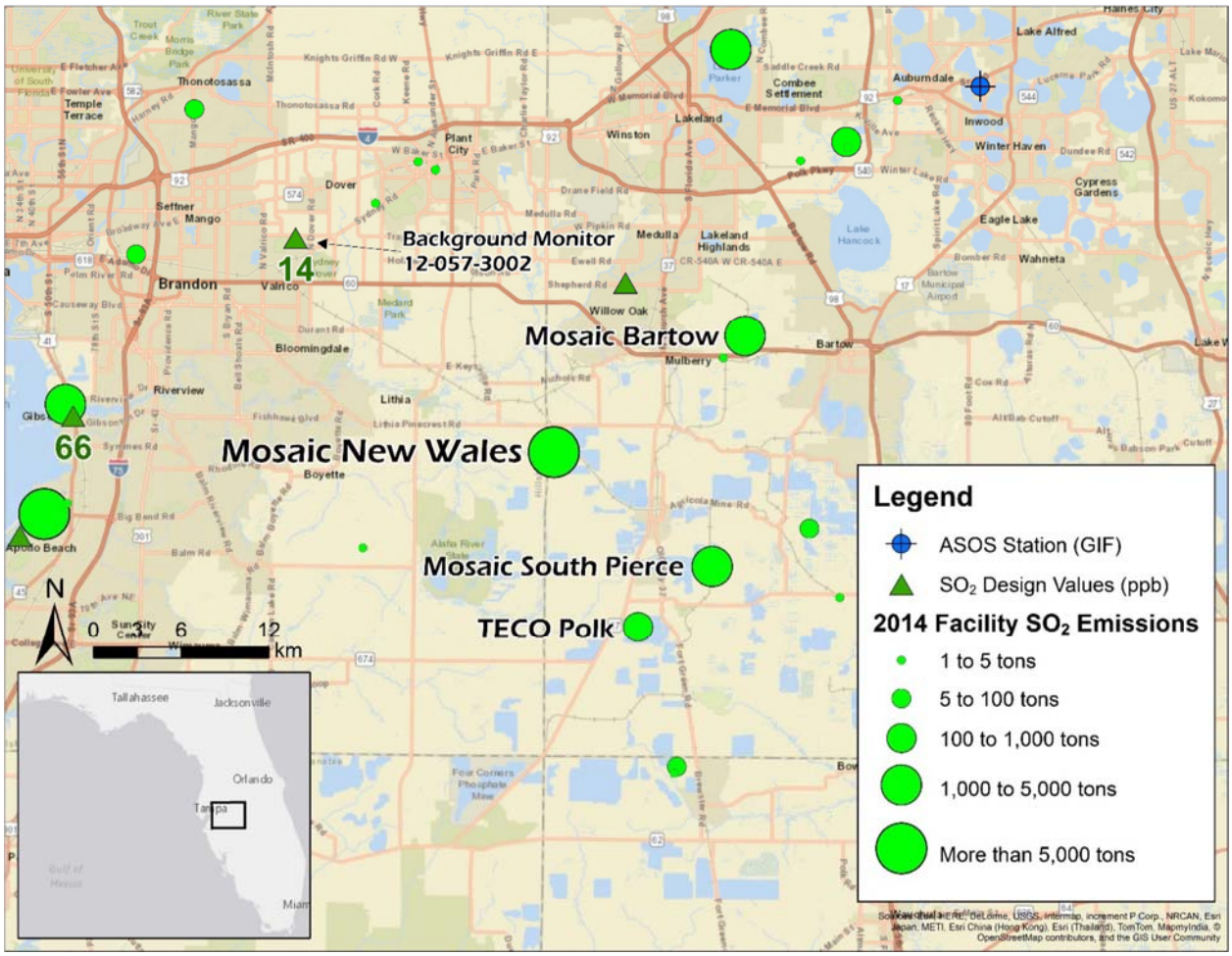
The area that Florida has assessed via air quality modeling is located in Polk County outside the City of Mulberry. The EPA expressed an intent to designate the area as nonattainment, whereas Florida's December 1, 2017 analysis was submitted by the State to support an attainment designation based on modeling future permit limits that will not be federally enforceable and effective until the construction at Mosaic-New Wales and Mosaic-Bartow is completed in August 2019. However, area designations cannot be based upon projected future ambient concentrations. Therefore, the EPA is basing our final nonattainment designation for the area on the January 2017 modeling which shows modeled violations of the 1-hour SO_2 NAAQS, as this modeling still represents the best available information to inform a determination regarding current air quality in the area.

As seen in Figure 17 below, the New Wales facility is located in Polk County within the city of Mulberry. The New Wales facility is near Mizelle Creek adjacent to Alafia River State Park.

Also included in the figure are other nearby emitters of SO_2.[22] These are Mosaic Fertilizer South Pierce, TECO Polk Power Station, and Mosaic Fertilizer Bartow. Additional sources in Figure 17 which are not labeled include Duke Hines Energy Complex, Seminole Electric Midulla Station, Wheelabrator Ridge Energy, Lakeland Electric McIntosh, Hillsborough Resource Recovery, Mosaic Fertilizer Riverview, and TECO Big Bend Station. These facilities are 35 km or less from the New Wales site and are all located in the western part of the State.

[22] All other SO_2 emitters of one tpy or more (based on information in the 2014 National Emissions Inventory) are shown in Figure 17. If no sources not named previously are shown, there are no additional SO_2 emitters above this emission level in the vicinity of the named source(s).

Figure 17. Map of the Polk County Area Addressing Mosaic - New Wales. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.



The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance cited in Chapter 1 of this TSD, as appropriate.

For this area, the EPA received and considered one new modeling assessment from the State, beyond those identified above in Table 13 that were reviewed in its TSD for its intended designations. To avoid confusion in referring to these assessments, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 14. New Modeling Assessments for the Polk County Area

Organization Submitting Assessment	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Florida DEP	12/01/17	Revised SIP Modeling	Modeling using future allowable emissions and expanded fenceline not currently in effect

3.4.2. Differences Among and Relevance of the Modeling Assessments

The December 1, 2017, revised SIP modeling analysis for New Wales in Polk County supersedes Florida's June 2017 Supplemental Modeling.[23] This analysis incorporates the most recent SO_2 emissions reductions for the Mosaic-New Wales and nearby Mosaic-Bartow facilities that will be fully effective by August 31, 2019. Specifically, this includes new, future emission limits issued in air construction permits for both facilities and an expanded proposed fenceline for Mosaic-New Wales based on new land acquisition by the company. All further discussion of state modeling results that follows reflects evaluation of this December 2017 revised SIP modeling analysis, except as otherwise explained.

3.4.3. Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute ASOS wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The State used AERMOD version 16216r. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

3.4.4. Modeling Parameter: Rural or Urban Dispersion

[23] The EPA notes the Agency is not making an assessment through this TSD of whether Florida's modeling submitted on December 1, 2017, is sufficient for the purposes of attainment planning or to support EPA's future action on Florida's SIP submission. If this modeling will be used to support a nonattainment plan, the EPA will consider this modeling for that purpose through the SIP process and will include public notice and comment on the Agency's evaluation of the modeling for such purposes.

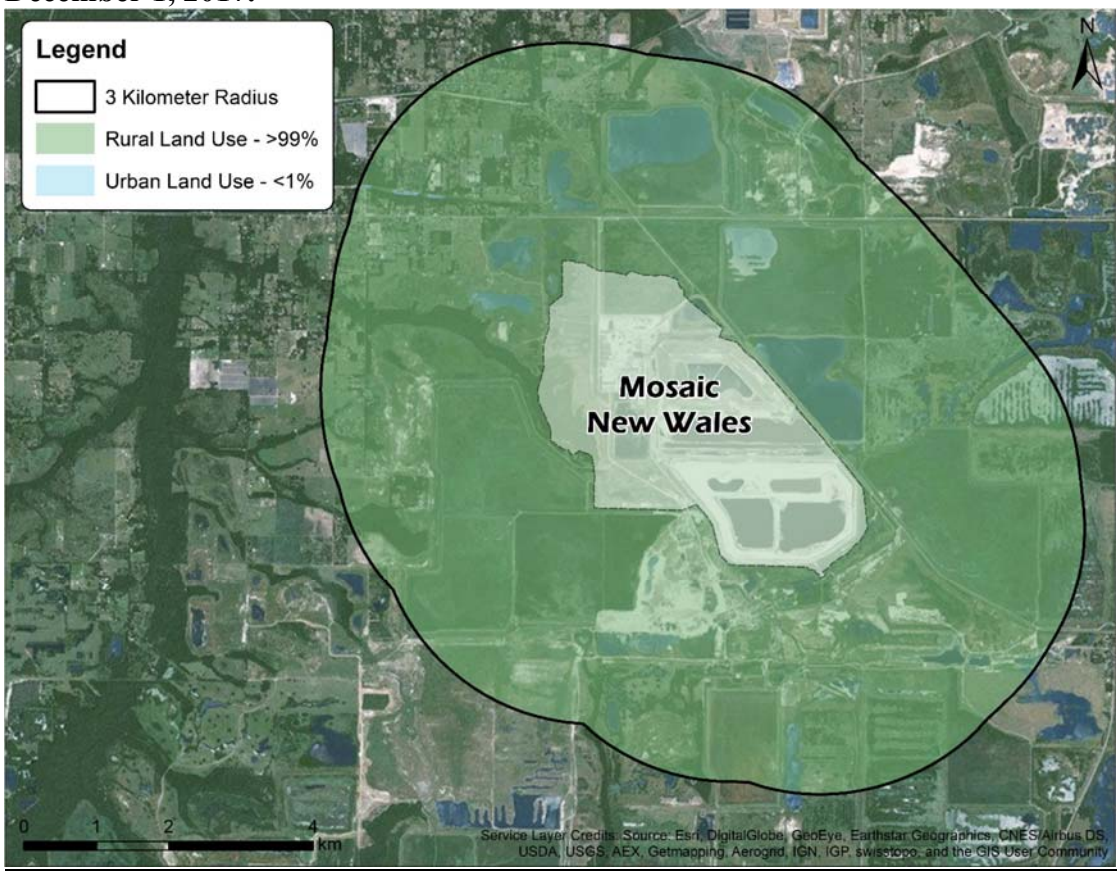
For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the State determined that it was most appropriate to run the model in rural mode.

The State used the Auer method to determine the majority of the land use. 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. Through this method, the State found that rural land use constitutes essentially all of the 3-km radius around Mosaic New Wales as depicted in Figure 18. In the December 2017 modeling the State used the same analysis as was assessed in the EPA's intended designations TSD regarding the January 2017 modeling.

The EPA agrees with the State's assessment and conclusion of the land use and find it appropriate to use the rural mode within the AERMOD tool for this area.

Figure 18. Land Use Around New Wales Facility. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.



3.4.5. Modeling Parameter: Area of Analysis (Receptor Grid)

The Modeling TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The sources of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Polk County area, the State has explicitly modeled three other emitters of SO_2 within 35 km of New Wales in any direction. The State determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas.

In addition to New Wales, the other emitters of SO_2 included in the area of analysis are: Mosaic Fertilizer South Pierce, TECO Polk Power Station, and Mosaic Fertilizer Bartow. Florida also assessed other SO_2 emissions sources in the Polk County area. Table 15 provided in Florida's Revised SIP identifies the other sources that were considered for inclusion in the modeling analysis.

Table 15. SO_2 Emissions Sources within 35 km of the Mosaic New Wales Facility. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

Facility ID	Facility Name	Distance from Mosaic New Wales (km) (d)	20d	2014 SO_2 Emissions (tons) (Q)	Q > 20d
105-0059	Mosaic Fertilizer New Wales [a,b]	0	0	7,126.50	Yes
105-0055	Mosaic Fertilizer South Pierce [a]	13	260	1,731.77	Yes
105-0233	TECO Polk Power Station [a]	13	260	1,245.17	Yes
105-0046	Mosaic Fertilizer Bartow [a,b]	16	320	4,045.72	Yes
105-0234	Duke Hines Energy Complex	18	360	23.72	No
049-0340	Seminole Electric Midulla Station	23	460	5.84	No
105-0216	Wheelabrator Ridge Energy	30	600	213.77	No
105-0004	Lakeland Electric McIntosh [b]	30	600	2,156.63	Yes
057-0261	Hillsborough Resource Recovery	32	640	13.89	No
057-0008	Mosaic Fertilizer Riverview	34	680	2,209.13	Yes
057-0039	TECO Big Bend Station [b]	35	700	11,156.71	Yes

a. Explicitly modeled facility.
b. DRR-applicable facility.

All sources within 35 km were 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 km (d) multiplied by 20, then it is unlikely to have a concentration gradient in the area of concern. While the Lakeland Electric C.D. McIntosh Jr. Power Plant (Lakeland

McIntosh), Tampa Electric Company Big Bend Station (TECO Big Bend) and Mosaic Riverview facilities, all more than 30 km away, are technically above the 20d threshold, they were not explicitly included in the modeling demonstration. Florida believes that the monitor used to develop the modeled background concentrations is well placed to fully represent their emissions in the model. This is discussed further in Section 3.4.10 when the Background Concentrations of SO_2 is evaluated.

No other sources beyond 35 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis. The EPA concludes that Florida's 35 km area of analysis is appropriate because there are no large sources of SO_2 emissions located beyond this distance that would be expected to impact the area.

The State developed a uniform method for dense receptor grid placement for all DRR sources in Florida. 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 2,500 m. Receptor density then decreased in 2,500 m intervals out to 7,500 m. The dense receptor grid is further described in Table 16.

Table 16: Modeling demonstration receptor grid description

Receptor Grid Parameter	Value/Description
Description of Unit at Grid Center	SAP 2
Unit UTM Zone	17N
Unit UTM Easting (m)	396,550.77
Unit UTM Northing (m)	3,078,958.33
Actual Stack Height (m)	60.96
Expected Distance to Max Concentration (m)	610
20 Times Stack Height (m)	1,219
100 m Receptor Spacing - Extent from the Origin (m)	2,500
250 m Receptor Spacing - Extent from the Origin (m)	5,000
500 m Receptor Spacing - Extent from the Origin (m)	7,500
Plant Boundary Receptor Spacing (m)	50
Total Receptors	3,426

The receptor network contained 3,426 receptors, and the network covered the western portion of Polk County completely surrounding Mosaic-New Wales.

Figures 19 and 20, included in the State's recommendation, show the State's chosen area of analysis surrounding the New Wales facility, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property with the exceptions of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor.

Receptors were placed with 50 m spacing along the fenceline of the facility and all receptors located within Mosaic-New Wales' fenceline were removed. Section 4.2 of 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. The State chose not to employ this process and instead included receptors in all areas the State considered to be ambient air within 7.5 km of Mosaic-New Wales.

The fenceline used in this submittal differs from the initial DRR submittal for Mosaic-New Wales, submitted on January 13, 2017, and the supplemental modeling submitted on June 23, 2017. As a part of upgrades at the facility, Mosaic is further developing its fence line on property already owned by the company. In addition, Mosaic has acquired more land since the June 2017 supplemental DRR submittal. Mosaic established the location of physical barriers sufficient to preclude access to the general public and determined where additional fencing will need to be constructed. Florida provided the map in Figure 21 that highlight these developments and photographs corresponding to the numbers to document these barriers and construction sites. This information is included as Appendix A in their recent revised SIP submittal. The existing physical barriers include densely vegetated ditches and canals with steep banks, forested and herbaceous wetlands with dense vegetation and standing water, deep water industrial ponds, and densely vegetated uplands. All work on the fencing is expected to be completed by August 2019, which is the same time that the new emissions limits for the facility will become effective and federally enforceable.

Figure 19. Area of Analysis for the Polk County Area. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

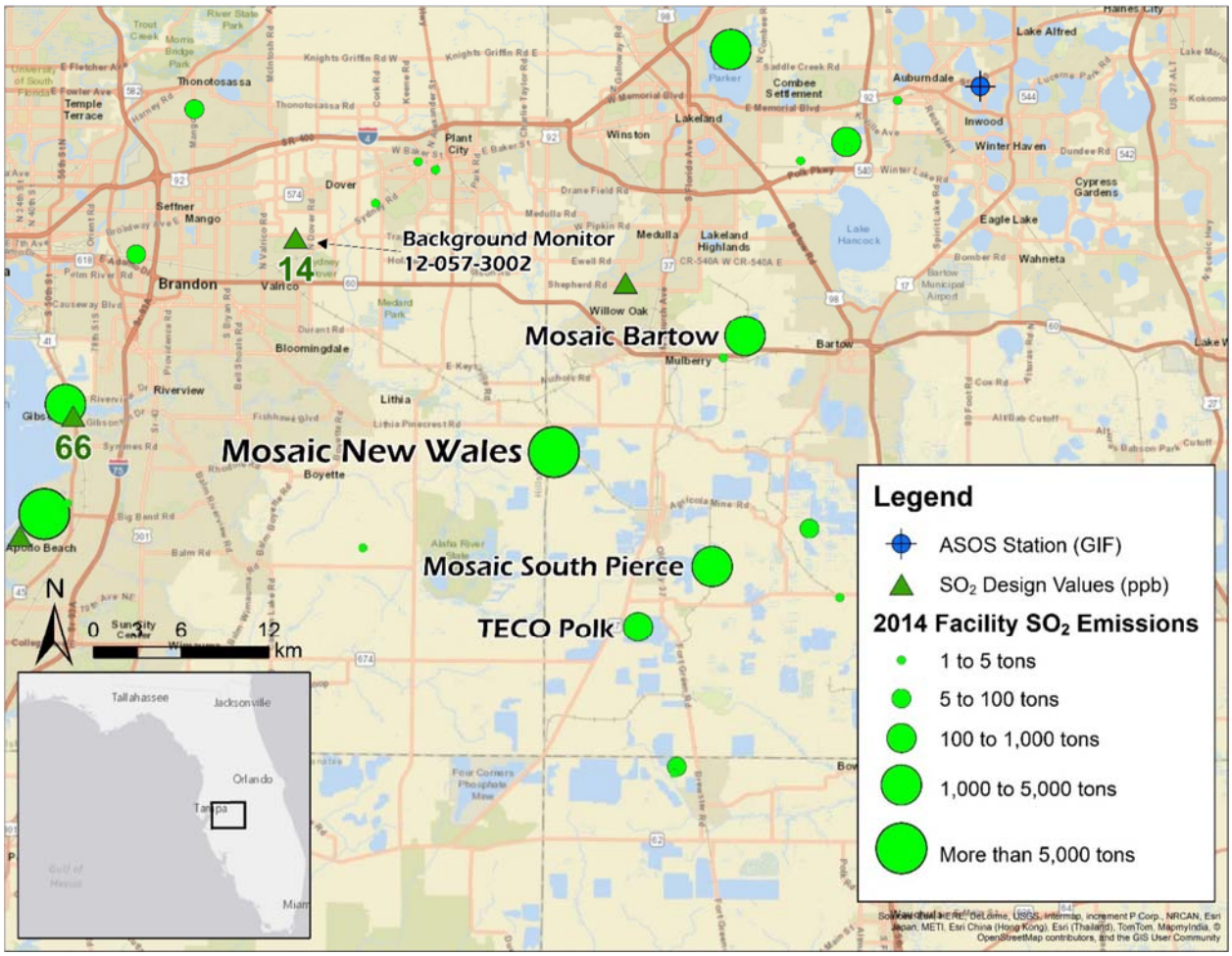


Figure 20. Receptor Grid for the Polk County Area. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

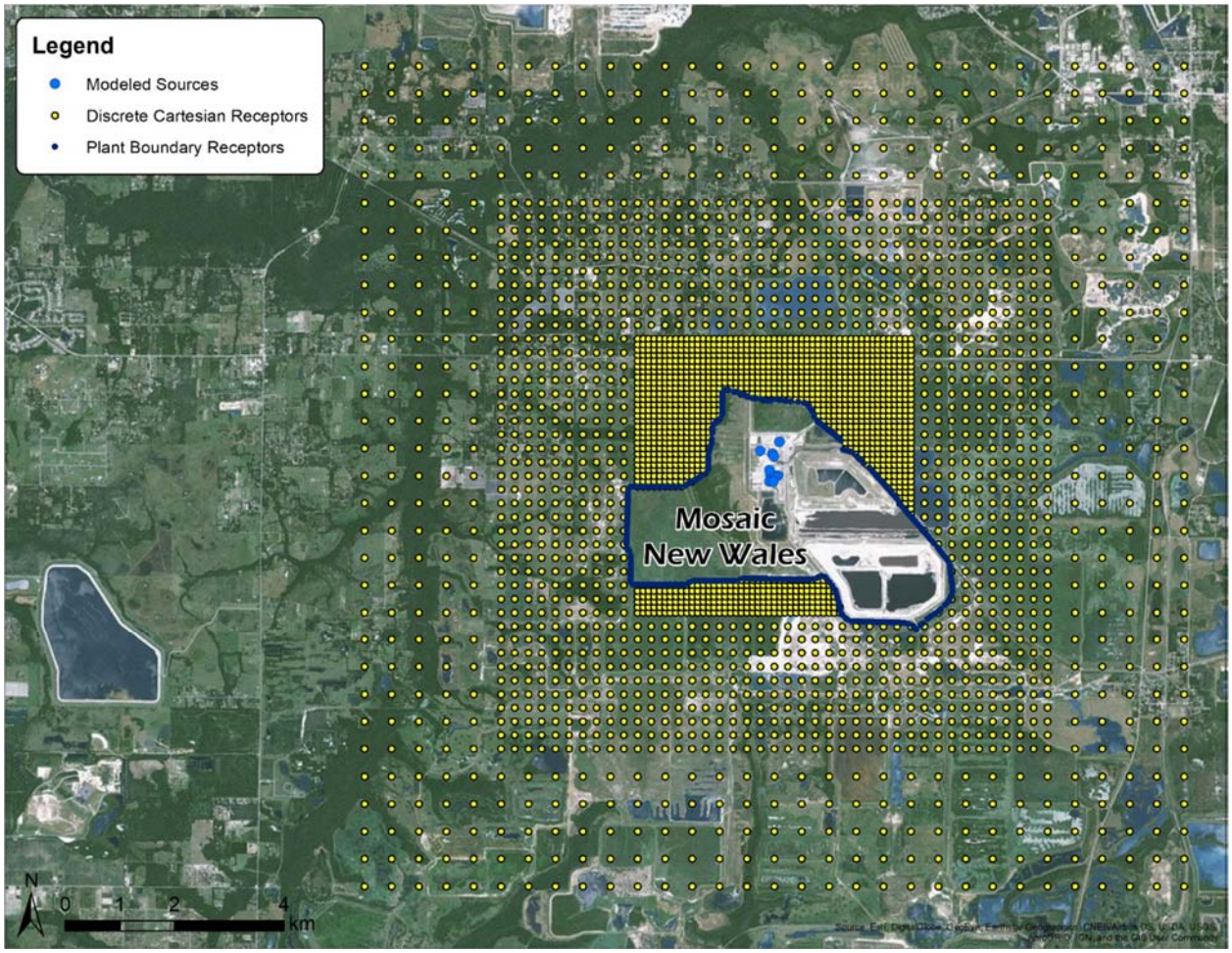


Figure 21. Mosaic New Wales Proposed Ambient Air Boundaries. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

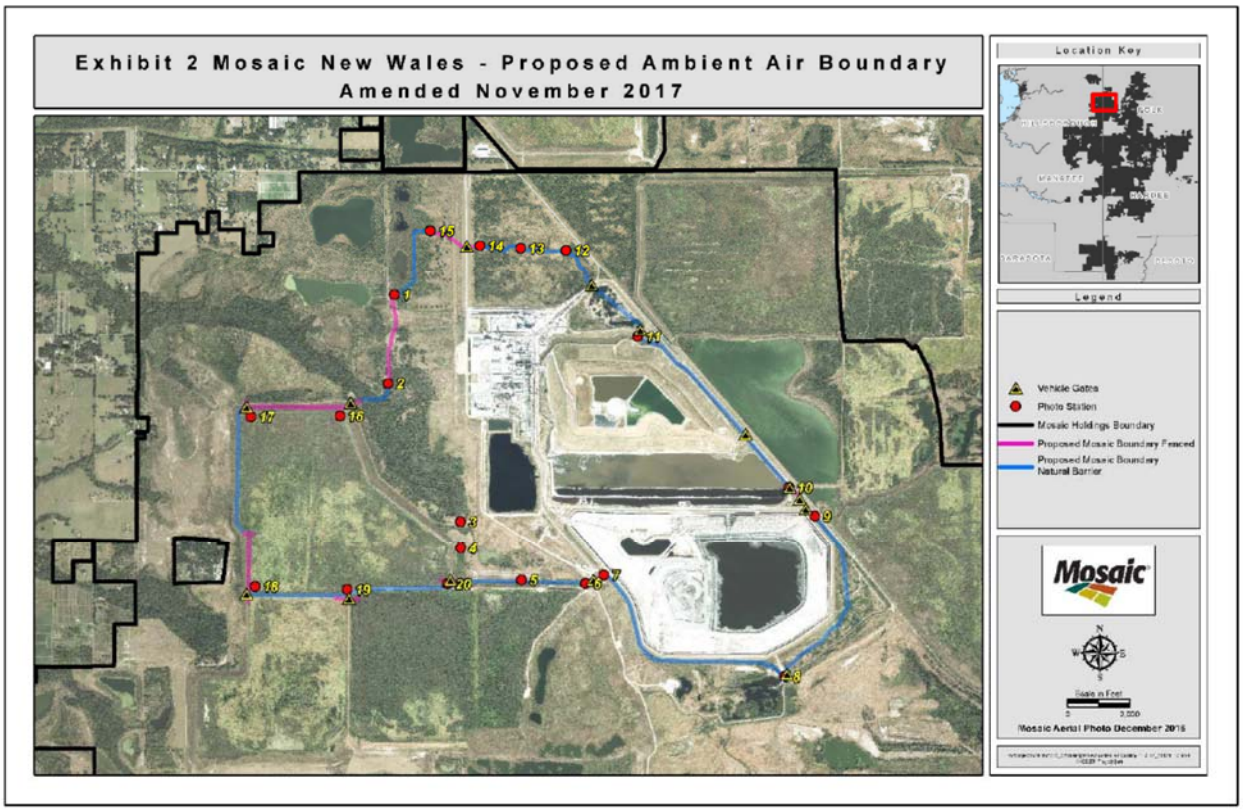


Table 17: Plant Boundary Descriptions to Numbered Segments in Figure 21. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

Section	Description
1 – 2	New fencing to be installed.
2 – 16	Combination of new fencing and areas of thick vegetation and swamp.
16 – 17	Combination of new fencing and the crest of a steep 12 m berm along the outside edge of a clay settling area that consists of heavily vegetated swampland.
17 – 18	
18 – 19	Raised berm through two separate clay settling areas surrounded by heavily vegetated swampland.
19 – 20	
20 – 5	Combination of new fencing and the crest of a 10 m berm along the inside edge of a clay settling area consisting of heavily vegetated swampland.
5 – 6	
6 – 7	New fencing and vehicle gate to be installed.
7 – 8	Base of a 60 m gypsum stack with a 10 m wide, water-filled ditch.
8 – 9	Water-filled retention/industrial pond.
9 – 10	New fencing and vehicle gates to be installed.
10 – 11	Two 60 m gypsum stacks and water-filled retention/industrial ponds along raised railway.
11 – 12	Water-filled retention/industrial pond.
12 – 13	Heavily vegetated swampland.
13 – 14	
14 – 15	New fencing and vehicle gate to be installed.
15 – 1	Heavily vegetated swampland.

The EPA has reviewed Mosaic's proposed new ambient air boundary and all supporting documentation. The EPA has determined that the proposed fenceline, scheduled to be completed in August 2019, is an insufficient ambient air boundary for the purpose of assessing the current air quality surrounding Mosaic-New Wales and informing this final designation. The EPA concludes that Florida's receptor grid is deficient for the characterization of the area and this final designation, because it excludes ambient air receptors.

3.4.6. Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

In addition to the New Wales facility, the other emitters of SO_2 included in the area of analysis are: Mosaic Fertilizer South Pierce, TECO Polk Power Station, and Mosaic Fertilizer Bartow. While the Mosaic Bartow facility was included in the Mosaic-New Wales modeling analysis, Florida also performed a separate modeling analysis to evaluate the area of Polk County near the Mosaic-Bartow facility since it emitted over 2000 tpy of SO_2 in 2014, and was therefore subject to evaluation pursuant to the DRR. The modeling for Mosaic-Bartow was submitted by Florida in January 2017. Florida's analysis, which included actual emissions from the Mosaic-New Wales facility, was performed with Mosaic-Bartow's 2012-2014 actual emissions and shows no modeled violations in the area surrounding the Mosaic-Bartow facility (see Section 3.4 of the EPA's 120-day TSD).

The State characterized the four sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD, except as otherwise explained. Specifically, the State used GEP stack heights in conjunction with permitted allowable emissions for each facility. The State also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

3.4.7. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally-enforceable and effective.

The EPA believes that CEMS data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the State included Mosaic-New Wales and three other emitters of SO_2 within 35 km in the area of analysis. The State has chosen to model these facilities using the most recent or future federally enforceable PTE/permitted allowable limits for SO_2 emissions. As discussed in Section 3.4.1 of this TSD, the future allowable emissions limits used in the modeling for the Mosaic-New Wales and Mosaic-Bartow facilities are contained in permits; however, they will not become fully effective until all of the sulfuric acid catalysis upgrades are completed at the two facilities in August 2019. The facilities in the State's modeling analysis and their associated PTE/permitted allowable rates are summarized below.

For Mosaic Fertilizer New Wales, Mosaic Fertilizer South Pierce, TECO Polk Power Station, and Mosaic Fertilizer Bartow, the State provided PTE or future-PTE values. This information is summarized in Table 18. A description of how the State obtained hourly emission rates is given below this table.

Table 18. SO_2 Emissions based on PTE from Facilities in the Polk County Area

Facility Name	SO_2 Emissions (tpy, based on PTE)
Mosaic-New Wales	4,865 (effective August 2019)
Mosaic-Bartow	4,922 (effective August 2019)
Mosaic-South Pierce	4,504
TECO Polk Power Station	2,452
Total Emissions from All Modeled Facilities in the Area of Analysis	16,743

The PTE in tons per year for Mosaic New Wales was determined by the State based on an air construction permit issued on October 30, 2017. The permit requires the facility to comply with a 1,090 lb/hr emissions cap for the five SAPs based on a 24-hour average as determined by CEMS data by August 31, 2019.[24] The facility will achieve compliance with the new limits by upgrading the catalyst used in the sulfuric acid plants. Compliance with the cap will be determined through reported CEMS data. The five-unit emissions cap of 1,090 lb/hr will be incorporated into the facility's title V permit. Table 19 below summarizes the New Wales SO_2 reduction project schedule.

[24] See Air Construction Permit No. 1050059-106-AC, issued by the Florida Department of Environmental Protection on October 30, 2017.

Table 19: Mosaic New Wales SO_2 reduction project schedule. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

Scheduled Project	Affected Unit	Anticipated Completion Date	Permitted Completion Date[10]
Catalyst Upgrade	SAP 2	Completed in January 2017	Completed January 2017
Catalyst Upgrade	SAP 1	January 2018	March 31, 2018
Catalyst Upgrade	SAP 3	June 2018	August 31, 2018
Catalyst Upgrade	SAP 4	January 2019	March 31, 2019
Catalyst Upgrade	SAP 5	June 2019	August 31, 2019

The PTE in tons per year for Mosaic Bartow was determined by the State based on an air construction permit issued on July 3, 2017. The permit requires the facility to comply with a 1,100 lb/hr emissions cap for the three SAPs based on a 24-hour average as determined by CEMS data by August 31, 2019.[25] Compliance with the cap will be determined through reported CEMS data. The three-unit emissions cap of 1,100 lb/hr has been incorporated into the facility's title V permit[26]. Table 20 below summarizes the Bartow SO_2 reduction project schedule.

Table 20: Mosaic Bartow SO_2 reduction project schedule. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

Scheduled Project	Affected Unit	Anticipated Completion Date	Permitted Completion Date
Catalyst Upgrade	SAP 4	Completed in October 2016	December 31, 2017 [11]
Catalyst Upgrade	SAP 6	October 2017	June 30, 2018 [12]
Catalyst Upgrade	SAP 5	October 2018	Not yet permitted.

Modeling was performed by the State to establish emissions caps for the New Wales SAPs and the Bartow SAPs. To demonstrate compliance with the NAAQS under the two new SO_2 emissions caps, the State modeled a series of emissions scenarios to account for the entire range of possible emissions distributions among the eight affected units. Once the caps were established, 336 AERMOD modeling runs were performed to verify that these caps will be protective of the NAAQS under any operational scenario.

The PTE in tons per year for Mosaic South Pierce and TECO Polk facilities were determined by the State based on their currently permitted emission limits.

For the permitted allowable emissions limits that have averaging times greater than a 1-hour average (e.g., 30-day average limits), Florida converted the limits to 1-hour average limits using the procedures contained in the EPA's April 23, 2014, "Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions." The facilities were modeled using maximum future allowable emissions and corresponding stack parameters consistent with the GEP Policy. Emissions were

[25] Air Construction Permit No. 1050046-050-AC, issued by the Florida Department of Environmental Protection on July 3, 2017.
[26] Title V Operating Permit No. 1050046-051-AV, issued by the Florida Department of Environmental Protection on September 15, 2017.

assumed to be the same in each modeled year. Note that the PTE values in tons per year for each of these facilities provided in Table 18 above were determined by the EPA by multiplying the maximum allowable hourly permitted emission rates (PTE) in pounds per hour for each unit by 8,760 hours in a year and dividing by 2000 pounds per ton.

Florida's modeling using PTE allowable emissions limits may indicate that once those limits are in force and being met, the currently occurring violations of the 1-hour SO_2 NAAQS in the area will be avoided in the future.[27] However, because the PTE allowable emissions limits for the Mosaic New-Wales and Mosaic-Bartow facilities will not be fully effective until August 31, 2019, the EPA is not able to rely upon Florida's modeling analysis to appropriately characterize the current air quality of the area to support this final designation. Therefore, the EPA is basing our final designation upon the modeling provided by Florida in January 2017 which used 2014-2014 actual emissions from the Mosaic-New Wales and Mosaic-Bartow facilities, as this modeling still represents the best available information to inform a determination of current air quality in the area. The details of Florida's January 2017 modeling were presented in the EPA's 120-day TSD and are not repeated in this final TSD.

3.4.8. Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include NWS stations, site-specific or onsite data, and other sources such as universities, FAA, and military stations.

For the area of analysis for the Polk County, Florida, area, the State selected the surface meteorology from Winter Haven Municipal Airport (GIF), located approximately 38 km northwest of the Mosaic New Wales facility, and coincident upper air observations from Ruskin, Florida (TBW), as best representative of meteorological conditions within the area of analysis. Since the State is using current and future PTE/allowable emissions limits, they chose to use five years of representative NWS meteorology data (2012-2016) consistent with the recommendations in Section 8.4.2.e of the EPA's *Guideline on Air Quality Models* contained in 40 CFR part 51, Appendix W.

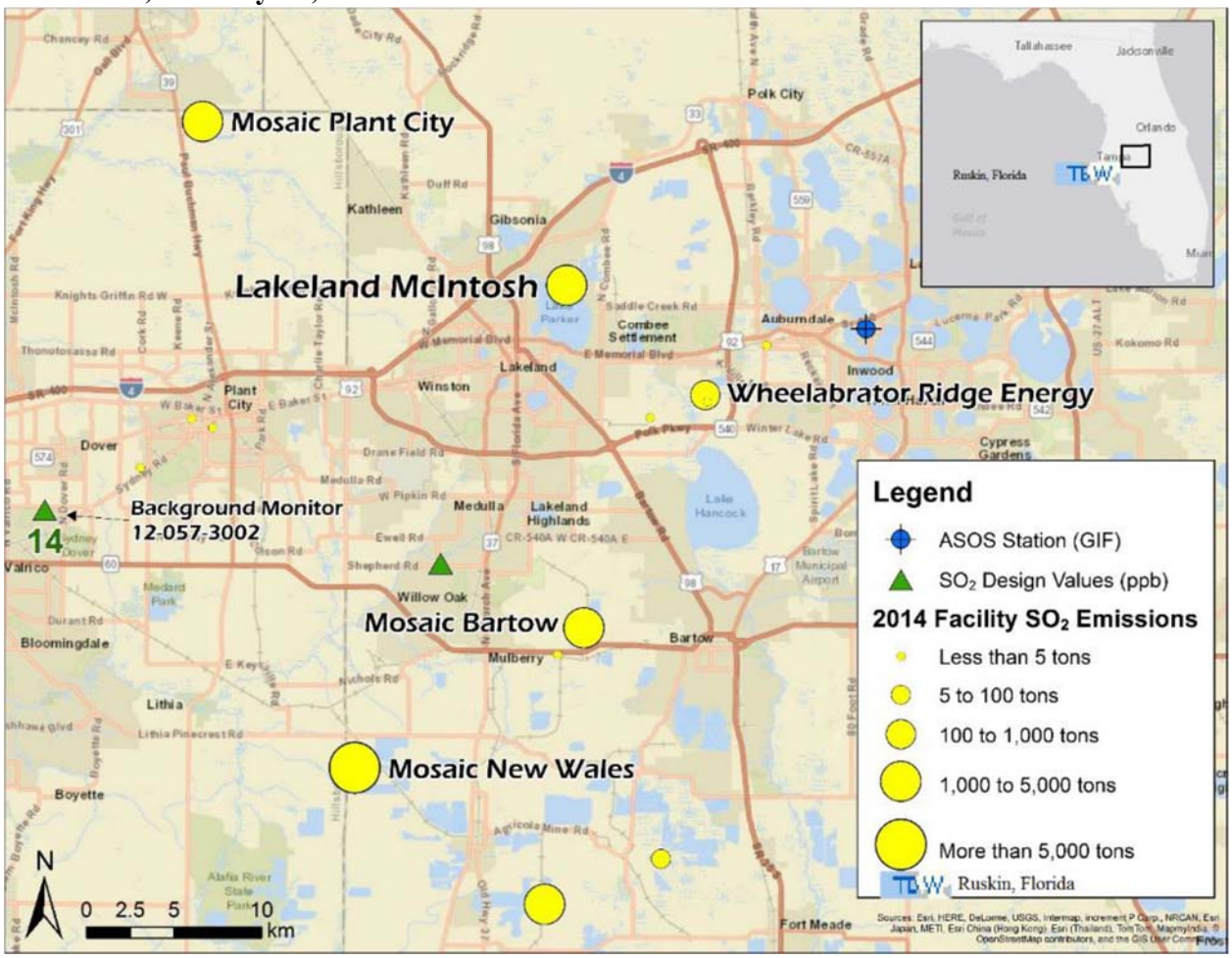
The State used AERSURFACE version 13016 using data from Winter Haven Municipal Airport to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness (z_o)) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space,

[27]The EPA again notes the Agency is not making an assessment through this TSD on whether Florida's modeling submitted on December 1, 2017, is sufficient for the purposes of attainment planning. If this modeling will be used to support a nonattainment plan, the EPA will consider this modeling for that purpose through the SIP process and will include public notice and comment on the Agency's evaluation of the modeling for such purposes.

the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as "z_o" The State estimated surface roughness values for 12 spatial sectors out to 1 km at a monthly temporal resolution for dry, wet and average conditions.

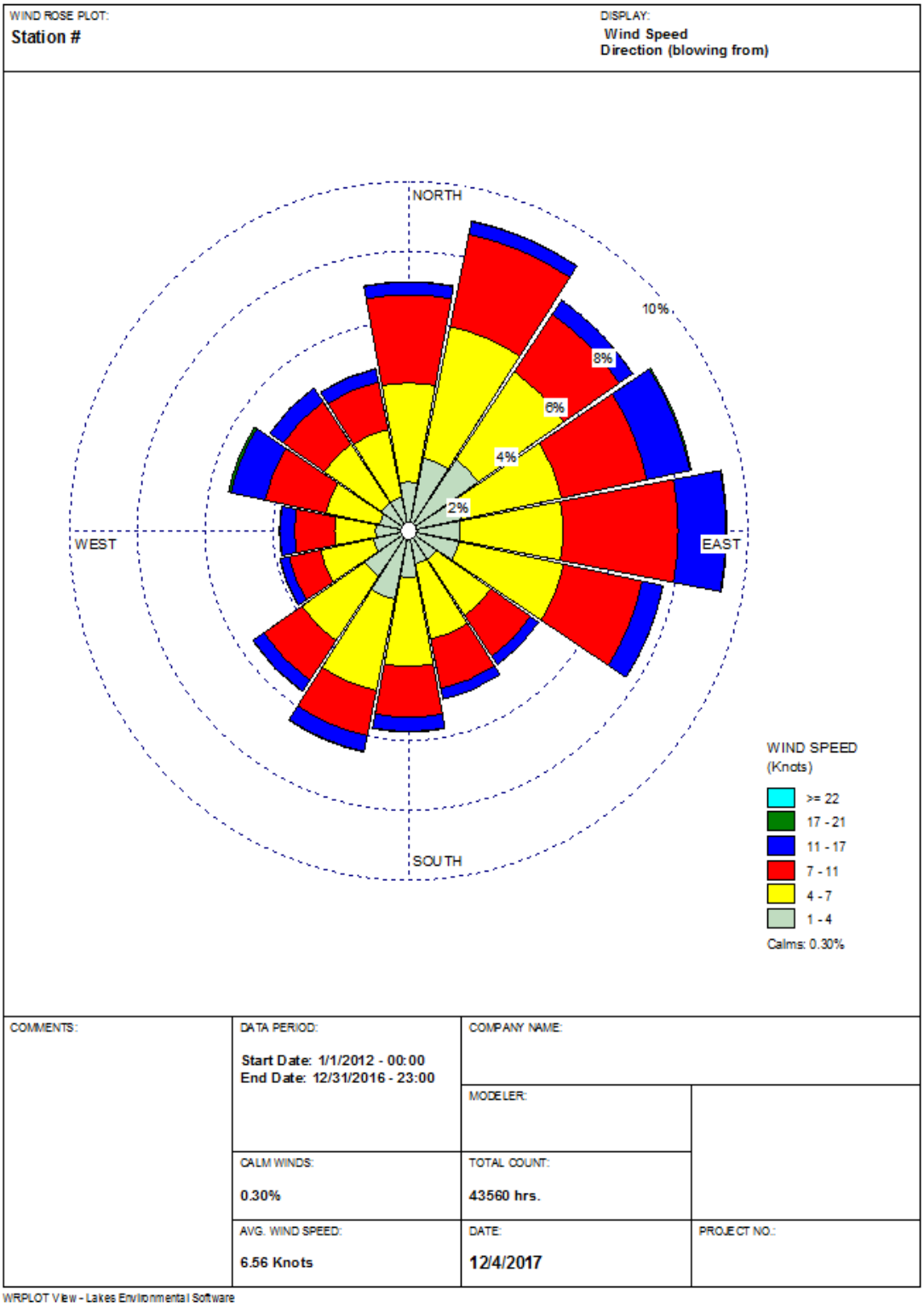
In the figure below, generated by the State, the location of this NWS stations is shown relative to the area of analysis.

Figure 22. Area of Analysis and the NWS station in the Polk County, Florida Area. Source: Data Requirements Rule Submittal, provided by the Florida Department of Environmental Protection, January 13, 2017.



The EPA generated a windrose for the Winter Haven Municipal Airport for the 2012-16 period. In Figure 23 the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Analysis of the NWS data indicate winds predominately blow from the north and east directions.

Figure 23. Winter Haven Municipal Airport NWS Cumulative Annual Wind Rose for Years 2012 – 2016



Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The State followed the methodology and settings presented in the Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from Winter Haven Municipal Airport, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the State set a minimum threshold of 0.5 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA has assessed the meteorological and surface characterization in Florida's modeling, including the wind rose above, and concludes that this component of Florida's modeling is appropriate.

3.4.9. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is best described as flat. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the 1992 National Land Cover Dataset. This analysis is the same as provided in the intended designations TSD regarding the January 2017 modeling.

The EPA has assessed this component of the State's modeling and concludes that it is appropriate.

3.4.10. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State chose to use a tier 2 approach. Data were obtained from 2014-2016 time period from the Sydney monitor (AQS Site ID: 12-057-3002), approximately 23 km northwest of the Mosaic New Wales facility. In order to avoid double-counting the emissions from the explicitly modeled sources, Florida filtered the data to remove measurements when the wind direction could transport pollutants from the sources explicitly included in the modeling. In this case, any measurement recorded when the wind direction was from 57° to 175° was removed from the background calculation. 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. Table 21 contained in Florida's December 2017 Revised SIP modeling provides the temporally varying background concentrations used in the modeling.

Table 21. Tier 2 Temporally Varying Background Concentrations from the Sydney monitor (AQS Site ID: 12-057-3002) for 2014 - 2016. Source: Proposed Revision to State Implementation Plan, provided by the Florida Department of Environmental Protection, December 1, 2017.

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

As previously noted in Section 3.4.5, there are three nearby facilities that exceeded the 20d threshold but which Florida did not explicitly model because the State contends they are well represented in the added background concentration. As detailed in Figure 24 from the State, TECO Big Bend and Mosaic Riverview are located significantly closer to the background monitor than Mosaic-New Wales. The monitor is located between Mosaic-New Wales and both TECO Big Bend and Mosaic Riverview. Florida states that this indicates that both facilities are likely impacting the monitor at higher levels than they are impacting the area around Mosaic-New Wales. As seen in Figure 25, the emissions from these facilities are well represented in the monitoring data. Figure 25 also shows that Lakeland McIntosh produces very little, if any,

impact on the monitor. Given that the monitor is approximately the same distance from Lakeland McIntosh as Lakeland McIntosh is from Mosaic New Wales, Florida states that the facility would not have a significant impact in the modeled area. In addition, emissions from these three facilities decreased approximately 40% from 2014 to 2016. Thus, Florida states that it is likely that the monitoring data are even further over-estimating the impact from all three of these facilities.

Figure 24: Location of large SO_2 sources in Polk and Hillsborough County relative to the background monitor (12-057-0081) and its associated 2012-2016 wind direction frequency graph.

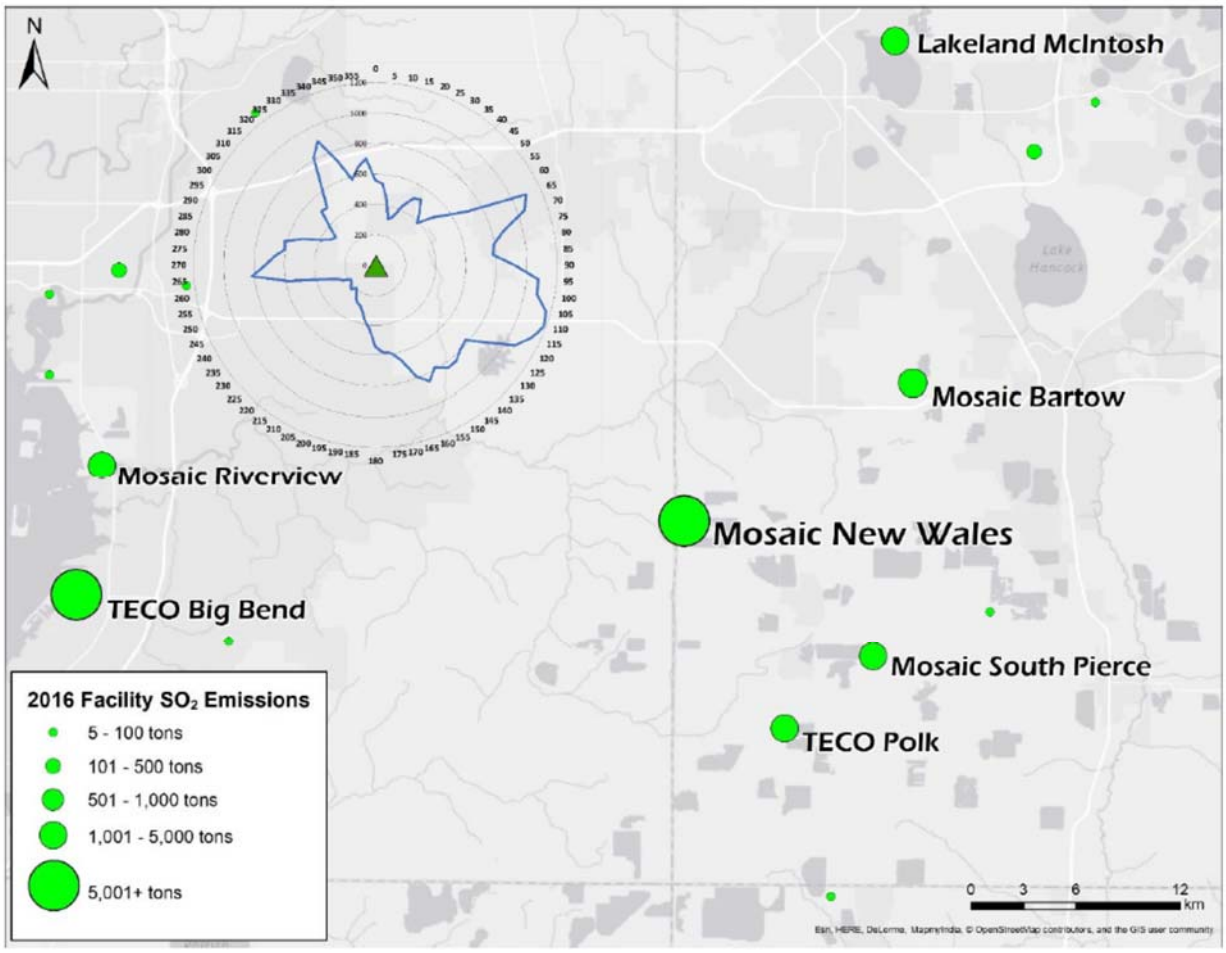
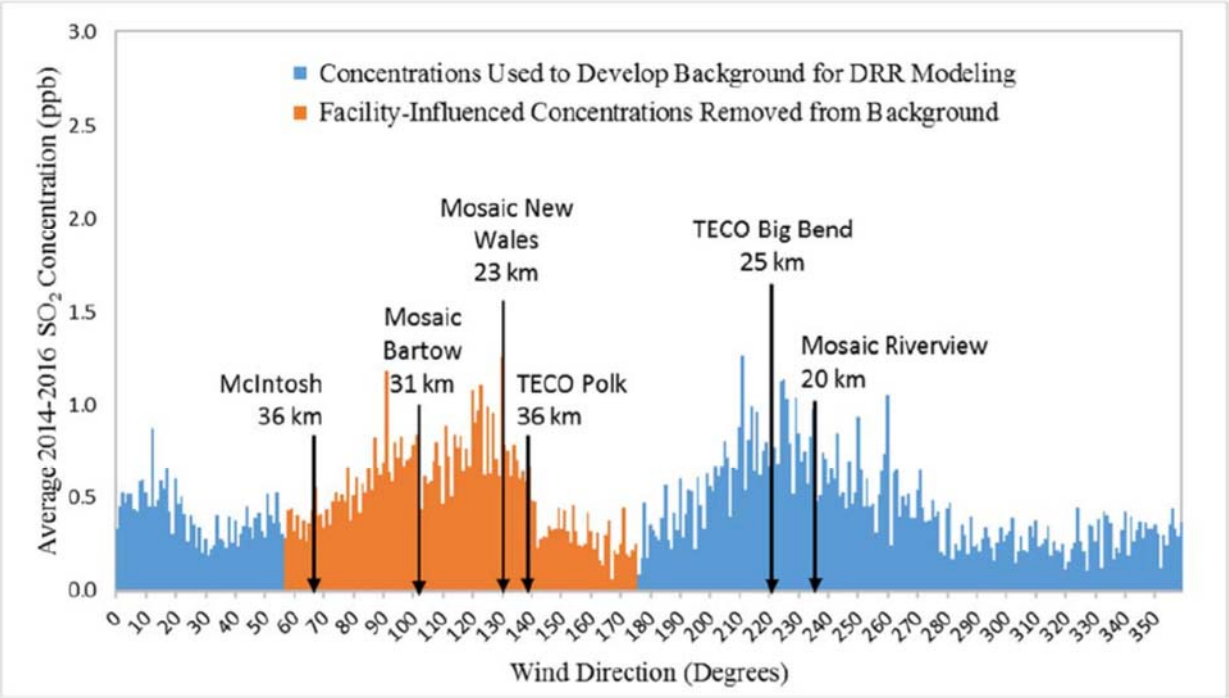


Figure 25: 2014-2016 average SO_2 concentrations by wind direction for monitor 12-057-3002.



The EPA concludes that the background concentrations used by Florida for the December 2017 Revised SIP Modeling are appropriate for accounting for the potential impacts of sources in the vicinity of the Polk County area that have not been explicitly included in the modeling. The EPA agrees with Florida's assessment that the Sydney background monitor adequately accounts for potential impacts from the TECO Big Bend and Mosaic Riverview facilities because the monitor is located much closer to these two facilities than the distance the facilities are from the Mosaic-New Wales facility and the fact that there is a significant increase in the monitored concentrations when the wind blows from the direction of these two facilities as shown in Figure 25 above. Figure 25 also demonstrates that the background monitor average concentrations do not increase when the winds blow from the direction of the Lakeland McIntosh facility. This information along with the fact that the Lakeland McIntosh facility is located approximately the same distance from the Sydney monitor and the Mosaic-New Wales facility adequately demonstrates that the Lakeland McIntosh facility would not likely result in a significant concentration gradient in the vicinity of the maximum modeled concentrations near the Mosaic-New Wales facility. Therefore, Florida's decision not to include Lakeland McIntosh explicitly in the modeling is acceptable.

The EPA agrees that Florida has appropriately chosen the background concentrations in accordance with the Modeling TAD. The State has chosen a monitor that is near the modeled source and is adequate for modeling purposes, with complete data for the 2014-2016 time period. The EPA believes that the chosen background monitored concentration is representative of the area.

3.4.11. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Polk County area of analysis are summarized below in Table 22.

Table 22. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Polk County Area

Input Parameter	Value
AERMOD Version	16216r with regulatory default settings
Dispersion Characteristics	Rural
Modeled Sources	21
Modeled Stacks	21
Modeled Structures	28
Modeled Fencelines	1
Total receptors	3,426
Emissions Type	PTE/permit allowable
Emissions Years	Future emission limits for Mosaic-New Wales and Bartow that will be effective by August 31, 2019. Mosaic South Pierce and TECO Polk were modeled at currently permitted emission rates.
Meteorology Years	2012 – 2016 (Five-year period)
NWS Station for Surface Meteorology	Winter Haven Municipal Airport
NWS Station Upper Air Meteorology	Ruskin, Florida
NWS Station for Calculating Surface Characteristics	Winter Haven Municipal Airport
Methodology for Calculating Background SO_2 Concentration	AQS Site # 12-057-3002, Tier 2 based on temporally varying approach from 2014 - 2016
Calculated Background SO_2 Concentration	Temporally varying

The results presented below in Table 23 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

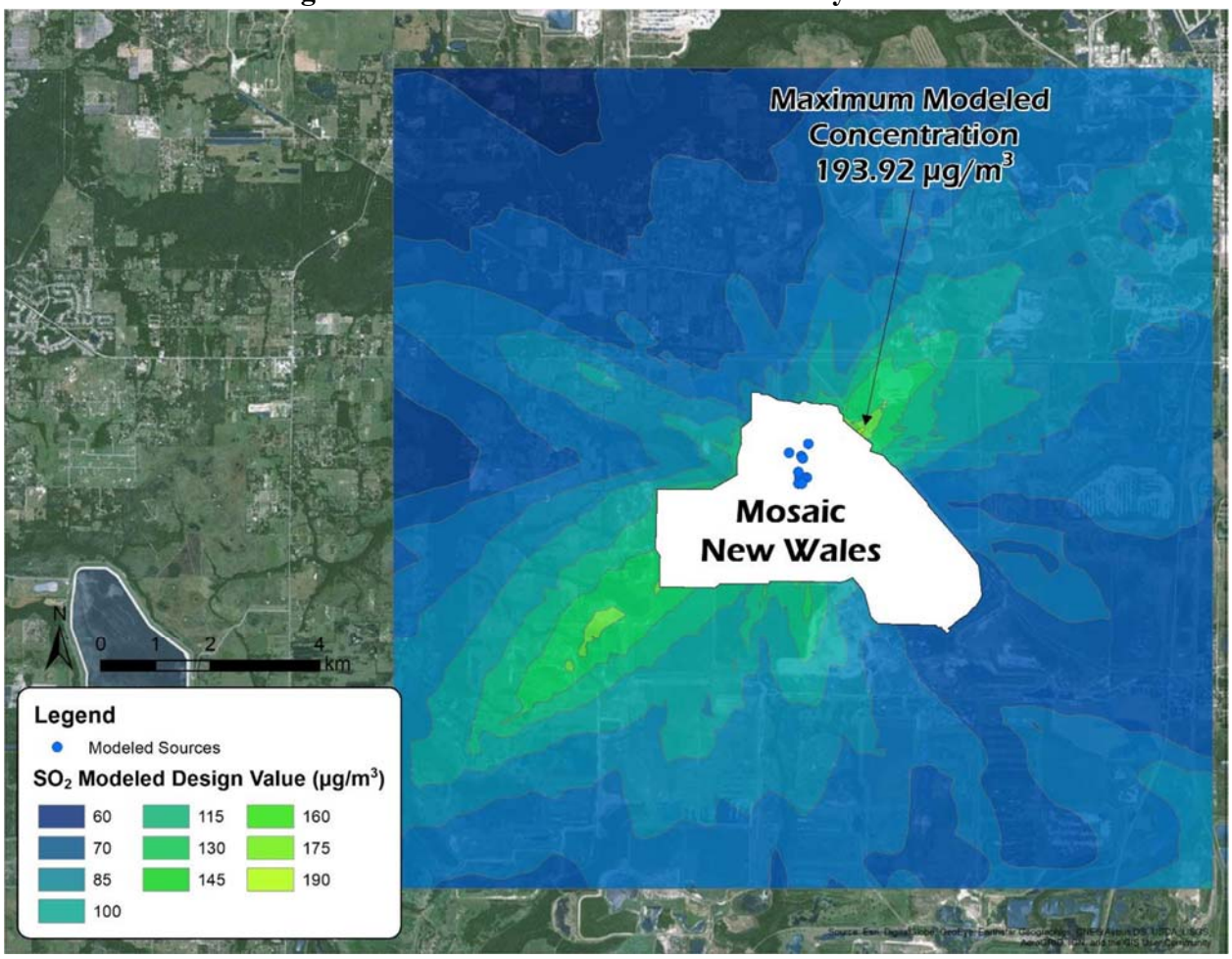
Table 23. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over Three Years for the Area of Analysis for the Polk County Area

Averaging Period	Data Period	Receptor Location UTM Zone 17N		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m^3)	
		UTM Easting	UTM Northing	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012 - 2016	397553.84	3079786.04	193.92	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb reflecting a 2.619 µg/m^3 conversion factor

The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain will be 193.92 µg/m^3, equivalent to 74 ppb, once future limits are in effect. This modeled concentration included the background concentration of SO_2, and is based on future PTE/allowable emissions from the Mosaic New Wales and Mosaic Bartow facilities. Also, the State chose to use five years of representative NWS meteorology (2012-2016) consistent with the recommendations in Section 8.4.2.e of the EPA's *Guideline on Air Quality Models* contained in 40 CFR part 51, Appendix W. Figure 26 below was included as part of the State's recommendation, and indicates that the predicted value occurred north-east of New Wales, near the fenceline. The State's receptor grid is also shown in the figure.

Figure 26. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Five Years for the Polk County Area



The modeling submitted by the State indicates that the 1-hour SO_2 NAAQS may be attained at all receptors in the area in the future when the Mosaic-New Wales and Mosaic-Bartow facilities are complying with their new permit allowable emissions limits which is scheduled to occur by August 31, 2019.[28]

3.4.12. The EPA's Assessment of the Modeling Information Provided by the State

The EPA believes that Florida's modeling using future PTE allowable emissions limits may indicate that when the sources are meeting those limits the currently occurring violations of the

[28] Again, EPA is not at this time taking proposed or final action to evaluate whether this modeling supports approval of Florida's SIP submission.

1-hour SO_2 NAAQS in the area may be avoided in the future.[29] However, because the PTE allowable emissions limits for the Mosaic-New Wales and Mosaic-Bartow facilities will not be fully effective until August 31, 2019, the EPA is not able to rely upon Florida's modeling analysis to inform the designation of the area. Furthermore, receptors were omitted from the area of analysis based on ambient air boundaries that will not be effective until August 31, 2019. Therefore, the EPA is basing our final designation upon the modeling provided by Florida in January 2017 which used 2012-2014 actual emissions from the Mosaic-New Wales and Mosaic-Bartow facilities, and which still reflects the best available information to inform a determination of the area's current air quality status. The details of Florida's January 2017 modeling were presented in the EPA's 120-day TSD and are briefly summarized in Section 3.2 of this final TSD. The January 2017 modeling submitted by the State indicates that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. Based upon a thorough evaluation of the information provided by Florida, the EPA concludes there are modeled violations of the 1-hour SO_2 NAAQS in ambient air locations near the Mosaic New Wales facility using 2012-2014 actual emissions.

Given the criteria for selecting nearby sources, we believe that the decision to include three additional sources, Mosaic Fertilizer South Pierce, TECO Polk Power Station, and Mosaic Fertilizer Bartow, and excluding all other sources from the modeling analysis was appropriate. Future PTE/allowable emissions were used in the analysis which provides for an assessment of SO_2 concentrations in the area once all of the modifications to the Mosaic New Wales and Mosaic-Bartow facilities are complete and fully effective by August 31, 2019. All other nearby sources not included in the modeling were accounted for in the background concentrations used in the modeling. With regards to the background concentrations, the State chose the nearest monitor with valid data for the 2014-2016 time period. The EPA agrees that the monitor chosen for background concentrations is appropriate. The EPA also agrees that the surface and upper air meteorological data used in this analysis is appropriate for performing a valid modeling assessment. However, as discussed above, because the PTE allowable emissions limits for the Mosaic New Wales and Mosaic Bartow facilities will not be fully effective until August 31, 2019, the EPA is not able to rely upon Florida's December 1, 2017, modeling analysis to inform the designation of the area.

3.5. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Polk County Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the

[29]The EPA notes the Agency is not making an assessment through this TSD on whether Florida's modeling submitted on December 1, 2017, is sufficient for the purposes of attainment planning. If this modeling will be used to support a nonattainment plan, the EPA will consider this modeling for that purpose through the SIP process and will include public notice and comment on the Agency's evaluation of the modeling for such purposes.

modeling. EPA's assessment of these factors are unchanged from our intended designations TSD.

3.6. Jurisdictional Boundaries in the Polk County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the Polk County area. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

Florida did not provide any jurisdictional information for Hillsborough and Polk Counties. The EPA did not use any jurisdictional information in the intended designation action. This factor did not play a role in the EPA's analysis.

3.7. Other Additional Information Relevant to the Designations for the Polk County Area

In Florida's October 20, 2017 response to the EPA's August 22, 2017, intended designations for the 2010 SO_2 NAAQS, the State restated its recommendation of unclassifiable for the area, but also included an alternative recommendation for the Polk County area. Specifically, Florida provided an alternative boundary for the nonattainment portions of Polk and Hillsborough Counties associated with the Mosaic-New Wales facility. In addition, Florida restated its recommendation of attainment for the area surrounding the Mosaic Bartow facility, but also included an alternative recommendation for the EPA to adjust the unclassifiable portions of Polk and Hillsborough Counties to align with the State's alternative recommended nonattainment boundary.

3.8. The EPA's Assessment of the Available Information for the Polk County Area

The EPA has identified a NAAQS violation based on the January 2017 modeling results submitted by Florida that followed the Modeling TAD, as detailed above in sections 2.2 and 2.4.

The EPA accepts Florida's alternative recommended boundary because it includes all areas of modeled violations (similar to the EPA's intended boundary from August 22, 2017 based on modeling provided in Florida's January 13, 2017 submission). The EPA concludes that our final nonattainment area, bounded by the area of modeled violation in a portion of Polk County surrounding the Mosaic-New Wales facility (encompassing receptors with modeled nonattainment only) and eastern portion of Hillsborough County (based on modeled violations associated with the Mosaic-New Wales facility,) has clearly defined legal boundaries, and we find these boundaries to be a suitable basis for defining our final nonattainment area.

3.9. Summary of Our Final Designation for the Polk County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA is designating the Hillsborough-Polk, Florida, area as nonattainment for the 2010 SO_2 NAAQS. Specifically, the boundary is comprised of the area of modeled violation in Polk County surrounding the Mosaic-New Wales facility (encompassing receptors with modeled nonattainment only) and eastern portion of Hillsborough County (based on modeled violations) provided by Florida in their October 20, 2017 letter (based on modeling provided in Florida's January 13, 2017 submission,) which responded to the EPA's August 22, 2017, intended designations. Specifically, the UTM coordinates for the vertices are: UTM Zone 17N, NAD 1983. The boundary is defined by:

Table 24. Final Polk-Hillsborough Counties Nonattainment Area Around Mosaic- New Wales

Vertex	UTM Easting (m)	UTM Northing (m)
1	390,500	3,073,500
2	390,500	3,083,500
3	400,500	3,083,500
4	400,500	3,073,500

In addition, the EPA is designating the Mulberry area (portions of Hillsborough and Polk Counties associated with the Mosaic-Bartow facility) as unclassifiable for the 2010 SO_2 NAAQS. The boundary is defined by starting with Northwest Corner and proceeding to the northeast:

Table 25. Final Mulberry Unclassifiable Area around Mosaic-Bartow

Vertex	UTM Easting (m)	UTM Northing (m)
1	390,500	3,083,500
2	410,700	3,091,600
3	412,900	3,089,800
4	412,900	3,084,600
5	400,500	3,073,500
6	400,500	3,083,500

The EPA's partial county nonattainment and unclassifiable boundary is consistent with the approach Florida used in their recommendations for Hillsborough and Nassau partial county areas in the Round 1 designations in 2013, and consistent with the State's alternative recommendation from October 20, 2017. Figure 27 shows the boundary of this intended designated area.

Figure 27. Boundary of the Final Hillsborough - Polk, FL Nonattainment and Mulberry Unclassifiable Areas