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**DRAFT Technical Support Document (TSD)**

**Florida  
Area Designations For the  
2010 SO<sub>2</sub> Primary National Ambient Air Quality Standard**

**Summary**

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must initially designate areas as either “unclassifiable,” “attainment,” or “nonattainment” for the 2010 1-hour sulfur dioxide (SO<sub>2</sub>) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS. Table 1 below identifies the counties or portions of counties (or areas of Indian Country) in Florida that EPA intends to designate “nonattainment” based on monitored violations.

**Table 1. Nonattainment Area Designations for Florida**

Area	Florida Recommended Designation of Areas/Counties	EPA’s Intended Designation of Areas/Counties
Hillsborough County Area Hillsborough County (partial)	Nonattainment	Nonattainment
Nassau County Area Nassau County (partial)	Nonattainment	Nonattainment

**Background**

On June 2, 2010, EPA revised the primary SO<sub>2</sub> NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is attained when the 3-year average of the 99<sup>th</sup> percentile of the daily maximum 1-hour average concentration at each monitor in an area does not exceed 75 ppb. EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO<sub>2</sub>. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO<sub>2</sub> has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

**EPA’s SO<sub>2</sub> Designation Approach**

Section 107(d) of the CAA requires that not later than 1 year after promulgation of a new or revised NAAQS, state Governors must submit their recommendations for designations and boundaries to EPA.

This deadline was in June 2011. Section 107(d) also requires EPA to provide a notification to states of no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA has reviewed the State's recommendations and has notified the Governor through a letter signed by the Regional Administrator of any intended modifications. While language in section 107 specifically addresses states, we intend to follow the same process for tribes, pursuant to section 301(d) of the CAA and Tribal Authority Rule (40 CFR Part 49). Therefore, we intend to designate areas of Indian Country, in consultation with the tribes, on the same schedule as state designations. If a state did not submit designation recommendations, EPA will promulgate the designations that it deems appropriate. If a state disagrees with EPA's intended area designations, they have an opportunity to demonstrate why any proposed modification is inappropriate. Florida does not have any tribes affected by this intend designation.

Designations guidance was issued by EPA through a March 24, 2011, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. These 5 factors include: 1) Air quality data; 2) Emissions and emissions-related data (location of sources and potential contribution to ambient SO<sub>2</sub> concentrations); 3) Meteorology (weather/transport patterns); 4) Geography/topography (mountain ranges or other air basin boundaries); and 5) Jurisdictional boundaries (e.g., counties, air districts, pre-existing nonattainment areas, reservations), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

The March 24, 2011, memo recommended that area boundaries be defaulted to the county boundary unless additional information justifies a larger or smaller boundary than that of the county. EPA believes it is appropriate to evaluate each potential area on a case-by-case basis, and to recognize that area-specific analyses conducted by states, tribes and/or EPA may support a different boundary than a default county boundary.

In this TSD, EPA discusses its review and technical analysis of the recommendations submitted by the State for designations of the 1-hour SO<sub>2</sub> standard and any modifications from these recommendations.

***Definition of important terms used in this document:***

- 1) **Designated “nonattainment” area** – an area which EPA has determined, based on a state recommendation and/or on the technical analysis included in this document, has violated the 2010 SO<sub>2</sub> NAAQS, based on the most recent three years of air quality monitoring data, or contributes to a violation in a nearby area.
- 2) **Recommended nonattainment area** – an area a State or Tribe has recommended to EPA be designated as nonattainment.
- 3) **Violating monitor** – an ambient air monitor meeting all methods, quality assurance and citing criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part 50.

4) **2010 SO<sub>2</sub> NAAQS** - 75 ppb, national ambient air quality standard for SO<sub>2</sub> promulgated in 2010. Based on the 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations

5) **Design Value** – a statistic that describes the air quality status of a given area relative to the level of the NAAQS.

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## Nonattainment Designations

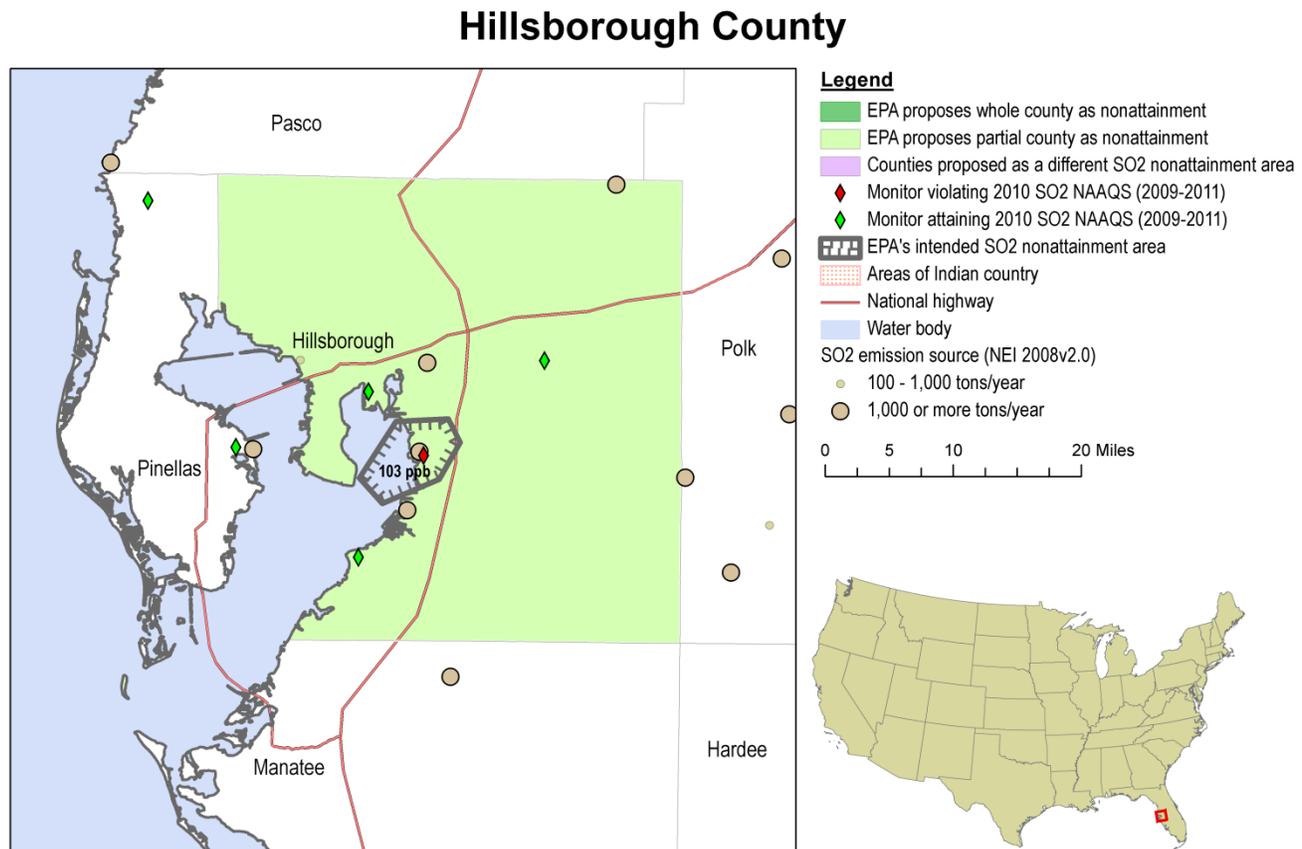
### Technical analysis for Hillsborough County Area

#### Introduction

This technical analysis for Hillsborough County Area identifies the partial county with a monitor that violates the 2010 SO<sub>2</sub> NAAQS based on 2009-2011 data, and evaluates nearby counties for contributions to SO<sub>2</sub> concentrations in the Area. EPA has evaluated this county and nearby counties based on the weight of evidence of the factors recommended in the March 24, 2011, issued EPA guidance.

Figure 1 is a map of the area analyzed showing the locations and design values of air quality monitors in the area, and the counties surrounding any violating air quality monitors.

**Figure 1. Hillsborough Nonattainment Area**



In June 2011, Florida Department of Environmental Protection (FDEP) Secretary Herschel T. Vinyard Jr. recommended that a partial boundary in Hillsborough County be designated as “nonattainment” for the 2010 SO<sub>2</sub> NAAQS based on monitored air quality data from 2008-2010. The State of Florida

recommendation is for a nonattainment area boundary encompassing the area that, based upon air dispersion modeling, may be experiencing violations of the standard caused by an identified source. Based on EPA’s technical analysis described below, EPA is intending to designate part of Hillsborough County, Florida as nonattainment for the 2010 SO<sub>2</sub> NAAQS as part of the Hillsborough County nonattainment area, based upon currently available information. This county is listed above in Table 1.

**Detailed Assessment**

***Air Quality Data***

This factor considers the SO<sub>2</sub> air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in Hillsborough County and the surrounding area based on data for the 2009-2011 period.

Secretary Vinyard’s recommendation was based on data from a Federal Equivalent Method (FEM) monitor located in the State (Florida Nonattainment Designation Recommendation Letter, June 13, 2011), in accordance with 40 CFR Part 53.

The 2011 SO<sub>2</sub> NAAQS design values for all monitors in the Hillsborough Area and surrounding area are shown in Table 2.

**Table 2. Air Quality Data for Nonattainment Designations in Hillsborough County, FL**

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO <sub>2</sub> Design Value, 2009-2011 (ppb)
Hillsborough County	<b>Yes</b>	<b>East Bay (Gibsonton)</b>	<b>12-057-0109</b>	<b>27.856389, -82.383667</b>	<b>103</b>
	No	E.G. Simmons Park	12-057-0081	27.740032, -82.465145	22
	No	Coast Guard Station – Davis Island	12-057-1035	27.928056 -82.454722	43
	No	Sydney	12-057-3002	27.965650, -82.2304	15

Hillsborough County shows a violation of the 2010 SO<sub>2</sub> NAAQS. Therefore, some area in Hillsborough County and possibly additional areas in surrounding counties must be designated nonattainment. The violating monitor (12-057-0109) near Gibsonton is located approximately 1 kilometer to the southeast of the Mosaic Riverview phosphate fertilizer plant, a major source of SO<sub>2</sub> emissions. The primary emissions units at this facility are three sulfuric acid plants. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for inclusion in a nonattainment area. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

### *Emissions and Emissions-Related Data*

Evidence of SO<sub>2</sub> emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emissions data for SO<sub>2</sub> and any growth in SO<sub>2</sub> emitting activities since the date represented by those emissions data.

#### Emissions

EPA recognizes that there may be important new information on emissions levels for the period after 2008, and would consider more recent information if available. Florida did not provide updated emissions information, therefore EPA relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V2).

Table 3 shows total emissions of SO<sub>2</sub> (given in tons per year (tpy)) for violating and potentially contributing counties in and around the Hillsborough nonattainment area, including sources emitting greater than 100 tpy of SO<sub>2</sub> according to the 2008 NEI. The county that contains the Hillsborough nonattainment area for the 2010 SO<sub>2</sub> NAAQS is shown in **bold**.

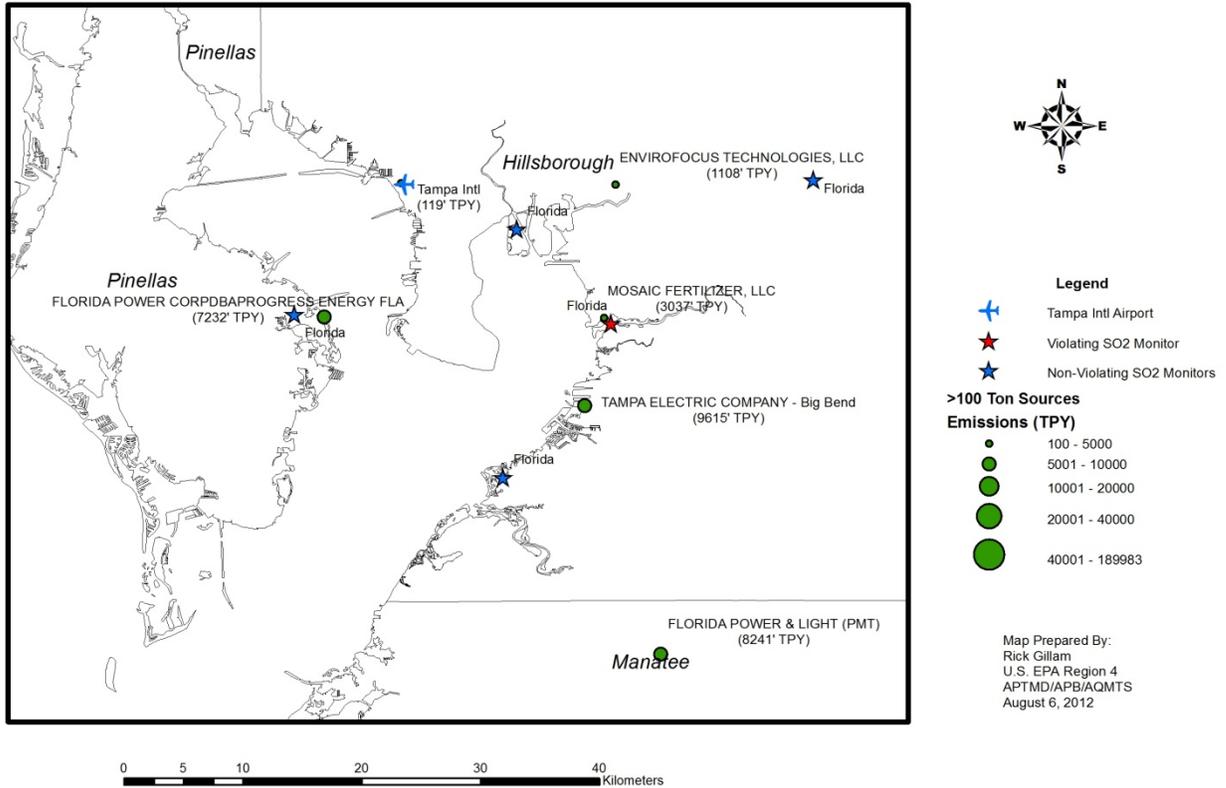
**Table 3. Annual SO<sub>2</sub> Emissions (NEI08V2)**

County	Facility >100 tpy (EIS or State Facility ID)	Facility Emissions (tpy)	Total County SO <sub>2</sub> Emissions (tpy)
<b>Hillsborough County, FL</b>	TAMPA ELECTRIC COMPANY - Big Bend	9,615	19,419
	CF INDUSTRIES, INC., PLANT CITY PHOS	3,430	
	MOSAIC FERTILIZER, LLC	3,037	
	ENVIROFOCUS TECHNOLOGIES, LLC	1,108	
	Tampa International Airport	119	

Figure 2 shows the above facility locations in relation to the violating monitor.

**Figure 2: Facility Locations in the Hillsborough County Area**

## Hillsborough County, Florida SO<sub>2</sub> Monitor, Meteorological Data, and Emissions Sources



### Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 3 represent emissions levels taking into account any control strategies implemented on stationary sources in the Hillsborough County Area up to and including the year 2008. EPA has not received any additional information on emissions reductions resulting from federally enforceable controls put into place after 2008.

### *Meteorology (weather/transport patterns)*

Evidence of source-receptor relationships between specific emissions sources and high SO<sub>2</sub> values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the National Weather Service (NWS) site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO<sub>2</sub> exceedances. For the Hillsborough County Area, the meteorological data used in this analysis is for 2009-2011 from the Tampa International Airport (ID # 722110-12842). Figure 2 shows a map of the SO<sub>2</sub> monitor location, meteorological data location, and the major emissions sources in the area. The Tampa International

Airport is approximately 19 kilometer west of the violating monitor. The primary SO<sub>2</sub> emissions source is the Mosaic Riverview facility, which is located less than one kilometer from the violating monitor.

Figure 3 shows a wind rose of the hours exceeding the 1-hr SO<sub>2</sub> NAAQS (75 ppb) at the violating monitor. The wind rose was developed using wind data from the Tampa International Airport.

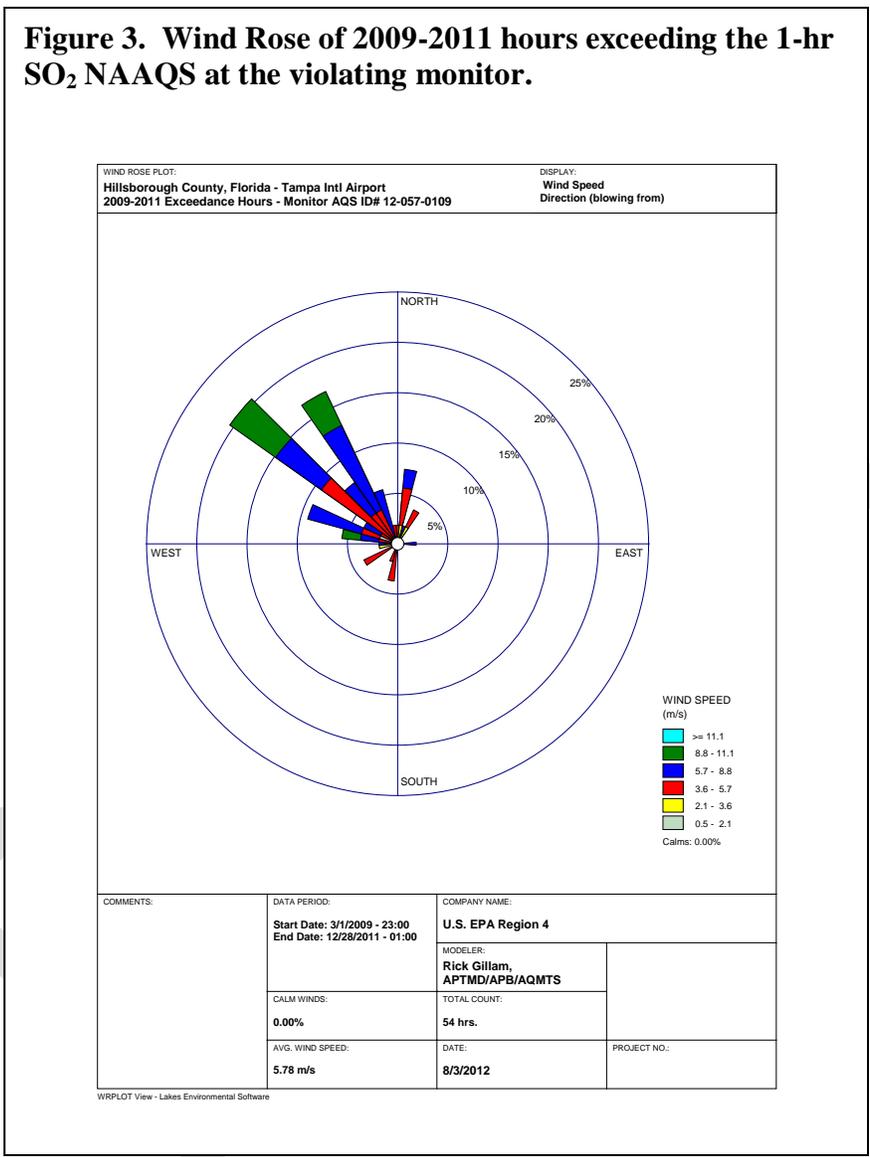


Figure 3 shows that the majority of the exceeding hours have winds blowing from the northwest with moderate to high wind speeds. As can be seen in Figure 2, the Mosaic Riverview facility is located less than 1 km to the northwest of the monitor. No other major sources are located near the violating monitor in the northwest direction. Therefore, the Mosaic Riverview facility is likely the major contributor to the violations.

FDEP performed an in-depth analysis of wind direction data to identify the wind directions associated with elevated SO<sub>2</sub> monitored concentrations. This information is based on “on-site” wind data collected

at the violating SO<sub>2</sub> monitor location and is provided in the “Meteorology” section of Appendix A of this TSD. The result of this analysis agrees with EPA’s analysis and indicates that winds blow from the northwest during times of high SO<sub>2</sub> concentrations at the violating monitor. This analysis shows that the Mosaic Riverview Facility is upwind of the monitor and is the most likely contributor to the violations. This hypothesis was further evaluated by the State using dispersion modeling. See the discussion in the “Modeling Analysis” section for further information about the modeling.

### ***Geography/Topography (mountain ranges or other air basin boundaries)***

The Hillsborough County Area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

### ***Jurisdictional Boundaries***

Once EPA identified the general areas that the Agency anticipated would be included in the nonattainment area, EPA then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. With regard to the 2010 SO<sub>2</sub> NAAQS, EPA has determined that the appropriate jurisdictional boundaries to be considered to include counties, air districts, pre-existing nonattainment areas, reservations, among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

No area in Hillsborough County has been or is currently nonattainment for a SO<sub>2</sub> NAAQS, so EPA had no boundary related to a previous nonattainment designation to consider for this area. Additionally, this area does not include Indian Country. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

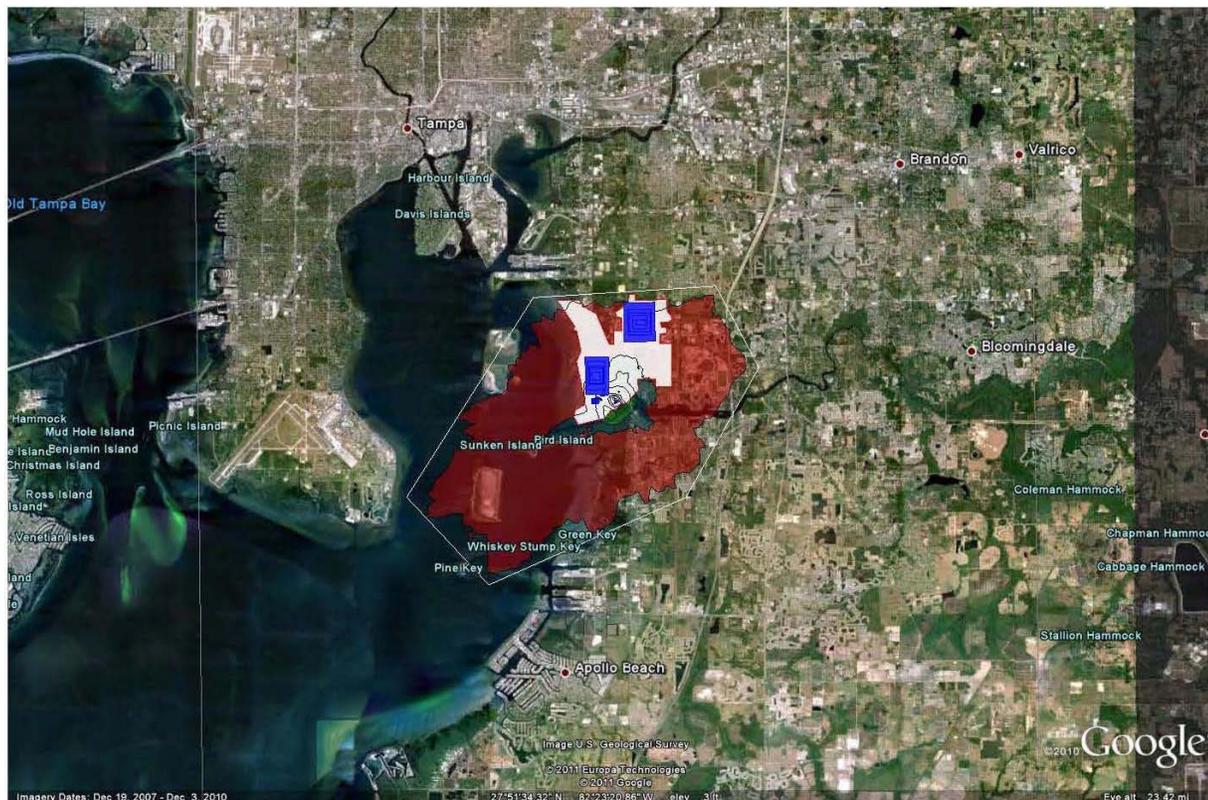
### ***Modeling Analysis for Nonattainment Area Boundaries***

The violating monitor is located within Hillsborough County, roughly in the center of the county, approximately one kilometer to the southeast of the Mosaic Riverview phosphate fertilizer plant. The violating area associated with the primary source of SO<sub>2</sub> at this monitor is well within the county boundary. The recommended nonattainment boundary encompasses this violating area as informed by air dispersion modeling. See Appendix A of this document for modeling results for nonattainment area boundaries. FDEP used air dispersion modeling to help delineate the boundary of the recommended nonattainment area. In completing this modeling, the Department generally followed the guidance provided in the March 24, 2011, EPA memorandum, “Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards.”

Specifically, the State’s recommendation letter provides modeling results to inform a nonattainment area boundary for this area. The AERMOD model results were used to determine the areal extent with which the Mosaic Riverview facility would be potentially violating the standard. The recommended nonattainment area encompasses the receptors having modeled violations of the ambient standard associated with the Mosaic Riverview facility (see Figure 4). Florida used its model results in an

exact manner to describe the recommended nonattainment boundaries. The nonattainment area is defined as the area where the model predicts that the SO<sub>2</sub> concentration (using the five-year average of the 4<sup>th</sup> high value as the metric) is greater than the ambient SO<sub>2</sub> standard. A polygon with six vertices is used to define the areal extent of the nonattainment area (See the discussion and figure below).

**Figure 4. Aerial photo with nonattainment area boundary.**



As indicated above, the June 13, 2011, Florida submittal recommends a nonattainment area boundary encompassing the area that, based upon air dispersion modeling, is experiencing violations of the SO<sub>2</sub> standard caused by the identified source. The State's recommended nonattainment boundary is described by a polygon encompassing the predicted area having a design value greater than the 1-hour ambient SO<sub>2</sub> standard of 75 ppb (see Figure 4). The following aerial photo below shows the bounds of the area having modeled concentrations greater than the ambient air quality standard. The annotated polygon (white line) outlines the area recommended for nonattainment classification. The red shaded area outlines the modeled area greater than the ambient standard. The whited-out area describes the property boundary of the Mosaic Riverview facility, with buildings and structures in blue. The Area includes the location of the violating monitor. In summary, the State's recommendation letter provides the following vertices of the polygon using Universal Transverse Mercator (UTM) coordinates in UTM zone 17 with datum NAD83 (see Table 4) :

**Table 4. Universal Transverse Mercator (UTM) Coordinates**

<b>Vertices</b>	<b>UTM Easting (m)</b>	<b>UTM Northing (m)</b>
1	358581	3076066
2	355673	3079275
3	360300	3086380
4	366850	3086692
5	368364	3083760
6	365708	3079121

***Other Relevant Information***

EPA did not receive additional information relevant to establishing a nonattainment area boundary for this Area.

**Conclusion**

After considering the factors described above, EPA intends to find that it is appropriate to agree with the State of Florida’s partial boundary recommendation as described in the modeling section above. EPA’s conclusion is premised on that fact that the air quality monitor in Hillsborough County shows a violation of the 2010 SO<sub>2</sub> NAAQS, based on 2009-2011 air quality data. Additionally, based on the modeling conducted by Florida and the boundary that Florida has presented, the boundary captures the violating monitor, the source contributing to the violation, and encompasses the entire area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2010 SO<sub>2</sub> NAAQS.

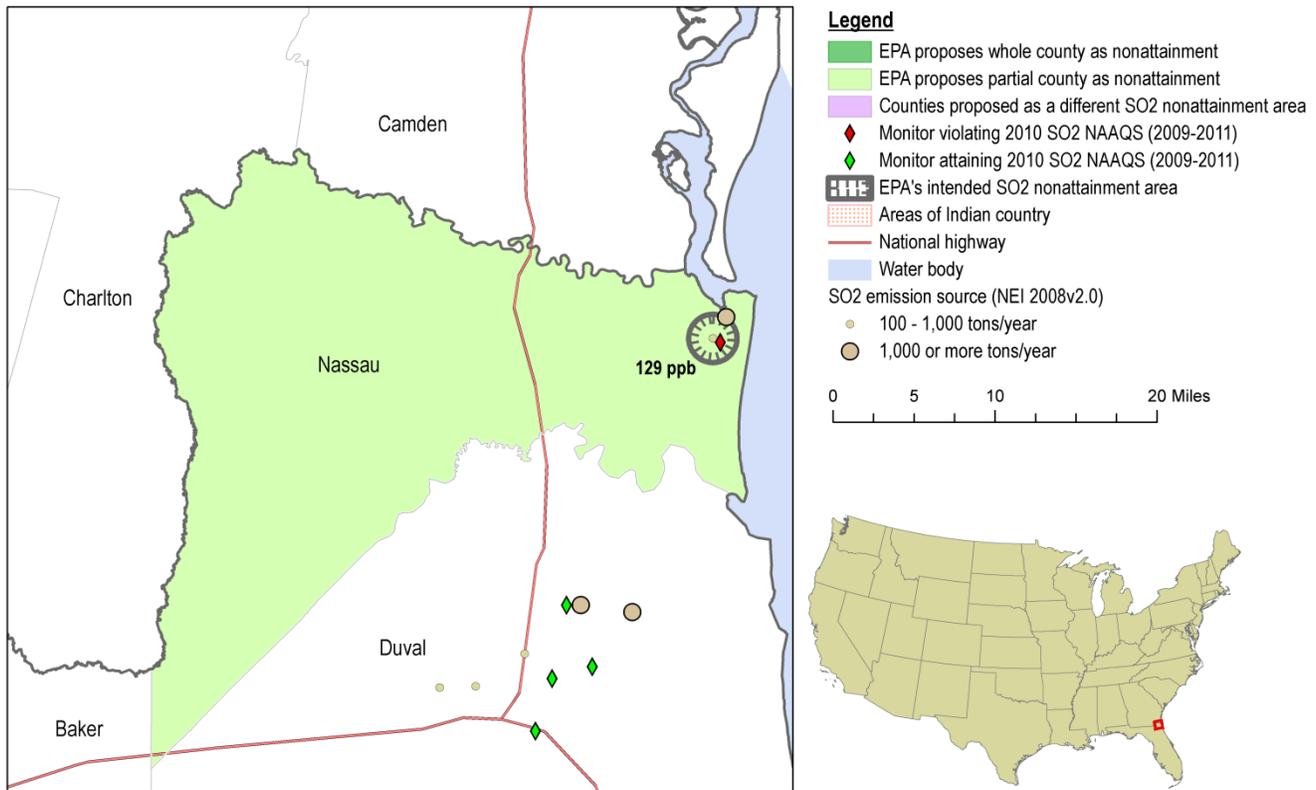
**Technical analysis for Nassau County**

**Introduction**

This technical analysis for Nassau County identifies the partial county with a monitor that violates the 2010 SO<sub>2</sub> NAAQS based on 2009-2011 data, and evaluates nearby counties for contributions to SO<sub>2</sub> concentrations in the area. EPA has evaluated this county and nearby counties based on the weight of evidence of the factors recommended in the March 24, 2011, issued EPA guidance.

Figure 5 is a map of the area analyzed showing the locations and design values of air quality monitors in the area, and the counties surrounding any violating air quality monitors.

**Figure 5. Nassau Nonattainment Area**  
**Nassau County**



In June 2011, FDEP Secretary Herschel T. Vinyard Jr. recommended that most of the State, as a whole, be designated “unclassifiable” or “unclassifiable/attainment” for the 75 ppb 1-hour SO<sub>2</sub> standard. This was intended to include the area surrounding the monitoring site in Nassau County. The State submitted a revised recommendation letter on November 28, 2011. In that letter, FDEP recommended that a portion of Nassau County also be designated “nonattainment.” The State of Florida recommendation is for a nonattainment area boundary encompassing the area that, based upon air dispersion modeling, may be experiencing violations of the standard caused by the identified source.

Based on EPA’s technical analysis described below, EPA is intending to designate part of Nassau County, Florida as nonattainment for the 2010 SO<sub>2</sub> NAAQS as part of the Nassau County nonattainment area, based upon currently available information. This county is listed above in Table 1.

**Detailed Assessment**

***Air Quality Data***

This factor considers the SO<sub>2</sub> air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in Nassau County and the surrounding area based on data for the 2009-2011 period.

Florida's recommendation was based on data from a FEM monitor located in the State (Florida Nonattainment Designation Recommendation Letter, November 28, 2011), in accordance with 40 CFR Part 53.

The 2011 SO<sub>2</sub> NAAQS design values for all monitors in the Nassau County and surrounding area are shown in Table 5.

**Table 5. Air Quality Data for Nonattainment Designations in Nassau County, Florida**

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO <sub>2</sub> Design Value 2009-2011 (ppb)
Nassau County, FL	<b>Yes</b>	<b>FBHWWTP</b>	<b>12-089-0005</b>	<b>30.3583, -81.4633</b>	<b>129</b>

Nassau County shows a violation of the 2010 SO<sub>2</sub> NAAQS. Therefore, some area in this county and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for inclusion in a nonattainment area. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

The violating monitor (12-089-0005) in Fernandina Beach is located less than one kilometer to the southeast of the Rayonier Performance Fibers plant, a major source of SO<sub>2</sub>. All other SO<sub>2</sub> monitors in the northeast Florida area are in compliance with the ambient standard.

#### ***Emissions and Emissions-Related Data***

Evidence of SO<sub>2</sub> emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emissions data for SO<sub>2</sub> and any growth in SO<sub>2</sub> emitting activities since the date represented by those emissions data.

#### Emissions

EPA recognizes that there may be important new information on emissions levels for the period after 2008, and would consider more recent information if available. Florida did not provide updated emissions information, therefore EPA relied on the 2008 NEI emissions data (NEI08V2).

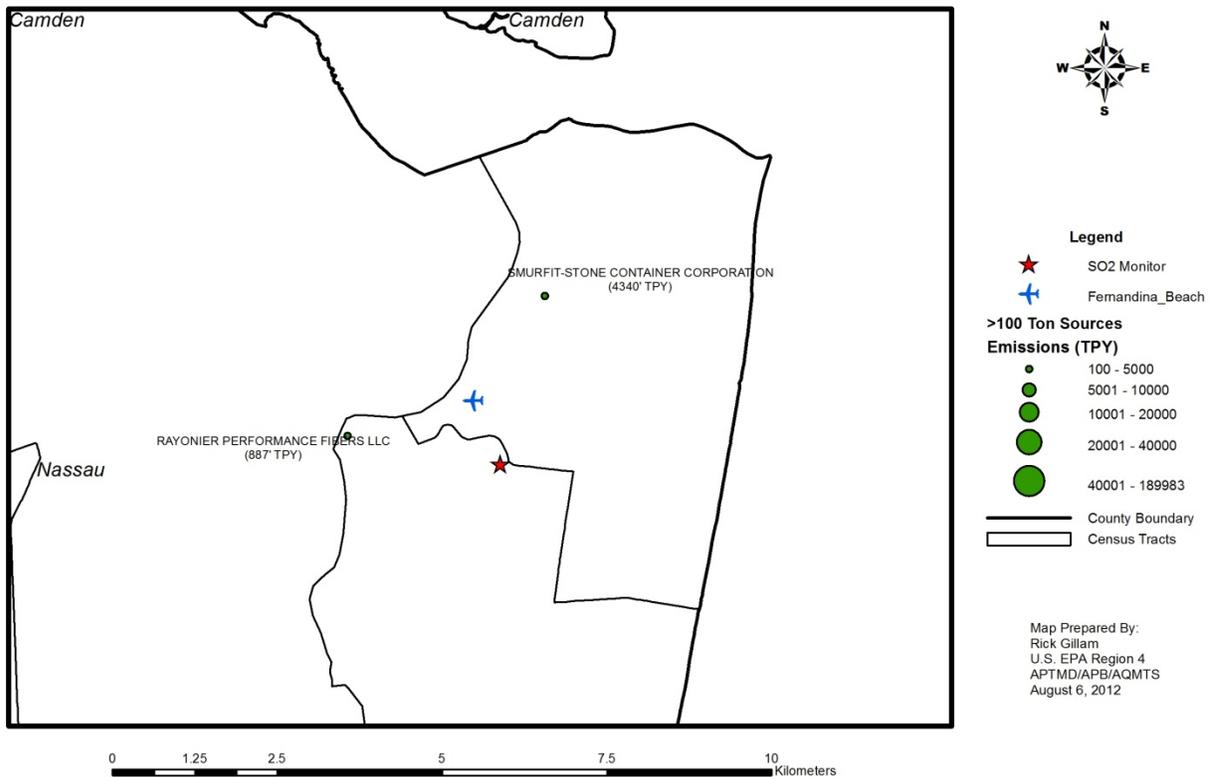
Table 6 shows total emissions of SO<sub>2</sub> (given in tpy) for violating and potentially contributing counties in and around Nassau County, including sources emitting greater than 100 tpy of SO<sub>2</sub> according to the 2008 NEI. The County that contains all or part of the Nassau County nonattainment area for the 2010 SO<sub>2</sub> NAAQS is shown in **bold**.

**Table 6. Annual SO<sub>2</sub> Emissions (NEI08V2)**

County	Facility >100 tpy (EIS or State Facility ID)	Facility Emissions (tpy)	Total County SO <sub>2</sub> Emissions (tpy)
Nassau County, FL	SMURFIT-STONE CONTAINER CORPORATION	4,340	5,309
	RAYONIER PERFORMANCE FIBERS LLC	887	

**Figure 6: Facility Locations in the Nassau County Area**

## Nassau County, Florida SO<sub>2</sub> Monitor, Meteorological Data and Emissions Sources



### Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 6 represent emissions levels taking into account any control strategies implemented on stationary sources in Nassau County up to and including the year 2008. EPA has not received any additional information on emissions reductions resulting from federally enforceable controls put into place after 2008.

**Meteorology (weather/transport patterns)**

Evidence of source-receptor relationships between specific emissions sources and high SO<sub>2</sub> values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the NWS site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO<sub>2</sub> exceedances. For the Nassau Area, the meteorological data used in this analysis is for 2009-2011 from the Fernandina Beach site (ID # 997347-99999). Figure 6 shows a map of the SO<sub>2</sub> monitor location, meteorological data location, and the major emissions sources in the area. The Fernandina Beach site is less than one kilometer northeast of the violating monitor. The primary SO<sub>2</sub> emissions sources nearby are the Rayonier Performance Fibers facility, located approximately one kilometer northwest from the violating monitor, and the Smurfit-Stone Container Corporation facility, located approximately 2.5 kilometers north-northeast from the violating monitor.

Figure 7 shows a wind rose of the hours exceeding the 1-hr SO<sub>2</sub> NAAQS (75 ppb) at the violating monitor. The wind rose was developed using wind data from the Fernandina Beach site.

**Figure 7. Wind Rose of 2009-2011 hours exceeding the 1-hr SO<sub>2</sub> NAAQS at the violating monitor.**

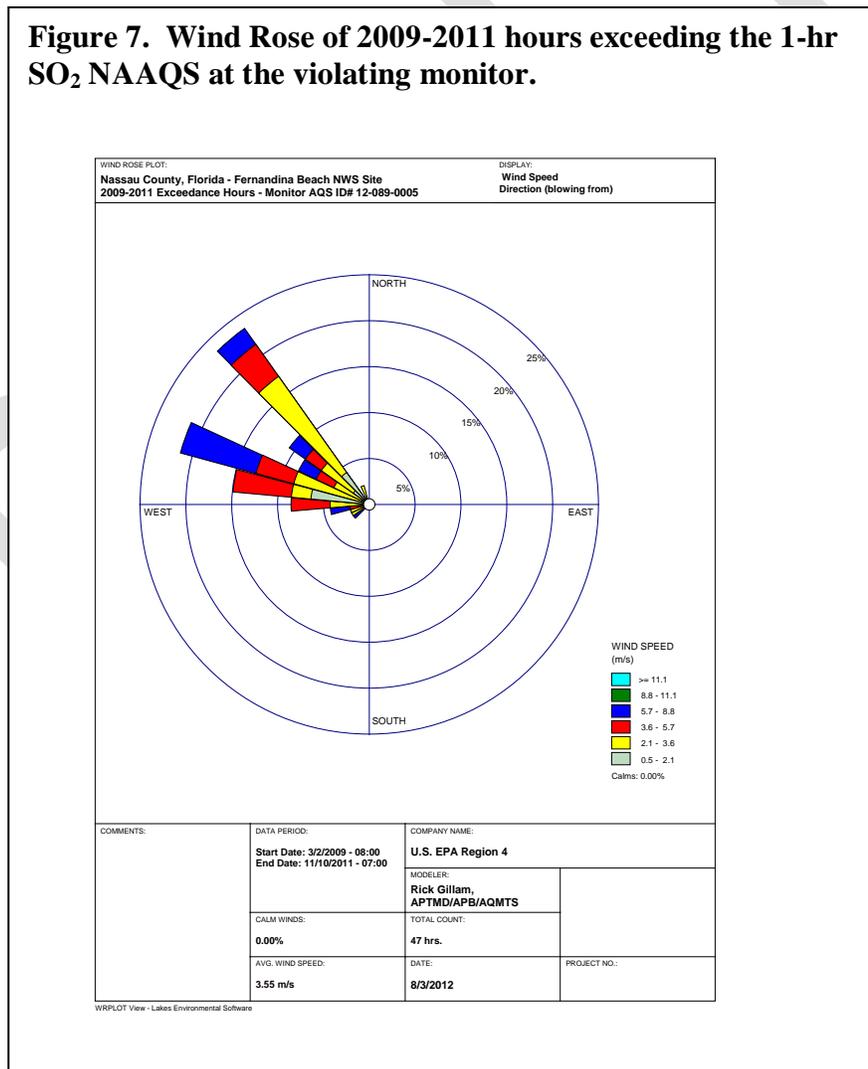


Figure 7 shows that the majority of the exceeding hours have winds blowing from the west-northwest direction with low to moderate wind speeds. As can be seen in Figure 6, the Rayonier Performance Fibers facility is located approximately 1 kilometer northwest of the monitor. No other major sources are located near the violating monitor in the west-northwest direction. Therefore, the Rayonier Performance Fibers facility is likely the major contributor to the violations.

FDEP performed an in-depth analysis of wind direction data to identify the wind directions associated with elevated SO<sub>2</sub> monitored concentrations. This information is provided in the “Meteorology” section of Appendix B of this TSD. The results of this analysis agree with EPA’s analysis above which indicates that winds blow from the northwest during times of high SO<sub>2</sub> concentrations at the violating monitor. This analysis shows that the Rayonier Facility is upwind of the monitor and is the most likely contributor to the violations. This hypothesis was further evaluated by the State using dispersion modeling. See the discussion in the “Modeling Analysis” section for further information about the modeling.

#### ***Geography/Topography (mountain ranges or other air basin boundaries)***

Nassau County does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

#### ***Jurisdictional Boundaries***

Once EPA identified the general areas that the Agency anticipated would be included in the nonattainment area, EPA then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. With regard to the 2010 SO<sub>2</sub> NAAQS, EPA has determined that the appropriate jurisdictional boundaries to be considered to include counties, air districts, pre-existing nonattainment areas, reservations, among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

No area in Nassau County has been or is currently nonattainment for a SO<sub>2</sub> NAAQS, so EPA had no boundary related to a previous nonattainment designation to consider for this area. Additionally, this area does not include Indian Country. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

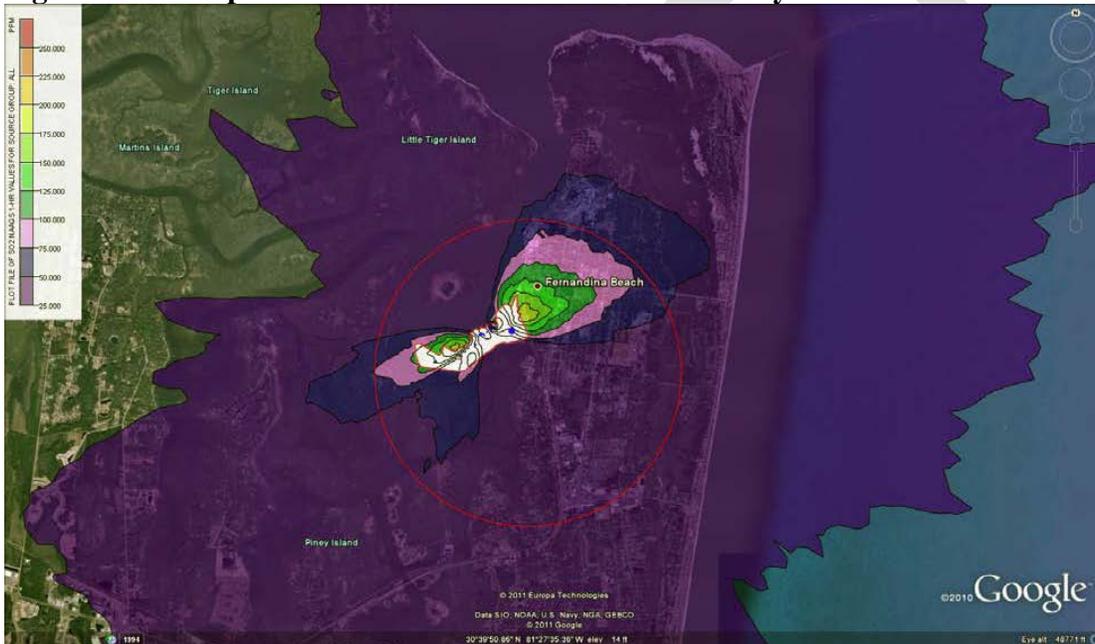
#### ***Modeling Analysis for Nonattainment Area Boundaries***

The violating monitor is located in the northeastern part of Nassau County, less than 1 kilometer to the southeast of the Rayonier Performance Fibers plant. The violating area associated with the primary source of SO<sub>2</sub> at this monitor is well within the county boundary. The recommended nonattainment boundary encompasses this violating monitor as informed by air dispersion modeling. See Appendix B of this document for modeling results for nonattainment area boundaries. FDEP used air dispersion modeling to help delineate the boundary of the recommended nonattainment area. In completing this modeling, the Department generally followed the guidance provided in the March 24, 2011, EPA

memorandum, “Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards.”

Specifically, the State’s updated recommendation letter dated November 28, 2011, (in Appendix B) provides modeling results to inform a nonattainment area boundary for this area. The AERMOD model results were used to determine the areal extent with which the Rayonier facility would be potentially violating the standard. The recommended nonattainment area encompasses the receptors having modeled violations of the ambient standard associated with the Rayonier facility. Florida used its model results in an exacting manner to describe the recommended nonattainment boundaries. The nonattainment area is defined as the area where the model predicts that the SO<sub>2</sub> concentration (using the five-year average of the 4<sup>th</sup> high value as the metric) is greater than the ambient SO<sub>2</sub> standard. A circular area is used to define the areal extent of the nonattainment area (See the discussion and figure below).

**Figure 8. Aerial photo with nonattainment area boundary.**



As indicated above, the November 28, 2011, Florida submittal recommends a nonattainment area boundary encompassing the area that, based upon air dispersion modeling, is experiencing violations of the SO<sub>2</sub> standard caused by the identified source. The State’s recommended nonattainment boundary is centered on the violating monitor and encompasses the area having a modeled violation of the ambient standard associated with the Rayonier facility. The State’s recommendation letter (in Appendix B) provides a circular boundary of the area recommended for nonattainment classification, with the center being the location of the violating ambient monitor and the radius being 2.4 kilometers. Figure 8 illustrates an aerial photo of the modeled nonattainment area boundary.

### ***Other Relevant Information***

EPA did not receive additional information relevant to establishing a nonattainment area boundary for this Area.

### **Conclusion**

After considering the factors described above, EPA intends to find that it is appropriate to agree with the State of Florida's partial boundary recommendation as described in the modeling section above. EPA's conclusion is premised on that fact that the air quality monitor in Nassau County shows a violation of the 2010 SO<sub>2</sub> NAAQS, based on 2009-2011 air quality data. Additionally, based on the modeling conducted by Florida and the boundary that Florida has presented, the boundary captures the violating monitor, the source contributing to the violation, and encompasses the entire area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2010 SO<sub>2</sub> NAAQS.

DRAFT

## Appendix A

### Modeling Results Used to Establish Area Boundaries

#### Hillsborough County Area Modeling Discussion (Appendix 2 of the 6/13/11 submittal)

##### **Meteorology**

A review of the monitoring data in relation to the wind direction at the time of maximum concentrations revealed that all occurrences of SO<sub>2</sub> above the level of the standard (75 ppb) were associated with winds coming from the Mosaic Riverview facility. The following aerial photo shows the direction of the Mosaic Riverview facility from the SO<sub>2</sub> monitor. The distance from the primary SO<sub>2</sub> sources (three sulfuric acid plants) to the monitor is 1 kilometer, with the direction of the entire facility ranging from 295° to 350°. The following tables list each of the hours in which a concentration was greater than the ambient SO<sub>2</sub> standard (75 ppb) along with its associated wind direction. The wind direction data come from the wind instrument located at the monitoring site (wind data from the nearby Simmons Park monitoring site are substituted when data at the Gibsonton site are missing). The tables show that for some hours of high SO<sub>2</sub> concentration the wind appears to be coming from a direction of about 56°. There are no SO<sub>2</sub> sources from that direction, so the department reviewed the wind direction data for regional consistency. A review of these data shows that winds measured at other wind instruments in the area during these hours are consistent with a wind flow from the Mosaic Riverview facility. The wind direction data from the nearby Simmons Park site, located to the south of the Gibsonton monitor, are shown as a truer representation of the winds during these hours. Florida has not identified the reason why the Gibsonton wind instrument displays this behavior; however, it appears to be confined to the period from November 19, 2009, through February 17, 2010. Both before and after this period, SO<sub>2</sub> concentrations remain near zero when the winds are out of this direction.



**SO<sub>2</sub> Concentration and Associated Wind Direction (2008) (for hours greater than 75 ppb)**

Date	Time	SO <sub>2</sub> (ppb)	WD	Simmons WD*
20080101	14:00	96	-	347
20080101	15:00	189	-	345
20080101	16:00	122	-	344
20080101	17:00	94	-	342
20080101	18:00	100	-	342
20080101	19:00	142	-	340
20080101	20:00	170	-	344
20080101	21:00	115	-	351
20080102	12:00	76	-	350
20080102	14:00	80	-	345
20080120	0:00	76	310	
20080227	15:00	86	297	
20080308	22:00	103	303	
20080324	15:00	75	302	
20080324	16:00	85	304	
20080324	17:00	90	306	
20080324	19:00	123	307	
20080324	20:00	129	300	
20080413	5:00	123	297	
20080414	18:00	104	294	
20080414	19:00	84	295	
20080414	20:00	102	295	
20080429	19:00	77	293	
20080812	18:00	99	317	
20080905	7:00	169	306	
20080905	8:00	128	306	
20080905	10:00	113	294	
20080914	16:00	76	308	
20081027	21:00	82	308	

\*Substitute wind direction data from the Simmons Park (0570081) site.

**SO<sub>2</sub> Concentration and Associated Wind Direction (2009) (for hours greater than 75 ppb)**

Date	Time	SO <sub>2</sub> (ppb)	WD	Simmons WD*
20090220	2:00	134	306	
20090301	23:00	92	295	
20090302	0:00	99	299	
20090302	1:00	127	302	
20090302	2:00	126	303	
20090302	3:00	136	299	
20090302	4:00	112	302	
20090302	5:00	80	311	
20090302	20:00	89	298	
20090407	2:00	107	301	
20090407	7:00	87	298	
20090408	0:00	83	294	
20090408	1:00	104	297	
20090408	2:00	85	298	
20090511	20:00	80	291	
20091017	13:00	81	305	
20091017	16:00	76	308	
20091017	17:00	83	307	
20091024	21:00	97	305	
20091126	15:00	87	56	339
20091126	16:00	83	55	337
20091126	19:00	96	55	335
20091205	14:00	86	57	345
20091219	3:00	84	56	328
20091219	5:00	79	56	329
20091219	6:00	98	57	336
20091219	7:00	85	56	331
20091219	8:00	87	57	329
20091220	1:00	85	56	333
20091220	2:00	98	56	334
20091220	3:00	94	59	343
20091228	21:00	75	59	346

\*Substitute wind direction data from the Simmons Park (0570081) site.

## SO<sub>2</sub> Concentration and Associated Wind Direction (2010) (for hours greater than 75 ppb)

Date	Time	SO <sub>2</sub> (ppb)	WD	Simmons WD
20100105	11:00	85	57	350
20100106	11:00	76	57	347
20100131	1:00	87	55	343
20100212	20:00	78	54	342
20100212	21:00	104	53	343
20100216	4:00	104	54	346
20101015	14:00	76	313	
20101105	15:00	79	307	
20101201	4:00	89	309	
20101201	9:00	111	309	
20101201	10:00	76	315	
20101201	11:00	93	308	
20101201	12:00	86	306	
20101226	20:00	117	302	
20101226	21:00	107	307	
20101227	0:00	95	312	
20101227	1:00	113	305	
20101227	2:00	100	308	
20101227	3:00	119	306	
20101227	4:00	95	303	
20101227	5:00	75	308	

\*Substitute wind direction data from the Simmons Park (0570081) site.

### Air Dispersion Modeling

Florida used air dispersion modeling to help delineate the boundary of the recommended nonattainment area. In completing this modeling, Florida generally followed the guidance provided in the March 24, 2011, EPA memorandum, “Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards.”

a) Model Selection – The department used the AERMOD modeling system.

- a. AERMOD ver11103
- b. AERMAP ver11103
- c. AERMET ver06341
- d. AERSURFACE ver08009

b) Modeling Domain – The focus of the nonattainment designation is on the monitor having the violation. As noted above, wind data at the monitoring site indicate that all of the high concentrations (greater than the standard of 75 ppb) occur within a small wind direction sector that implicates the nearby Mosaic Riverview phosphate processing facility. Modeling of this source alone indicates that the predicated concentrations at the location of the monitor are almost completely explained by this single source. As a result, the modeling domain is centered on the Mosaic Riverview facility, which is located

only 1000 meters from the monitoring location and the domain extends to a 15 by 15 kilometer area around this facility.

c) Determining the Sources to Model – Because the Mosaic Riverside facility is the overwhelming source of the violation, it is the only source that is modeled for the purpose of informing the extent of the nonattainment area. Florida recognizes that other SO<sub>2</sub> sources in the multi-county area could interact with the Mosaic facility for certain wind directions. Florida believes for the purpose of simply determining the area of nonattainment encompassing the violating monitor, it is sufficient to focus on the Mosaic Riverside facility.

d) Receptor Grid – The receptor grid follows EPA guidance: a nested grid with 50 meter spacing within one kilometer of the source, 100 meter spacing from one to two kilometers, 250 meters from two to ten kilometers, and 500 kilometers outside of ten kilometers.

e) Source Inputs – Maximum allowable short-term limits on SO<sub>2</sub> emissions or potential-to-emit levels were used for all sources. Stack and emission information were obtained from the Florida's Air Resource Management System, Title V operating permits, and previous air construction permit applications. These data were reviewed by Mosaic, resulting in changes in refinement of the inputs related to geographic location of buildings and stacks. Where stack heights are less than good engineering practices (GEP), building downwash effects are included. No stacks at this facility exceed GEP limits. The ground surface characteristic of the area is rural as determined through land-use data consistent with the guidance.

f) Meteorological Data – Five years (2005-2009) of meteorological data from the National Weather Service site at Tampa International Airport were used in this analysis. These data were processed through AERMET version 06341. The Tampa airport is located approximately 20 kilometer from the Mosaic facility, also along Tampa Bay. These data are deemed representative of the area in which Mosaic Riverview is located.

g) Background Concentration – The background concentration at the Gibsonton monitor was determined based on the 99th percentile maximum daily 1-hour value on hours that were not impacted by the Mosaic Riverview facility. A 90-degree sector of wind directions centered on the Mosaic facility was excluded from the calculation to avoid double counting. The 99<sup>th</sup> percentile of the remaining concentrations associated with winds not from the direction of the Mosaic facility was calculated for each year and averaged. Based on this calculation, the background concentration is 25.8 ppb.

### **Modeling Results**

The AERMOD model results were used to determine the areal extent with which this facility would be potentially violating the standard. The recommended nonattainment area encompasses the receptors having modeled violations of the ambient standard associated with the Mosaic Riverview facility. A review of the modeled impact at the location of the monitor provides an indication of the general performance of the model in describing the SO<sub>2</sub> concentrations. The table below compares the model results with those at the monitor.

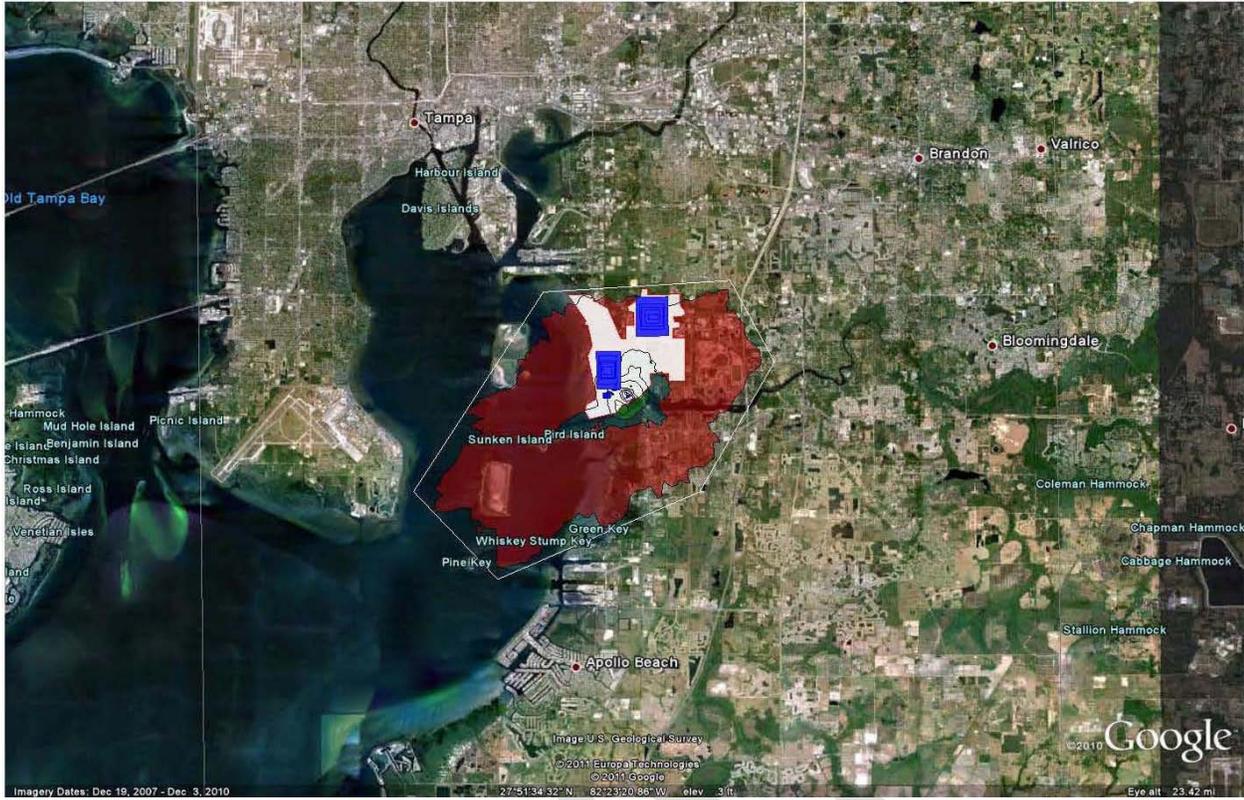
Year	Modeled Maximum at Monitor Location (ppb)	Actual 1 <sup>st</sup> High Maximum 1 hour value at Monitor (ppb)	Modeled 4 <sup>th</sup> High at Monitor Location (ppb)	Actual 4 <sup>th</sup> High (99 <sup>th</sup> Percentile) at Monitor (ppb)
2005	163.0	151	133.5	135
2006	166.7	130	130.5	96
2007	163.3	143	137.6	126
2008	187.3	189	140.1	123
2009	153.7	136	130.1	104

These results indicate that the model is performing very well in replicating the SO<sub>2</sub> concentration at the monitoring location, and that the Mosaic Riverview facility explains virtually all of the elevated concentrations that occur at this monitor. The design value concentrations in the area due to the Mosaic Riverview facility show that there are potentially higher concentrations in other locations.

The maximum modeled design values associated with the Mosaic facility for 2005-2009 are as follows.

Year	Date (MMDDHH)	4 <sup>th</sup> High Concentration (ppb)
2005	010411	506.7
2006	031211	494.8
2007	120811	486.7
2008	090110	462.6
2009	022617	442.1
5-Year Average		478.5

It should be noted that the location of the design value concentration is on the Mosaic plant property. Because the model performance is very good, the department has used the model results in an exacting manner to describe the recommended nonattainment boundaries. The nonattainment area is defined as the area where the model predicts that the SO<sub>2</sub> concentration (using the five-year average of the 4<sup>th</sup> high value as the metric) is greater than the ambient SO<sub>2</sub> standard. A polygon with six vertices is used to define the areal extent of the nonattainment area. The following aerial photo below shows the bounds of the area having modeled concentrations greater than the ambient air quality standard. The annotated polygon (white line) outlines the area recommended for nonattainment classification. The red shaded area outlines the modeled area greater than the ambient standard. The whited-out area describes the property boundary of the Mosaic Riverview facility, with buildings and structures in blue.



**Appendix B**  
**Nassau County Area Modeling Discussion (Appendix of the 11/28/11 submittal)**

**Meteorology**

A review of the monitoring data in relation to the wind direction at the time of maximum concentrations revealed that all occurrences of SO<sub>2</sub> above the level of the standard (75 ppb) were associated with winds coming from the Rayonier facility. The following aerial photo shows the direction of the Rayonier facility from the SO<sub>2</sub> monitor. The distance from the facility to the monitor is 1 kilometer, with the direction of the entire facility ranging from 290° to 320°. The following tables list all of the hours in which a concentration was greater than the ambient SO<sub>2</sub> standard (75 ppb) along with its associated wind direction. The wind direction data come from the wind instrument located at the monitoring site. When the winds come from the direction of the nearby Rock Tenn pulp mill, the monitor typically registers single digit SO<sub>2</sub> concentrations with highest value in the upper 30's ppb. It is clear that the violation of the standard is due to the Rayonier facility.



**SO<sub>2</sub> Concentration and Associated Wind Direction (2008) (for hours greater than 75 ppb)**

Date	Time	SO <sub>2</sub> (ppb)	WD
20080113	21:00	100	321
20080114	1:00	79	321
20080114	7:00	78	324
20080127	21:00	93	325
20080210	1:00	98	316
20080413	22:00	82	292
20080512	22:00	86	332
20081212	17:00	85	321
20081212	19:00	146	325

**SO<sub>2</sub> Concentration and Associated Wind Direction (2009) (for hours greater than 75 ppb)**

Date	Time	SO <sub>2</sub> (ppb)	WD
20090302	4:00	145	325
20090303	0:00	77	347
20090929	20:00	121	297

**SO<sub>2</sub> Concentration and Associated Wind Direction (2010) (for hours greater than 75 ppb)**

Date	Time	SO <sub>2</sub> [ppb]	WD
20100106	20:00	106	291
20100106	23:00	76	301
20100109	23:00	253	287
20100110	0:00	134	323
20100110	20:00	105	330
20100111	0:00	79	334
20100111	5:00	152	315
20100111	6:00	80	297
20100111	7:00	216	284
20100111	8:00	105	316
20100112	17:00	143	295
20100112	18:00	345	295
20100112	19:00	121	322
20100127	2:00	81	325
20100203	4:00	76	321
20100213	18:00	289	294
20100213	19:00	320	290
20100213	20:00	344	288
20100214	1:00	102	314
20100214	3:00	145	276
20100214	9:00	86	289
20100215	23:00	93	297
20100216	0:00	176	294
20100216	3:00	201	291
20100216	4:00	190	294
20100216	5:00	88	300
20100216	6:00	121	295
20100216	7:00	135	295
20100216	22:00	124	293
20100217	3:00	132	301
20100314	0:00	186	321
20100315	1:00	84	296
20100315	23:00	80	294
20100316	1:00	81	289
20100316	4:00	78	330
20100318	7:00	85	330
20101007	5:00	111	323

### **Air Dispersion Modeling**

Florida used air dispersion modeling to help delineate the boundary of the recommended nonattainment area. In completing this modeling, Florida generally followed the guidance provided in the March 24, 2011, EPA memorandum, "Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards."

a) Model Selection – The department used the AERMOD modeling system.

a. AERMOD ver11103

b. AERMAP ver11103

c. AERMET ver11059

d. AERMINUTE ver11059

e. AERSURFACE ver08009

b) Modeling Domain – The focus of the nonattainment designation is on the monitor having the violation. As noted above, wind data at the monitoring site indicate that all of the high concentrations (greater than the standard of 75 ppb) occur within a small wind direction sector that implicates the nearby Rayonier facility. As a result, the modeling domain is centered on the Rayonier facility, which is located only 1 kilometer from the monitoring location and the domain extends to a 10 by 10 kilometer area around this facility.

c) Determining the Sources to Model – Because the Rayonier facility is the overwhelming source for the violation, this is the only source modeled for the purpose of determining the extent of the nonattainment area.

d) Receptor Grid – The receptor grid used follows the guidance. A nested grid with 50 meter spacing within one kilometer of the source, 100 meter spacing from one to two kilometers, and 250 meters from two to ten kilometers.

e) Source Inputs – Maximum allowable short-term limits on SO<sub>2</sub> emissions or potential to emit levels were used for all sources. Stack and emission information were obtained from the department's Air Resource Management System, Title V operating permit, and previous air construction permit applications. These data were reviewed by Rayonier to verify the correct geographic location of buildings and stacks. Where stack heights are less than GEP, building downwash effects are included. No stacks at this facility exceed GEP limits. The Rayonier facility is rural as determined through land-use data consistent with the guidance.

f) Meteorological Data – Five years (2006-2010) of meteorological data from the NWS site at Jacksonville International Airport were used in this analysis. These data were processed through AERMET version 11059, using 1-minute data from the same site processed through AERMINUTE version 11059. The Jacksonville airport is located approximately 28.5 kilometers to the south of the violating monitor.

g) Background concentration – The background concentration at the Fernandina Beach monitor was determined based on the 99th percentile maximum daily 1-hour value on hours that were not impacted by the Rayonier facility. A 90-degree sector of wind directions centered on the Rayonier facility was

excluded from the calculation to avoid contribution from the Rayonier facility. The 99th percentile of the remaining concentrations associated with winds not from the direction of the Rayonier facility were calculated for each year and averaged. Based on this calculation, the background concentration is 26.0 ppb.

### Modeling Results

The AERMOD model results were used to determine the areal extent to which this facility would be potentially violating the standard. The recommended nonattainment area is centered on the violating monitor and encompasses the area having a modeled violation of the ambient standard associated with the Rayonier facility.

The maximum modeled design values associated with the Rayonier facility for the 2006 – 2010 are as follows.

Year	Date (MMDDHH)	4 <sup>th</sup> High Concentration (ppb)
2006	082909	230.7
2007	081709	267.0
2008	072214	274.7
2009	072812	276.6
2010	071812	284.5
5-Year Average		266.7

The aerial photo below shows the bounds of the area having modeled concentrations greater than the ambient air quality standard. The red annotation circle outlines the area recommended for nonattainment classification, with the center being the location of the violating ambient monitor and the radius being 2.4 kilometers. Inside the shaded pink area outlines the modeled area greater than the ambient standard.

