

# Technical Support Document

## Chapter 11: Intended Round 3 Area Designations for the 2010 1-Hour SO<sub>2</sub> Primary National Ambient Air Quality Standard for Guam

### 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<sub>2</sub>) primary national ambient air quality standard (NAAQS) (2010 SO<sub>2</sub> NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO<sub>2</sub> NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO<sub>2</sub> NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS<sup>1</sup>. An unclassifiable area is defined by the EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO<sub>2</sub> NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

This technical support document (TSD) addresses designations for all undesignated areas in Guam for the 2010 SO<sub>2</sub> NAAQS. In previous final actions, the EPA has issued designations for

---

<sup>1</sup> The term “attainment area” is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA’s approval of a state-submitted maintenance plan.

the 2010 SO<sub>2</sub> NAAQS for selected areas of the country.<sup>2</sup> The EPA is under a deadline of December 31, 2017, to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.<sup>3</sup> We are referring to the set of designations being finalized by this deadline as “Round 3” of the designations process for the 2010 SO<sub>2</sub> NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state, tribe, or territory has installed and begun timely operating a new SO<sub>2</sub> monitoring network meeting EPA specifications referenced in EPA’s SO<sub>2</sub> Data Requirements Rule (DRR) (80 FR 51052). The EPA is required to designate those remaining undesignated areas by December 31, 2020.

Guam submitted its recommendation that the entire island be designated unclassifiable for the 2010 1-hour SO<sub>2</sub> NAAQS in 2011.<sup>4</sup> Guam submitted a 2013 inventory of emissions sources in Guam that emit SO<sub>2</sub> in excess of 2,000 tons per year on January 15, 2016.<sup>5</sup> On June 22, 2016, Guam notified the EPA that it would characterize air quality for the areas surrounding the sources listed under the DRR on Guam using air quality modeling, and submitted the SO<sub>2</sub> NAAQS Designations Modeling Protocol for the Island of Guam.<sup>6</sup> The EPA concurred on Guam’s modeling protocol on October 13, 2016.<sup>7</sup> Guam submitted its modeling report and associated documentation to the EPA on January 13, 2017.<sup>8</sup> On June 29, 2017, the EPA received from Guam a supplemental modeling analysis and a revised recommendation that the Piti-Cabras area be designated as nonattainment and that the rest of Guam be designated as attainment for the 2010 SO<sub>2</sub> NAAQS.<sup>9</sup> In our intended designations, we have considered all the submissions from Guam, except that we have considered the most recent recommendation from Guam as replacing the initial recommendation, as described in section 3.7.

Table 1 identifies the EPA’s intended designations for Guam. It also lists Guam’s current recommendations. The EPA’s final designation for these areas will be 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.

---

<sup>2</sup> A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).

<sup>3</sup> *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

<sup>4</sup> The letter submitted by Ivan C. Quintata, Guam Environmental Protection Agency, to Jared Blumenfeld, EPA Region IX, was undated. EPA received the letter on June 6, 2011.

<sup>5</sup> See letter dated January 15, 2016, from Eric M. Palacios, Guam Environmental Protection Agency, to Jared Blumenfeld, EPA Region IX.

<sup>6</sup> See letter dated June 22, 2016, from Yvette L.G. Cruz, Guam Environmental Protection Agency, to Alexis Strauss, EPA Region IX.

<sup>7</sup> See electronic mail from Krishna Viswanathan, EPA Region IX, to Roland Gutierrez, Guam EPA, dated October 13, 2016.

<sup>8</sup> See letter dated January 13, 2017, from Walter S. Leon Guerrero, Guam Environmental Protection Agency, to Elizabeth Adams, EPA Region IX.

<sup>9</sup> See letter dated June 29, 2017, from Walter S. Leon Guerrero, Guam EPA, to Alexis Strauss, EPA Region IX. See also, email from Roland Gutierrez, Guam EPA, to Gwen Yoshimura, EPA Region IX, dated June 29, 2017.

**Table 1. Summary of the EPA’s Intended Designations and the Designation Recommendations by Guam**

Area	Guam’s Recommended Area Definition	Guam’s Recommended Designation	EPA’s Intended Area Definition	EPA’s Intended Designation
Piti-Cabras	Piti-Cabras	Nonattainment	Piti-Cabras  Portion of Guam within 6.074 km radius centered on UTM Zone 55P (Easting 249,601.60 m, Northing 1,489,602.00 m)	Nonattainment
Remaining Undesignated Areas to Be Designated in this Action*	Rest of Guam	Attainment	Rest of Guam	Unclassifiable/Attainment

\* The EPA intends to designate the remaining undesignated areas in Guam as “unclassifiable/attainment” as these areas were not required to be characterized by the state and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

If a state, tribe, or territory elected to install and begin timely operation of a new, approved SO<sub>2</sub> monitoring network meeting EPA specifications referenced in EPA’s SO<sub>2</sub> DRR, the EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. Guam did not elect to install and begin operation of a new monitoring network for SO<sub>2</sub>.

Areas that the EPA previously designated unclassifiable in Round 1 (*see* 78 FR 47191) and Round 2 (*see* 81 FR 45039 and 81 FR 89870) are not affected by the designations in Round 3 unless otherwise noted. The EPA did not designate any areas in Guam in Rounds 1 or 2.

## 2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a memorandum dated July 22, 2016, and a memorandum dated March 20, 2015, 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. These memoranda supersede earlier designation guidance for the 2010 SO<sub>2</sub> NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO<sub>2</sub> NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. These factors include: 1) air quality characterization via ambient monitoring or dispersion

modeling results; 2) emissions-related data; 3) meteorology; 4) geography and topography; and 5) jurisdictional boundaries.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO<sub>2</sub>, the EPA released its most recent version of a draft document titled, “SO<sub>2</sub> NAAQS Designations Modeling Technical Assistance Document” (Modeling TAD) in August 2016.<sup>10</sup>

Readers of this chapter of this TSD should refer to the additional general information for the EPA’s Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO<sub>2</sub> Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO<sub>2</sub> Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the court order dated March 2, 2015, the EPA is required to designate by December 31, 2017, all “remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO<sub>2</sub> monitoring network meeting EPA specifications referenced in EPA’s” SO<sub>2</sub> DRR (80 FR 51052). The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the area associated with two sources in Guam meeting DRR emissions criteria that Guam has chosen to be characterized using air dispersion modeling, and other areas not specifically required to be characterized by the territory under the DRR.

The area associated with two sources in Guam meeting DRR emissions criteria that Guam has chosen to be characterized using air dispersion modeling is addressed in section 3. The remaining to-be-designated areas of Guam are then addressed in section 4.

The EPA does not plan to revise this TSD after consideration of public comments on our intended designation. A separate TSD will be prepared as necessary to document how we have addressed such comments in the final designations.

The following are definitions of important terms used in this document:

- 1) 2010 SO<sub>2</sub> NAAQS – The primary NAAQS for SO<sub>2</sub> promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations. *See* 40 CFR 50.17.
- 2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.

---

<sup>2</sup> <https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf>. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO<sub>2</sub> monitoring network design, to advise states that have elected to install and begin operation of a new SO<sub>2</sub> monitoring network. *See* Draft SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, <https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf>.

- 3) Designated nonattainment area – an area that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO<sub>2</sub> NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
- 4) Designated unclassifiable/attainment area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO<sub>2</sub> NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
- 5) Designated unclassifiable area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO<sub>2</sub> NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
- 6) Modeled violation – a violation of the SO<sub>2</sub> NAAQS demonstrated by air dispersion modeling.
- 7) Recommended attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.
- 8) Recommended nonattainment area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.
- 9) Recommended unclassifiable area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.
- 10) Recommended unclassifiable/attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.
- 11) Violating monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
- 12) We, our, and us – these refer to the EPA.

### 3. Technical Analysis for the Piti-Cabras Area

#### 3.1. Introduction

The EPA must designate the Piti-Cabras, Guam, area by December 31, 2017, because the area has not been previously designated and Guam has not installed and begun timely operation of a new, approved SO<sub>2</sub> monitoring network to characterize air quality in Piti-Cabras.

#### 3.2. Air Quality Monitoring Data for the Piti-Cabras Area

There is no approved SO<sub>2</sub> monitoring network on Guam.

#### 3.3. Air Quality Modeling Analysis for the Piti-Cabras Area

##### 3.3.1. Introduction

This section 3.3 presents all the available air quality modeling information for a portion of Guam that includes the Piti and Cabras sources. (This portion of Guam will often be referred to as “the Piti-Cabras area” within this section 3.3.) This area contains the following SO<sub>2</sub> sources around which Guam is required by the DRR to characterize SO<sub>2</sub> air quality, or alternatively to establish an SO<sub>2</sub> emissions limitation of less than 2,000 tons per year:

- The Piti facility (also referred to as “MEC” by Guam), consisting of Units 8 and 9, has actual emissions of 2,000 tons of SO<sub>2</sub> or more annually. Specifically, over 2011 to 2013, Piti emitted an average of 4,828 tons of SO<sub>2</sub> per year.<sup>11</sup> Guam has chosen to characterize this source with modeling.
- The Cabras facility, consisting of four units, has actual emissions of 2,000 tons of SO<sub>2</sub> or more annually. Specifically, over 2011 to 2013, Cabras emitted an average of 8,891 tons of SO<sub>2</sub> per year.<sup>12</sup> Guam has chosen to characterize this source with modeling.

Because we have available results from 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 both of these sources. In its modeling analysis, Guam included the entire island of Guam in the modeling domain.

In its 2011 recommendation letter, prior to the submission of the January 13, 2017, modeling analysis, Guam recommended that the entire island of Guam be designated as unclassifiable based on the absence of monitoring or modeling information to characterize air quality impacts from these (and other) facilities. On January 13, 2017, Guam submitted its first modeling analysis for the DRR. This assessment and characterization was performed using air dispersion modeling software, *i.e.*, AERMOD, analyzing allowable emissions rather than actual emissions.

---

<sup>11</sup> Based on a 3-year (2011-2013) average of calculated actual hourly emissions.

<sup>12</sup> Based on a 3-year (2011-2013) average of calculated actual hourly emissions.

This modeling indicated that violations of the 2010 SO<sub>2</sub> NAAQS would result from the Piti-Cabras facilities emitting at those allowable emission levels. Guam did not provide an updated recommendation with its first modeling analysis. On June 29, 2017, the EPA received a supplemental modeling analysis using the current regulatory version of AERMOD and estimates of hourly actual emissions. In this submittal, Guam updated its recommendation, stating that the Piti-Cabras area is in modeled nonattainment, and the rest of the island is in modeled attainment of the 2010 SO<sub>2</sub> NAAQS.<sup>13</sup> After careful review of Guam’s most recent modeling assessment, supporting documentation, and all available data, the EPA intends to designate an area associated with these two sources nonattainment. The EPA’s intended nonattainment designation boundary for the Piti-Cabras area is consistent with Guam’s updated recommendation. Our reasoning for this conclusion and the boundary of this area are explained in a later section of this TSD, after all the available information is presented.

As seen in Figure 1 below, the Piti and Cabras facilities are located on the western side of the island of Guam. Also included in the figure are other nearby emitters of SO<sub>2</sub>.<sup>14</sup> This includes the “TEMES” power plant (also referred to as “Piti 7” by Guam). Marine vessels were also modeled, and are shown on the map.

---

<sup>13</sup> See electronic mail from Roland Gutierrez, Guam EPA, to Gwen Yoshimura, EPA Region IX, dated June 29, 2017.

<sup>14</sup> Emissions information from the National Emission Inventory (NEI) are not available for sources on Guam. Sources of SO<sub>2</sub> emissions shown in Figure 1 are the sources included in Guam’s modeling analysis.

**Figure 1. Map of the Piti-Cabras Area Addressing the Piti and Cabras Sources**





The discussion and analysis that follows below will reference the Modeling Technical Assistance Document (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 an initial modeling assessment and an updated modeling analysis from Guam. The updated modeling analysis uses the latest version of AERMOD (16216r), and calculated hourly actual emissions. To avoid confusion in referring to these assessments, Table 2 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. Modeling Assessments for the Piti-Cabras Area**

<b>Assessment Submitted by</b>	<b>Date of the Assessment</b>	<b>Identifier Used in this TSD</b>	<b>Distinguishing or Otherwise Key Features</b>
Guam	January 13, 2017	Initial	AERMOD Version 15181 Allowable Emissions
Guam	June 29, 2017	Updated	AERMOD Version 16216r Calculated Hourly Emissions

### 3.3.2. Modeling Analyses Provided by the Territory

#### 3.3.2.1. Differences Between and Relevance of the Modeling Assessments Submitted by the Territory

Guam submitted one modeling assessment based on AERMOD version 15181 and allowable emissions, discussed below. Guam then updated this modeling with the latest version of AERMOD (16216r) and calculated actual hourly emissions.

#### 3.3.2.2. Model Selection and Modeling Components

The EPA’s Modeling TAD notes that for area designations under the 2010 SO<sub>2</sub> 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
- BPIPFRM: 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

Guam used the default version of AERMOD version 15181 for the initial modeling analysis, the most recent and regulatory version of AERMOD at the time of the analysis. The analysis provided on June 29, 2017, updated this modeling using AERMOD version 16216r, the current regulatory version of AERMOD.

For both the initial and updated analyses, Guam did not use AERSURFACE because the appropriate database for use with AERSURFACE is not available for Guam. A discussion of Guam's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

*3.3.2.3. Modeling Parameter: Rural or Urban Dispersion for both the Initial and Updated Analyses*

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

The EPA agrees that the rural mode is appropriate, based on the small population and remote location of Guam.

*3.3.2.4. Modeling Parameter: Area of Analysis (Receptor Grid) for both the Initial and Updated Analyses*

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<sub>2</sub> emission sources or facilities considered for modeling; the extent of 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<sub>2</sub> concentrations.

The sources of SO<sub>2</sub> emissions subject to the DRR in this area are described in the introduction to this section. For the Piti-Cabras area modeling, the territory has included one other stationary source of SO<sub>2</sub> on the island of Guam and certain mobile sources. In addition to the Piti and Cabras facilities, the other emitters of SO<sub>2</sub> included in the area of analysis are the TEMES power plant and marine vessels. No other sources on or beyond the island were determined by Guam to have the potential to cause concentration gradient impacts within the area of analysis.

The grid receptor spacing for the area of analysis chosen by the territory is as follows:

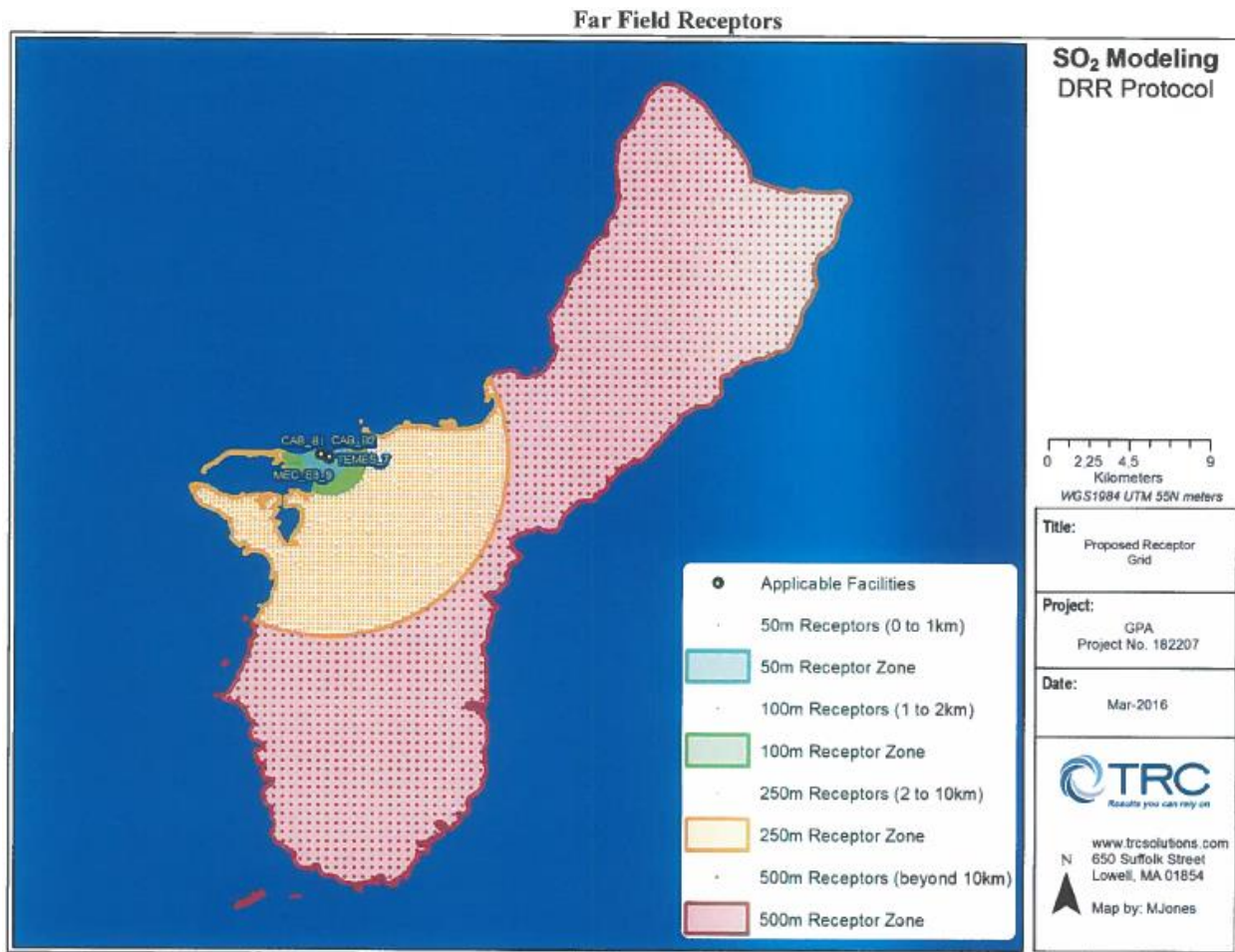
- spacing of 50 m out to a distance of 1 km from the source
- spacing of 100 m from that point out to a distance of 2 km from the source
- spacing of 250 m from that point out to a distance of 10 km from the source
- spacing of 500 m from that point out to the coast of the island

Additional receptors were placed to define the maximum design concentration over terrain to the southeast. The receptor network covered the island of Guam.

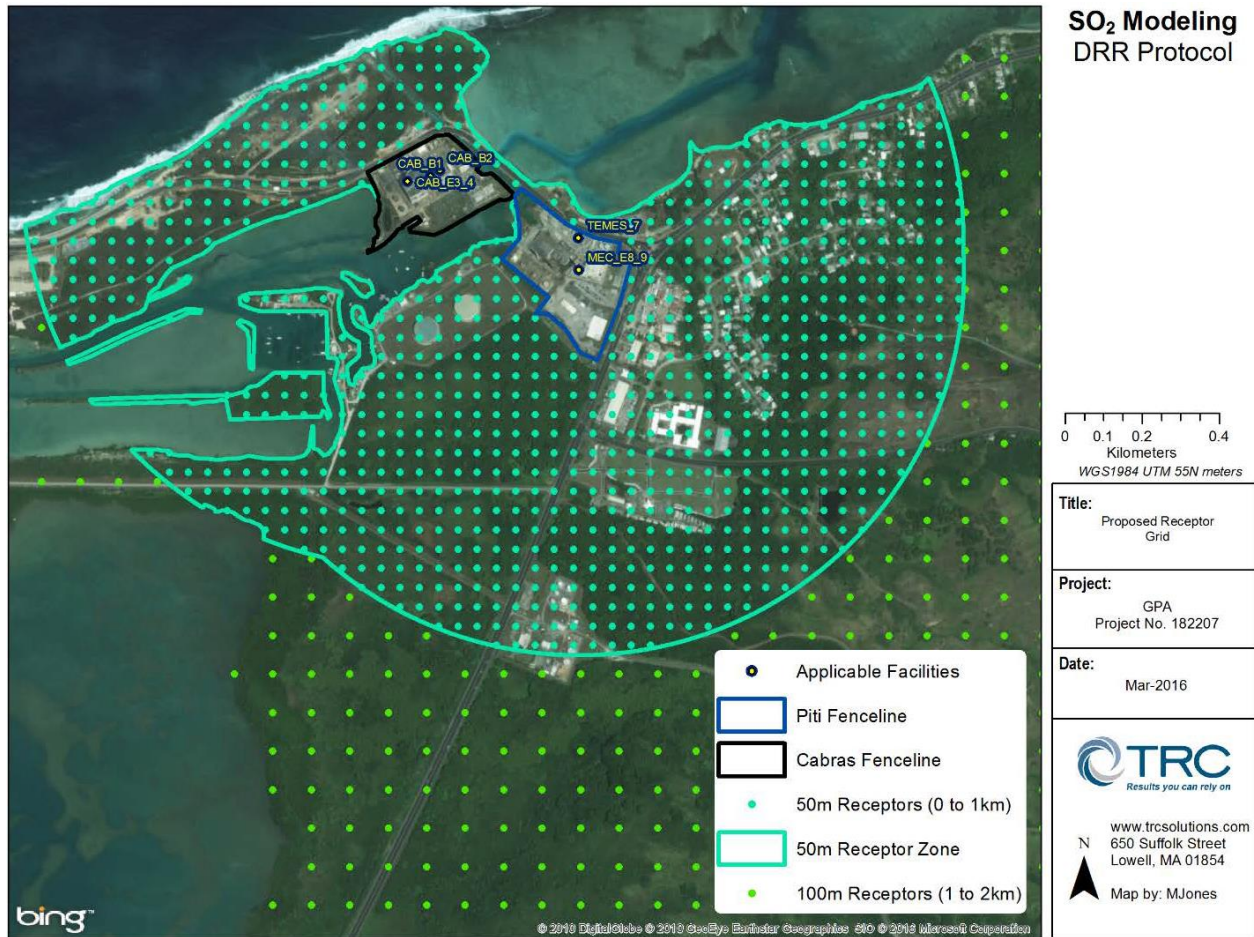
Figure 2a, included in Guam's analysis, shows the territory's chosen area of analysis surrounding the sources in the Piti-Cabras area, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, Guam 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. Specifically, Guam did not place receptors over water. Guam did not place receptors inside of the Piti property fence line and did not place receptors inside of the Cabras property fence line. Figure 2b shows the nearfield receptors, and the Piti and Cabras fence lines. We agree the removal of these receptors was consistent with the Modeling TAD and was adequately supported by the information provided by the territory.

**Figure 2a. Area of Analysis and Receptor Grid for the Piti-Cabras Area**



**Figure 2b. Area of Analysis and Receptor Grid for the Piti-Cabras Area (Near Field Receptors)**



The EPA has also reviewed the receptor placement and concludes that the receptor spacing is adequate and consistent with the Modeling TAD.

3.3.2.5. *Modeling Parameter: Source Characterization*

Guam modeled the Piti and Cabras facilities, which are located on the western side of the island of Guam. It also included other nearby emitters of SO<sub>2</sub>, including the TEMES power plant and marine vessels. Guam evaluated the remaining sources on Guam and found that these sources are not expected to cause a concentration gradient in the vicinity of the Piti-Cabras facilities.<sup>15</sup>

Guam characterized these sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the territory appropriately used actual stack heights for the initial modeling with allowable emissions because the actual stack heights

<sup>15</sup> Based on information in the SO<sub>2</sub> NAAQS Designations Modeling Protocol for the Island of Guam, Table 1: GPA Stack Parameters, submitted June 22, 2016, and October 11, 2016, updates to the modeling protocol, sent via electronic mail from Roland Gutierrez, Guam EPA, to Krishna Viswanathan, EPA Region IX.

are below the *de minimis* height permitted for all sources under the EPA’s good engineering practice (GEP) stack height regulations.<sup>16</sup> This information was also used for the updated modeling with actual emissions. Guam also adequately characterized the sources’ building layout and location, as well as the stack parameters, *e.g.*, exit temperature, exit velocity, location, and diameter. The modeled stack parameters are shown in Tables 3 and 4, below. Where appropriate, the AERMOD component BPIPFRM was used to assist in addressing building downwash.

**Table 3: Modeled Stack Parameters for Stationary Sources**

Facility	Source Name	Elevation (m)	Stack height (m)	Stack diameter (m)	Flow Rate (ACFM)	Exit Velocity (m/s)	Temperature (K)
Cabras	Cabras #1	0.7	61.0	2.6	175,268	15.7	422.0
	Cabras#2	0.6	61.0	2.6	175,268	15.7	422.0
	DEG 3 and DEG 4	1.1	61.6	2.4	211,115	21.3	445.7
MEC	#8 and #9	2.8	61.9	5.3	341,846	7.3	812.6
TEMES	Piti #7	2.4	21.2	4.1	773,186	26.3	831.8

**Table 4: Modeled Stack Parameters for Marine Sources**

Source	Model ID	Elevation (m)	Release Height (m)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (m)	Emission Rate (g/s)
Commercial port hoteling vessel	HOTELC1	0	25	14	11.6	2.2
Navy Port Hoteling vessel	HOTELN2	0	25	14	11.6	2.2
Navy Port Hoteling vessel	HOTELN#	0	25	14	11.6	2.2

We have reviewed the stack parameters for the stationary sources and marine sources and believe they are adequately characterized. We conclude that the territory adequately characterized emission sources and building downwash in its modeling.

3.3.2.6. *Modeling Parameter: Emissions*

The EPA’s Modeling TAD notes that for the purposes of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual

<sup>16</sup>See 40 CFR 51.100(ii)(1)

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, territories, 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<sub>2</sub> emissions to a level that indicates compliance with the NAAQS, the state may choose to use PTE. 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<sub>2</sub> 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, Guam included the Piti and Cabras facilities and one additional stationary source of SO<sub>2</sub> on the island of Guam in the area of analysis. Guam initially chose to model these facilities using the federally enforceable emissions limits for SO<sub>2</sub>. The facilities in Guam's modeling analysis and their associated PTE rates are summarized below. Guam later chose to update the modeling for these facilities using calculated actual hourly emissions (as well as using AERMOD version 16216r). The facilities in Guam's modeling analysis and their emission rates are summarized below. Estimated actual emissions were used for the marine vessels in both modeling analyses.

Guam provided PTE values for the Cabras, Piti, and TEMES facilities for its January 2017 initial modeling. Guam provided calculated actual emission values for the Cabras, Piti, and TEMES facilities for its June 2017 updated modeling. This information is summarized in Table 5.



**Table 5. Allowable and Actual SO<sub>2</sub> Emissions from Stationary Facilities in the Piti-Cabras Area and Actual Marine Vessel Emissions (Initial and Updated Modeling)**

Facility Name	SO <sub>2</sub> Emissions (tons per year)	
	January 2017 Initial Modeling Allowable Emissions	June 2017 Updated Modeling Estimated Actual Emissions (2011-13 Average)
Cabras	17,589	8,891
Piti (MEC)	6,783	4,828
TEMES 7	1,003	2
Marine Vessels	76 (actual)	76
Total Emissions	25,451	13,797

Continuous Emission Monitoring System (CEMS) SO<sub>2</sub> emissions data are not available for the Cabras, MEC (Piti), or TEMES generating stations. The Modeling TAD describes approaches for calculating temporally varying emissions appropriate for inclusion in an hourly emission file for AERMOD dispersion model input when hourly emissions data (*e.g.* CEMS data) are not readily available. Guam selected one of these approaches, using production data and AP-42 emission factors, for the Cabras, Piti, and TEMES facilities.

Guam Power Authority (GPA) compiled the data needed to calculate hourly emission rates for 2011-2013 based on AP-42 emission factors, and hourly production data for each unit included in the modeling. Electronic files containing the hourly production rates (Generation Loading Reports), daily fuel use, the monthly fuel oil receiving reports, and the low sulfur fuel oil (LSFO) firing events reports (hours and minutes), for the modeling period were developed, and based on these data, actual hourly emission rates were calculated.<sup>17</sup> Guam then used these rates in the June 2017 updated modeling.

As reflected in Table 5, Guam calculated actual emissions from Piti (also referred to as “MEC” by Guam), consisting of Units 8 and 9, averaging 4,828 tons of SO<sub>2</sub> per year for 2011 to 2013. Guam calculated actual emissions from Cabras, averaging 8,891 tons of SO<sub>2</sub> per year for 2011 to 2013.

We have reviewed the approach and information presented by Guam. We believe the method used by Guam for calculating temporally varying emissions is consistent with the Modeling TAD and appropriate for the Piti and Cabras facilities. We conclude that the territory adequately characterized emission sources.

<sup>17</sup> See SO<sub>2</sub> NAAQS Designations Modeling Analyses, Results and Documentation for the Guam Power Authority Piti and Cabras Power Stations, Appendix E. June 2017

3.3.2.7. *Modeling Parameter: Meteorology and Surface Characteristics for both the Initial and Updated Analysis*

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 National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

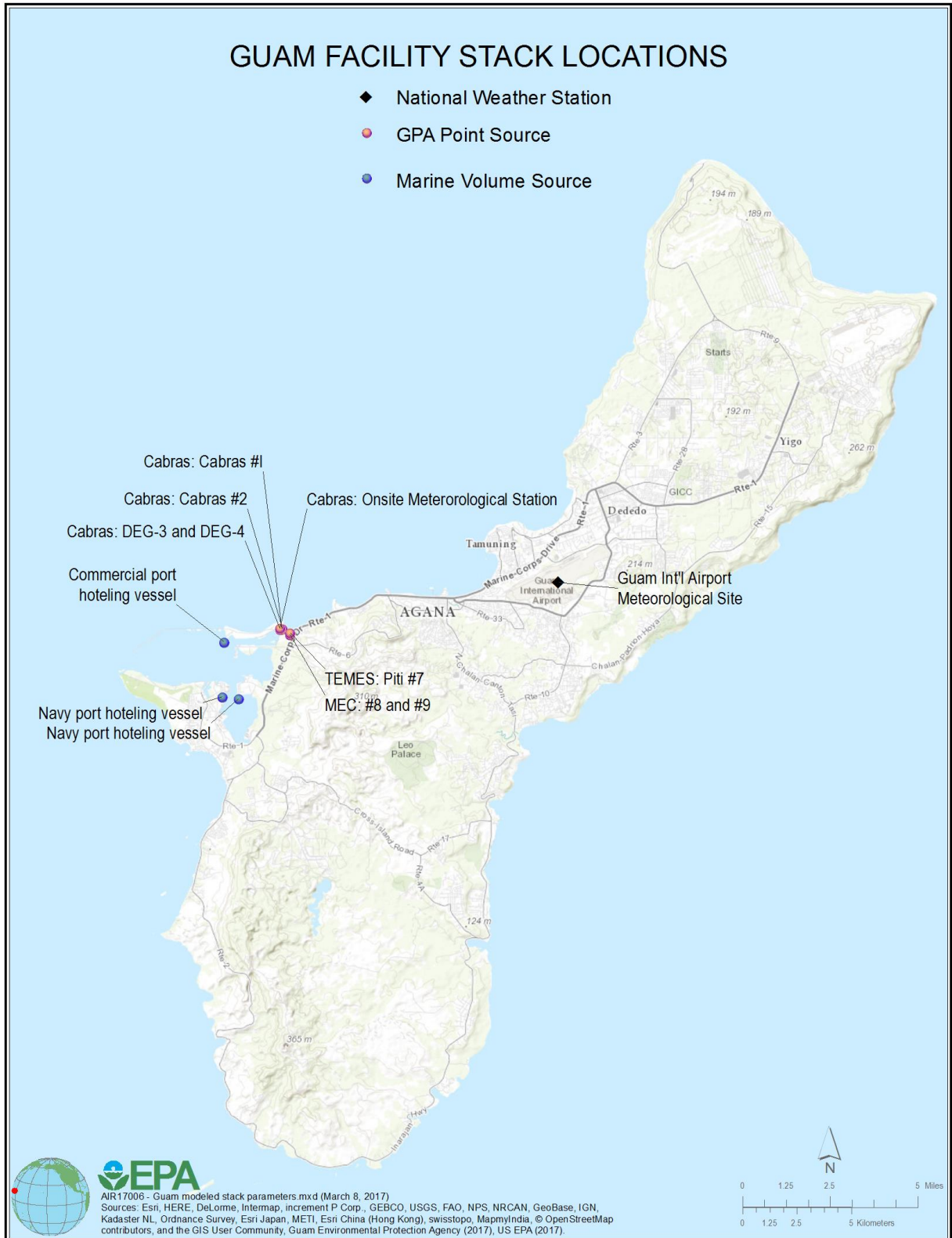
For the area of analysis for the Piti-Cabras area, Guam selected the surface meteorology from an onsite meteorological tower located at the Cabras Plant and coincident upper air observations from the Guam Airport (GUM) as best representative of meteorological conditions within the area of analysis. The modeling analysis used surface data in Integrated Surface Hourly Data (ISHD) format and upper air data in Forecast Systems Laboratory (FSL) format for GUM from 2011 through 2015 for analysis. Review of the data indicated that observations of cloud cover and other stability-type data necessary to run AERMOD were missing for a significant portion of the year 2014 and this year did not meet minimum data collection requirements. Thus, the three-year consecutive data period of 2011 through 2013 was used in this analysis. The onsite meteorological data of wind speed and direction from the 60-meter tower level located at the Cabras Plant was used as the primary source of surface wind data for the analysis. The onsite data observations are available for the same data period of 2011 through 2013 that was used for GUM.

Guam did not use AERSURFACE because the National Land Cover Dataset is not available for Guam. Guam used the Coastal Change Analysis Program data for Guam for 2005 to determine surface micro-meteorological characteristics at the primary on-site meteorology station to estimate the surface characteristics of the area of analysis. The territory estimated values for 8 spatial sectors out to 1 km at an annual temporal resolution for wet and average conditions for calculating the surface roughness (sometimes referred to as “Zo”). The territory estimated values for albedo (the fraction of solar energy reflected from the earth back into space), and the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance) using a 10 km by 10 km area.

In Figure 3, created by the EPA, the location of the Guam Airport NWS station and the on-site meteorological station is shown relative to the area of analysis.

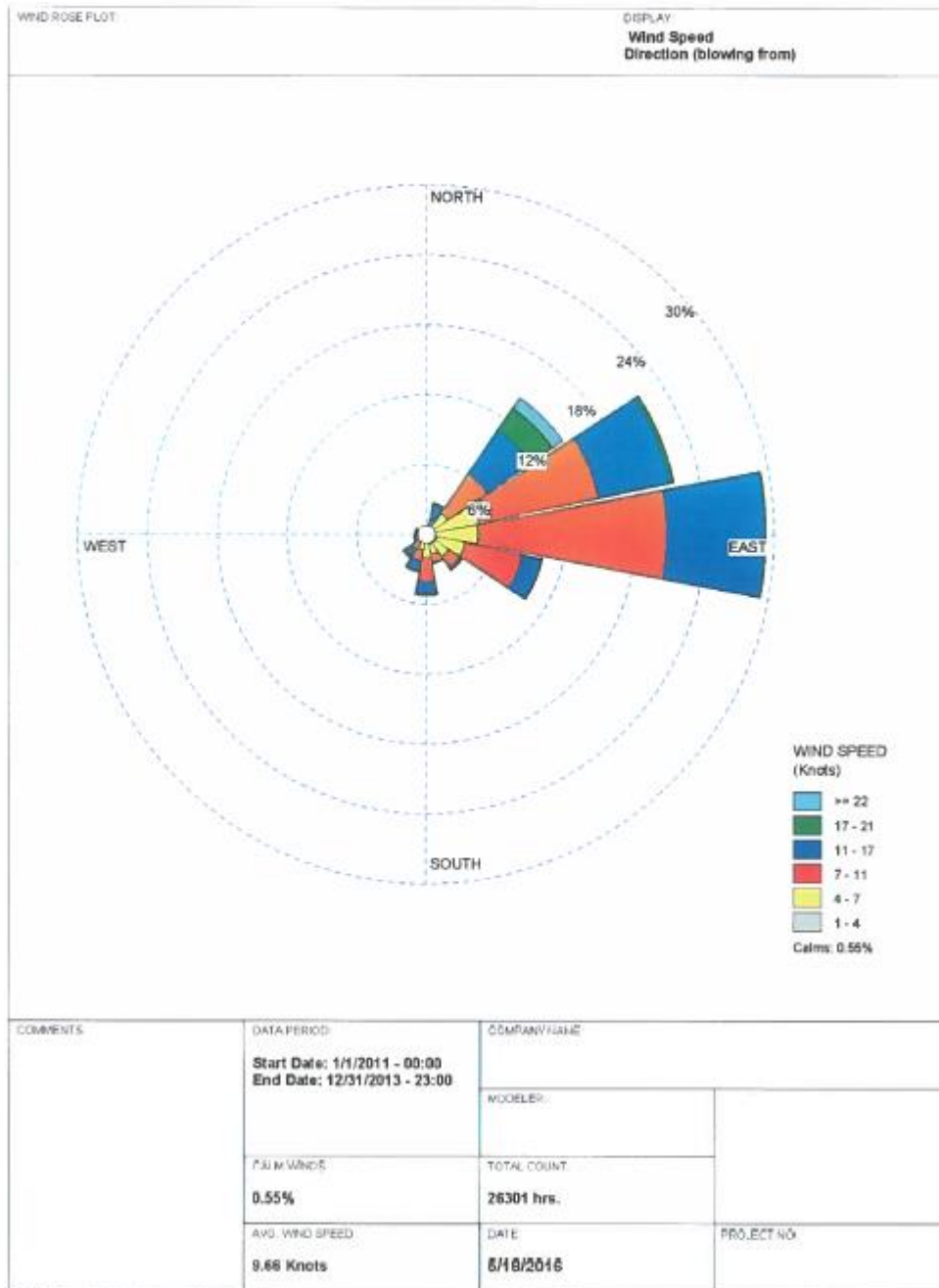


**Figure 3. Area of Analysis and the NWS station and Onsite Meteorological Station in the Piti-Cabras Area**



The territory also provided the 3-year surface wind rose for the Cabras onsite station for 2011-2013. In Figure 4, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind direction is predominantly from the east, due to the prevailing easterly trade winds that dominate the local wind flows.

**Figure 4. Guam Cumulative Annual Wind Rose for Years 2011-2013**  
**Windrose for 2011-2013 AERMET Processed Onsite and GUM ASOS Data**



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 territory followed the methodology and settings presented in the SO<sub>2</sub> NAAQS Designations Modeling Protocol for the Island of Guam, dated June 22, 2016, in the processing of the raw meteorological data into an AERMOD-ready format. Guam used the methodology discussed above 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 the GUM NWS station. 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 territory set a minimum threshold of 0.5 meters per second 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.

We have reviewed the information provided by Guam and conclude the territory appropriately selected meteorological sites, properly processed meteorological data, and adequately estimated surface characteristics. The onsite meteorological tower is representative of both the Piti and Cabras facilities. The GUM NWS station is in close proximity to, and representative of, both of the facilities. The three-year consecutive data period of 2011 through 2013 is appropriate, considering the data quality problems in the more recent year, and is concurrent with the emissions data used in the modeling.

3.3.2.8. *Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain for both the Initial and Updated Analysis*

The terrain in the area of analysis is best described as complex. 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 National Elevation Database.

We have reviewed the information provided by Guam and conclude that, consistent with the Modeling TAD, the territory appropriately addressed terrain in its analysis by using AERMAP.

3.3.2.9. *Modeling Parameter: Background Concentrations of SO<sub>2</sub> for both the Initial and Updated Analysis*

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO<sub>2</sub> 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 99<sup>th</sup> percentile monitored concentrations by hour of day and season or month. For this area of analysis, the territory chose the tier 1 approach. Guam calculated the background using data from the monitoring site at Nimitz Hill, which operated from 1999 to 2000, but is no longer in operation. Data were excluded based on wind direction, when the monitor was inside a 90-degree downwind sector from the modeled sources. The single value of the background concentration for this area of analysis was determined by the territory to be 29 micrograms per cubic meter (µg/m<sup>3</sup>), equivalent to 11 ppb when expressed in two significant figures,<sup>18</sup> and that value was incorporated into the final AERMOD results.

Based on the information provided by Guam and summarized above, we conclude that the territory appropriately calculated background concentrations of SO<sub>2</sub> to add to modeled design values. We concur that background data from the monitoring site at Nimitz Hill are appropriate. We also agree that it is appropriate to exclude data based on wind direction, when the monitor was inside a 90-degree downwind sector from the modeled sources.

3.3.2.10. *Summary of Modeling Inputs and Results*

The AERMOD modeling input parameters for the Piti-Cabras area of analysis are summarized below in Table 6.

---

<sup>18</sup> The SO<sub>2</sub> NAAQS level is expressed in ppb but AERMOD gives results in µg/m<sup>3</sup>. The conversion factor for SO<sub>2</sub> (at the standard conditions applied in the ambient SO<sub>2</sub> reference method) is 1ppb = approximately 2.619 µg/m<sup>3</sup>.

**Table 6: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Piti-Cabras Area**

<b>Input Parameter</b>	<b>Value January 2017 Initial Modeling Analysis</b>	<b>Value June 2017 Updated Modeling Analysis</b>
AERMOD Version	15181	16216r
Dispersion Characteristics	Rural	Rural
Modeled Sources	3 (PTE) 3 Marine Volume Sources	3 (Calculated Actual Emissions) 3 Marine Volume Sources
Modeled Stacks	5	5
Modeled Structures	n/a	n/a
Modeled Fencelines	2	2
Total receptors	Total number not provided by Guam EPA	Total number not provided by Guam EPA
Emissions Type	PTE for Stationary Sources Actual for Marine Vessels	Calculated Actual for Stationary Sources and Marine Vessels
Emissions Years	2011-2013	2011-2013
Meteorology Years	2011-2013	2011-2013
NWS Station for Surface Meteorology	Cabras On-site Meteorological Station (Primary) GUM (Secondary)	Cabras On-site Meteorological Station (Primary) GUM (Secondary)
NWS Station Upper Air Meteorology	GUM	GUM
NWS Station for Calculating Surface Characteristics	Cabras On-site Meteorological Station (Primary) GUM (Secondary)	Cabras On-site Meteorological Station (Primary) GUM (Secondary)
Methodology for Calculating Background SO <sub>2</sub> Concentration	Nimitz Hill Tier 1 based on design value, excluding data when the monitor is inside a 90-degree downwind sector.	Nimitz Hill Tier 1 based on design value, excluding data when the monitor is inside a 90-degree downwind sector.
Calculated Background SO <sub>2</sub> Concentration	11 ppb or 29 µg/m <sup>3</sup>	11 ppb or 29 µg/m <sup>3</sup>

The results presented below in Table 7 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

**Table 7. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentration Averaged Over 3 Years for the Area of Analysis for the Piti-Cabras Area**

Modeling Analysis	Averaging Period	Data Period	Receptor Location	Maximum 99 <sup>th</sup> percentile daily maximum 1-hour SO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	
				Modeled concentration (including background)	NAAQS Level
January 2017 Initial Modeling	99th Percentile 1-Hour Average	2011-2013	Nimitz Hill	2,243	196.4*
June 2017 Updated Modeling	99th Percentile 1-Hour Average	2011-2013	Nimitz Hill	585	196.4*

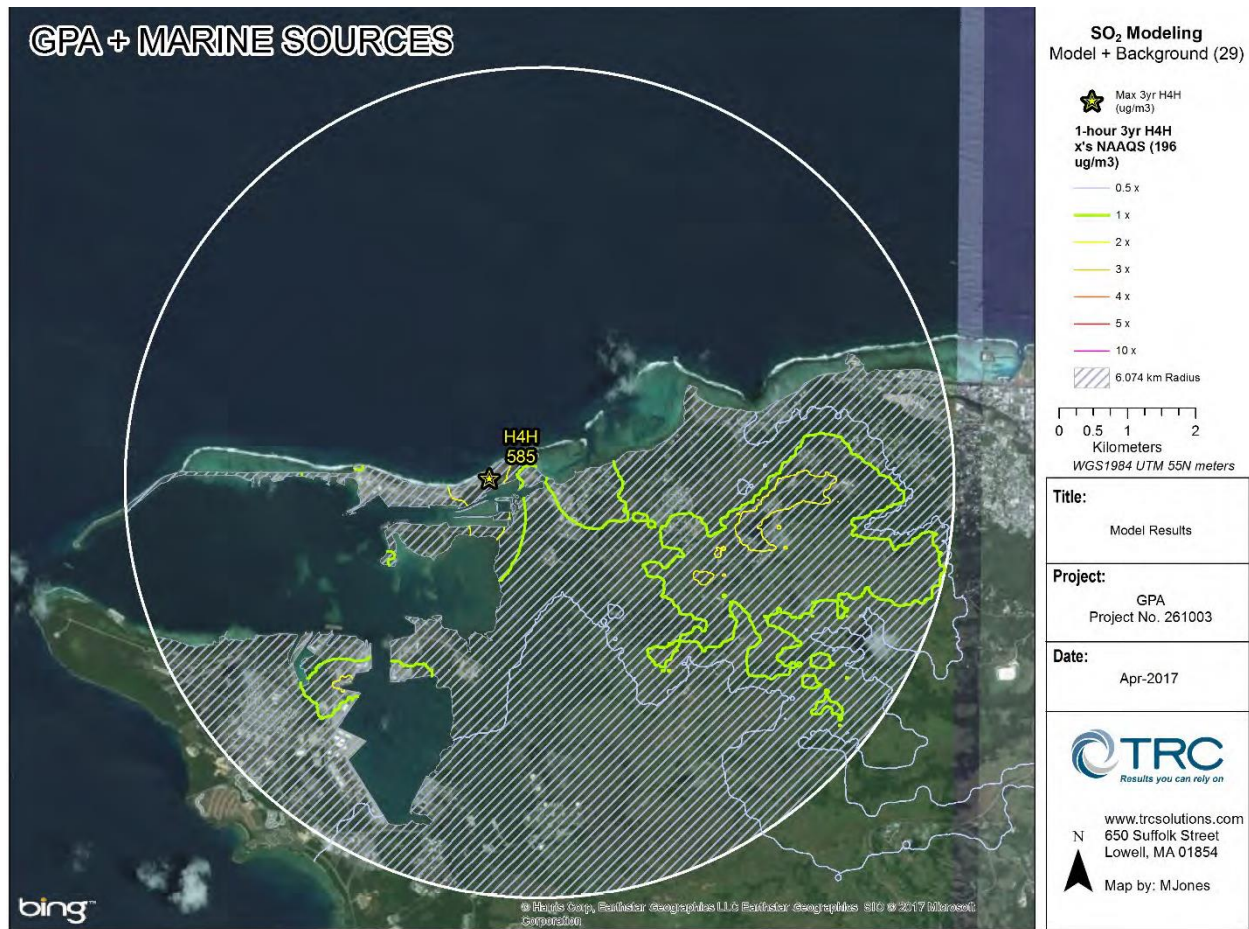
\* Equivalent to the 2010 SO<sub>2</sub> NAAQS of 75 ppb using a 2.619 µg/m<sup>3</sup> conversion factor

Guam’s initial modeling indicates that the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration within the chosen modeling domain is 2,243µg/m<sup>3</sup>, equivalent to 856 ppb. Guam’s updated modeling indicates that the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration within the chosen modeling domain is 585 µg/m<sup>3</sup>, equivalent to 223 ppb. Both modeled concentrations include the background concentration of SO<sub>2</sub>, and are based on allowable and calculated actual emissions from the facilities, respectively.

Based on the June 2017 updated modeling results using actual hourly emission rates for the stationary sources, modeled receptors in the vicinity of the Piti-Cabras plants, eastern Orote Peninsula (the peninsula located south of the plants that extends west of the main body of the island), and the terrain southeast of the plants (Nimitz Hill) are predicted to have concentrations above the 1-hour NAAQS for SO<sub>2</sub> out to a distance of approximately 6,074 m from the mid-point of modeled applicable sources. Figure 5, below, was included as part of Guam’s updated modeling, and indicates that the highest predicted value occurs on Nimitz Hill to the southeast of the facilities.



**Figure 5. Predicted 99<sup>th</sup> Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentrations Averaged Over 3 Years for the Area of Analysis for the Piti-Cabras Area based on the June 2017 Updated Modeling Analysis.**



The modeling submitted by the territory indicates violations of the 1-hour SO<sub>2</sub> NAAQS at the receptor with the highest modeled concentration and other receptors. The modeling results also include the area in which a NAAQS violation was modeled, which is relevant to the selection of the boundaries of the area that will be designated. Based on Guam's updated modeling, the 2010 SO<sub>2</sub> NAAQS is violated near the Piti-Cabras area, within a 6.074 km radius centered on the UTM Easting 249,601.60 m, and UTM Northing 1,489,602.00 m.

#### 3.3.2.11. *The EPA's Assessment of the Modeling Information Provided by the Territory*

Guam's initial modeling for the Piti-Cabras area used AERMOD version 15181, the latest version at the time of submittal, using all regulatory default options. AERMOD version 16216r is now the current regulatory model version. As mentioned, Guam submitted updated modeling using version 16216r in June 2017. In addition, Guam's updated modeling was based on calculated hourly actual emissions. Based on the information provided by Guam and summarized in Section 3.3, we conclude that the territory adequately examined and characterized sources within the area of analysis and appropriately placed receptors in the modeling domain; appropriately characterized and accounted for modeled emission sources and building downwash; correctly selected meteorological sites and properly processed the data; adequately estimated surface characteristics; and appropriately calculated background concentrations of SO<sub>2</sub> to add to modeled design values. Based on this assessment, we conclude the modeling provided by Guam accurately characterizes air quality in the area of analysis for the Piti-Cabras area.

### 3.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Piti-Cabras 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.

### 3.5. Jurisdictional Boundaries in the Piti-Cabras Area

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

Guam EPA has jurisdiction over the entire island of Guam to administer air pollution control programs. In 2011, Guam recommended the entire island be designated unclassifiable based on an absence of monitoring or modeling information. In January and June 2017, Guam submitted modeling analyses for the DRR that showed violations of the 2010 SO<sub>2</sub> NAAQS as a result of the facilities in the Piti-Cabras area. The updated June 2017 modeling analysis from Guam showed violations of the 2010 SO<sub>2</sub> NAAQS within a 6.074 km radius centered on the UTM Easting 249,601.60 m, and UTM Northing 1,489,602.00 m. Guam updated its designation recommendation, stating that the area around Piti-Cabras is in modeled nonattainment and that the rest of the island is in modeled attainment. The 6.074 km radius area encompasses the extent of the modeled violations.

### 3.6. Other Information Relevant to the Designations for the Piti-Cabras Area

In general, previous designations for other NAAQS have designated the entire island of Guam (territory-wide or state-wide) as unclassifiable/attainment (*e.g.*, carbon monoxide, 1-hour ozone, 1997 and 2012 Annual PM<sub>2.5</sub> NAAQS, 1997 and 2006 24-hour PM<sub>2.5</sub> NAAQS, 1971 and 2010



NO<sub>2</sub> NAAQS, 1997 and 2008 8-hour ozone NAAQS, and 2008 lead NAAQS).<sup>19</sup> For the 1971 SO<sub>2</sub> NAAQS, two areas of Guam were designated as not meeting the primary standards (*i.e.*, nonattainment): the portion of Guam within a 3.5 km radius of the Piti Power Plant, and the portion of Guam within a 3.5 km radius around the Tanguisson Power Plant (Tanguisson).<sup>20</sup> The rest of Guam was designated as better than the national standards (*i.e.*, attainment). Tanguisson closed in January 2015, its permits have been revoked, and therefore it was not listed as a source subject to the DRR and Guam was not required to characterize the air quality impacts of its SO<sub>2</sub> emissions.

### 3.7. The EPA's Assessment of the Available Information for the Piti-Cabras Area

There are no regulatory SO<sub>2</sub> monitors located on Guam. The modeling analyses submitted by Guam to characterize air quality resulting from the sources in the Piti-Cabras area indicate violations of the 2010 SO<sub>2</sub> NAAQS. Combined annual actual emissions of SO<sub>2</sub> from the sources in Piti-Cabras exceed 13,000 tpy. The June 2017 updated modeling results using AERMOD v16216r and estimated hourly emissions show that modeled receptors in the vicinity of the Piti-Cabras plants, eastern Orote Peninsula (the peninsula located south of the plants that extends west of the main body of the island), and the terrain southeast of the plants (Nimitz Hill) are predicted to have concentrations above the 1-hour NAAQS for SO<sub>2</sub> out to a distance of approximately 6,074 m from the mid-point of modeled applicable sources. Figure 5, above, was included as part of Guam's updated modeling, and indicates that the highest predicted value occurs on Nimitz Hill to the southeast of the facility.

Guam EPA has jurisdiction to administer air pollution control programs for the entire island of Guam. Two separate areas of Guam, each bounded by the 3.5 km radius around one of the main sources of SO<sub>2</sub> emissions, were designated nonattainment for the 1971 SO<sub>2</sub> NAAQS. The remainder of the island was designated as attainment.

Although Guam had recommended in 2011 that the entire island of Guam be designated unclassifiable for the 2010 SO<sub>2</sub> NAAQS, this recommendation was made prior to the completion and submission of any DRR modeling analysis for the Piti-Cabras area. As indicated previously, the modeling analyses submitted by Guam in 2017 showed violations of the 2010 SO<sub>2</sub> NAAQS, and Guam subsequently recommended that the Piti-Cabras area be designated nonattainment and the rest of Guam designated attainment. Therefore, based on modeling information provided by Guam in 2017 showing that the Piti-Cabras area does not meet the 2010 SO<sub>2</sub> NAAQS, the EPA agrees with the territory's latest recommendation and intends to designate the Piti-Cabras area as nonattainment for the 2010 SO<sub>2</sub> NAAQS. However, the EPA does not have information or reason to believe that areas outside the boundaries of the Piti-Cabras area are violating the NAAQS; consequently, the Piti-Cabras area is not contributing to violating air quality in nearby areas that do not meet the NAAQS.

---

<sup>19</sup> 40 CFR 81.353 – Guam.

<sup>20</sup> *Id.*

The EPA believes that our intended nonattainment area, the portion of Guam bounded by a 6.074 km radius centered on the UTM Easting 249,601.60 m, and UTM Northing 1,489,602.00 m, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended nonattainment area.

### 3.8. Summary of Our Intended Designation for the Piti-Cabras Area

After careful evaluation of Guam's updated recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the Piti-Cabras area as nonattainment for the 2010 SO<sub>2</sub> NAAQS. Specifically, the boundaries are comprised of a 6.074 km radius centered on UTM Easting 249,601.60 m, and UTM Northing 1,489,602.00 m (UTM Zone 55P). Figure 6 shows the boundary of this intended Piti-Cabras nonattainment area.

## 4. Technical Analysis for the Rest of Guam

### 4.1. Introduction

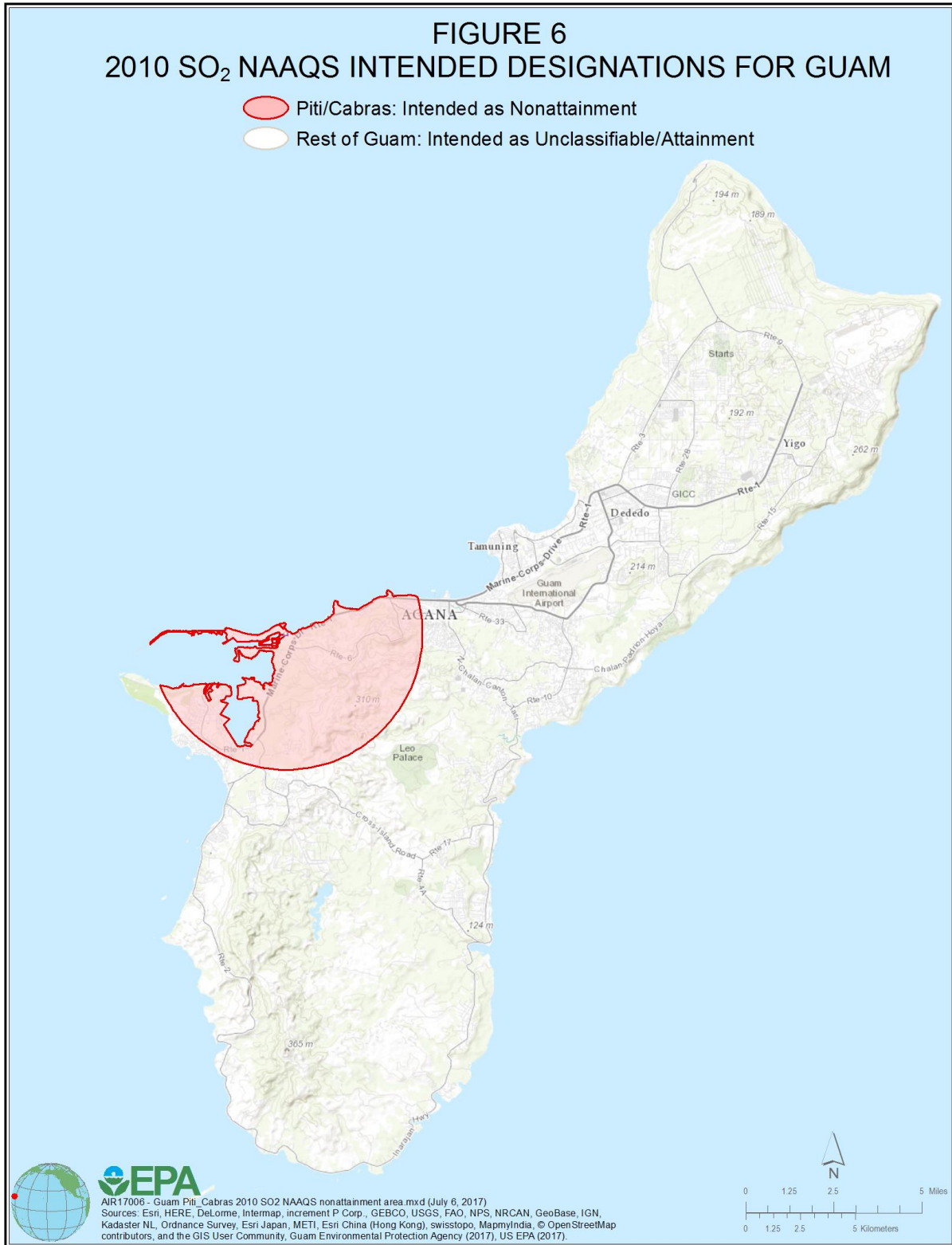
Guam elected to not install and begin timely operation of a new, approved SO<sub>2</sub> monitoring network meeting EPA specifications referenced in the EPA’s SO<sub>2</sub> DRR for any sources of SO<sub>2</sub> emissions in the areas of Guam identified in Table 8. Accordingly, the EPA must designate these areas by December 31, 2017. There are no regulatory SO<sub>2</sub> monitors located on Guam. However, as discussed in section 3.3, Guam submitted two modeling analyses to characterize air quality near the sources located in the Piti-Cabras area. We are relying on the updated analysis based on estimated actual emissions to designate the Piti-Cabras area (as described in sections 3.7 and 3.8) as nonattainment. The EPA is designating the rest of Guam (listed in Table 8) as “unclassifiable/attainment” since these areas were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. Moreover, the updated modeling analysis submitted by the territory, which applied a receptor grid covering the entire territory, indicates no NAAQS violation in these areas.

**Table 8. Areas of Guam that the EPA Intends to Designate Unclassifiable/Attainment**

<b>Areas</b>	<b>Guam’s Updated Recommended Area Definition</b>	<b>Guam’s Recommended Designation</b>	<b>EPA’s Intended Area Definition</b>	<b>EPA’s Intended Designation</b>
Rest of Guam	Rest of Guam (excludes the intended Piti-Cabras nonattainment area)	Attainment	Rest of Guam (excludes the intended Piti-Cabras nonattainment area)	Unclassifiable/Attainment

Table 8 also summarizes Guam’s recommendations for the island. Specifically, in 2011, Guam recommended that the entire island of Guam be designated as unclassifiable based on the absence of monitoring or modeling data. In June 2017, Guam provided an updated recommendation that the Piti-Cabras area is in modeled nonattainment and the rest of Guam is in modeled attainment. After careful review of Guam’s modeling assessment, supporting documentation, and all available data, the EPA intends to modify the territory’s recommendation and to designate the areas of Guam that are not within the EPA’s intended nonattainment area as a single unclassifiable/attainment area. Figure 6 shows the locations of the intended unclassifiable/attainment area within Guam.

**Figure 6. The EPA's Intended Unclassifiable/Attainment Designation for the Rest of Guam**



## 4.2. Air Quality Monitoring Data for the Rest of Guam

There is no approved SO<sub>2</sub> monitoring network on Guam.

## 4.3. Jurisdictional Boundaries in the Rest of Guam

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

Guam EPA has jurisdiction over the entire island of Guam to administer air pollution control programs. In 2011, Guam recommended the entire island be designated unclassifiable based on an absence of monitoring or modeling information. On June 29, 2017, Guam updated its recommendation that the rest of Guam is in attainment of the 2010 SO<sub>2</sub> NAAQS.

## 4.4. Other Information Relevant to the Designations for the Rest of Guam

In general, previous designations for other NAAQS have designated the entire island of Guam (territory-wide) as unclassifiable/attainment (*e.g.*, carbon monoxide, 1-hour ozone, 1997 and 2012 Annual PM<sub>2.5</sub> NAAQS, 1997 and 2006 24-hour PM<sub>2.5</sub> NAAQS, 1971 and 2010 NO<sub>2</sub> NAAQS, 1997 and 2008 8-hour ozone NAAQS, and 2008 lead NAAQS).<sup>21</sup> For the 1971 SO<sub>2</sub> NAAQS, two areas of Guam were designated nonattainment (not meeting the primary standards): the portion of Guam within a 3.5 km radius of the Piti Power Plant, and the portion of Guam within a 3.5 km radius around the Tanguisson Power Plant (Tanguisson).<sup>22</sup> The rest of Guam was designated as attainment (better than the national standards). Tanguisson closed in January 2015, its permits have been revoked, and therefore it was not listed as a source subject to the DRR and Guam was not required to characterize the air quality impacts of its SO<sub>2</sub> emissions.

## 4.5. The EPA's Assessment of the Available Information for the Rest of Guam Area

The rest of Guam was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. The rest of Guam therefore meets the definition of an "unclassifiable/attainment" area.

Our intended unclassifiable/attainment area, the whole island of Guam excluding the intended Piti-Cabras nonattainment area consisting of the portion of Guam within a 6.074 km radius centered on the UTM Easting 249,601.60 m and UTM Northing 1,489,602.00 m, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for

---

<sup>21</sup> 40 CFR 81.353 – Guam.

<sup>22</sup> *Id.*

defining our intended unclassifiable/attainment area. Following the completion of the Round 3 designations, there will be no remaining undesignated areas of Guam to be addressed in Round 4.

#### 4.6. Summary of Our Intended Designation for the Rest of Guam

After careful evaluation of Guam's recommendation and supporting information, as well as all available relevant information, the EPA intends to modify the territory's recommendation and to designate the rest of Guam as a single unclassifiable/attainment area for the 2010 SO<sub>2</sub> NAAQS. Specifically, the boundaries are comprised of the whole island of Guam, excluding the intended Piti-Cabras nonattainment area consisting of the portion of Guam within a 6.074 km radius centered on the UTM Easting 249,601.60 m, and UTM Northing 1,489,602.00 m. Figure 6 above shows the location and boundaries of these areas within Guam.