January 12, 2017

U. S. Environmental Protection Agency, Region IV
Air Planning and Implementation Branch
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Alabama Department of Environmental Management
1400 Coliseum Boulevard
Montgomery, AL 36110-2059

RE: Alabama Power Company – Barry Steam Electric Generating Plant
AkzoNobel Functional Chemicals LLC LeMoyne Site
1-Hour SO_2 Data Requirements Rule Modeling Report

Dear Sir/Madam:

The attached air dispersion modeling analysis was conducted in order to characterize sulfur dioxide (SO_2) air quality in the vicinity of both Alabama Power Company's Barry Steam Electric Generating Plant (Plant Barry) and AkzoNobel Functional Chemicals LLC's LeMoyne Site (AkzoNobel). This analysis is designed to fulfill the requirements of the United States Environmental Protection Agency's (EPA) final Data Requirements Rule (DRR) for the 2010 1-Hour SO_2 Primary NAAQS[1] (e.g. "SO_2 Data Requirements Rule," or "DRR") for both facilities.

AkzoNobel informed EPA and the Alabama Department of Environmental Management (ADEM) of their desire to not accept an enforceable permit limitation on SO_2 emissions, and instead characterize SO_2 air quality around their facility through air dispersion modeling. After consultation with EPA and ADEM, in lieu of a permit limitation, the regulatory agencies agreed to allow AkzoNobel to submit modeling characterizing air quality in the vicinity of their facility in satisfaction of ADEM's obligations under the DRR.

Due to the close proximity of Plant Barry and AkzoNobel to each other, a combined modeling analysis was conducted to fulfill the requirements of the DRR for both facilities. The enclosed modeling report was prepared in order to present the model results along with the methodology

[1] 80 FR 51052, August 21, 2015 Federal Register Notice. Docket ID No. EPA–HQ–OAR–2013–0711.

for a combined modeling analysis that characterizes SO_2 air quality in the vicinity of Plant Barry and AkzoNobel. The modeling approach conforms to the applicable modeling procedures and guidance contained in the DRR, the draft EPA Modeling Technical Assistance Documents (TAD)[2], the final combined modeling protocol for Plant Barry and AkzoNobel submitted jointly by both companies on December 28, 2016, and direction otherwise received from ADEM. Modeling under the DRR is designed to approximate what an ambient monitor would observe should one be placed at each modeled receptor location. Please note that both Alabama Power and AkzoNobel have no desire or would allow ambient SO_2 monitoring equipment to be located on our respective properties. Therefore, in this joint modeling analysis, receptors were appropriately excluded from the controlled and/or patrolled areas of both facilities.

The attached modeling report (along with the associated modeling files included via web link) is being submitted on behalf of ADEM and is being sent electronically to the distribution list below.

Sincerely,

C. Mark Steele

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[2] Modeling Technical Assistance Document, EPA, 2014; Available at https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf

Modeling Report
Barry Steam Electric Generating Plant & AkzoNobel Functional Chemicals LLC
1-Hour SO_2 NAAQS Modeling

AECOM, Inc.
January 2017
Document No.: 60331751.5

Modeling Report
Barry Steam Electric Generating Plant & AkzoNobel Functional Chemicals LLC
1-Hour SO_2 NAAQS Modeling

Prepared By: Kimberly Zuk

Reviewed By: Jeffrey Connors

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AECOM

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1.0 Introduction

On June 2, 2010, the United States Environmental Protection Agency (i.e. the EPA) issued final revisions (75 FR 35520) to the primary National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO_2). In the final rule, the EPA established a new primary 1-hour standard for SO_2 set at a level of 75 parts per billion (ppb). Also in the revision, the EPA revoked the two existing primary NAAQS (the 24-hour and annual standards) however; the secondary SO_2 NAAQS was not revised.

EPA is issuing area designations for the 1-hour SO_2 NAAQS in separate rounds. On August 10, 2015, as part of its implementation of the standard, the EPA issued the final Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary NAAQS[1] (e.g. "SO_2 Data Requirements Rule," or the "DRR"). The DRR directs state and tribal air agencies to provide data to characterize air quality in the vicinity of large sources of SO_2 emissions to identify maximum 1-hour SO_2 concentrations in ambient air. The air quality data provided pursuant to the DRR presumably will be used by the Alabama Department of Environmental Management (ADEM) and EPA in future actions regarding area designations as the agencies continue implementing the 1-hour SO_2 NAAQS.

In part, the DRR required air agencies to submit to EPA by January 15, 2016, a list identifying the sources in the state around which SO_2 air quality is to be characterized. This list must include sources located in areas that have not been designated nonattainment and have emissions greater than 2000 tons per year (tpy) of SO_2 unless otherwise exempt (e.g. due to a unit retirement, fuel switch, permit limits, etc.). The DRR sets forth a process for two options air agencies may utilize to characterize air quality; by using either dispersion modeling of actual source emissions or by data from ambient air quality monitors. For each source on the list, air agencies are required to identify the approach (e.g. ambient monitoring or modeling) it will use to characterize air quality in the vicinity of the source unless the source chooses to adopt emission limits and thereby eliminate the requirement to characterize air quality.

In a letter to the EPA dated January 14, 2016, ADEM identified the sources in Alabama that have SO_2 emissions greater than 2000 tpy for the most recent year for which emissions data were available (2014) and subject to the DRR. ADEM identified Alabama Power Company's (Alabama Power) Barry Steam Electric Generating Plant (Plant Barry) in Mobile County on this source list and ADEM opted to characterize air quality in the vicinity of Plant Barry through modeling. Accordingly, a modeling protocol describing the proposed methodology for a 1-hour SO_2 NAAQS air quality dispersion modeling analysis was previously provided to ADEM on June 20, 2016, for forwarding to the EPA.

In the January 14, 2016, letter referenced above, ADEM also noted that AkzoNobel Functional Chemicals LLC (AkzoNobel) was accepting an enforceable permit limit restricting its SO_2 emissions to 2000 tpy thereby exempting this facility from having to characterize SO_2 air quality under the DRR. In November 2016, AkzoNobel informed ADEM and EPA of their desire to characterize SO_2 air quality around their facility through air dispersion modeling rather than accept the 2000 tpy enforceable permit limit. ADEM and EPA agreed to allow AkzoNobel to submit modeling characterizing SO_2 air quality in the vicinity of their facility in satisfaction of ADEM's obligations under the DRR.

AkzoNobel previously was identified by ADEM as a nearby background source to be included in the Plant Barry SO_2 modeling for the DRR, and was appropriately documented as such in the Plant Barry modeling protocol submitted to the regulatory agencies in June 2016. That Plant Barry modeling protocol was updated to incorporate AkzoNobel as an additional DRR source characterizing ambient air quality in the region around Plant Barry and AkzoNobel through modeling. This revised modeling protocol was submitted to ADEM and EPA on December 28, 2016.

[1] 80 FR 51052, August 21, 2015 Federal Register Notice. Docket ID No. EPA–HQ–OAR–2013–0711

EPA has issued[2] a non-binding draft Technical Assistance Document (TAD) for modeling and that set forth procedures for the modeling pathway. The current version of the TAD references other EPA modeling guidance documents, including the following clarification memos; (1) the August 23, 2010, "*Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 NAAQS*", and (2) the March 1, 2011, "*Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*" (hereafter referred to as the "additional clarification memo"). In the March 1, 2011, additional clarification memo, EPA declares that the memo applies equally to the 1-hour SO_2 NAAQS even though it was prepared primarily for the 1-hour nitrogen dioxide (NO_2) NAAQS.

EPA Region 4 provided comments on the Barry-alone modeling protocol and those comments have been addressed or otherwise resolved in this final Plant Barry and AkzoNobel modeling report. The modeling methodology utilized and described herein conforms to the applicable modeling procedures and guidance contained in the DRR, the August 2016, *"SO_2 NAAQS Designations Modeling Technical Assistance Document"*[2], and direction otherwise received from ADEM. This report presents the modeling results, methods and assumptions including model selection and options, meteorological data, and source parameters used in the modeling analyses that characterize 1-hour SO_2 air quality in the vicinity of Plant Barry and AkzoNobel.

This document consists of the following three additional sections:

Section 2 - Facility Description and Emission Sources

Section 3 - Modeling Approach

Section 4 - Analysis of Modeling Results

[2] Modeling Technical Assistance Document; EPA, 2014. Available at https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf

2.0 Facility Description and Emission Sources

The following section provides a description of both Plant Barry and AkzoNobel facilities and SO_2 emission sources that will be included in the modeling. The location of Plant Barry and AkzoNobel are shown in Figure 2-1.

2.1 Plant Barry

Plant Barry is an existing Alabama Power electric power generating facility located in Bucks, Alabama, in Mobile County, approximately 20 miles north of Mobile, Alabama. The location of Plant Barry is shown in Figures 2-1 and 2-2. The sources that were modeled for 1-hour SO_2 concentrations at Plant Barry are two coal-fired boiler electric generating units (Units 4 and 5) and four natural gas-fired combined cycle electric generating units (Units 6A, 6B, 7A and 7B). Units' 4 and 5 boilers are tangentially fired and have nominal rated generating capacities of 376 megawatts (MW) and 785 MW, respectively. The four combined cycle units have a total nominal rated generating capacity of approximately 1000 MW.

Exhaust flue gases from Unit 4 pass through electrostatic precipitators (ESPs) for particulate matter (PM) control and a selective non-catalytic reduction (SNCR) system for nitrogen oxides (NOx) control before being emitted from an individual 600-foot stack. Unit 4 is equipped with a dry sorbent system where hydrated lime, or other similar alkali, is injected into the flue gas upstream of the air heater and the cold-side ESPs for acid gas control. In addition, Unit 4 is equipped with a powdered activated carbon (PAC) system where PAC is injected into the flue gas downstream of the air heater and upstream of the ESPs for mercury control. Units 4 and 5 are equipped with an SO_3 burner to condition flue gas as necessary to enhance ESP performance.

Unit 5 is equipped with a calcium bromide ($CaBr_2$) fuel additive application system where the raw coal is conditioned as necessary with liquid $CaBr_2$ solution which allows for oxidation of gaseous mercury when combusted in the boiler. Once in an oxidized state, gaseous mercury can be effectively removed in a downstream control device. Exhaust flue gases from Unit 5 pass through ESPs for PM control, a selective catalytic reduction (SCR) system for NOx control, and a flue gas desulfurization system (e.g. FGD or scrubber) for control of SO_2, mercury and additional PM control before being emitted from its 600-foot wet stack. In addition, activated carbon is injected in an aqueous slurry into the FGD slurry as necessary to further inhibit mercury emissions (e.g. the mercury re-emission control system, or "MRCS").

Exhaust flue gases from Unit 5 may also be discharged upstream of the FGD through a separate individual 600-foot dry stack during emergency situations or at times the operator deems necessary in order to adhere to good engineering practices. Infrequently, a very small slip stream of flue gases from Unit 5 may be diverted to a carbon capture and sequestration research demonstration facility and emitted from that facility's 238-foot absorber stack (CCS).

Each combined cycle unit consists of a combustion turbine with a supplementally fired (e.g. duct burner) heat recovery steam generator (CT/HRSG) and associated support facilities. Each of the two combined cycle "blocks" is comprised of two CT/HRSGs which supply steam to a single steam turbine. Exhaust flue gases from each of the four combined cycle units pass through an SCR system for NO_x control before emitted through its individual 121-foot stack.

Table 2-1 shows the physical stack parameters as applicable for the emission sources that were used in this modeling analysis. Units 4 and 5 were modeled using actual hourly emissions using data from Continuous Emissions Monitoring Systems (CEMS). All three stacks in the Unit 5 multi-stack configuration have CEMS. Units 6A, 6B, 7A, and 7B were all modeled with estimated hourly emission rates using heat input from monitored fuel flow and emission factors.

For Unit 4, flow rates were available from the CEMS database however, exhaust temperatures are not recorded. As such, one of three flue gas exhaust temperatures based on results from a Relative Accuracy Test Audit was assigned to each individual hour based on the corresponding heat input for that hour. Flow was converted from standard cubic feet per minute to actual cubic feet per minute using the assigned temperature for use in AERMOD.

For Unit 5, the exhaust temperatures and flow rates were available from the CEMS database and used directly in AERMOD after converting the flow rate from standard cubic feet per minute to actual cubic feet per minute. The CEMS database was used for both the FGD and Bypass stacks. For the Unit 5 carbon capture stack, design exhaust temperature and flue gas flow volume were used when the CCS facility operated. Emission rates for Unit 5 CCS come from its CEMS.

For Units 6A, 6B, 7A, and 7B, two representative exhaust temperature and flow rate combinations were developed and assigned to each hour depending on the unit's recorded load for that hour. From these stack parameter estimates, stack velocities can be calculated. If the unit was operating at >70% of rated capacity, that hour was assigned to a high load bin, and if the unit was operating less than or equal to 70% of capacity then it was assigned to a minimum load bin. The two combinations of exhaust temperatures and flow rates are provided in Table 2-1.

Table 2-1: Plant Barry Physical Stack Parameters of Modeled Emission Sources

Unit	Location (UTM Zone 16 NAD 1983)		Basis for Modeled Emission Rate	Stack Base Elevation (ft)	Stack Height (ft)	Stack Exit Diameter (ft)	Stack Exhaust Velocity (ft/s)	Stack Exit Temperature (°F)
	Easting (meters)	Northing (meters)						
Unit 4 High Load	403,459.0	3,430,817.0	Actual(1)	21	600	13.69	Actual(2)	285.8(3)
Unit 4 Mid Load	403,459.0	3,430,817.0	Actual(1)	21	600	13.69	Actual(2)	271.8(3)
Unit 4 Low Load	403,459.0	3,430,817.0	Actual(1)	21	600	13.69	Actual(2)	244.2(3)
Unit 5 (Bypass)	403,530.0	3,430,854.0	Actual(1)	22	600	25.00	Actual(4)	Actual(4)
Unit 5	403,707.0	3,430,757.0	Actual(1)	22	600	31.00	Actual(4)	Actual(4)
Unit 5 CSS	403,832.0	3,430,745.0	Actual(1)	21	238	5.00	50.0(5)	96.0(5)
CC6A High Load	402,653.0	3,430,175.0	Actual(6)	25	121	16.80	70.5(5)	183.3(5)
CC6A Low Load	402,653.0	3,430,175.0	Actual(6)	25	121	16.80	45.8(5)	168.3(5)
CC6B High Load	402,664.0	3,430,142.0	Actual(6)	25	121	16.80	70.5(5)	183.3(5)
CC6B Low Load	402,664.0	3,430,142.0	Actual(6)	25	121	16.80	45.8(5)	168.3(5)
CC7A High Load	402,619.0	3,430,316.0	Actual(6)	25	121	16.80	70.5(5)	183.3(5)
CC7A Low Load	402,619.0	3,430,316.0	Actual(6)	25	121	16.80	45.8(5)	168.3(5)
CC7B High Load	402,628.0	3,430,283.0	Actual(6)	25	121	16.80	70.5(5)	183.3(5)
CC7B Low Load	402,628.0	3,430,283.0	Actual(6)	25	121	16.80	45.8(5)	168.3(5)

1 Actual emissions for Unit 4, Unit 5, Unit 5 Bypass and Unit 5 CCS are based on data from CEMS (2013-2015).
2 Stack exhaust velocities for Unit 4 are based on flow data from CEMS (2013-2015) and temperatures recorded from a Relative Accuracy Test Audit performed on March 12, 2015.
3 Stack temperatures for Unit 4 are based on results from a Relative Accuracy Test Audit performed on March 12, 2015, for each of the three load points.
4 Actual stack velocities and temperatures for Unit 5 and Unit 5 Bypass are based on data from CEMS (2013-2015).
5 Stack exhaust velocity and temperature for Unit 5 CCS, and Units 6A, 6B, 7A and 7B are based on engineering design estimates.
6 Actual emissions for Units 6A, 6B, 7A and 7B are calculated using hourly monitored fuel usage along with an emission factor.

2.2 AkzoNobel

The AkzoNobel LeMoyne site manufactures a variety of miscellaneous organic and inorganic chemicals including carbon disulfide (CS_2), sulfuric acid (H_2SO_4), sodium hydrosulfide (NaSH), Crystex^R, sulfur mono and dichloride, and monochloroacetic acid. The AkzoNobel LeMoyne site is located north of Axis, Alabama, in Mobile County. The location of AkzoNobel is shown in Figures 2-1 and 2-3. The sources that were modeled for 1-hour SO_2 concentrations at AkzoNobel are the H_2SO_4 plant (AC-1) and the CS_2 and Crystex plant (CS-1).

AC-1 uses air and sulfur in a combustion process to produce SO_2. The produced SO_2 is then oxidized in a closed system to produce sulfur trioxide (SO_3) which is then exposed to water and SO_2 in an absorption and scrubbing process to produce H_2SO_4. As a byproduct of this process, excess SO_2 is released from the H_2SO_4 plant.

CS-1 and the NaSH plant use natural gas and sulfur to produce CS_2. The CS_2 is retained as a product, and the hydrogen sulfide (H_2S) that is produced in the first step of the process is combined with sodium hydroxide

(NaOH) to produce NaSH. H_2S that is not used in the NaSH process is routed to a Claus sulfur recovery unit, which recovers approximately 97.5% of the sulfur from the H_2S to be recycled back into the process. Sulfur which is not recovered in the Claus unit is vented to the incinerator and emitted to the atmosphere as SO_2.

Table 2-2 details the physical stack parameters for AC-1 and CS-1 that were used in the modeling analysis. Modifications to AC-1 are currently being made which include the installation of a wet scrubber and the relocation and rebuild of the AC-1 stack. Therefore, the stack characteristics presented below reflect the new AC-1 stack and stack location. CS-1 stack characteristics were based on the most recent stack test information.

Table 2-2: AkzoNobel Physical Stack Parameters of Modeled Emission Sources

Model ID	Unit	Location (UTM Zone 16 NAD 1983)		Stack Base Elevation (ft)	Stack Exit Temperature (°F)	Stack Exhaust Velocity (ft/s)	Stack Height (ft)	Stack Exit Diameter (ft)
		Easting (m)	Northing (m)					
AC-1	Sulfuric Acid Plant	402,420.4	3,426,628.7	35	90.1	56.5	201.1	4.5
CS-1	Carbon Disulfide and Crystex Plant	402,806.1	3,426,640.1	35	1115.0	40.95	149.9	6.0

In addition to the stack parameters detailed above, the SO_2 modeled emission rates from AC-1 and CS-1 were based on the following:

(1) Due to the modification of AC-1, AC-1 modeled emission rates were based on the future potential to emit (PTE) rates for each hour modeled in the air dispersion modeling analysis. A PTE emissions factor of 1.5 lb of SO_2 emitted/ton H_2SO_4 produced was applied to the maximum production rate of AC-1 (35.42 tons of H_2SO_4/hour) for a total modeled PTE rate of 53.13 lb/hr.

(2) For CS-1, modeled emission rates were estimated using actual hourly production information for the 2013 through 2015 calendar years (when available). SO_2 emission rates from the CS_2 plant were estimated using a chemical balance on H_2S. H_2S is produced by the CS_2 plant and is consumed by the NaSH plant. Any excess H_2S not used by the NaSH plant then proceeds to the Claus sulfur recovery system where approximately 97.5% of sulfur is recovered and reused in the process. Any sulfur that is not recovered is vented to the incinerator and exhausts to the atmosphere as SO_2. This calculation was completed on an hourly basis using hourly production information to the extent possible to estimate the modeled SO_2 emission rate.

Note that AkzoNobel only began tracking hourly production data via a distributed control system (DCS) in November 2013. Prior to this date, only monthly production information is available. As such, for emissions before November 2013, monthly CS_2 and NaSH production was converted to hourly production. Specifically, monthly CS_2 and NaSH production rates (tons CS_2 and NaSH per month) were converted to daily production rates by dividing by the number of calendar days in the month. Daily production was then converted to hourly production by dividing by 24 hours per day. It was assumed that the CS_2 plant operates 24 hours per day. Using hourly production data, AkzoNobel apportioned annual reported emissions for CS-1 to each hour. Detailed hourly emissions calculations are included in the electronic modeling archive found in Appendix B.

Figure 2-1: Locations of Plant Barry and AkzoNobel

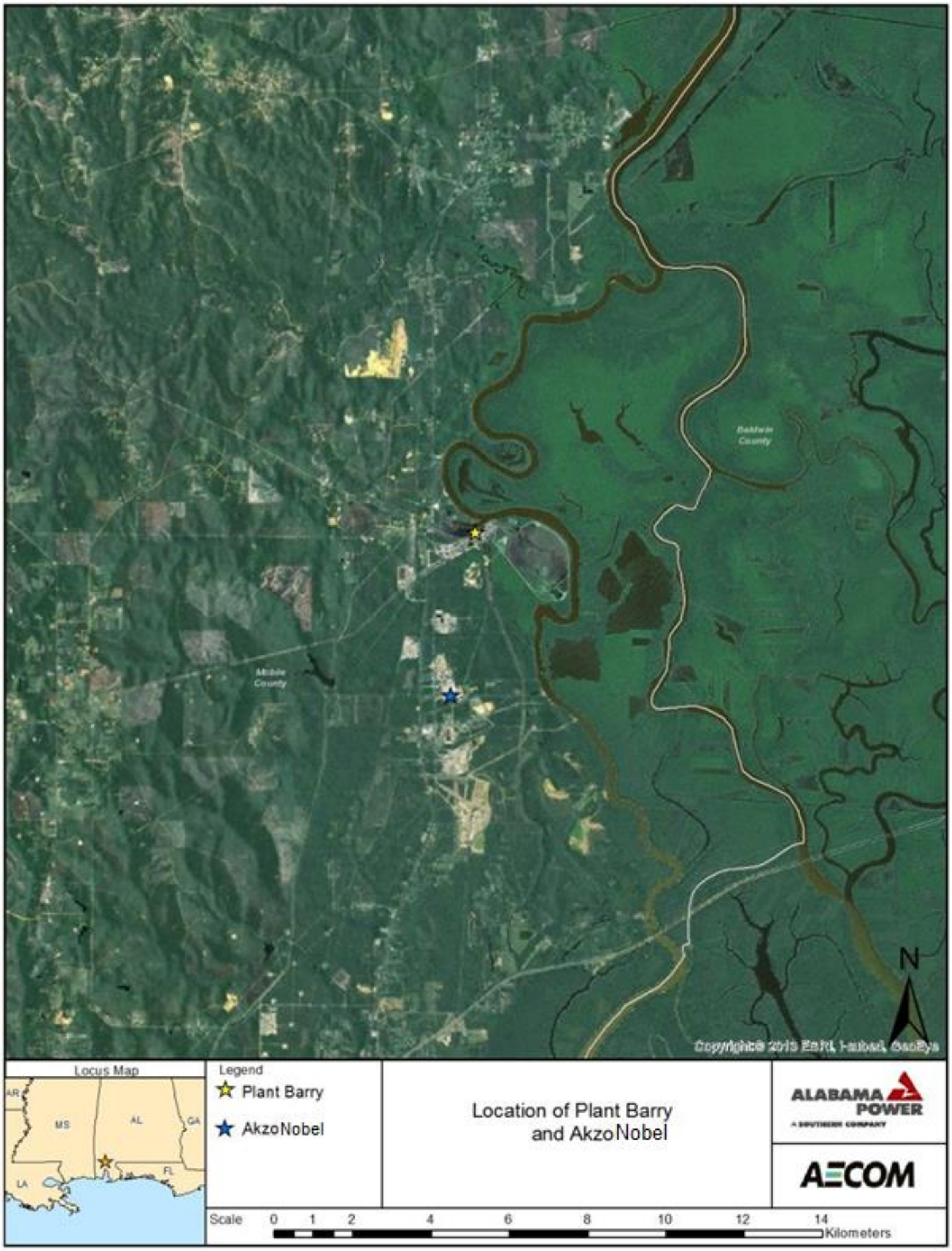


Figure 2-2: Near-Field View of Plant Barry

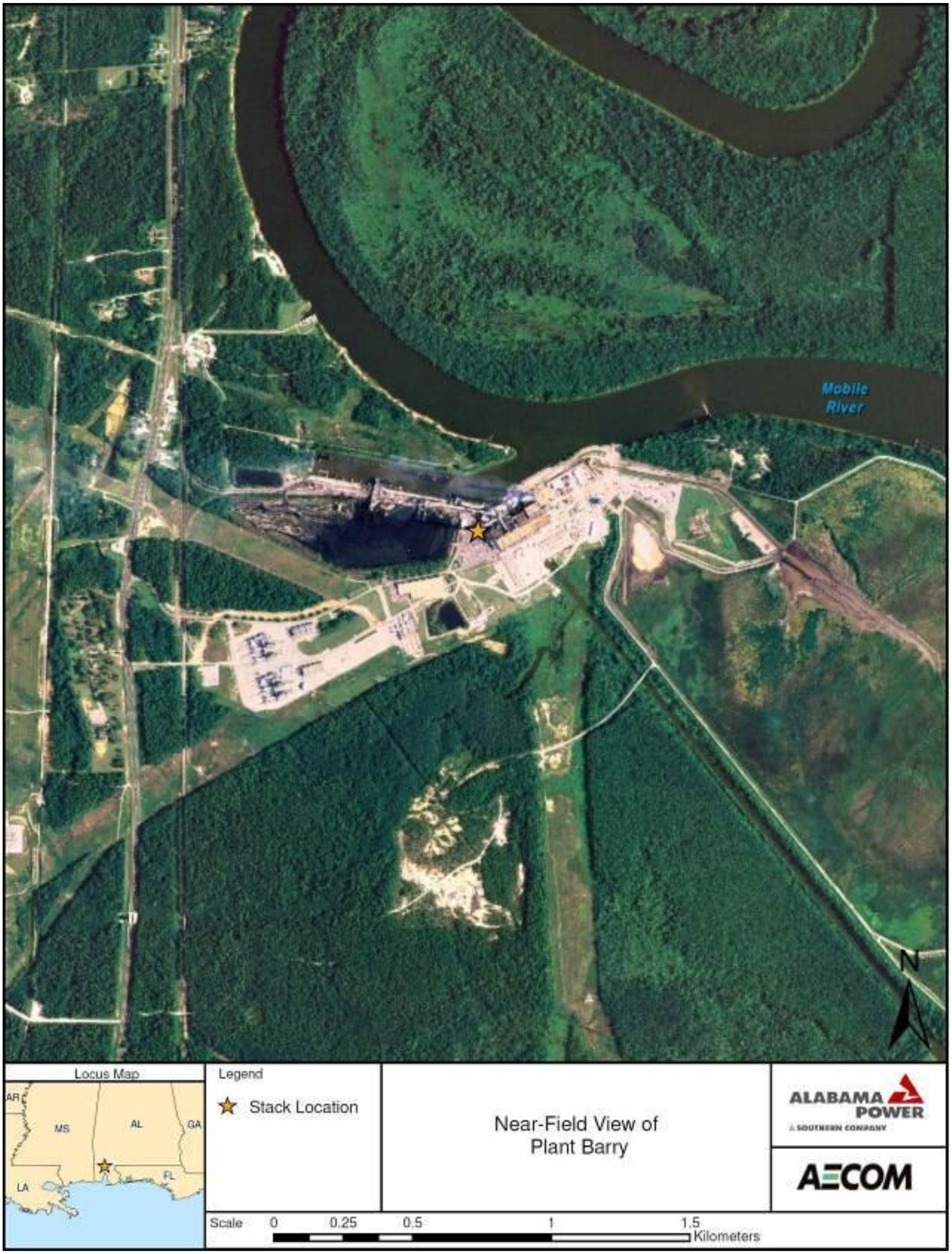


Figure 2-3: Near-Field View of AkzoNobel

3.0 Modeling Approach

3.1 Overview

This section presents the approach to the dispersion modeling analysis that was used for the 1-hour SO_2 modeling for Plant Barry and AkzoNobel. The modeling approach was consistent with the guidance provided in the DRR, TAD where applicable, and direction received from ADEM. The following sections address each relevant portion of the modeling approach, including model selection, building downwash, terrain, meteorology, ambient air quality data, and background emission sources.

3.2 Model Selection and Options

AERMOD is EPA's recommended refined dispersion model for simple and complex terrain for receptors within 50 kilometers (km) of a modeled source. AERMOD is also capable of producing the statistical output required for the 1-hour SO_2 NAAQS.

In a final rulemaking published on EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) website[3] as a pre-federal register version of the final rule that was signed by the EPA Administrator on December 20, 2016, a revised version of AERMOD (Version 16216) was released replacing the previous version of AERMOD (Version 15181).

In proposed rulemaking in the July 29, 2015 Federal Register (80 FR 45340), EPA proposed refinements to its preferred short-range model, AERMOD, involving low wind conditions. These refinements included an adjustment to the computation of the friction velocity ("ADJ_U*") in the AERMET meteorological pre-processor. This proposed change was made a default model option in the final rule when using meteorological data from a National Weather Service (NWS) station. The updated December 2016 User's Guide for the AERMOD Meteorological Preprocessor (AERMET)[4] also specifies in Section 4.7.6.4: *"The ADJ_U* option is now a default option and no longer requires the alternative model provisions in Section 3.2 of Appendix W (40 CFR Part 51)."*

As such, for this application, AERMOD (Version 16216) was used to model 1-hour SO_2 concentrations consistent with the form of the standard using current EPA-recommended default options in the CONTROL pathway along with the new default AERMET option ADJ_U*.

Figure 3-1 shows that the area surrounding Plant Barry and AkzoNobel is predominantly rural. Therefore, the urban source options in AERMOD were not used.

3.3 Building Downwash

EPA modeling guidelines require the evaluation of the potential for physical structures to affect the dispersion of emissions from stack emission points. The exhaust from stacks that are located within specified distances of buildings, and whose physical heights are below specified levels, may be subject to "aerodynamic building downwash" under certain meteorological conditions. If this is the case, a model capable of simulating this effect must be employed.

The analysis used to evaluate the potential for building downwash is referred to as a physical "Good Engineering Practice" ("GEP") stack height analysis. Stacks with heights below physical GEP are considered to be subject to building downwash.

[3] https://www3.epa.gov/ttn/scram/appendix_w-2016.htm

[4] https://www3.epa.gov/ttn/scram/7thconf/aermod/aermet_userguide.pdf

Barry Unit 4 has a single dedicated stack at a physical stack height of 600 ft. Unit 5 also has a dedicated stack with a bypass stack both of which are at physical heights of 600 ft. The GEP controlling structure for the Unit 4 and Unit 5 stacks is the boiler house for Unit 5 (height of 202 ft with a projected width greater than the height). Therefore, the GEP stack height is 505 ft (2.5 x 202 ft) for each stack. However, these stacks are grandfathered from the GEP Stack Height Regulations (e.g., credit for full stack height can be taken in modeling analysis, even though this stack height is above the calculated GEP height of 505 ft). This is documented in a letter dated December 11, 1985, from Mr. W. L. Bowers of Alabama Power to Mr. Richard E. Grusnick of ADEM. A copy of this letter is attached in Appendix A.

The Barry Unit 5 carbon capture stack has a physical height of 238 ft. The GEP controlling structure for this stack is the boiler house for Unit 5 (height of 202 ft with a projected width greater than the height). Therefore, the GEP stack height is 505 feet (2.5 x 202 ft) for the Unit 5 carbon capture stack.

The DRR and TAD allow modeling to be conducted using actual stack heights. Since Barry Units 4 and 5 were modeled using actual hourly emission rates, the dispersion modeling was conducted using the physical stack heights of 600 feet. For all other sources modeled at the facility, actual stack heights were used since these heights are at or below associated GEP stack heights.

AkzoNobel CS-1 and AC-1 stacks are both less than GEP formula height, and therefore, were modeled at their actual physical height.

For both Plant Barry and AkzoNobel, the effects of building downwash were incorporated into the modeling analysis. The latest version of EPA's Building Profile Input Program software (currently BPIP PRIME Dated 04274) was used to calculate the direction-specific building dimensions for input to AERMOD.

Figures 3-2 and 3-3 show the location of the modeled stack locations and buildings that were used as input to BPIP for Plant Barry and AkzoNobel, respectively.

3.4 Terrain and Receptor Processing with AERMAP

EPA modeling guidelines require that the differences in terrain elevations between the stack base and model receptor locations be considered in the modeling analyses. There are three types of terrain:

- simple terrain – locations where the terrain elevation is at or below the exhaust height of the stacks to be modeled;
- intermediate terrain – locations where the terrain is between the top of the stack and the modeled exhaust "plume" centerline (this varies as a function of plume rise, which in turn, varies as a function of meteorological conditions);
- complex terrain – locations where the terrain is above the exhaust plume centerline.

Based on a review of the United States Geographical Survey (USGS) topographical maps, the area in the vicinity of Plant Barry and AkzoNobel is generally characterized as simple terrain relative to the modeled stacks.

A comprehensive Cartesian receptor grid extending a minimum of 15 km from a central point between Plant Barry and AkzoNobel was used in the AERMOD modeling to assess ground-level SO_2 concentrations. The 15-km receptor grid was more than sufficient to resolve the maximum impacts and any potential significant impact area(s).

The nested Cartesian receptor grid consists of the following receptor spacing:

- From a central point between Plant Barry and AkzoNobel (UTM northing = 3,429,000 meters and UTM easting = 403,500 meters) out to a distance of 3500 meters (m) in the east-west direction and 4000 m in the north-south direction at 100-m increments

- From the edge of the 100-m spaced receptors, 250-m spacing was used out an additional 2000 m;
- From the edge of the 250-m spaced receptors, 500-m spacing was used out an additional 5000 m and;
- From the edge of the 500-m spaced receptors, 1000-m spacing was used out and additional 5000 m

Receptors were placed at a minimum of 100-m intervals along the modeled ambient air boundary for both Plant Barry and AkzoNobel. For Plant Barry, Figure 3-4 shows the modeled ambient boundary consisting of fence, swamp land, river and barge canal banks, controlled and patrolled areas. Below is a description of the various segments of the proposed ambient air boundary:

- Segment #1 consists in part the Mobile River bank, thick vegetation, “Warning, Private Property, No Trespassing, Violators Will be Prosecuted” signs, and gates. The gates are locked and only opened when access is needed to that area, which is infrequent. It is patrolled by plant security personnel and also under surveillance by the plant personnel working in the barge canal. Further, there is camera video surveillance in this area. Therefore this area of Plant Barry encompassed by segment #1 has signage, is patrolled and controlled and as such, is not ambient air.
- Segment #2 consists of the interface between the Mobile River and the man-made barge canal. The canal was constructed by Alabama Power for the dedicated use by Plant Barry. Barge unloading and the constant presence of coal barges along with the pilings and coffer dams located within this narrow canal act as a physical barrier to other vessels. There are “Private Property, No Trespassing” signs on the river bank at the mouth of the canal. The Plant Barry coal generating units are situated at the mouth of the canal and the fuel pile runs along the length of the canal. This area is patrolled and under surveillance – including closed circuit television (CCTV) surveillance of the mouth of the canal and at the barge unloading area, and as such, the area inside the barge canal is not ambient air.
- Segment #3 consists of the Mobile River bank along the existing ash pond and levee. The steep banks of the river and levee are barriers that restrict public access. In addition, a road runs parallel to the river along this segment to the southeast discharge canal and then circles back to the main generating plant building. This road is patrolled by plant security personnel. Therefore, public access to plant areas inside this segment is controlled and patrolled and as such, this area is not ambient air.
- Segment #4 delineates swamp land that is impassable due to the terrain and vegetation. The area has no roads and is not navigable or accessible to vehicles. Further, there is “No Trespassing” signage at the river, and steep natural terrain barriers in the area of the transmission line rights-of-way. Therefore, the natural barriers and the absence of roads are sufficient to restrict public access and consider this segment controlled, and as such, the area inside segment #4 is not ambient air.
- Segment #5 outlines an area of thick vegetation along the boundary that inhibits access. Further, there is a steep bank along the north-south section of this segment. The lone access road that can access plant area in this segment is gated and guarded. Further, there are “Warning, Private Property, No Trespassing, Violators Will be Prosecuted” signs. Therefore, this segment should be considered patrolled and controlled, and as such, the area inside segment #5 is not ambient air.
- Segment #6 contains the main plant entrance and contractor gates. All visitors must pass through plant security. Further, areas of this segment have some fencing and are under surveillance by workers located at Barry Units 6 and 7. Further, there is CCTV surveillance in this area. These factors are sufficient to consider this area of Plant Barry to be patrolled and controlled. As such, the plant area bounded by segment #6 is not ambient air.

For AkzoNobel, Figure 3-5 shows the ambient air boundary. Public access to AkzoNobel’s property is limited by natural barriers, fences, and gates. The banks of the Mobile River to the east of AkzoNobel provide a natural barrier to entry along the roughly 500 meters where the AkzoNobel property fronts the river. The banks of the river are steep, and the vegetation along the bank is thick, serving to restrict access to the property between the patrolled roads that bound the property to the north and south of the river bank segment. Where there is not a fence or natural barrier, AkzoNobel limits public access by patrolling the property routinely and through the use of "Private Property, No Trespassing" signs. AkzoNobel's site security is manned 24/7 and patrols the entirety of the property. Therefore, these measures are sufficient to consider each property boundary segment as patrolled and controlled. As such, AkzoNobel does not consider this area ambient air and will not include receptors in these locations. AkzoNobel has detailed the areas of their property line that are limited by a natural barrier, fenced, gated, or contain no trespassing signs in the Figure 3-5.

Modeling under the DRR is intended to approximate what an ambient monitor would observe should one be placed at each modeled receptor location. Please note that both Alabama Power and AkzoNobel have no desire nor would allow ambient SO_2 monitoring equipment to be located on our respective properties. Therefore, in this joint modeling analysis, receptors were appropriately excluded from the controlled and/or patrolled areas of both facilities.

The AERMAP domain corresponds to a 1.5-km buffer beyond the receptor grid and is proposed to provide sufficient resolution of the hill height scale required for each receptor. A larger buffer is not necessary as there are no significant terrain features just beyond this distance. Terrain elevations from the NED acquired from USGS[5] were processed with the most recent version of AERMAP (currently version 11103) to develop the receptor terrain elevations and corresponding hill height scale required by AERMOD. The NED file is referenced to Datum NAD83 (note all source locations and receptors will be referenced to NAD83 UTM Zone 16). The NED files are included in the electronic modeling archive (see Appendix B) that is submitted along with this final modeling report. The extent of the receptor grid is shown in Figure 3-6 (near-field) and Figure 3-7 (far-field).

3.5 Meteorological Data for Modeling

No on-site meteorological data is available, so the application of a refined dispersion model requires multiple years of hourly meteorological data that are representative of the model application site. In addition to being representative, the data must meet quality and completeness requirements per EPA guidelines. Per Appendix B of ADEM's PSD Air Quality Analysis – AERMOD Modeling Guidelines, surface data from Mobile Regional Airport in Alabama was used in the modeling analysis. Mobile Regional Airport is located approximately 25 miles southwest of Plant Barry and AkzoNobel.

Three contiguous years of data from Mobile Regional Airport with concurrent upper air data from Slidell Airport in Louisiana, as provided by ADEM, was used in the analysis. The 2013-2015 pre-processed meteorological data (profile and surface files) for use with AERMOD was provided by ADEM. The pre-processed meteorological data provided by ADEM was processed with the latest version of AERMET (version 16216) using the default ADJ_U* option. The locations of Mobile Regional and Slidell airports relative to the project location are shown in Figure 3-8. The meteorological station information can be found in Table 3-1.

Table 3-1: Meteorological Stations used for Modeling

Met Site	Latitude	Longitude	Base Elevation (ft)	Station Call Sign
Mobile Regional Airport	30.6914	88.2428	218.7	KMOB
Slidell Airport	30.3463	89.8208	28.3	KASD

[5] http://seamless.usgs.gov/index.php

Source: AIRNAV.com

3.6 Ambient Monitoring Data

As part of the 1-hour SO_2 modeling analysis, ambient background was added to the modeled concentrations. For this analysis, ADEM has directed the use of ambient data from the Centreville, Alabama monitor for the period of 2013-2015 to be consistent with the meteorological years used for modeling. From their response to EPA's comments on the Barry-only modeling protocol initially submitted by Alabama Power, ADEM's justification for the use of the Centreville monitor is as follows:

> *"The 1-hour SO_2 background values used for this analysis were derived from data collected at the Centreville, Alabama, SEARCH site. The Centreville SEARCH site is considered to be representative of background SO_2 concentrations based on a number of factors. The data from this SEARCH site has very little impact from anthropogenic sources, therefore, it should be representative of background 1-hour SO_2 values for most areas of the State of Alabama. The purpose of adding the background value to the final model-predicted concentration is to account for the potential impact of sources outside the scope of the modeling analysis, such as natural and distant sources, which may minimally impact air quality in the area. Due to the fact that an inventory of sources is modeled in addition to the source under review, there is a high possibility that the air quality impacts from many sources could be double-counted when the background value is added to the final 1-hour SO_2 concentration predicted by the model.*
>
> *Other monitors located outside the State were considered as possible background sites, but due to the proximity of alternative monitors to urban areas and anthropogenic sources, these monitors would not provide an appropriate background concentration. Using concentrations from urbanized/industrialized areas can unduly influence the monitors and not provide a value that is truly representative of background conditions in a rural area. These areas tend to be more populated and urbanized, which is not representative of rural areas such as the Bucks area. These monitors are likely impacted by urban influences and would not be representative of the rural background conditions in Bucks, Alabama.*
>
> *Additionally, due to the Centreville site's location relative to Bucks, the synoptic-scale weather conditions in the Centreville area would be very similar to the Bucks area. Most major weather systems that would impact the Bucks area would, in general, impact the Centreville area as well. Due to all the factors cited above, ADEM determined that the Centreville, Alabama, site was the appropriate background monitor to use for this analysis."*

Design concentrations for the period of 2013 through 2015 are provided for the Centreville, Alabama monitor in Table 3-2. The design concentration is based on the 99th percentile of the peak daily 1-hour SO_2 concentrations averaged over three years as provided by ADEM.

Table 3-2: 1-Hour SO_2 Design Concentrations for the Centreville Monitor

Monitor	Year	99th Percentile Concentration (ppb)	Design Concentration (3-year average)	
			ppb	µg/m^3
Centreville	2013	9	13	35
	2014	22		
	2015	9		

According to EPA guidance documents, the combining of the modeled plus monitored concentrations can consider the following options:

Option 1: The design concentration from Table 3-2 would be added to every hour of modeled concentrations to determine the total concentration, as referenced in Section 8 of the SO_2 Modeling TAD.

Option 2: Seasonal and hour of day varying background concentrations would be calculated in accordance with EPA guidance in the March 1, 2011, additional clarification memo[6]. The matrix of seasonal and hour of day varying background concentrations would be combined with the modeled concentrations on an hourly basis within the AERMOD modeling system using the SEASHR keyword in the SOURCE input pathway.

Option 3: Would include seasonal and hour of day varying background concentrations as described above, but hours in which the source clearly influence the monitor would be removed from the database prior to calculating the seasonal and hour of day varying background concentrations. This procedure would follow guidance in Section 8.2.2 of the Appendix W of the GAQM. Section 8.2.2 of Appendix W states *"Use air quality data in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding concentrations when the source in question is impacting the monitor… For shorter time periods, the meteorological conditions accompanying concentrations of concern should be identified. Concentrations for meteorological conditions of concern, at monitors, not impacted by the source in question, should be averaged for separate averaging time to determine the average background value. Monitoring sites inside a 90° degree sector downwind of the source may be used to determine the area of impact."* This approach is also referenced in Section 8 of the SO_2 Modeling TAD. Similar to Option 2, the matrix of seasonal and hour of day varying background concentrations would be combined with the modeled concentrations on an hourly basis within the AERMOD modeling system using the SEASHR keyword in the SOURCE input pathway.

Option 2 was utilized in the 1-hour SO_2 modeling for Plant Barry and AkzoNobel. As such, three years (2013-2015) of hourly SO_2 monitoring data from the Centreville monitor were obtained from ADEM and then used to calculate season and hour of day varying background concentrations in accordance with the EPA guidance in the March 1, 2011, additional clarification memo. The database of seasonal and hour of day varying background concentrations includes a matrix of 96 hourly concentrations used as input to the model (96 = 4 seasons x 24 hours per day). Each of the 96 background concentrations was determined from a potential of 90-92 valid observations depending on the number of days in the season. After accounting for the invalid and missing data, the range of valid observations was 46 to 92 depending on the season and hour or day. Most season and hour of day values have 80+ valid observations per year with the exception of the fall of 2015 in which some hours had less than 80, but still more than 70 valid observations. Also, hour 21 for all four seasons and years had closer to 50 valid observations. Nonetheless, most of these counts in valid observations resulted in the 99^{th} percentile equaling the 2^{nd} highest observations for each season and hour to be consistent with the EPA March 1, 2011, guidance. Any season and hour with less than 50 valid observations used the 1^{st} highest concentration. Table 3-3 shows the resultant seasonal and hour of day varying background used as input to AERMOD.

[6] http://www.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_Appendix W_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

Table 3-3: Centreville Monitor – 2013-2015 Season and Hour of Day Ambient Background (ppb)

Hour of Day	Season 1 (Dec-Jan-Feb)	Season 2 (Mar-Apr-May)	Season 3 (Jun-Jul-Aug)	Season 4 (Sep-Oct-Nov)
1	3.6	2.4	1.7	2.0
2	3.9	2.0	2.5	1.7
3	3.1	1.9	2.8	2.1
4	2.6	1.8	2.7	3.6
5	3.3	1.9	2.0	6.4
6	5.0	1.9	3.3	8.2
7	6.7	2.0	5.9	8.3
8	7.5	2.7	7.7	8.7
9	6.8	4.6	7.4	8.7
10	4.1	3.7	4.0	6.2
11	4.5	3.2	5.2	4.2
12	5.6	2.3	2.9	4.6
13	4.4	2.2	3.3	2.3
14	3.9	3.1	3.1	1.9
15	4.0	3.4	2.8	1.8
16	3.9	3.2	2.0	2.0
17	4.1	3.0	2.0	1.3
18	3.5	3.0	2.9	1.3
19	4.2	2.3	2.4	1.2
20	3.4	2.4	2.3	1.0
21	6.0	2.4	2.4	1.7
22	8.9	1.6	1.2	1.7
23	4.2	2.5	1.3	2.1
24	4.5	2.7	1.2	3.1

3.7 Nearby Sources

ADEM evaluated a list of background sources that had the potential to be included in the modeling. From their response to EPA comments on modeling protocols for Alabama sources, ADEM provided the following justification for the methodology used in the selection of sources near Plant Barry and AkzoNobel:

"ADEM evaluated sources within a 20 km area surrounding the eight facilities who elected following the modeling pathway for compliance under the SO_2 1 hour Data Requirements Rule. ADEM believes that this is a reasonable starting point for evaluation of sources and does not preclude sources from choosing alternate screening criteria that include/exclude sources. A spreadsheet provided each facility with the facilities that met the 2014 actual emissions (in tpy) divided by the distance of greater than 20 within a maximum distance of 20 km. This did include small sources at very close distances. This information will be well documented in the final submittals due to EPA by January 13, 2017. Again, the metric ADEM used to develop the preliminary additional source(s) to be evaluated for inclusion in the modeling for the eight DRR subject sources choosing to model is as follows:

ADEM Metric: Q/D > 20 within 20 km

- *First, ALL sources within 20 km of each facility were pulled,*

- *Next, a Q/D value was developed for each facility on the list, where Q represents the 2014 actual SO_2 tpy emissions totals, and D represents the distance between the two facilities,*

- *If the Q/D metric yielded a value of greater than 20, the facility was retained and additional QA/QC was performed on a unit by unit basis."*

ADEM's list of nearby background sources for Plant Barry and AkzoNobel modeling is in Table 3-4. Alabama Power and AkzoNobel agree that ADEM's methodology for nearby source selection is reasonable and an alternate screening criterion is not necessary. Using the above methodology, ADEM has identified one additional nearby background source that was included in the 1-hour SO_2 DRR modeling analysis for Plant Barry and AkzoNobel. The nearby source is SSAB Alabama steel mill (SSAB), located approximately 7 km south of Plant Barry and 3 km south of AkzoNobel. The location of SSAB relative to Plant Barry and AkzoNobel is depicted in Figure 3-9. The second source listed in Table 3-4, Union Oil of CA Chunchula, was not included in the modeling at the direction of ADEM. This source is undergoing a permit modification resulting in their SO_2 emissions to be insignificant to this modeling effort.

ADEM also provided emission rate and stack parameter data for SSAB. This data is listed in Table 3-5 and is included in the Plant Barry and AkzoNobel modeling analysis.

Table 3-4: ADEM List of Nearby SO_2 Sources

Facility Name	2014 SO_2 Emissions (tpy)	Direction from Barry	Distance (km)	Q/D
SSAB	423	SW	7.2	59
Union Oil of CA Chunchula[1]	796	WSW	17.4	46

1. Union Oil is currently undergoing a permit modification resulting in their SO_2 emissions to be insignificant.

Table 3-5: Stack Parameter Data for SSAB

Model Stack ID	Base Elevation (ft)	Stack Height (Actual) (ft)	Stack Exit Diameter (ft)	Stack Exit Temperature (°F)	Stack Exit Velocity (ft/s)	SO_2 Modeled Emission Rate (lb/hr)
SSAB Alabama						
SSABX001	30.0	175.0	25.0	247.0	54.32	119.3

Figure 3-1: Land Use within 3 km of Plant Barry and AkzoNobel – Aerial Photo

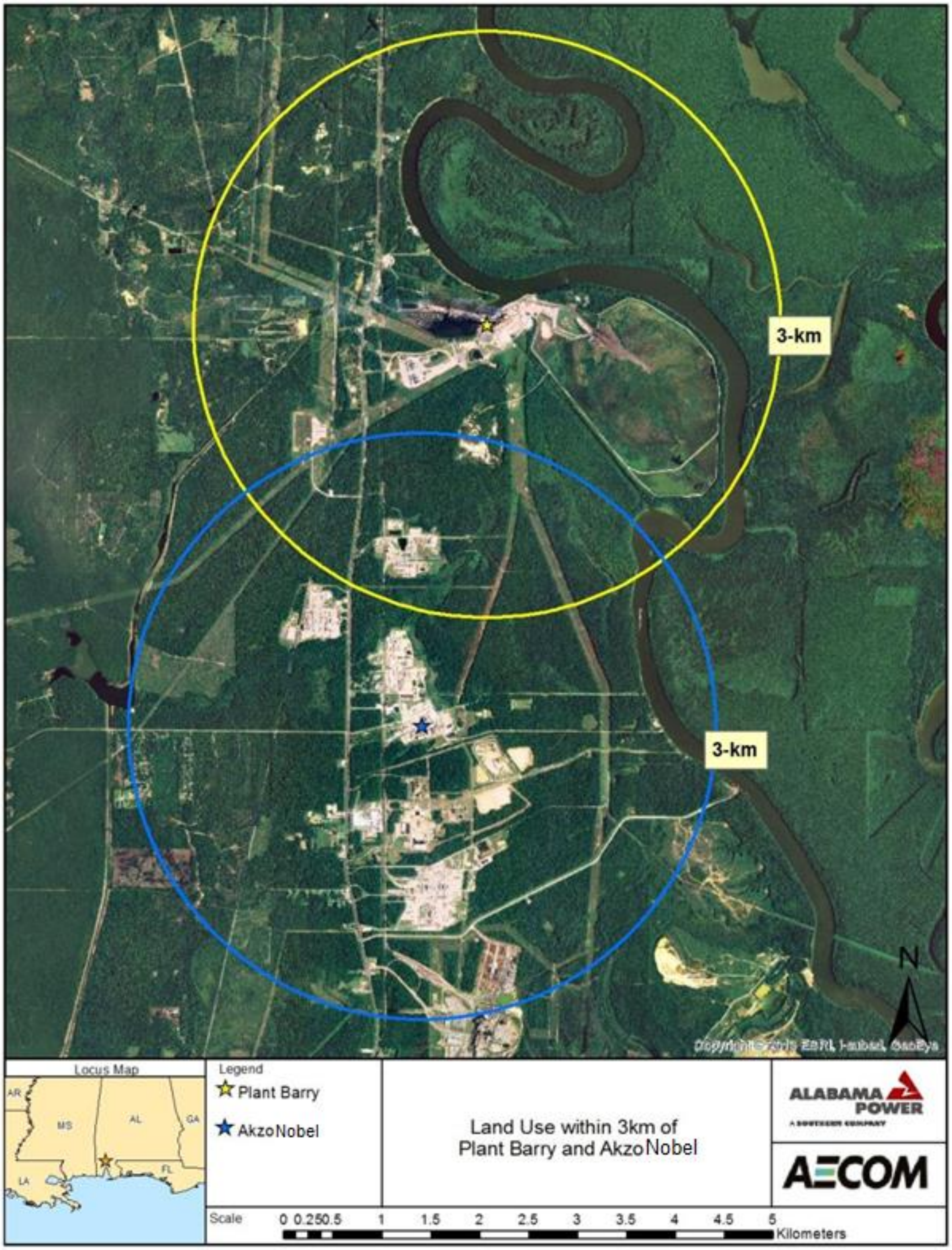


Figure 3-2: Plant Barry Buildings and Stacks used for the BPIP Analysis (looking west)

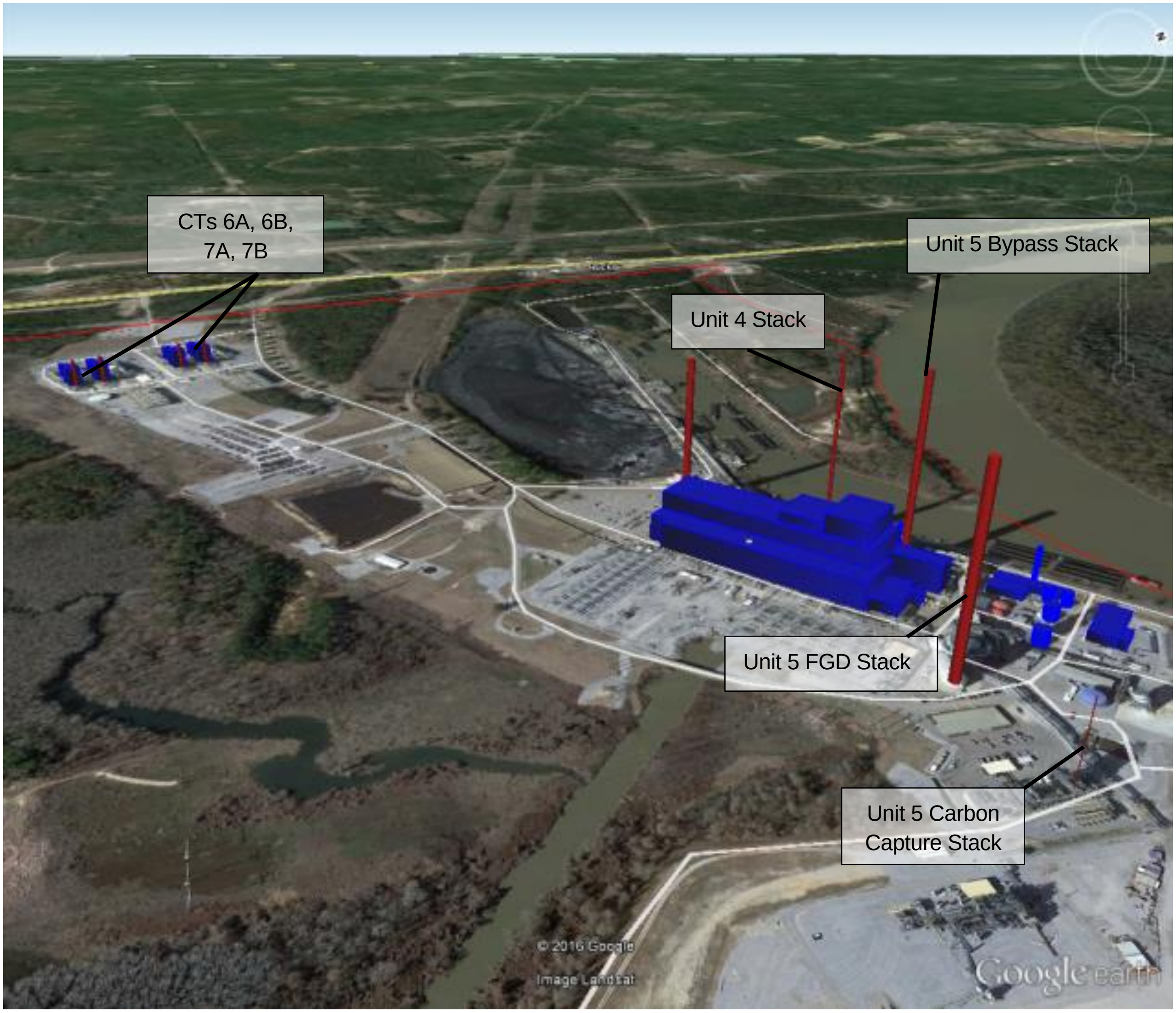


Figure 3-3: AkzoNobel Buildings and Stacks used for the BPIP Analysis (looking southwest)

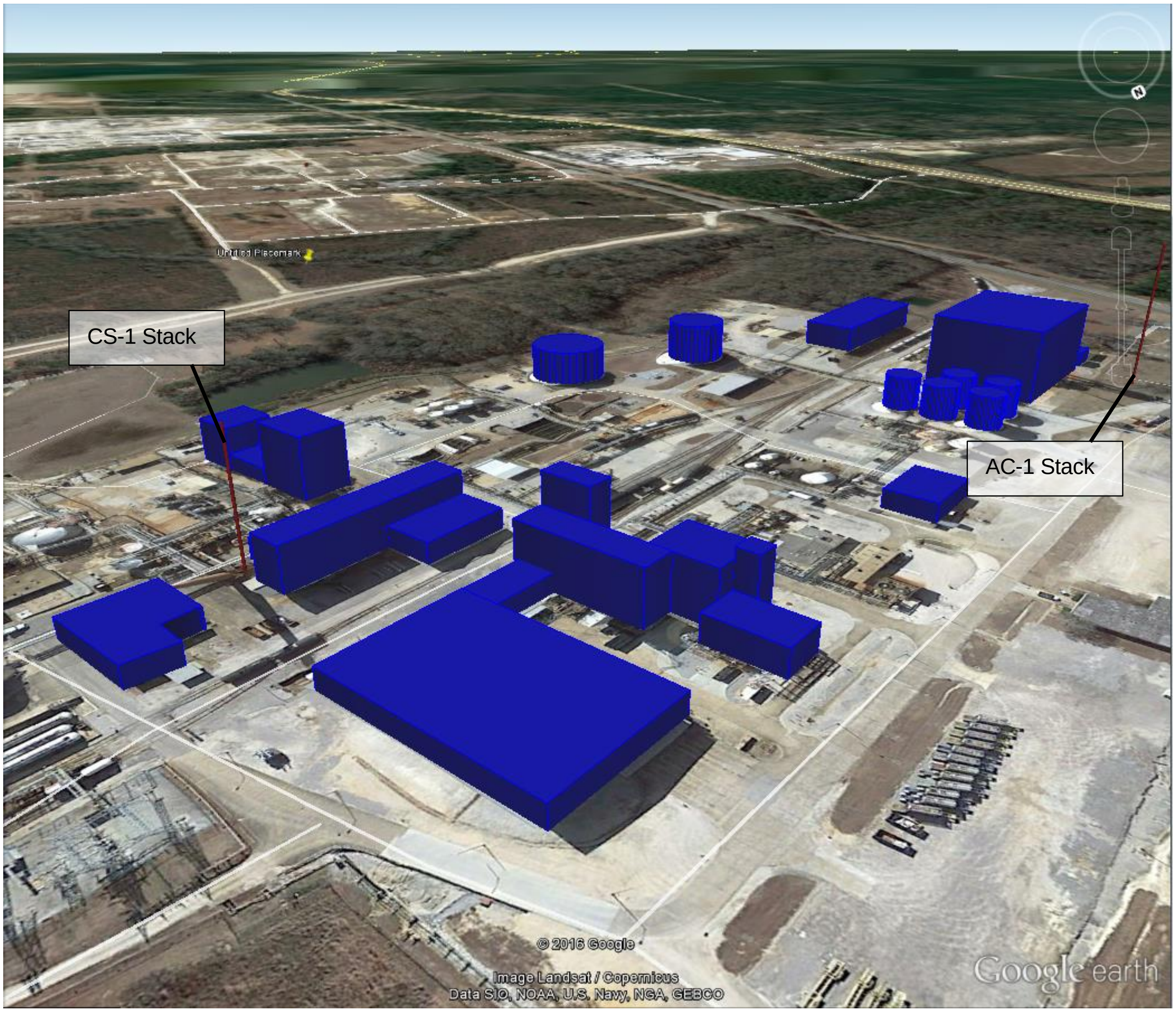


Figure 3-4: Plant Barry Ambient Air Boundary

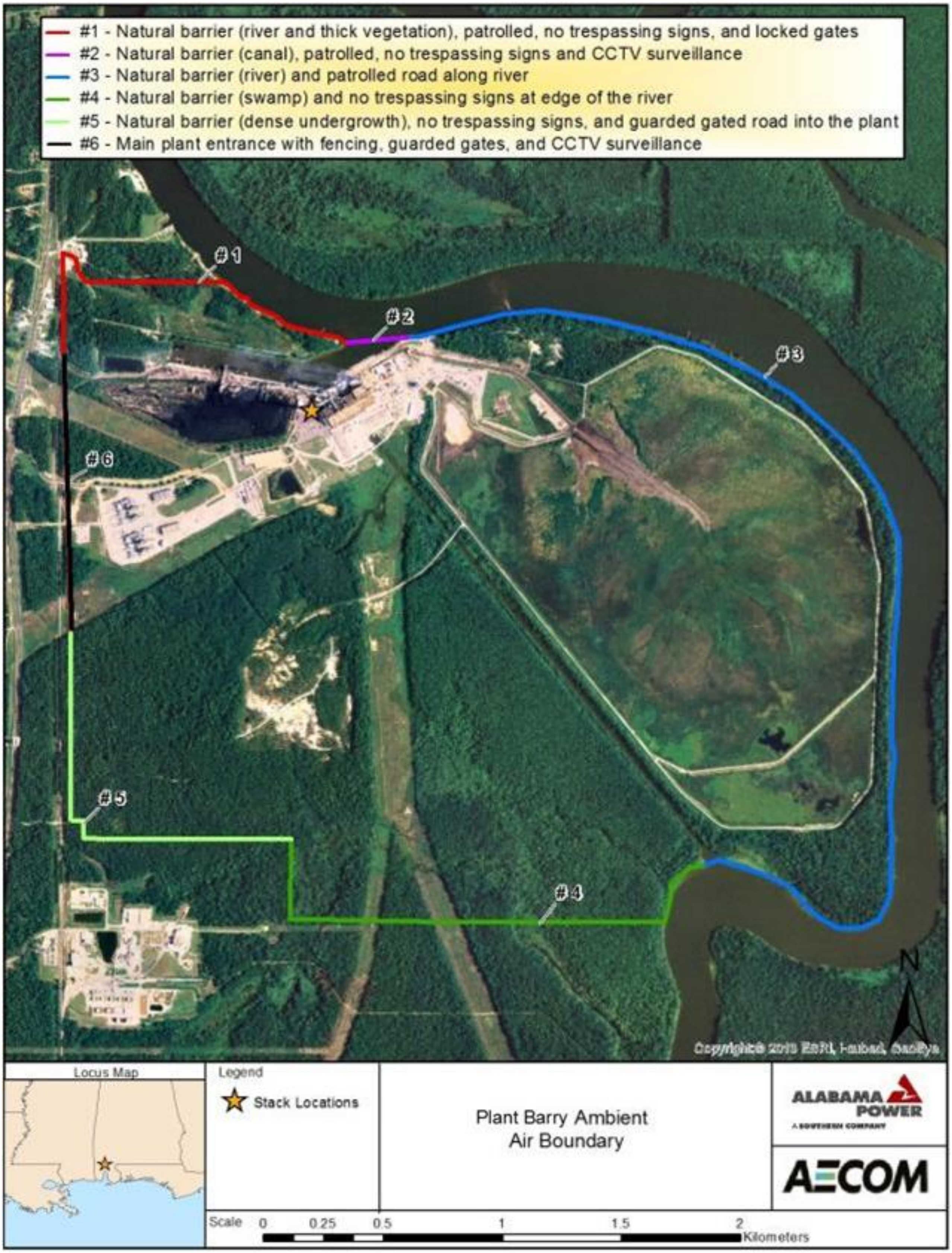


Figure 3-5: AkzoNobel Ambient Air Boundary

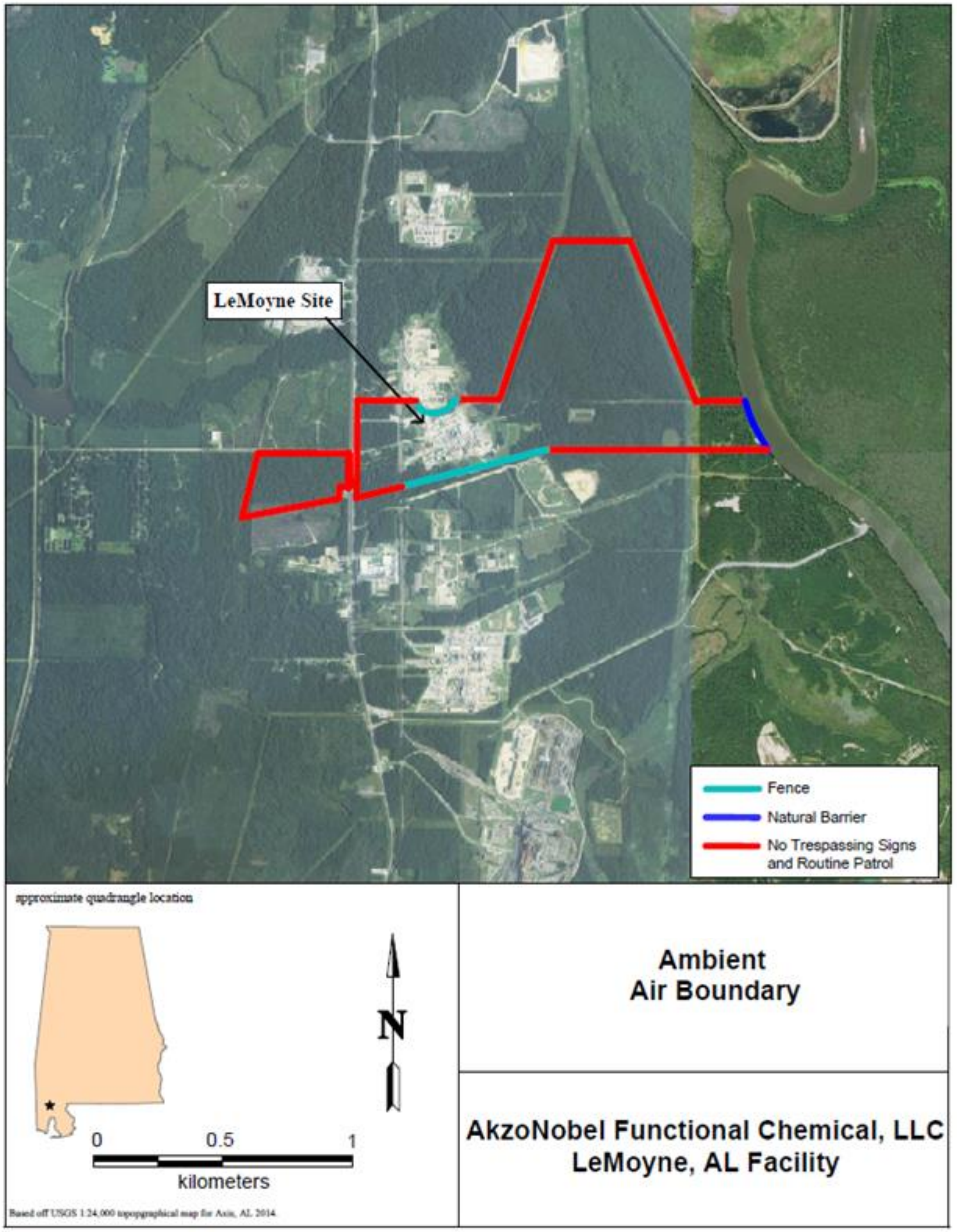


Figure 3-6: Near-Field View of Receptor Grid

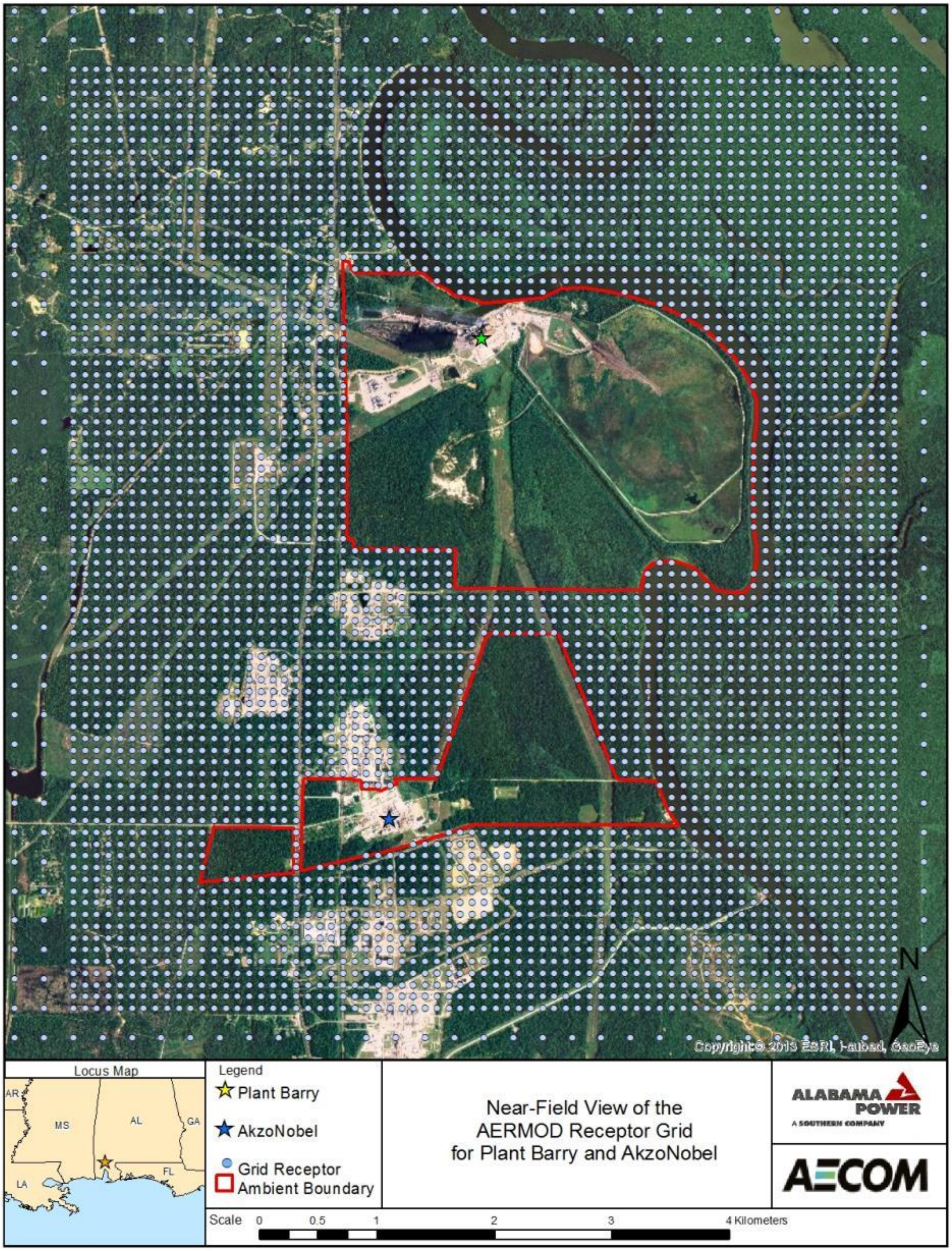


Figure 3-7: Extent of Receptor Grid

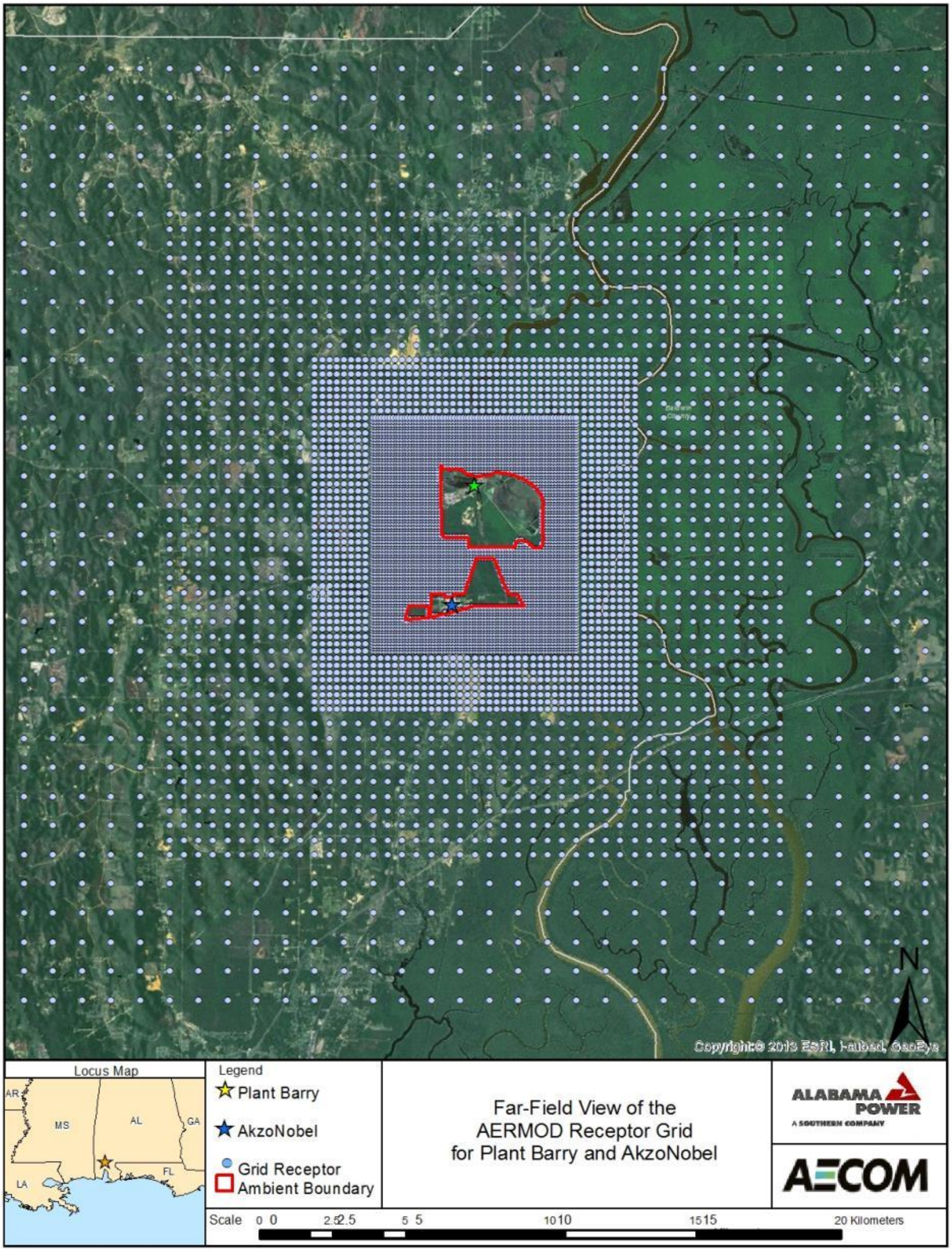


Figure 3-8: Location of Meteorological Stations Relative to Plant Barry and AkzoNobel

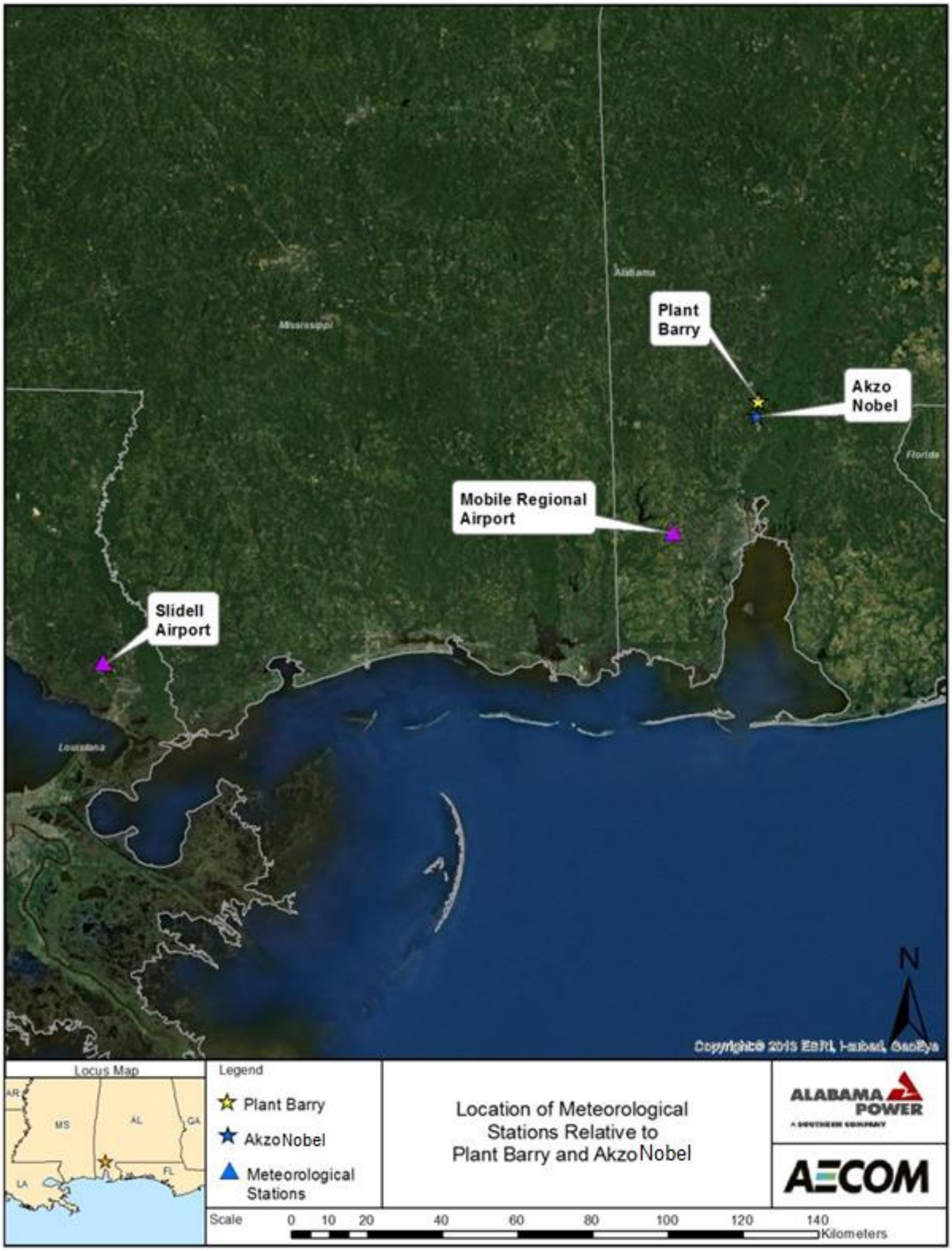


Figure 3-9: Location of Background Source for Plant Barry and AkzoNobel SO_2 DRR Modeling

4.0 Analysis of Modeling Results

The modeling results for 1-hour SO_2 concentrations are presented in Table 4-1 and are based on the sum of the modeled design concentration for Plant Barry and AkzoNobel using emissions as described in Section 2 plus the ambient background concentration. The modeled design concentration was calculated by AERMOD and reflects the three-year average of the 99th percentile ranked peak daily 1-hour SO_2 concentration.

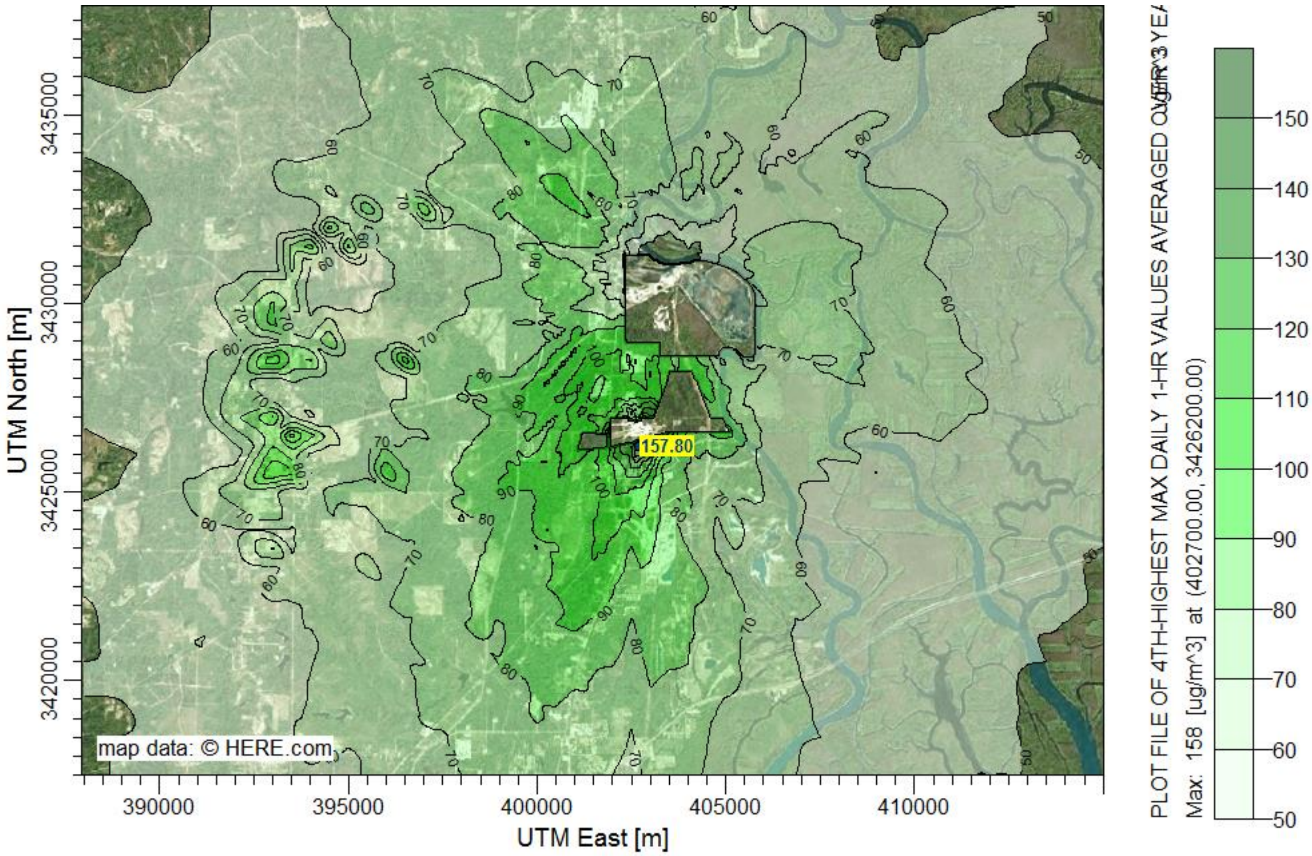
Table 4-1 compares the total concentration (modeled plus background) with the 1-hour SO_2 NAAQS of 196.5 $\mu g/m^3$. Figure 4-1 shows the location of the maximum modeled concentration, which is just south of the AkzoNobel ambient boundary. The location of maximum design concentration is within 100-m spaced receptors.

As shown in Table 4-1, the modeling results indicate that all areas surrounding Plant Barry and AkzoNobel are below the applicable NAAQS standard and should be designated as attainment. The modeling archive (see Appendix B) contains all the electronic files needed to review and reproduce the results contained in this report.

Table 4-1 Summary of 1-hour SO_2 Modeling Results

Pollutant	Averaging Period	Model Design Concentration ($\mu g/m^3$)	Monitored Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Below NAAQS (Yes/No)	Percent of NAAQS (%)
SO_2	1-hour	149.0	8.8	157.8	196.5	Yes	80.3

Figure 4-1 Isopleth Map of 1-hour SO_2 Total Concentrations (Modeled + Background)



Appendix A

GEP Documentation for the Plant Barry Unit 4 and Unit 5 Stacks

Alabama Power Company
600 North 18th Street
Post Office Box 2641
Birmingham, Alabama 35291
Telephone 205 250-1000

Alabama Power
the southern electric system

December 11, 1985

Mr. Richard E. Grusnick, Chief
Air Division
Alabama Department of
Environmental Management
1751 Federal Drive
Montgomery, AL 36130

Dear Mr. Grusnick:

Reference is made to your letter of October 22, 1985 and our meeting of November 18, 1985 concerning the Stack Height Regulations promulgated by the Environmental Protection Agency on July 8, 1985. Attached are the following documents and data:

1. Determination of Good Engineering Practice stack heights for stacks greater than 65 meters APC 200 forms for Barry, Gadsden and Gorgas Steam Electric-Generating Plants.

2. Exceptions from restrictions on credit for merged stacks with attachments.

3. Air quality modeling analysis with attachments.

4. Emission inventory for Barry Steam Plant.

5. 1983 on-site meteorological data on computer tape for all Alabama Power Company coal-fired plants.

The stacks for Units 4 and 5 at the Barry Steam Plant and the stack for Units 8-10 at the Gorgas Steam Plant are grandfathered under the regulations. The stacks for Units 4 and 5 at the Barry Steam Plant were completed in May, 1969 and June, 1970, respectively. The stack for Units 8-10 at the Gorgas Steam Plant began construction in February, 1970.

It should be noted that the Gadsden and Gorgas Steam Plants will not require any additional modeling to prove compliance with the regulations. The stacks at these plants, as indicated on the APC 200 forms, are either grandfathered or less than Good Engineering Practice stack height.

Mr. Richard E. Grusnick
Page two
December 11, 1985

The APC 200 forms and the emission inventory for the remaining affected plants will be submitted within two weeks. This information has been delayed due to a recheck of construction drawings by our surveyors.

I would appreciate a meeting to discuss this information as soon as possible. If you have any questions, please call me.

Sincerely,

Willard L. B

W. L. Bowers, Manager
Environmental Compliance

WDH:dy

Attachment

DETERMINATION OF GOOD ENGINEERING PRACTICE STACK HEIGHT
FOR STACKS GREATER THAN 65 METERS

1. Company ALABAMA POWER COMPANY

2. Address P. O. Box 2641, Birmingham, AL 35291

3. Permit Unit/Source Description Barry Steam Plant Unit 4

   (a) Actual stack height above grade 600 feet

   (b) List the air emission sources which utilize this stack. Describe the air pollution control system. Attach diagrams or further explanation as needed. Barry Steam Plant Boiler 4 with electrostatic precipitators.

4. Attach a top-view schematic drawing of the plant (drawn-to-scale) including geographical orientation. Label all buildings and stacks. Include height, width, and length of all buildings.

5. (a) GEP stack height Grandfathered

   (b) Date construction started on stack ____

   (c) In the space provided below or in attachments show the GEP calculations and indicate the building used.

   See attached information on grandfathering.

6. Highest terrain elevation within 1/2 mile:

   (a) Height 40 feet

   (b) Distance and direction from stack 0.5 miles west (taken from U. S. Geological Map Citronelle 1:62500 Quad)

W. L. Bowers
Name of Company Official

William L. Bowers
Signature

12/12/85
Date

APC 200

DETERMINATION OF GOOD ENGINEERING PRACTICE STACK HEIGHT
FOR STACKS GREATER THAN 65 METERS

1. Company ALABAMA POWER COMPANY

2. Address P. O. Box 2641, Birmingham, AL 35291

3. Permit Unit/Source Description Barry Steam Plant Unit 5

   (a) Actual stack height above grade 600 feet

   (b) List the air emission sources which utilize this stack. Describe the air pollution control system. Attach diagrams or further explanation as needed. Barry Steam Plant Boiler 5 with electrostatic precipitators.

4. Attach a top-view schematic drawing of the plant (drawn-to-scale) including geographical orientation. Label all buildings and stacks. Include height, width, and length of all buildings.

5. (a) GEP stack height grandfathered

   (b) Date construction started on stack ______

   (c) In the space provided below or in attachments show the GEP calculations and indicate the building used.

   See attached information on grandfathering.

6. Highest terrain elevation within 1/2 mile:

   (a) Height 40 feet

   (b) Distance and direction from stack 0.5 Miles West (Taken from U. S. Geological Map Citronelle 1:62500 Quad)

W. L. Bowers
Name of Company Official

Willard L. Bowers
Signature

12/12/85
Date

Appendix B

Electronic Modeling Archive

(See attached web link in transmittal email to download files)