AIR DISPERSION MODELING FOR EVALUATING COMPLIANCE WITH THE 1-HOUR SO_2 NATIONAL AMBIENT AIR QUALITY STANDARD AT THE ASCEND PERFORMANCE MATERIALS FACILITY IN DECATUR, ALABAMA

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1.0 INTRODUCTION

This document presents the results of the air quality dispersion modeling analysis conducted for the Ascend Performance Materials (Ascend) chemical manufacturing facility in Decatur, Alabama. The modeling was conducted to evaluate compliance with the 1-hour SO_2 National Ambient Air Quality Standard (NAAQS) as required by the Data Requirements Rule (DRR) of 40 CFR Part 51, Subpart BB.

The modeling conforms with the modeling procedures outlined in the U.S. Environmental Protection Agency's (EPA) Guideline on Air Quality Models[1] (Guideline), the Alabama Department of Environmental Management's (ADEM) Prevention of Significant Deterioration Air Quality Analysis AERMOD Modeling Guidelines[2], the EPA SO_2 NAAQS Designations Modeling Technical Assistance Document (Draft), or TAD[3], and associated EPA modeling policy and guidance. The modeling also conforms with the modeling protocol submitted to and approved, with revisions, by the Alabama Department of Environmenal Management (ADEM) and US Environmental Protection Agency.[4,5] Appendix A to this report provides the EPA comments on the protocol as well as the ADEM and Ascend responses to these comments.

2.0 SITE DESCRIPTION

The Ascend facility is located in Morgan County, on a peninsula, in Wheeler Lake on the north side of the city of Decatur. The approximate Universal Transverse Mercator (UTM) coordinates of the facility are 498,100 meters east and 3,832,700 meters north (UTM Zone 16, NAD 83). Figure 1 shows the general location of the facility. Figure 2 shows the specific facility location on a 7.5-minute U.S. Geological Survey (USGS) topographic map.

The facility is approximately 174m (570ft) above mean sea level. Morgan County is classified as attainment or unclassified for all criteria pollutants.

The Ascend facility is classified under the regulations governing PSD (40 CFR 52.21) and Title V (40 CFR 70.2) as a major source of air pollution.

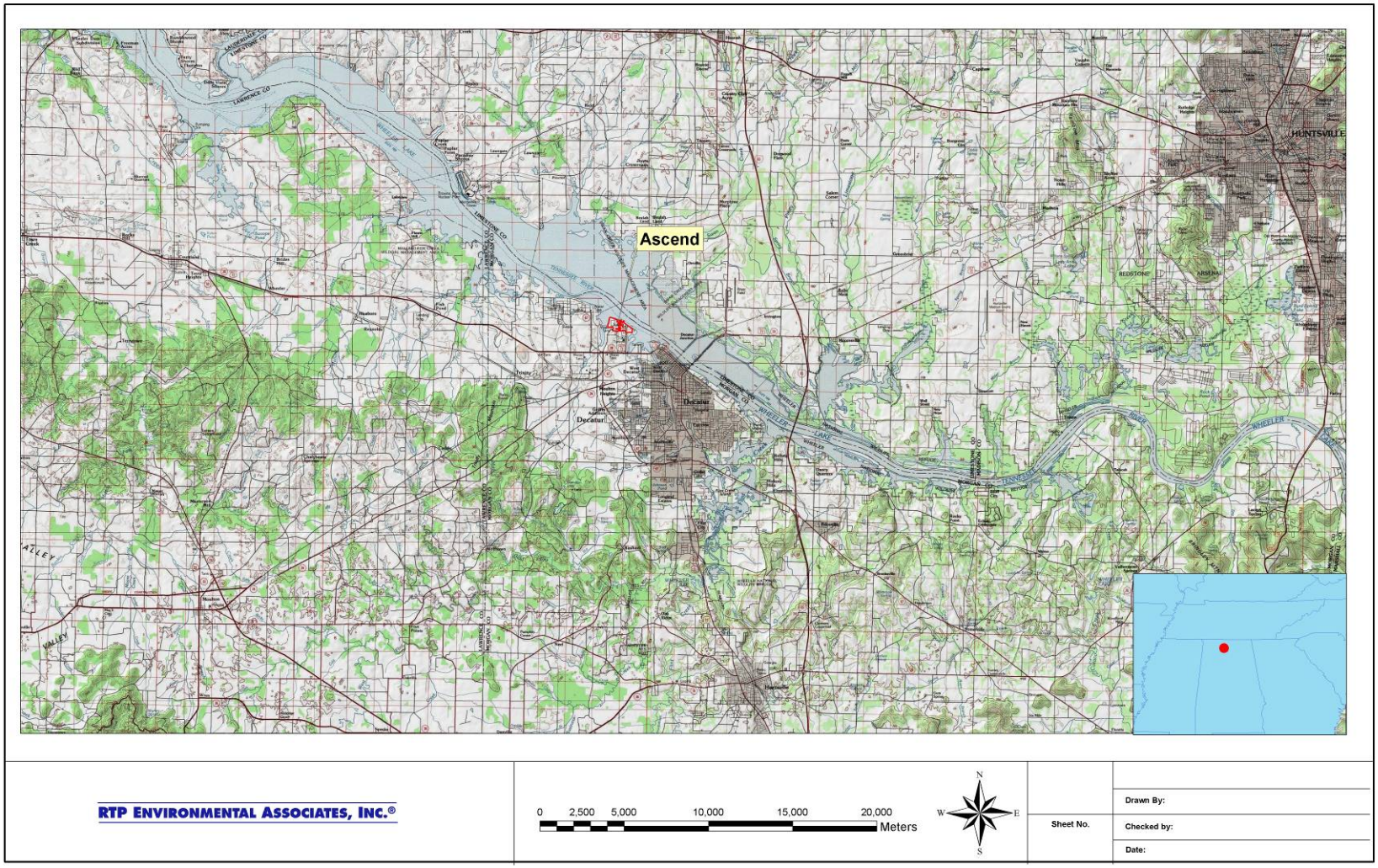

Figure 1. General Location of the Ascend Facility

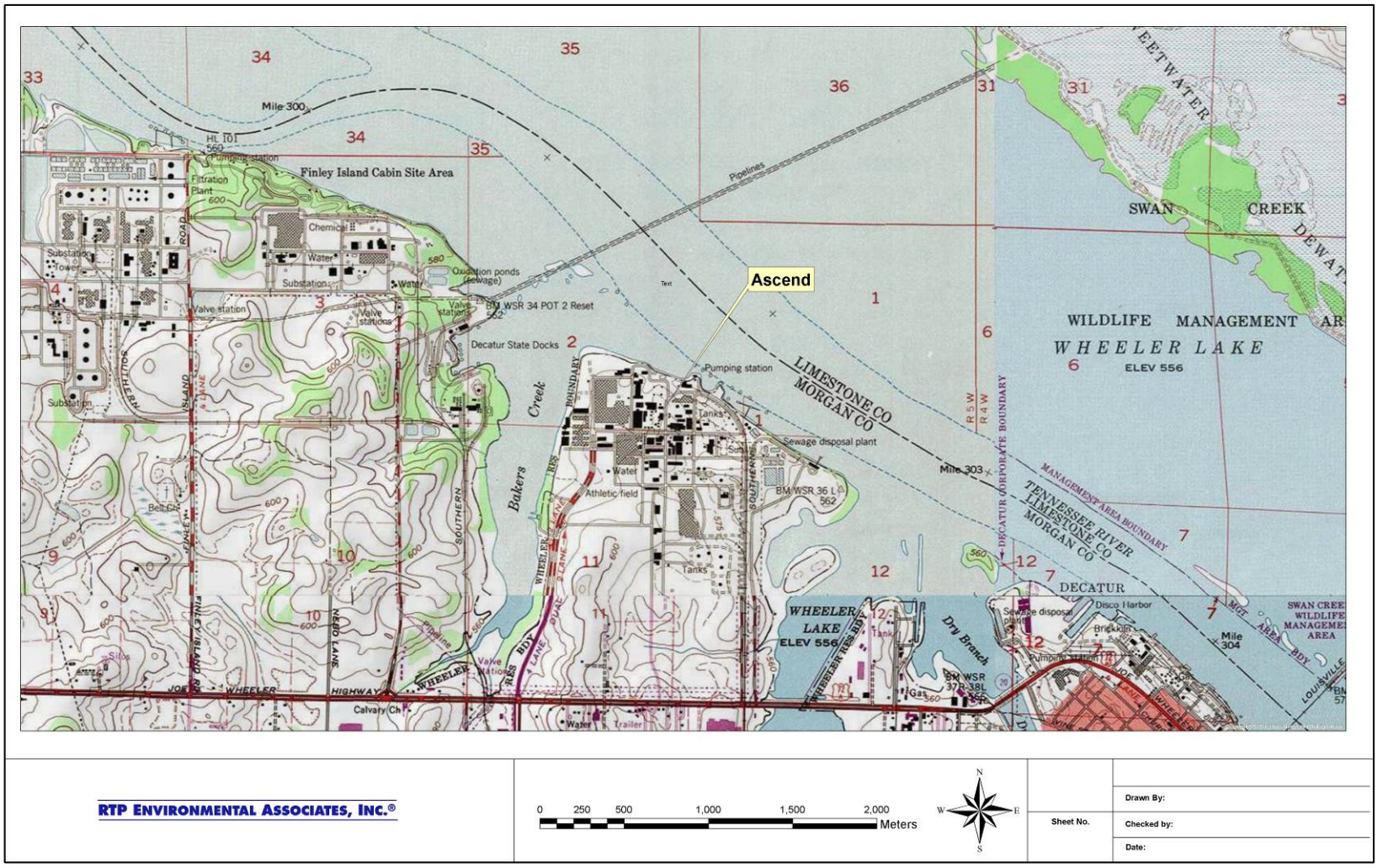

Figure 2. Specific Location of the Ascend Facility

3.0 MODEL SELECTION AND MODEL INPUT

3.1 Model Selection

The latest version of the AMS/EPA Regulatory Model (AERMOD, Version 15181) was used to conduct the dispersion modeling analysis. AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principals for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD is a modeling system with three components: AERMAP is the terrain preprocessor program, AERMET is the meteorological data preprocessor and AERMOD includes the dispersion modeling algorithms.

AERMOD is the most appropriate model for calculating ambient concentrations near the facility based on the model's ability to incorporate multiple sources and source types. The model can also account for convective updrafts and downdrafts and meteorological data throughout the plume depth. The model also provides parameters required for use with up to date planetary boundary layer parameterization. The model also has the ability to incorporate building wake effects and to calculate concentrations within the cavity recirculation zone. All model options will be selected as recommended in the EPA Guideline on Air Quality Models.

Oris Solution's BEEST Graphical User Interface (GUI) was used to run AERMOD. The GUI uses an altered version of the AERMOD code to allow for flexibility in the file naming convention. The dispersion algorithms of AERMOD are not altered. Therefore, there is no need for a model equivalency evaluation pursuant to Section 3.2 of 40 CFR 51, Appendix W.

3.2 Model Control Options and Land Use

AERMOD was run with the non-default/beta option to allow for the use of the surface

friction velocity (u*) adjustment (adjust u*) option in AERMET. All other regulatory default options were employed. The adjust u* option has been proposed by EPA as a regulatory default option[6]. This regulation is currently under review by the Office of Management and Budget, but, based upon EPA statements at the Regional Modeler's Workshop in New Orleans (November 15, 2016), EPA is expecting that the adjust u* will be part of the final Federal Rule Making (FRM) package. Until such time as the regulation is final, however, use of the beta option must be approved as an alternative option pursuant to the procedures of Section 3.2.2.b of 40 CFR Part 51, Appendix W.. Since Ascend anticipates this option to be part of the regulatory model by the time EPA reviews this analysis, we have elected not to submit documentation necessary to fullfill the requirements to use an alternative option. Should the FRM not include the adjust u* option, Ascend will either revise this submittal to eliminate the use of this beta option or will submit the documentation necessary to fullfill the Section 3.2.2.b requirements. It should be noted, however, that Asend believes that the appropriate justification can be easily made. EPA has allowed for numerous evaluations using the u* option for sources similar to Ascend (i.e., tall stacks with nearby complex terrain).[a] In addition, the u* option has been throughly peer reviewed in model validation studies, as presented in the January 2014 EPA webinar as well as in the June 2015 Addendum to the AERMOD User's Guide. Each of the model validation studies showed improved model performance compared to the Default Method.

AERMOD was also run using rural dispersion coefficients. Use of rural dispersion is supported by the Land Use Procedure consistent with subsection 7.2.3(c) of the Guideline and Section 5.1 of the AERMOD Implementation Guide.

The USGS 2006 National Land Cover Data (NLCD) within 3km of the site were converted to Auer 1978 land use types and evaluated.[7] It was determined that the land use in the vicinity of the facility is predominantly rural (Figure 3). Only the red and dark red areas in the figure are classified as urban by Auer. These areas (land use

[a] Please note that maximum impacts from the Ascend facility using the regulatory default option and the hard coded, default u* method occur under stable conditions on Trinity Mountain in terrain that exceeds stack top elevation.

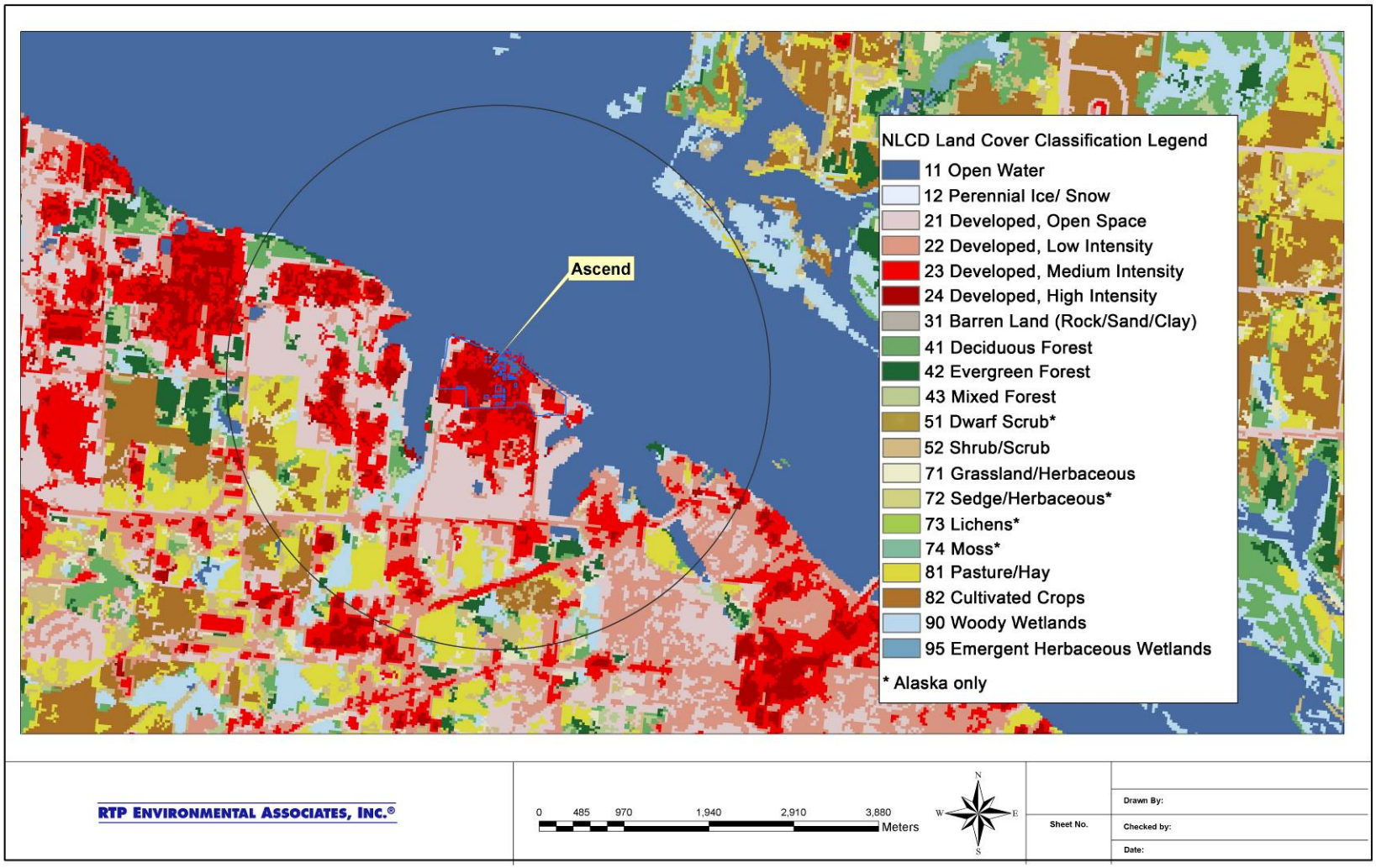

Figure 3. Land Use within Three Kilometers (3km Radius Shown)

categories 23 & 24 represent less than 20 percent of the total landuse within the 3km radius (See Appendix B). The potential for urban heat island affects, which are regional in character, was considered and determined not to be of concern.

3.3 Source Data

Source Characterization

Point Sources

The major SO_2 sources at the facility consist of two coal fired boilers (Boiler Nos. 5 & 6), a natural gas and sulfur free heavy liquid boiler (Boiler No. 7), and two cokers. These sources represent 99 percent of the total facility emissions. The remainder of the SO_2 from the facility originates from two hydrogen reformers. Boiler No. 7 just recently (March of 2016) converted to a sulfur free fuel and has accepted a federally enforceable permit condition to restrict SO_2 emissions by January 2017. In its modeling protocol, Ascend had therefore proposed to exclude Boiler 7 from the modeling analysis. However, EPA did not agree and stated that it was not appropriate to mix past actual emissions for some sources and future potential emissions for others. Asend has therefore evaluated the total facility impacts using actual emissions both with and without Boiler No. 7.

All of the SO_2 sources at the facility vent to stacks with well defined openings. These sources were modeled as point sources in AERMOD. No other sources at Ascend required evaluation. The modeled source input parameters are shown in Table 1.

Source Emissions

Ascend modeled the most recent three years (2013-2015) of actual hourly emissions. SO_2 continuous emissions monitoring (CEMS) data are not available for boiler 5 or 6 or cokers. However, the hourly exhaust gas flow rate, temperature and steam production rate are available for the boilers. In addition, the hourly temperature and steam production rate are available for the cokers. Ascend used these hourly measurements to calculate SO_2 emissions. The hourly emissions were calculated

Table 1. Modeled Source Input Data

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elevation (ft)	Stack Height (ft)	Temp (F)	Exit Velocity (fps)	Stack Diameter (ft)
BOILE56	Boilers 5 & 6	498191.082	3832678.240	570.7	190.0	365.0	34.36	10.5
BOIL7	Boiler 7	498128.027	3832670.781	570.1	190.0	355.0	48.78	8.0
COKERS	Cokers	498089.383	3832561.289	575.7	190.0	560.0	34.66	10.5
REFORM1	Hydrogen Reformer	498291.969	3832493.296	564.6	57.0	271.0	47.49	1.9
REFORM2	Hydrogen Reformer	498319.539	3832467.236	564.5	57.0	271.0	47.49	1.9

Note: A file of actual hourly emissions, exit temperatures, and velocities was modeled for the boilers and cokers.

based upon the fraction of total annual steam flow for each hour and the total annual emissions calculated and reported from each unit. The annual calculations of SO_2 are based upon known fuel use quantities and fuel sulfur contents. Since the hourly emissions are linearly related to steam production and since the fuel sulfur contents do not vary in a significant manner, allocating the annual emissions based upon the hourly fraction of total steam production results in the most accurate estimate of hourly emissions. The emission calculations are provided as an attachment with the modeling files. SO_2 CEMS data are available for boiler 7 for the years modeled.

Good Engineering Practice Stack Height Analysis

A Good Engineering Practice (GEP) stack height evaluation was conducted to determine appropriate building dimensions to include in the model. Procedures to be used were in accordance with those described in the EPA Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations-Revised)[8]. GEP formula stack height, as defined in 40 CFR 51, is expressed as GEP = H_b + 1.5L, where H_b is the building height and L is the lesser of the building height or maximum projected width. Building/structure locations were determined from a facility plot plan and site visit. The structure locations and heights were input to the EPA's Building Profile Input Program (BPIP-PRIME) computer program to calculate the direction-specific building dimensions needed for AERMOD. Actual stack heights were modeled since actual hourly emissions were modeled. The Ascend facility plot plan is shown in Figure 4. A three dimensional rendering of the facility is shown in Figure 5.

3.4 Off-Site Sources

Ascend also included emissions from the Nucor Steel facility located approximately 5.3km to the west. The stack information and SO_2 emissions were provided to Ascend by the ADEM.

Figure 4. Ascend Facility Plot Plan

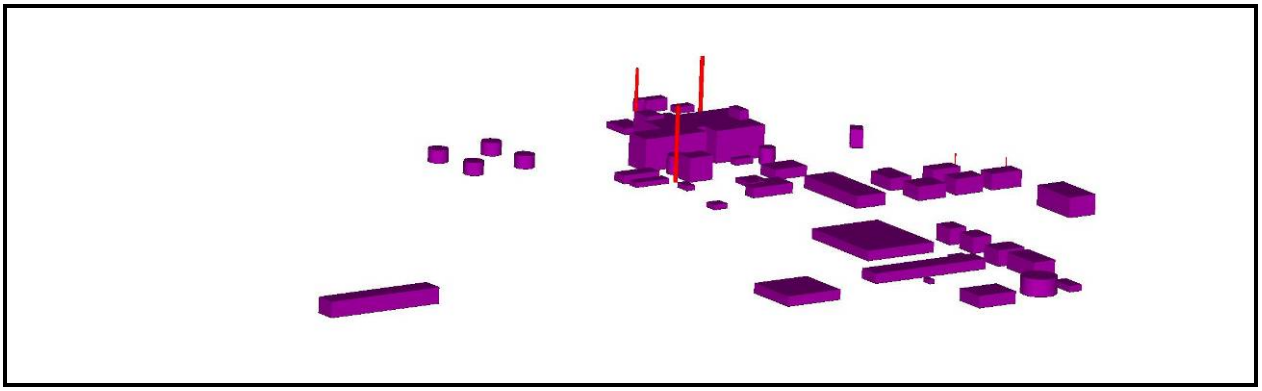

Figure 5. Ascend Three Dimensional Plot Plan (View from SW)

3.5 Monitored Background Concentrations

Ambient, background pollutant concentrations are needed to establish the cumulative impact of the facility and other contributing nearby sources not explicitly modeled. The DRR and the August 23, 2010 EPA clarification memo on "Applicability of Appendix W Modeling Guidance for the 1-hr SO_2 National Ambient Air Quality Standard" suggest a first tier approach of adding a uniform monitored background contribution based on adding the overall highest hourly background SO_2 concentration from a representative monitor to the modeled design value. This approach is overly conservative and is prone to increasing the potential for double counting modeled and monitored contributions. Therefore, as discussed in EPA's 2010 clarification memo, we have used a less conservative approach of adding a temporally varying background concentration by hour of day and season to the modeled design concentration. RTP Environmental developed such a temporally varying dataset based upon the 99% concentration for each season. The 2013-2015 hourly SO_2 values from the Centreville monitor operated by the Southern Company were processed to derive the 99% values. This monitor is one of the few within 100 miles of the Ascend facility and is representative of the Ascend site. The processed background values proposed for use are provided in Table 2. The actual calculations of the 99% values is also provided on the attached disk with the modeling files.

Table 2. Centreville SO_2 Background Values (ppb)

Hour	Winter	Spring	Summer	Autumn
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	2.9	1.6	1.2	1.7
23	4.2	2.5	1.3	2.1
24	4.5	2.7	1.2	3.1

3.6 Receptor Data

As stated in the TAD, the strategy for placement of receptors for modeling of SO_2 designations differs from the modeling conducted for SIP, PSD, or NSR. Receptors may be ignored or not placed in areas where it is not feasible to place a monitor (water bodies, etc.). The Ascend facility is located on a peninsula in Wheeler Lake. Any receptors located over water were excluded from the analysis. RTP also excluded receptors on the adjacent industrial sites immediately south of the Ascend facility. These neighboring industrial operations are confined by security barriers which restrict access for both Ascend personnel as well as the general public. It would not be feasible to locate a SO_2 monitor on an industrial site for which Ascend cannot access nor restrict access.

Ascend could also not monitor the safety and subsequently be responsible for the personnel accessing the monitor. In addition, there will be safety concerns regarding the operation of a monitor within the confines of an industrial site. For example, the electrical components within the monitoring system could provide an ignition source that will have to be mitigated by using explosion proof design/operation. Additionally, the adjacent facility will have to provide electrical service and proper operation and maintenance of the electrical system. As a result, it is highly unlikely that the adjacent facility would commit to providing ongoing access to their facility for liability reasons and practical reasons related to providing electrical service. Furthermore, the area over the adjacent industrial sites would also only be considered as "ambient air" to the employees of the adjacent site. Access to these sites is tightly controlled and within a secure zone. As noted earlier, the general public does not have access to any of the industrial sites adjacent to the Ascend facility.

Approximately 8,600 receptors were used in the AERMOD NAAQS analysis. The receptor grid consists of several Cartesian grids. The first Cartesian grid extended to approximately 3km from the facility in all directions. Receptors in this region were spaced at 100m intervals. The second Cartesian grid extended from 3km to 7.5km from the facility. Receptor spacing in this region was 250m. A third Cartesian grid was employed that extended from 5km to 15km from the facility. Receptor spacing in this region was 500m. The receptor grid was designed such that maximum facility impacts fell within the 100m spacing of receptors. Preliminary results indicated that the maximum impacts fell in complex terrain on Trinity Mountain, which is approximately 9km southeast of the facility, outside of the 3km grid. Receptors in this impact area were therefore also refined to 100m.

The Ascend facility is located in north central Alabama. The terrain in the vicinity of the facility is generally flat (with the exception noted for Trinity Mountain). Receptor elevations and hill height scale factors were calculated with AERMAP (11103). The elevation data were obtained from the USGS 1/3 arc second National Elevation Data (NED) from the USGS. Locations were based upon a NAD83, UTM Zone 16 projection. The secure boundary that encompasses the Ascend facility and the other immediate

industries as well as the proposed near-field receptor grid is presented in Figure 6. The complete grid is found in Figure 7.

3.7 Meteorological Data

Data Selection and Representativeness

The 2013-2015, 3-year sequential hourly surface meteorological data collected at the National Weather Service (NWS) station at Pryor Field (WBAN No. 53852) and upper air data from Nashville, TN (WBAN No. 13897) were used in the analysis. These data were processed by the ADEM into a "model-ready" format using the latest version of AERMET (version 15181).

The AERMET meteorological processor requires estimates of the following surface characteristics: surface roughness length, albedo, and Bowen ratio. The surface roughness length is related to the height of obstacles to the wind flow. It is the height above the surface where the average wind speed is zero. The smoother the surface, the lower the roughness length. The surface roughness length influences the surface shear stress and is an important factor in calculating mechanical turbulence and stability. The albedo is the fraction of the total incident solar radiation reflected by the surface back to space without absorption. The Bowen ratio is an indicator of surface moisture and is the ratio of the sensible heat flux to the latent heat flux. The albedo and Bowen ratio are used for determining the planetary boundary layer parameters for convective conditions due to the surface sensible heat flux. Estimates of the surface characteristics were made using EPA's AERSURFACE program (Version 13016). A 1km search radius was employed at the location of the meteorological tower. Twelve sectors of 30 degrees each and seasonal resolution were used in the AERSURFACE analysis. The profile base elevation was set equal to the Pryor Field station elevation of 180.4m.

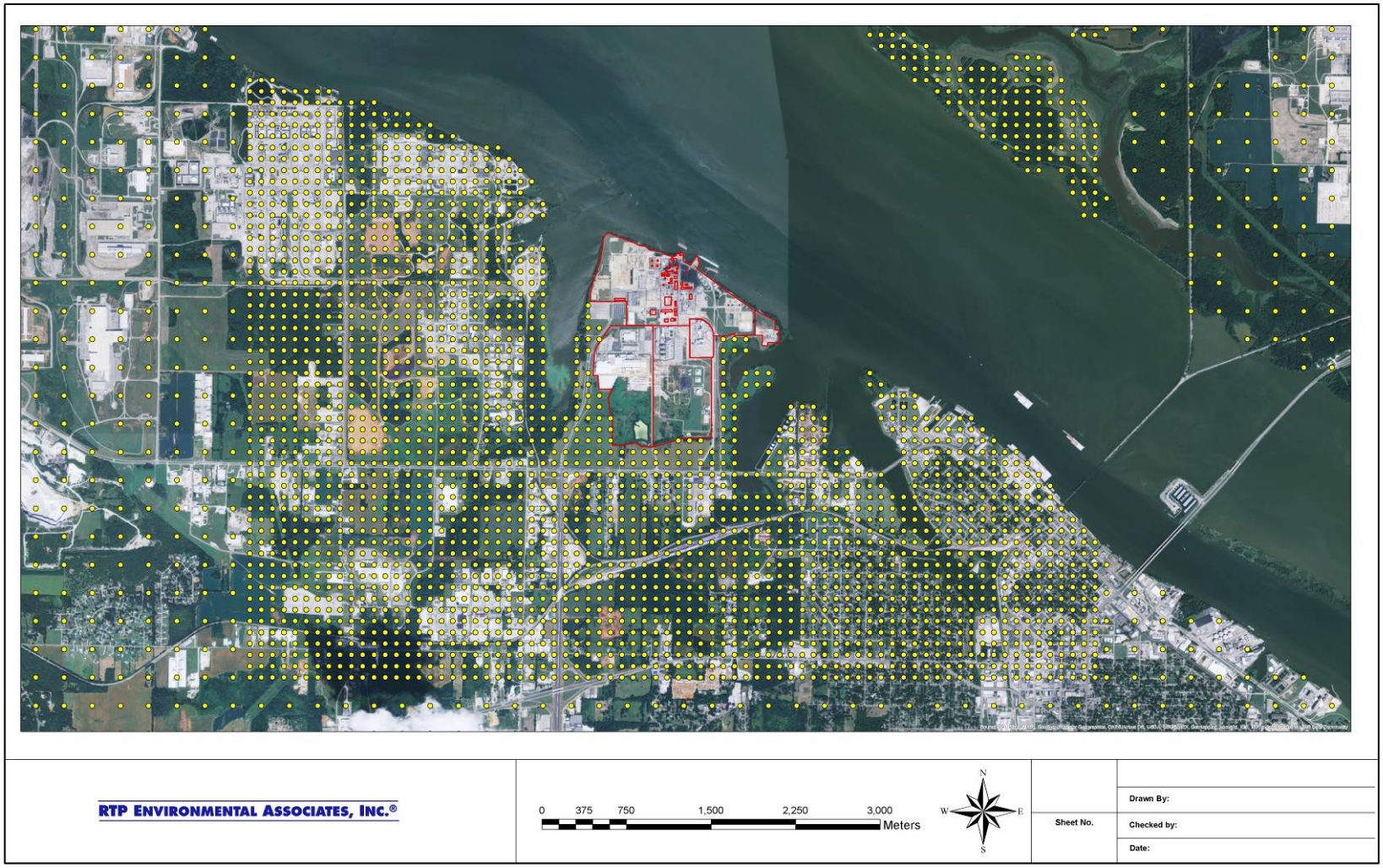

Figure 6. Ascend Near-field Receptor Grid

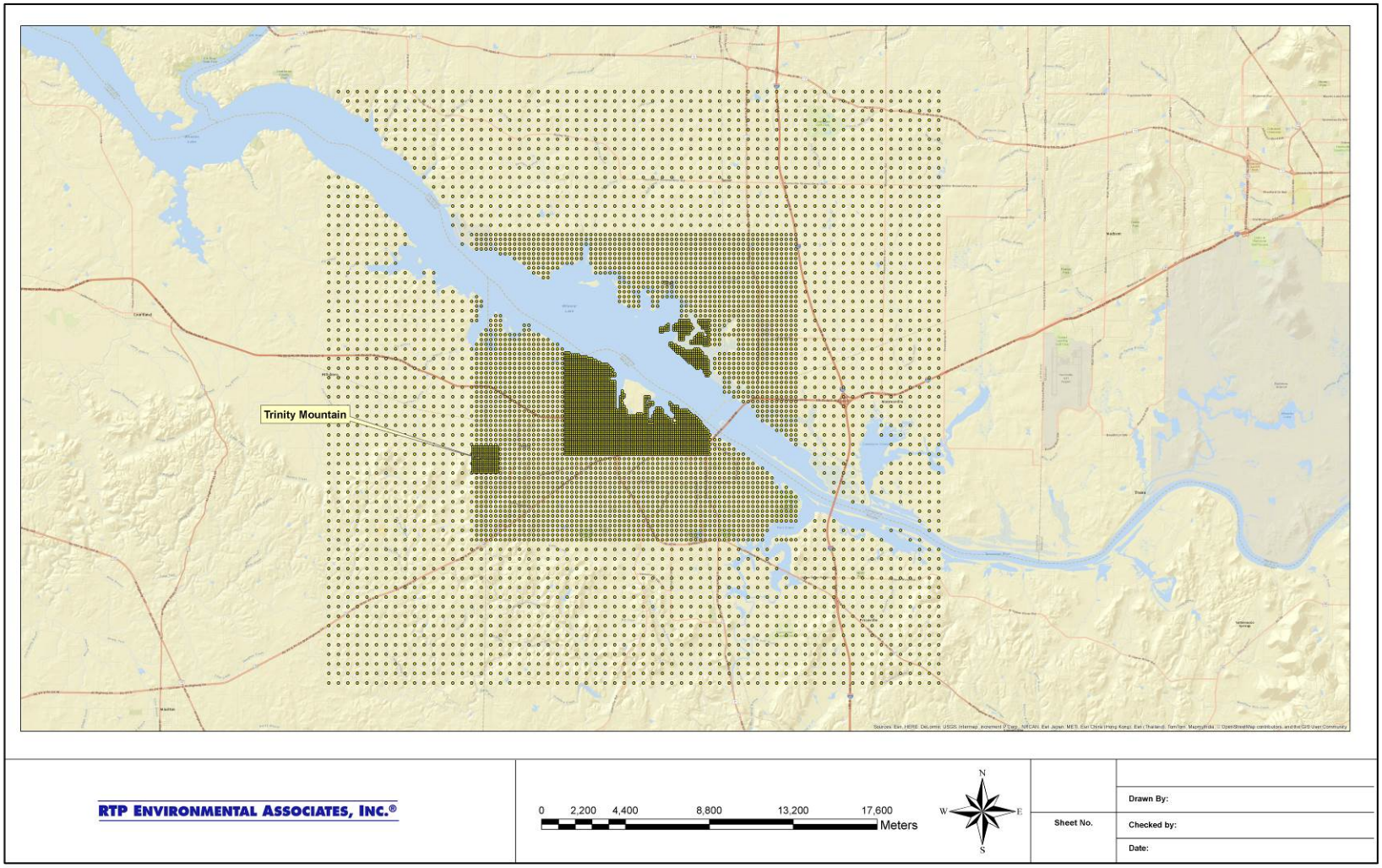

Figure 7. Ascend Complete Receptor Grid

The use of NWS meteorological data for dispersion modeling can often lead to a high incidence of calms and variable wind conditions if the data are collected by Automated Surface Observing Stations (ASOS), as are in use at most NWS stations since the mid-1990's. A calm wind is defined as a wind speed less than 3 knots and is assigned a value of 0 knots. In addition, variable wind observations may include wind speeds up to 6 knots, but the wind direction is reported as missing, if the wind direction varies more than 60 degrees during the 2-minute averaging period for the observation. The AERMOD model currently cannot simulate dispersion under calm or missing wind conditions. To reduce the number of calms and missing winds in the surface data, archived 1-minute winds for the ASOS stations were used to calculate hourly average wind speed and directions, which were used to supplement the standard archive of hourly observed winds processed in AERMET. The EPA AERMINUTE program (Version 15272) was used for these calculations. A wind rose of the 5-year meteorological dataset is provided in Figure 8.

The TAD states that the selection of the meteorological data should be considered carefully. The data should be based on spatial and climatological representativeness. The representativeness of the data is 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 the data are collected. Pryor Field is located approximately 7km northeast of the Ascend facility (Figure 9). The meteorological data collected at this site are representative of the Ascend study area based upon the proximity of the site and the lack of significant terrain. The data are also current.

3.8 Output Options

The output options were specified to generate graph files of concentrations for each pollutant and averaging period. Modeled concentrations were not rounded or truncated when compared to the NAAQS.

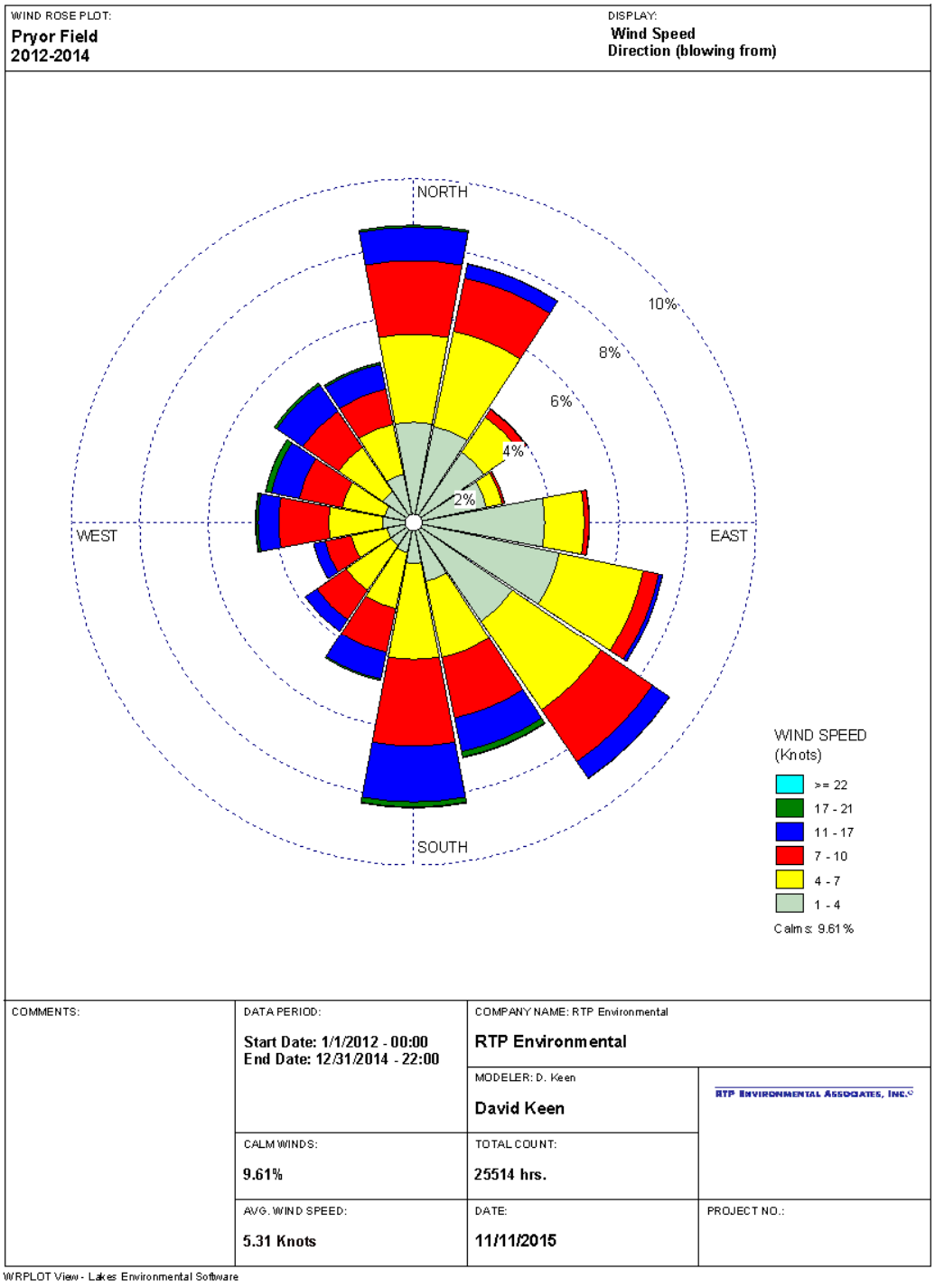

Figure 8. Pryor Field 2012-2014 Windrose

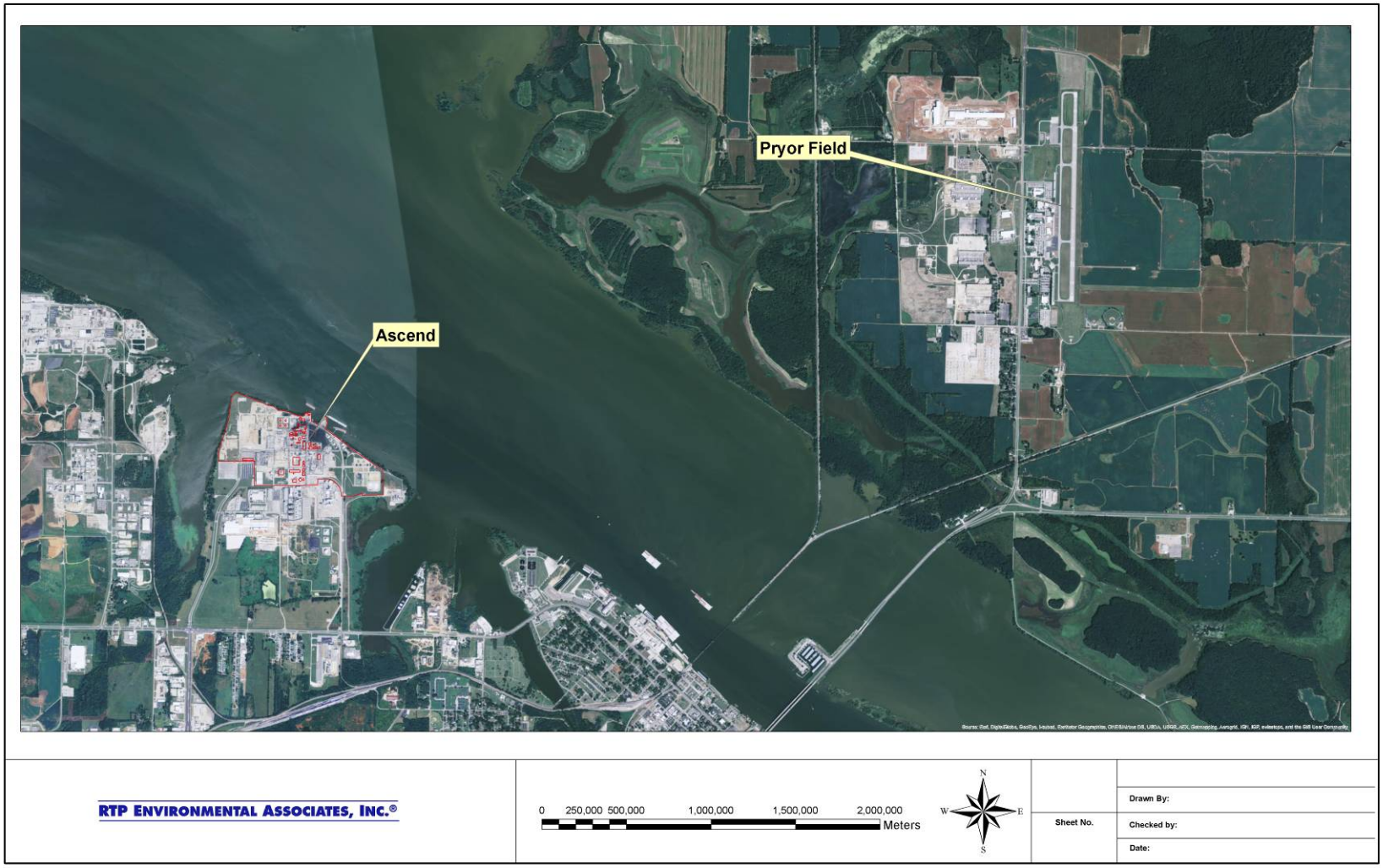

Figure 9. Location of Pryor Field Relative to the Ascend Facility

4.0 RESULTS

The three year average of the 99th percentile maximum daily 1-hr SO_2 modeled values was added to the background monitor values and compared to the NAAQS. The combined impact of the Ascend and Nucor Steel facilities was used to calculate the design value. The results of the analysis are shown in Table 3. As shown, the facility is compliant with the 1-hr SO2 NAAQS both with and without Boiler No. 7. The source group with Boiler 7 included is the "ALL" group in Table 3. The source group without Boiler No. 7 include is "NOBOIL7. The location of the maximum 1-hr SO_2 impact is shown in Figure 10.

The modeling inputs and results, as well as the hourly SO2 emission calculation spreadsheet and Centreville background value calculation spreadsheet are provided on the attached disk.

Table 3. 1-hr SO_2 Model Results

Pollutant	Average	Source Group	Modeled Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% NAAQS
SO_2	4th Highest Max Daily 1-hr	ALL	179	196	91
		NOBOIL7	148	196	76

Figure 10. Location of Maximum Modeled 1-hr SO_2 Impact (Both Source Groups)

APPENDIX A

ADEM Responses to EPA Comments on Modeling Protocol

EPA Technical Review Comments

Ascend Performance Materials Chemical Manufacturing Facility SO_2 DRR Modeling Protocol

1. Section 3.3 Source Data (page 3-2) states that one of the boilers (Boiler No. 7) will be converted to a sulfur free fuel and will accept a federally enforceable permit condition to restrict SO_2 emissions by January 2017 and won't be evaluated in the compliance analysis. Since Ascend is planning to use 3 years of actual emissions from the 2012-2014 timeframe to perform the modeling, it is not appropriate to exclude the emissions from Boiler 7 from the modeling. The modeling should use actual emissions from Boiler 7 that occurred during the 2012-2014 timeframe. If Ascend wishes to exclude the Boiler 7 emissions because they will be eliminated in the future (i.e., using the future allowable emissions for Boiler 7), potential or allowable emissions from the other four sources at the facility (Boilers 5&6, Cokers, and the 2 Hydrogen Reformers) will need to be used in the modeling. It is not appropriate to mix past actual emissions for some emissions units with future allowable emissions for other units.

   ADEM Response:

   40 CFR 51.1203(d)(2) states "Modeling analyses shall characterize air quality based on either actual SO_2 emissions from the most recent 3 years, or on any federally enforceable allowable emission limit or limits established by the air agency or the EPA and that are effective and require compliance by January 13, 2017." Ascend has taken a federally enforceable limit of burning only natural gas, liquid, and heavy liquid fuels which is effective January 31, 2017. However, the facility completed the modification of Boiler No. 7 from a coal fired boiler to a natural gas, liquid, and heavy liquid fired boiler on March 13, 2016. Therefore, including the most recent 3 years of actual emissions from Boiler No. 7 in the modeling analysis would not accurately represent the air quality for January 2017 and thereafter.

2. Section 3.3 Source Data (page 3-5) states that continuous emissions monitoring (CEMS) data are not available for either the boilers or cokers and outlines how the SO_2 emissions will be calculated. If Ascend performs the modeling with 2012-2014 actual emissions, please include documentation in the final modeling submission on how these emissions were calculated.

   Facility Response:

   Ascend will include the calculations with the final submission.

3. Section 3.4 Monitored Background Concentrations (page 3-7) states that the 2012-2014 hourly SO_2 values from the Centreville monitor operated by Southern Company will be used for the temporally varying background concentration. This is not a regulatory monitor and therefore should not be used to develop background concentrations for this modeling demonstration. Please select an alternative monitor that meets Part 58 requirements and has complete data to use as a background site for this modeling demonstration. Section 8 of EPA Modeling TAD provides guidance on selecting appropriate background concentrations. There are no specific procedures that are applicable to every situation, so the guidance provides a number of options depending on the available data. As

indicated in the comment below, EPA modeling staff are available to further discuss proposed background concentrations and how they may impact the selection of which other "nearby sources" to model. The TAD indicates that these issues call for professional judgment and recommends consultation with an EPA Regional Modeling Contact prior to the modeling being performed.

ADEM Response:

The 1-hour SO2 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 SO2 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 SO2 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 SO2 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 Decatur area. Alternative sites considered as possible background sites were the Nashville and Memphis, TN sites, as well as the Jackson, MS and Birmingham, AL sites. These monitors are likely impacted by urban influences and would not be representative of the rural background conditions in Decatur, Alabama.

Additionally, due to the Centreville site's location relative to Decatur, the synoptic-scale weather conditions in the Centreville area would be very similar to the Decatur area. Most major weather systems that would impact the Decatur 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.

4. Section 3.5 Off-Site Sources (page 3-8) indicates that emissions from the Nucor Steel facility will be modeled. There is no discussion of other SO2 background sources in the area. Another major SO2 emissions source is located approximately 28 km north-northwest of Ascend. The source is International Paper Company in Courtland, AL, which had 1200 tpy of SO2 emissions reported in the 2011 National Emissions Inventory. It appears that this IP Courtland facility operated and had significant emissions in 2012 and 2013, but had zero emissions reported in 2014. If Ascend chooses to model 3 years of actual emissions from 2012-2014, IP Courtland should be evaluated for inclusion in the modeling and a justification should be provided if it is not included in the modeling.

Contemporaneous emissions from any nearby sources that may have had a significant impact near the Ascend facility during the 2012-2014 would need to be included in the modeling.

Also, please include a discussion of any other "nearby sources" with significant SO2 emissions and indicate why these sources were not included in the modeling. If multiple large sources are located far from Ascend but are clustered together in the same upwind direction, their emissions should be combined when being considered, as they could act as one large source of emissions if the plumes merge. Also, justifications should be provided for any sources with significant emissions levels that are being excluded from the modeling. The identification of specific sources to model should be done in conjunction with the determination of an appropriate representative background concentration (discussed in previous comment) as the selection of appropriate background concentrations may be adequate to account of potential impacts of some these "nearby sources." EPA modeling staff are available to further discuss these issues if desired.

ADEM Response:

ADEM does not agree with the inclusion of the IP Courtland facility in the modeling analysis.

ADEM evaluated sources within a 20 km area surrounding the eight facilities who elected to following the modeling pathway for compliance under the SO2 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 facility(ies) 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 20km

- First, ALL sources within 20km of each facility were pulled,
- Next, a Q/D value was developed for each facility on the list, where Q represents the 2014 actual SO2 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.

It is important to note that EPA did not prescribe criteria on selecting competing sources and in absence of prescribed guidance, states used their discretion in developing criteria they feel is appropriate to the form of the standard combined with acceptable and approved methods used in NAAQS evaluations in the past to develop criteria for competing source inventories.

5. In Section 3.6 Receptor Data (pages 3-8 and 3-9), RTP Environmental Associates proposes to exclude receptors on nearby roads, parking lots, buildings, as well as the adjacent industrial sites south of the Ascend facility. EPA has provided additional clarification regarding areas for receptor placement in the August 2016 version of the SO2 Modeling TAD guidance. Based on the revised language in Section 4.2 of the Modeling TAD, receptors should be included for the area near roads, parking lots, and buildings and on the other nearby industrial sites. A specific justification would need to be provided in the modeling report for any receptors that are excluded from areas that would be considered ambient air. Additionally, the final modeling report should clearly demonstrate that the general public does not have access to all areas within the facility's ambient air boundary (i.e., fence-line), referred to as the secure boundary in the modeling protocol, that have been excluded from the modeling (i.e., that a fence or some other security measures are in place to preclude access from the public).

Facility Response:

EPA requested specific justification for why receptors would be excluded from those areas normally considered as "ambient air" under SIP, NSR, or PSD modeling. In our July 2017 modeling protocol, we had proposed to exclude receptors over roads, parking lots, buildings and the adjacent industrial sites south of the Ascend facility. This followed the guidance from the February 2016 TAD document which stated that receptors should only be placed in areas where it would be feasible to place a monitor. The February TAD specifically listed water bodies and facility property as examples. Since submittal of our protocol, EPA issued a revised TAD (August 2016). While this version somewhat limits the list of areas to be excluded, it still states that the receptor placement can differ from SIP, NSR, and PSD modeling since the modeling is acting as a surrogate for monitoring. It also still states that locations where it is not feasible to place a monitor can be excluded.

The Ascend complex as well as several adjacent industrial sites are on a peninsula in Wheeler Lake. The majority of the peninsula is fenced and public access effectively precluded. The first figure below shows the land owned by Ascend and enclosed with a fence. As show, Ascend leases an area within its confines to LS Power. The second figure below shows the other areas on the peninsula that are fenced by other industry. As can be seen, the neighboring industrial operations are confined with fencing which restricts access for both Ascend personnel as well as the general public. It would not be feasible to locate a SO2 monitor on an industrial site for which Ascend cannot access nor restrict access. Ascend could also not monitor the safety and subsequently be responsible for the personnel accessing the monitor. In addition, there will be safety concerns regarding the operation of a monitor within the confines of an industrial site. For example, the electrical components within the monitoring system could provide an ignition source that will have to be mitigated by using explosion proof design/operation. Additionally, the adjacent facility will have to provide electrical service and proper operation and maintenance of the electrical system. As a result, it is highly unlikely that the adjacent facility would commit to providing ongoing access to their facility for liability reasons and practical reasons related to providing electrical service. Furthermore, the area over the adjacent industrial sites would also only be considered as "ambient air" to the employees of the adjacent site. Access to these sites is tightly controlled and within a

secure zone. As noted earlier, the general public does not have access to any of the industrial sites adjacent to the Ascend facility.

The last figure shows the receptor grid we propose for the analysis. Please note that this grid has been modified from what we submitted in July. To be consistent with the more recent version of the TAD, we have now included receptors over the roadways and the parking areas.


Land leased to Linde by Ascend
Toray (separate owner)
Styrolution (separate owner)

APPENDIX B

Land Use Analysis Results

2006 NLCD Desc	NLCD Cat	Count #	Total Area (km2) (30mx30m/cell)	Frac Total			
Open Water	11	14704	13.23	0.47			
Perennial Ice/Snow	12	0	0.00	0.00			
Developed, Open Space	21	4273	3.85	0.14			
Developed, Low Intensity	22	2228	2.01	0.07			
Developed, Med Intensity	23	3352	3.02	0.11			
Developed, High Intensity	24	1725	1.55	0.05	**0.161678**	total urban fraction	
Barren Land	31	9	0.01	0.00			
Deciduous Forest	41	474	0.43	0.02			
Evergreen Forest	42	701	0.63	0.02			
Mixed Forest	43	158	0.14	0.01			
Dwarf Scrub	51	0	0.00	0.00			
Shrub/Scrub	52	291	0.26	0.01			
Grassland/Herbaceous	71	370	0.33	0.01			
Lichens	73	0	0.00	0.00			
Moss	74	0	0.00	0.00			
Pasture/Hay	81	1569	1.41	0.05			
Cultivated Crops	82	972	0.87	0.03			
Woody Wetlands	90	574	0.52	0.02			
Emergent Herb Wetlands	95	2	0.00	0.00			
No Data	-9999	0	0.00	0.00			
			28.26				
total area of 3km radius circle (km2)			28.26				

REFERENCES

1. Guidelines on Air Quality Models, (Revised). Appendix W of 40 CFR Part 51, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. November 9, 2005.

2. PSD Air Quality Analysis AERMOD Modeling Guidelines, , Alabama Department of Environmental Management, Air Division, May 2008.

3. SO_2 NAAQS Designations Modeling Technical Assistance Document (Draft), US EPA Office of Air and Radiation, August 2016.

4. Air Dispersion Modeling Protocol for Evaluating Compliance with the 1-hr SO_2 National Ambient Air Quality Standard at the Ascend Performance Materials Facility in Decatur, Alabama, RTP Environmental Associates, July 2016.

5. EPA Technical Review Comments, Ascend Performance Materials Chemical Manufacturing Facility SO_2 DRR Modeling Protocol, August 22, 2016 email from Eric Reidy, ADEM, to Bob Burke, Ascend.

6. Revision to the Guideline on Air Quality Models, Federal Register, Vol. 80, No. 145, July 29, 2015.

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

8. Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations (Revised). EPA-450/4-80-023R, U.S. Environmental Protection Agency, June 1985.