

AFFIDAVIT OF STEVEN KLAFKA

I, Steven Klafka, state:

1. I have personal knowledge of the statements made herein.
2. I am a licensed professional engineer (PE) and board certified environmental engineer (BCEE).
3. I am a consultant in the field of environmental engineering and air pollution control and compliance, and have approximately 45 years of experience in interpreting and implementing the 1970 Clean Air Act and subsequent amendments, including expertise in federal/major New Source Review (NSR), Prevention of Significant Deterioration (PSD) and air dispersion modeling (AERMOD, ISCST3, and CALPUFF). I began as an environmental engineer for the Wisconsin Department of Natural Resources, responsible for reviewing air permit applications, and then have spent more than 35 years as a consultant specializing in air permitting work. I founded and have been President of my own consulting firm, Wingra Engineering, since 1991.
4. Attachment A hereto is a true and accurate copy of my curriculum vitae.
5. I have been asked by attorneys at Earthjustice, on behalf of their clients, to provide a report expressing my expert opinions concerning the records that the Louisiana Department of Environmental Quality (LDEQ) provided to Earthjustice in response to a February 13 and 14, 2025, Public Records Act request relating to an EPA Region 6 February 1, 2023, correspondence to LDEQ and the extent to which those records met or did not meet the demands EPA Region 6 set forth in that February 1, 2023 letter (the Report). Attachment B to this affidavit is a true and correct copy of my Report and reflects my informed and expert opinion on the matter.

I hereby certify under penalties of perjury that the foregoing representations are true to the best of my knowledge.

Steven Klafka Date 2-23-26
Steven Klafka

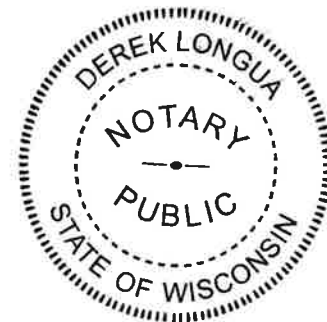
State of WISCONSIN

County of DANE

Sworn to and subscribed before me on 02/23/26
Date

by DEREK LONGUA
Notary Public (print)

[Signature]
Signature of Notary Public



My commission expires 08/14/29

CURRICULUM VITAE OF STEVEN KLAFKA, P.E., BCEE

Experience With Current Firm

President/Environmental Engineering Consultant Wingra Engineering, Madison, Wisconsin (1991 to Present)

- Conducts environmental engineering projects related to air pollution control, hazardous waste management, compliance with regulations, and environmental impact studies. Formed Wingra Engineering in 1991.
- Provides environmental and regulatory consulting services for a diverse range of clients including manufacturing plants, electrical utilities, environmental advocacy groups, law firms and individuals.
- Worked for a wide range of industrial operations including foundries, glass manufacture, painting, coating, mineral quarries, lime manufacturing, coal handling, chemical manufacture, and electrical utilities.
- Completed projects in numerous states including Wisconsin, Minnesota, Iowa, Illinois, Ohio, Virginia, North Carolina, Tennessee, Oklahoma, Texas, Colorado, California, Oregon, and Washington.
- Services provided to clients include preparation of permit applications; dispersion modeling; risk assessment; environmental impact analysis; regulatory training; expert witness services; compliance inspections and audits; reporting and recordkeeping development; testing programs; air pollution control system design and selection; and air quality monitoring systems.
- Significant projects include preparation of permit applications for major air pollution sources located near Class I national parks and wilderness areas; evaluation of cumulative air toxic risk from manufacturing plants; dispersion modeling analysis for over 200 coal-fired generating stations to determine compliance with air quality standards; and, expert witness services for litigation regarding air pollution control, dispersion modeling and emission control methods.

Past Experience

Associate/Senior Environmental Engineer Dames & Moore Consultants, Madison, Wisconsin (1988-1991)

- Conducted environmental audits and analyses to verify compliance with local air pollution control regulations at manufacturing facilities throughout the U.S., as well as Canada, India, Singapore and Taiwan.
- Managed and developed multi-disciplinary environmental impact studies for a wide variety of projects including utility turbine generating stations, a biomedical waste disposal facility, and a flat glass manufacturing facility.

Environmental Engineer, Wisconsin Department of Natural Resources Bureau of Air Management, Madison, Wisconsin (1981-1988)

- Evaluated air pollution control permit applications for diverse range of air pollution sources. Duties included estimation of air pollution emissions, verification of compliance with applicable regulations and policies, and use of computer dispersion models to predict air quality impacts and determine health risks.
- Developed the air pollution control permit application forms used by the agency.
- Assisted in the development of the Wisconsin state policy for the control of hazardous air pollutant emissions.

Academic B.S., Mechanical Engineering, University of Wisconsin, Madison, Wisconsin (1980).

Background M.S., Civil & Environmental Engineering, University of Wisconsin (1994).

Professional Affiliations Air and Waste Management Association, Past Chair for Wisconsin Chapter
American Academy of Environmental Engineers

CURRICULUM VITAE OF STEVEN KLAFKA, P.E., BCEE

Registration Registered Professional Engineer
Wisconsin (#E-24305), Illinois (#062-045104) and North Carolina (PE #023787)

Professional Honors Certified by the American Academy of Environmental Engineers
Designated Board Certified Environmental Engineer (BCEE) in 2002.

Publications

"Recent Air Pollution Control and Permit Experience in the Lime Industry", Annual Meeting of the Air & Waste Management Association, Pittsburgh, Pennsylvania, 2007.

"Evaluation of Cumulative Risk from an Iron Foundry", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"The Challenge of Air Quality Permit Approval for a Glass Plant near Mount Rainier and Olympic National Parks", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"New Source MACT and Residual Risk at an Iron Foundry", Presented at the Annual Meeting of the Air & Waste Management Association, San Diego, California, 2003.

"Influence of Emission Estimates on a BACT Determination for Iron Foundry Core Making Operations", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Challenging a Title V Operation Permit with the Part 70(8) Petition Process: An Aluminum Foundry Case Study", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluating Local Impacts of a Utility SCR Retrofit Project", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Using a Flexible Compliance Strategy to Issue a Title V Operation Permit", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Electric Utilities Environmental Conference, Tucson, Arizona, January 2002.

"Recent New Source MACT Determinations and Air Quality Compliance Experience in the Iron Foundry Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Complexities of Air Quality Permit Issuance for an Iron Foundry near Great Smoky Mountains National Park", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Air Quality Permit Issuance and Varying Interpretations of BACT in the Flat Glass Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Benzene Emissions and Exposure - Targeting Sources for the Greatest Benefit", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Measurement of Organic Air Toxics at Iron Foundries", Annual Meeting of the Air & Waste Management Association, San Antonio, Texas, 1995.

"Air Toxics Emission from Two Wood and RDF-Fired Fluidized Bed Combustors", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Recent Air Quality Compliance Experience at Wisconsin Gray and Ductile Iron Foundries", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Composition of VOC Emissions from the Sycamore Landfill", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Sulfur Dioxide Control in a Rotary Lime Kiln", Annual Meeting of the Air & Waste Management Association, Denver, Colorado, 1993.

"Air Toxics Control Alternatives for Iron Foundry Pouring, Cooling and Shakeout Operations", Annual Meeting of the Air & Waste Management Association, Kansas City, Missouri, 1992.

Critique of NAAQS Exceedance Evaluations
Submitted to Louisiana Department of Environmental Quality
February 16, 2026

Conducted by:
Steven Klafka, P.E., BCEE
Wingra Engineering
Madison, Wisconsin

ATTACHMENT B

1. Introduction

1.1 Background

Wingra Engineering was hired by Earthjustice to assess the air modeling impact analyses submitted to the Louisiana Department of Environmental Quality (LDEQ) by nine facilities which had been issued air quality permits under the Prevention of Significant Deterioration (PSD) regulations during a time period from 2014 to 2024. To obtain their PSD permits, the facilities had conducted dispersion modeling analyses to verify compliance with air quality standards. These analyses had predicted exceedances of the national ambient air quality standards (NAAQS).

Despite the predicted exceedances, which are grounds for not issuing a permit, the PSD permits were issued because the facilities stated that the emissions from their projects under review at the time would be less than the applicable Significant Impact Level (SIL) for the respective air pollutant and averaging period. Since the SIL was not exceeded by estimated project emissions, LDEQ allowed each facility to receive an air permit for their project and the exceedances did not receive any further evaluation.

In a letter to Earthjustice concerning “the use of SILs in Louisiana air permitting,” dated April 15, 2024, USEPA Region 6 stated that it had “been clear that further state evaluation and review is needed to address any predicted NAAQS violation” and provided its 2023 correspondence with LDEQ stating the same.¹

USEPA’s February correspondence to LDEQ explained that there were:

“claims of disparate impacts in communities having environmental justice considerations not being adequately addressed”

and that

“LDEQ has had PSD permitting actions in the Mississippi River industrial corridor (ex St. James Parish, Iberville Parish) and in the Calcasieu Parish area where the air quality analysis identifies potential modeled violations of the applicable NAAQS.”²

USEPA required LDEQ to take specific steps to ensure that the state agency is properly administering its PSD permit program and ensure the protection of the NAAQS:

¹ Letter from E. Nance – USEPA Region 6 to E. Livingston de Calderon – Earthjustice, dated April 15, 2024, with attached correspondence dated February 1, 2023, and August 15, 2023 (available at <https://earthjustice.org/document/epa-region-6-letter-regarding-significant-impact-levels-sils-petition>).

² *See id.*

“Going forward and consistent with longstanding EPA policy and guidance, ... when the LDEQ has a PSD permitting action where the air quality analysis identifies potential modeled violations of the applicable NAAQS via air modeling, we are asking LDEQ to take the following steps to protect the NAAQS in a given area:

- 1. Demonstrate for each submitted model with NAAQS violations, that there is not an actual violation. If this demonstration is based on the prior modeling including overly conservative emission estimates for a source, the LDEQ should either reduce the applicable emissions limits for that source to be representative of the modeled parameters or explain why that is not necessary.*
- 2. Develop a plan to alleviate modeled violations. This plan may include identifying the source(s) that significantly contribute to the modeled violations in the submitted permit modeling and revising emissions limits for such sources.*
- 3. We encourage the LDEQ to consider whether additional ambient monitoring in the areas with modeled NAAQS exceedances would ensure that actual emissions and background concentrations are available to better inform future dispersion modeling.”³*

Earthjustice requested public records from LDEQ related to EPA Region 6’s February 1, 2023, correspondence with LDEQ, as well as those showing the steps LDEQ has taken towards meeting the Region 6 requests. In response, on April 22, 2025, LDEQ provided the public records analyzed for this report. LDEQ confirmed there were no additional responsive records on November 6, 2025. Those records show LDEQ contacted nine facilities and asked them to revisit their modeling analyses to determine the off-site sources responsible or culpable for the predicted exceedances. These facilities were as follows:

1. Benteler Steel – Caddo Parish, Louisiana
2. FG LA, LLC – St. James Parish, Louisiana
3. Marathon Petroleum Company LP – St. John the Baptist Parish, Louisiana
4. Nucor Steel - St. James Parish, Louisiana
5. Plaquemines LNG – Plaquemines Parish, Louisiana
6. Sabine Pass LNG – Cameron Parish, Louisiana
7. Shintech, Inc. – Iberville Parish, Louisiana
8. Washington Parish Energy Center – Washington Parish, Louisiana
9. Venture Global Calcasieu Pass – Cameron Parish, Louisiana

³ See *id.*

This is an example of the request LDEQ made to each facility:⁴

“LDEQ is requesting that you provide information to assist us in evaluating cases in which Air Quality Impacts Analysis (AQIA) modeling for PSD permitting actions predict exceedances of the NAAQS. In such cases, under EPA guidance and Environmental Appeals Board (EAB) interpretation, it is incumbent upon the permitting authority to take appropriate actions to assure the modeled exceedances are not indicative of any existing or anticipated future actual NAAQS exceedance, and to take action to eliminate or prevent any such exceedance if necessary. It is important to note, as EPA and the EAB have affirmed, that this LDEQ assessment is independent of the permit action. This request for information is not a reconsideration of our prior PSD permitting decision and does not constitute a notice to reopen your Title V operating permit.

In order to conduct a more detailed, case-specific review to assure the modeled exceedance(s) are not indicative of actual current or future NAAQS exceedances, LDEQ is requesting the following information

- 1) A figure mapping the location of each modeled exceedance, labeling UTM coordinates and the receptor number corresponding to the AERMOD file.*
- 2) A table listing each modeled exceedance, including receptor, location, time of exceedance, and modeled concentration.*
- 3) For each exceedance, a culpability analysis listing the primary contributors to the modeled exceedance, including:
 - a. Facility Al number*
 - b. EQT and source description*
 - c. Source identifier corresponding to the AERMOD file*
 - d. Modeled source type (e.g., point, area, volume)*
 - e. Stack and dispersion parameters used in the model*
 - f. Modeled concentration.”**

Wingra Engineering reviewed the correspondence and supporting modeling files submitted by the nine facilities to LDEQ and provided to Earthjustice in response to a Public Records Act request. As is customary for this type of review, a representative sample of the submitted modeling files was opened in AERMOD to assess the input assumptions including facility sources, off-site sources, and extent of the receptor grid. Generally, these assumptions would be the same across modeling files for each facility. The specific files reviewed for each facility are identified below. The review included verifying whether the information was complete and accurately identified the sources and facilities culpable for the predicted exceedances of the NAAQS in the region surrounding the facilities.

⁴ *Supra* note 1, Letter from L. Fifita – Providence Engineering and Environmental Group to B. Higgins – Louisiana Department of Environmental Quality, Model Culpability Data Request, Entergy Services, LLC, Washington Parish Energy Center, Bogalusa, Washington Parish, Louisiana, Agency Interest No. 83619, August 21, 2023.

1.2 Qualifications

This assessment of the modeling analyses submitted to LDEQ was conducted by Steven Klafka, P.E., BCEE and Wingra Engineering. Mr. Klafka has over 40 years of experience as an environmental engineer conducting analyses for air quality permits and dispersion modeling. He has reviewed and prepared modeling analyses throughout the U.S. as a state regulator, consultant for regulated industries obtaining air quality permits, and as a consultant for law firms and environmental advocacy groups such as Sierra Club, Earthjustice, and Southern Environmental Law Center.

During the past ten years, Mr. Klafka has prepared approximately 74 air quality permit applications including 15 applications for permits under the Prevention of Significant Deterioration regulations, and approximately 59 dispersion modeling analyses evaluating compliance with the NAAQS for PM_{2.5}, SO₂ and NO₂. Within that time, during the past five years, he has conducted modeling analyses in the states of Louisiana, Wisconsin, Alabama, Pennsylvania, Texas, and Virginia. The majority of these recent analyses assessed the accuracy of the modeling conducted by PSD permit applicants to determine compliance with the NAAQS.

The enclosed assessment of modeling analyses is based on Mr. Klafka's experience and familiarity with current USEPA and state dispersion modeling regulations and guidance. This background includes the USEPA *Guideline on Air Quality Models* (Appendix W to 40 CFR Part 51, "Guideline")⁵, currently approved version of the AERMOD modeling system, and current policy documents such as the 2018 and 2024 federal guidance, *Significant Impact Levels for Ozone and Fine Particles*.⁶ He is familiar with the state-specific modeling guidelines for each state in which he has conducted dispersion modeling analyses including the 2024 LDEQ reference, *Louisiana Guidance for Air Permitting Actions*.⁷

Recent modeling analyses that Mr. Klafka has conducted in Louisiana and submitted to LDEQ as public comments on pending air quality permits include:

- 2025 - Venture Global CP2 LNG - Cameron Parish, Louisiana - Evaluation of Compliance with the NAAQS;
- 2024 - FG LA LLC and St. James Parish Louisiana - Evaluation of Compliance with the NAAQS for PM_{2.5};
- 2024 - Atlantic Alumina Operation Permit Renewal - Evaluation of Compliance with Air

⁵ <https://www.epa.gov/scram/2024-appendix-w-final-rule>

⁶ <https://www.epa.gov/nsr/significant-impact-levels-ozone-and-fine-particles>

⁷ https://www.deq.louisiana.gov/assets/docs/Air/Air_Permit_Applications/r06_LouisianaGuidanceforAirPermittingActions.pdf

Quality Standards;

- 2023 - Plaquemines Parish, Louisiana - Evaluation of Compliance with the 1-hour Average NAAQS for NO₂;
- 2023 - Cameron and Calcasieu Parishes, Louisiana - Evaluation of Compliance with the 1-hour Average NAAQS for NO₂;
- 2022 - Plaquemines LNG - Plaquemines Parish, Louisiana - Evaluation of Compliance with the 1-hour Average NAAQS for NO₂;
- 2022 - Commonwealth LNG - Cameron Parish, Louisiana - Evaluation of Compliance with the 1-hour Average NAAQS for NO₂.

Each of the above modeling analyses improved the completeness and/or accuracy of the original analysis submitted with each PSD permit application, respectively. These improvements included an expansion of the receptor grid and inventory of off-site sources, expanding from less than a 50 km modeling domain out to the full 50 km at which AERMOD provides accurate predictions. The expanded modeling predicted exceedances of the NAAQS throughout the larger modeling domain. Many of these NAAQS exceedances had not been identified in the original modeling analysis submitted with the PSD permit application.

2.0 Conclusions

The following sections of this report provide a review of the modeling analyses submitted by each facility in response to LDEQ's request. Based on this review, the following general conclusions were reached:

1. Some facilities conducted no new modeling analyses to evaluate predicted exceedances of the NAAQS. Instead, they simply submitted the analyses prepared for their original PSD permit applications. These facilities include Benteler Steel and FG LA, LLC.
2. No facility submitted a report explaining their overall modeling procedures. A modeling report is typically provided to explain the steps and assumptions. Some facilities did provide a short summary of the updated analyses they had conducted.
3. It is important to note a key difference between the modeling analyses conducted for issuance of PSD air permits (applicants' task in permitting), and those for examining NAAQS violations in an area more generally (LDEQ's task here). Each of the facilities here, in their responses to LDEQ, generally followed only the protocols for PSD permitting. PSD permit air quality analyses are focused on verifying compliance with the NAAQS only at receptors where their project's emissions exceeded the SIL. Thus, while an analysis might begin with thousands of receptors spread over the surrounding region, a relatively small number of select receptors or locations received further evaluation. For the updated analyses submitted

to LDEQ, every facility continued to evaluate NAAQS exceedances only at these few select receptors. This approach failed to identify all of the potential NAAQS exceedances in the region surrounding the project.

4. No facility took steps to expand the receptor grid around off-site sources in the modeling domain to identify potential NAAQS exceedances that had been ignored for the PSD air permits. Firstly, to identify and resolve predicted NAAQS exceedances in the modeling domain surrounding the approved project, the analyses for the nine projects must be repeated using receptors extended to 50 km from the center of the project, the maximum distance at which AERMOD provides acceptable modeling results. Secondly, just like closely spaced receptors were used near the proposed facility, closely spaced receptors are needed around off-site sources and maximum concentrations to identify the highest concentrations for comparison with the NAAQS. Expanding the original receptor grid to 50 km and using closely spaced receptors around off-site sources and maximum concentrations are easily implemented modeling tools available to the PSD permit applicant and the reviewing regulatory agency.
5. Most facilities included off-site sources close to their location, based on the radius of impact where project emissions exceed the SIL. To assure compliance with the NAAQS in the region surrounding the projects, the analyses for the nine projects must be repeated using off-site sources obtained for the entire 50 km modeling domain at which AERMOD provides acceptable results. This is in keeping with the latest version of the LDEQ modeling guidelines from 2006, which states in Section 2.1.2 (at page 2-4) that an *“applicant orders an off-property inventory from LDEQ based upon the AOI plus 50-kilometers (please note the maximum distance for an off-property inventory is 100-kilometers due to accuracy constraints of the dispersion models).”*⁸
6. Where exceedances are predicted to occur in areas where the receptor grid is widely spaced, an updated analysis that uses refined, more closely-spaced receptors is required to assure the highest concentration has been predicted. The latest version of the LDEQ modeling guidelines from 2006 states under Section 5.6: *“If the maximum concentrations are located in areas where the receptor spacing is greater than 100-m, a 100-m receptor grid should be placed around the maximum concentration to ensure the maximum concentration location is accurately identified.”*⁹

LDEQ, Air Quality Modeling Procedures, Aug. 2006, available at <https://www.deq.louisiana.gov/assets/docs/Air/ModelingProcedures0806.pdf>; see also *id.* at § 2.2 (“The NAAQS off-property inventory will include all emission sources located within the AOI plus 50 km (please note that 100-kilometers is the maximum distance based upon accuracy constraints of the dispersion models).”).

⁹ *Id.* at § 5.6.

7. For PM_{2.5}, USEPA currently enforces a 24-hour average NAAQS of 35 µg/m³ and an annual average NAAQS of 9 µg/m³. The annual NAAQS was lowered by USEPA from 12 to 9 µg/m³ by a rule issued on February 7, 2024, effective on May 6, 2024. At the same time, USEPA reduced the Significant Impact Level for the annual average PM_{2.5} from 0.3 to 0.13 µg/m³. The original modeling analyses conducted for issuance of the PSD air permits were completed prior to the lowering of the annual average SIL and NAAQS for PM_{2.5} in 2024. The analyses for the nine projects should be repeated to verify compliance with these new and more protective standards in the region surrounding the projects. These projects had been approved using the older SIL and NAAQS adopted prior to 2024.

The proposed improvements to the modeling analyses submitted by the nine facilities are necessary for LDEQ to comply with USEPA Region 6's instructions. As stated in USEPA Region 6's February 1, 2023 email, LDEQ is required to take further action when there is a PSD permitting action where the air quality analysis identifies potential modeled violations of the applicable NAAQS via air modeling.¹⁰ To assure that all modeling violations are identified, each of the nine facilities needs an updated modeling analysis which expands the receptor grid and inventory of off-site sources out to a distance of 50 km from the center of the project. The expanded and improved modeling analysis will comply with the USEPA request to LDEQ as well as provide the following benefits to Louisiana residents:

1. Identify all potential violations of the NAAQS within the 50 km modeling domain in which AERMOD provides an accurate assessment of regional air quality impacts.
2. Identify hot spots of potential NAAQS violations near emission sources that cannot be identified by the existing ambient air quality monitoring network.
3. Allow LDEQ to identify culpable facilities and develop a plan to alleviate modeled violations.
4. Determine if additional ambient monitoring in the areas with modeled NAAQS exceedances would ensure that actual emissions and background concentrations are available to better inform future dispersion modeling.
5. Assess regional compliance with the most current and health protective annual average NAAQS for PM_{2.5} adopted in 2024.

¹⁰ *Supra* note 11, Email, Robinson, J. – USEPA Region 6 to Johnston, B. – LDEQ, Air Permit Modeling Evaluations for NSR Permitting, February 1, 2023.

6. Address the disparate impacts in communities having environmental justice considerations especially in the Mississippi River industrial corridor (ex St. James Parish, Plaquemines Parish) and in southwest Louisiana (ex Calcasieu Parish, Cameron Parish).

The proposed improvements to the modeling analyses submitted by the nine facilities reflect common and established USEPA procedures when dispersion modeling is used to assess regional compliance with the NAAQS in lieu of ambient monitoring. For example, USEPA recently required states and regulatory facilities in the U.S. to conduct hundreds of dispersion modeling analyses to assess compliance with the most recently promulgated 1-hour average NAAQS for SO₂ and NO₂.^{11,12} Control measures were implemented at these facilities to address any violations which had been predicted using these dispersion modeling analyses.

¹¹ <https://www.epa.gov/so2-pollution/applying-or-implementing-sulfur-dioxide-standards> .

¹² <https://www.epa.gov/no2-pollution/applying-or-implementing-nitrogen-dioxide-standards#designations> .

3.0 Review of Analyses Submitted to LDEQ by Each Facility

3.1 Benteler Steel – Caddo Parish, Louisiana

3.1.1 Critique Summary

Benteler Steel's response appears to be a re-submission of its 2014 modeling analysis, with no updates. It did not provide a report and provided none of the figures or list of sources culpable for modeled NAAQS exceedances as required by LDEQ. Exceedances of the 24-hour NAAQS for PM_{2.5}, 1-hour average NAAQS for NO₂ and 1-hour average NAAQS for SO₂ were evaluated in 2014. In summary, Benteler Steel's submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors within 5 km of the project, i.e., the area where project emissions exceeded the significant impact levels; the lack of any receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.1.2 Overview of Shortcomings

1. Benteler Steel submitted no modeling report to explain the steps undertaken to respond to the LDEQ request to identify predicted NAAQS exceedances and culpable sources in the surrounding region. Benteler evaluated exceedances of the 24-hour average NAAQS for PM_{2.5}, 1-hour average NAAQS for NO₂, and 1-hour average NAAQS for SO₂. There are shortcomings with the Benteler analysis such that it failed to identify all possible exceedances in the modeling domain.
2. The supporting modeling files submitted to LDEQ were dated 2014, which suggests no new analysis was conducted to respond to the LDEQ request.
3. No supporting figures are provided to show the location of NAAQS exceedances. LDEQ specifically asked for figures.
4. For predicted exceedances of the NAAQS, no list is provided identifying the specific sources that are culpable for the exceedances. They are merely grouped together in the culpability analysis as "off-site". This does not respond to the LDEQ request to determine specific source culpability.
5. Receptors where compliance with the NAAQS is evaluated are located relatively close to the facility. They do not extend beyond 5 km from the project site. This small receptor grid does not evaluate compliance for the full 50-km range in which AERMOD provides acceptable results.
6. Receptors are located too close to the project site, which prevents adequately evaluating the

NAAQS compliance of off-site sources that are located far from the receptors.

7. Off-site sources are limited to those located relatively close to the facility. The furthest source that was considered was 28 km from the project site. This smaller, more localized group of off-site sources does not evaluate NAAQS compliance for off-site sources located within the full 50-km range in which AERMOD provides acceptable results.
8. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in 2014, prior to reductions in the SIL and NAAQS for PM_{2.5} in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} should be completed.
9. The modeling analysis appears to be for issuance of a modified PSD air permit and was focused on identifying receptors where the project exceeded the SIL, rather than identifying exceedances of the NAAQS by the entire facility or off-site sources. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.
10. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area, which is a circle defined by the furthest receptor where the project exceeds the applicable SIL.

3.1.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

PM_{2.5}

Benteler submitted files evaluating compliance with the 24-hour NAAQS but not the annual average NAAQS. These were dated 2014 so it appears no more recent analysis was conducted.

To review the analysis for PM_{2.5}, the supporting file for the 24-hour NAAQS analysis was opened in AERMOD:

Benteler_Steel_PM25_24hr_NAAQS_5yrs_PM25

Figure 1 provided with this report displays the receptor grid and sources used to determine compliance with the 24-hour NAAQS for PM_{2.5}. The receptors are green crosses and the sources are red circles with cross hatching.

Based on a review of this modeling file, the 24-hour NAAQS analysis used 1,934 receptors extending to approximately 4 km from the center of the site. There were 24 on-site sources (i.e. sources on the facility property) and 826 off-sites sources. The off-site sources were no further than 28 km from the center of the site. The highest impact from all sources was $53.2 \mu\text{g}/\text{m}^3$, which exceeds the NAAQS of $35 \mu\text{g}/\mu\text{m}^3$.

Benteler generated the following file to show the contributions to exceedances of the 24-hour NAAQS at each receptor:

Benteler_Steel_PM25_24hr_NAAQS_5yrs_PM25_24-hr_ALL_1_THRESH_MAXDCONT

The MAXCONT file which provides the culpability of sources to the predicted maximum concentration groups them as “On-site” and “Off-site”. This analysis does not identify the specific sources responsible for the violations as requested by LDEQ.

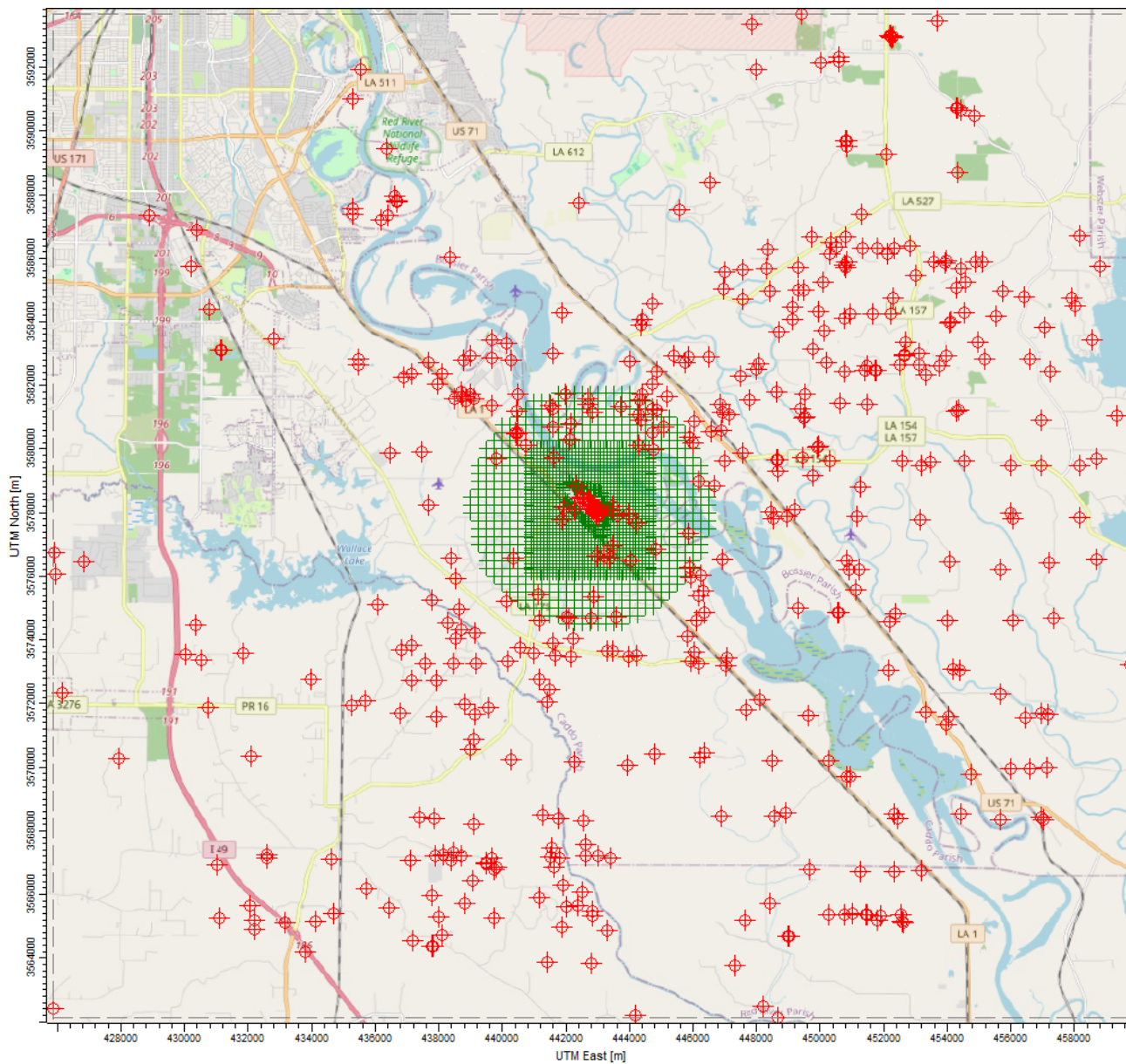


Figure 1 – Benteler Receptors & Sources Evaluating Compliance with 24-hour Average NAAQS for PM_{2.5}

NO₂

Benteler submitted files evaluating compliance with the 1-hour average NAAQS. These were dated 2014 so it appears no more recent analysis was conducted.

To review the analysis for NO₂, the supporting file for the 1-hour average NAAQS analysis was opened in AERMOD:

Benteler_Steel_NOx1hr__NAAQS_5yrs_NO2

Figure 2 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

The 1-hour average NAAQS analysis used 2,418 receptors extending to approximately 5 km from the center of the site. There were 4 on-site sources and 397 off-sites sources. The off-site sources were no further than 13 km from the center of the site. The highest impact from all sources was 548.8 µg/m³, which exceeds the NAAQS of 188 µg/m³.

Benteler generated the following file to show the contributions to exceedances of the 1-hour average NAAQS at each receptor:

Benteler_Steel_NOx1hr__NAAQS_5yrs_NO2_1-hr_ALL_8_THRESH_MAXDCONT

The MAXCONT file which provides the culpability of sources to the predicted maximum concentration groups them as “On-site” and “Off-site”. This does not identify the specific sources responsible for the violations as requested by LDEQ.

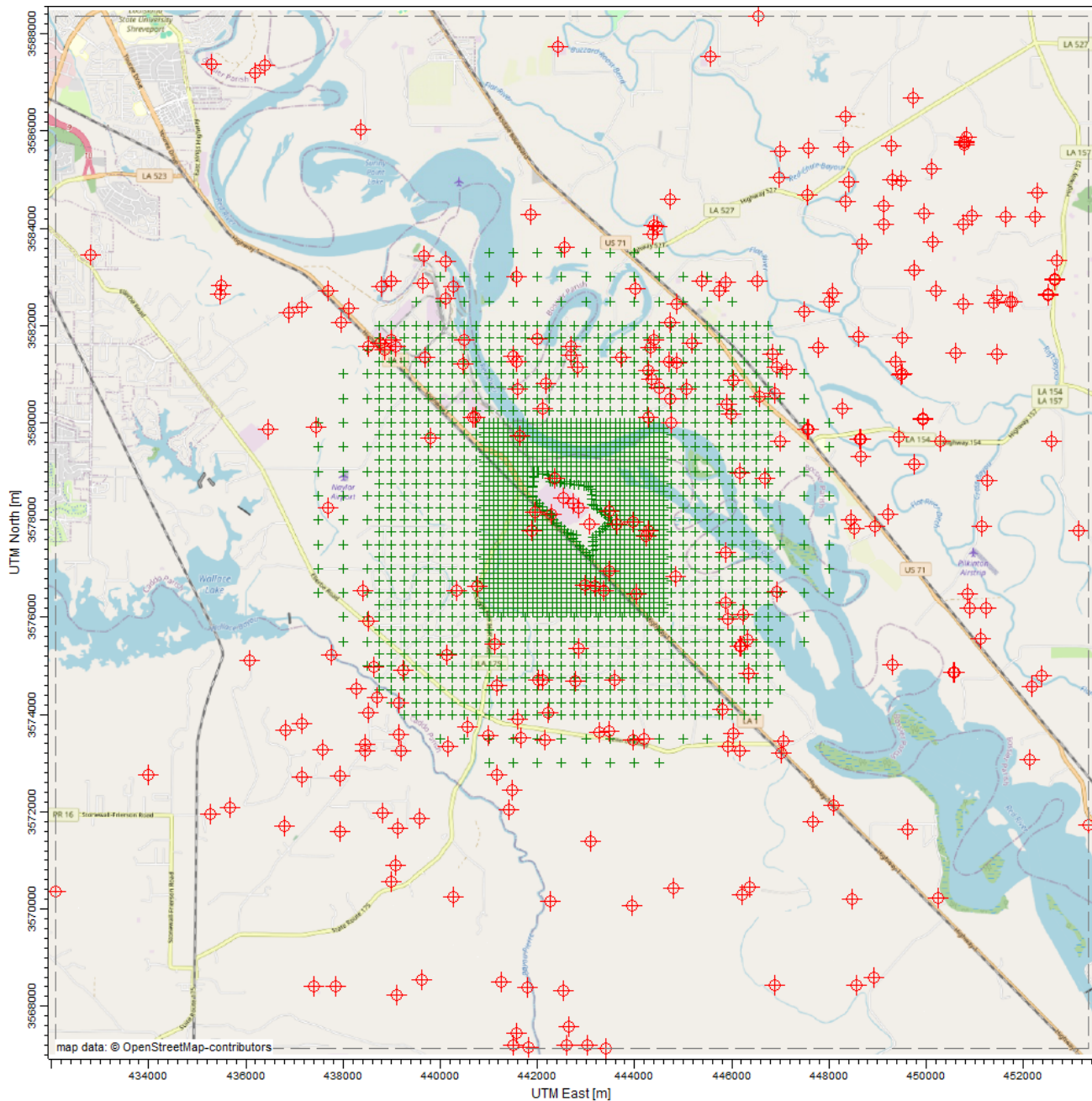


Figure 2- Benteler Receptors & Sources Evaluating Compliance with 1-hour Average NAAQS for NO₂

SO₂

Benteler submitted files evaluating compliance with the 1-hour average NAAQS for SO₂. These were dated 2014 so it appears no more recent analysis was conducted.

To review the analysis for SO₂, the supporting file for the 1-hour average NAAQS analysis was opened in AERMOD:

Benteler_Steel_SO2_1hr__NAAQS_5yrs_SO2

Figure 3 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for SO₂. The receptors are green crosses and the sources are red circles with cross hatching.

The 1-hour average NAAQS analysis used 2,414 receptors extending to approximately 5 km from the center of the site. There were 4 on-site sources and 586 off-sites sources. The off-site sources were no further than 16 km from the center of the site. The highest impact from all sources was 245.8 µg/m³, which exceeds the NAAQS of 196.2 µg/m³.

Benteler generated the following file to show the contributions to exceedances of the 1-hour average NAAQS at each receptor:

Benteler_Steel_SO2_1hr__NAAQS_5yrs_SO2_1-hr_ALL_4_THRESH_MAXDCONT

The MAXCONT file which provides the culpability of sources to the predicted maximum concentration groups them as “On-site” and “Off-site”. This does not identify the specific sources responsible for the violations as requested by LDEQ.

3.2 FG LA, LLC – St. James Parish, Louisiana

3.2.1 Critique Summary

FG LA, LLC provided none of the figures or list of sources culpable for modeled NAAQS exceedances as required by LDEQ. The submitted files are taken from a February 9, 2024 modeling analysis submitted to support an extension of the construction deadline, so no new evaluation was conducted in response to the request by LDEQ. Exceedances of the 24-hour NAAQS for PM_{2.5} and 1-hour average NAAQS for NO₂ were evaluated. In summary, FG LA, LLC's submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis grouped off-site sources together rather than determining the culpability of each off-site source; the exceedance culpability analysis only reviewed receptors where project emissions exceeded the significant impact levels; the lack of a closely spaced receptor grid around off-site sources and maximum concentrations prevented identifying possible exceedances around these sources; and, off-site sources throughout the full 50-km range of the AERMOD model were not considered. Additionally, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.2.2 Overview of Shortcomings

1. To respond to the LDEQ request to identify predicted NAAQS exceedances and culpable sources in the surrounding region, FG LA, LLC simply re-submitted its February 9, 2024, PSD air permit application to LDEQ. FG LA evaluating exceedances of the 24-hour average NAAQS for PM_{2.5} and 1-hour average NAAQS for NO₂. There are shortcomings with the FG LA analysis such that it failed to identify all possible exceedances in the modeling domain.
2. The supporting modeling files submitted to LDEQ were also dated February 2024, which suggests no new analysis was conducted in response to the LDEQ request. For predicted exceedances of the NAAQS, no list is provided identifying the specific sources which are culpable for the exceedances. They are merely grouped together in the culpability analysis as "PROJECT1" and "ALL1".
3. No supporting figures are provided to show the location of NAAQS exceedances. LDEQ specifically asked for figures.
4. For PM_{2.5}, the receptors where compliance with the NAAQS is evaluated are located relatively close to the facility, within 7 km from the project site. This small receptor grid does not evaluate compliance for the full 50-km range in which AERMOD provides acceptable results.
5. For NO₂, the receptors did extend to the full 50-km available for AERMOD. However, the receptors around the highest predicted concentration were spaced 1000 meters apart so may have not identified a higher concentration occurring in between the 1000-meter receptors. A

refined receptor grid using receptors spaced 100 meters apart is required.

6. For PM_{2.5}, receptors are located too close to the project site, which prevents adequately evaluating the NAAQS compliance of off-site sources that are located far from the receptors.
7. For PM_{2.5}, off-site sources are limited to those located relatively close to the facility. The furthest source that was considered was 27 km from the project site. The small number of off-site sources does not evaluate NAAQS compliance for off-site sources located within the full 50-km range in which AERMOD provides acceptable results.
8. For NO₂, off-site sources included all those located within 50-km from the facility.
9. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in early 2024, prior to EPA finalizing reductions in the SIL and NAAQS for PM_{2.5} later in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} needs to be completed.
10. For SO₂, no modeling analysis was conducted for the 1-hour average NAAQS because the impact of project emissions was below the Significant Impact Level. Without a modeling analysis, there is no information on compliance with the 1-hour average NAAQS for SO₂ in the surrounding region.
11. The original modeling analysis for issuance of the PSD air permit was focused on identifying receptors where the project exceeded the SIL, rather than identifying exceedances of the NAAQS by the entire facility or off-site sources. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.
12. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

3.2.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

FGLA submitted to LDEQ a copy of its February 9, 2024, PSD air permit application, “FG LA LLC, AI No. 198351, Request for Extension of PSD Permit No. PSD-LA-812.” This includes Exhibit C, “February 2024, Air Quality Analysis, In Support of FG LA Permit No. PSD-LA-812, Start of Construction Extension, Submitted By: FG LA, LLC, St. James Parish, Louisiana.”

The electronic files included those for meteorological data, modeling runs, monitoring data, off-property sources, spreadsheets and terrain. The AERMOD files for the NAAQS analysis were provided for the 24-hour and annual average NAAQS for PM_{2.5} and 1-hour and annual average

NAAQS for NO₂.

These AERMOD modeling files are dated February 2024, so were likely generated to support the PSD air permit application and not in response to LDEQ's request for additional culpability information.

Under Section 6.3.1 of the air quality analysis, it says:

“The full-impact modeling analysis utilized a receptor grid following the LDEQ guidelines. Consistent with EPA guidance, only receptors with predicted concentrations equal to or greater than the SIL in the preliminary modeling analysis were included in the full-impact modeling.”

If the analysis was the same used for a permit application, it would explain why the results focus on locations where their project exceeds the Significant Impact Level or SIL for each air pollutant and averaging period, rather than identifying potential NAAQS exceedances in the surrounding region.

Under Section 5.2.1 of the air quality analysis, it says:

“Based on the previous discussions with LDEQ for the 2018 AQA, off-property sources located within a distance of the area of impact (AOI) plus 20 kilometers of the FG LA location were included in the NAAQS analysis and increment analysis for each pollutant and averaging period.”

This means the off-site sources were limited to those near the significant impact area or AOI. Many of the off-site sources likely to be located throughout the 50 km range of AERMOD were not included in the NAAQS compliance evaluation.

PM_{2.5}

To review the analysis for PM_{2.5}, the supporting file for the 24-hour NAAQS analysis was opened in AERMOD:

FG_03_NQS_2018-2022_PM2.5.DTA

Figure 4 provided with this report displays the receptor grid and sources used to determine compliance with the 24-hour NAAQS for PM_{2.5}. The receptors are green crosses and the sources are red circles with cross hatching.

The 24-hour NAAQS analysis for PM_{2.5} used 2,651 receptors extending to approximately 7 km from the center of the site. There were 210 on-site sources and 2,187 off-sites sources. The off-site sources were no further than 27 km from the center of the site. The highest impact from all sources

was 43.3 $\mu\text{g}/\text{m}^3$, which exceeds the NAAQS of 35 $\mu\text{g}/\text{m}^3$.

The analysis described above generated the following file to show the contributions to exceedances of the 24-hour NAAQS at each receptor:

FG_03_NQS_2018-2022_PM2.5_24-hr_ALL1_8_THRESH_MAXDCONT

The MAXCONT file which provides the culpability of sources to the predicted maximum concentration groups them as “PROJECT1” and “PROJECT2” and “ALL1” and “ALL2”. This does not identify the specific sources responsible for the violations as requested by LDEQ.

The annual NAAQS analysis for PM_{2.5} appears to have been conducted because results below the NAAQS due to project and off-site sources is shown in Table 11-4 of the modeling report. The maximum concentration is 9.03 $\mu\text{g}/\text{m}^3$, which is below the stated NAAQS of 12 $\mu\text{g}/\text{m}^3$. However, on March 6, 2024, EPA issued a final rule tightening the PM_{2.5} NAAQS, which set the primary (health-based) annual NAAQS for PM_{2.5} at 9 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), down from the prior limit of 12 $\mu\text{g}/\text{m}^3$. The modeling results exceed the current NAAQS so the analysis should be repeated to verify compliance with the current NAAQS.

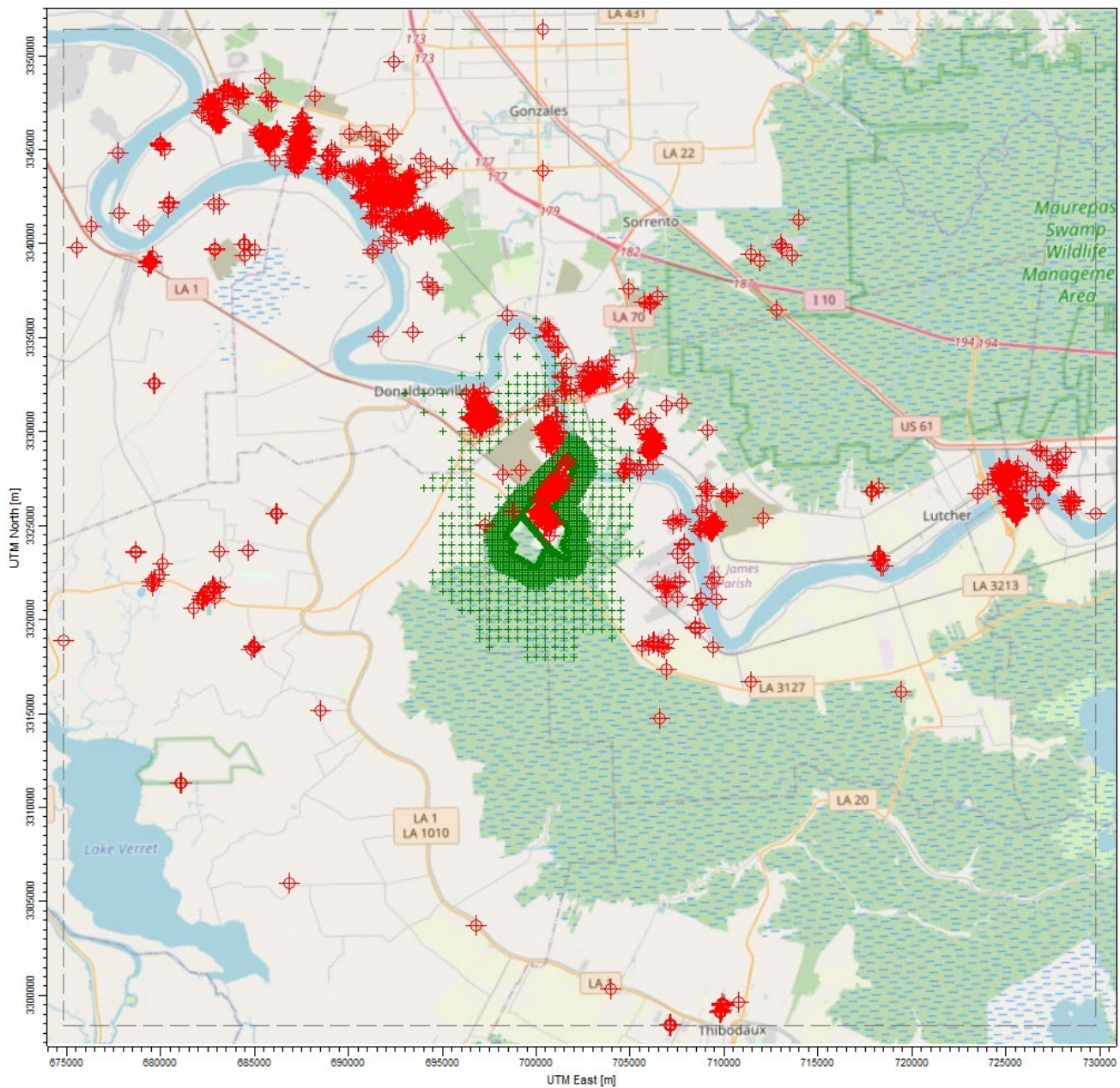


Figure 4 – FG LA Receptors & Sources Evaluating Compliance with 24-hour Average NAAQS for PM_{2.5}

NO₂

To review the analysis for NO₂, the supporting file for the 1-hour average analysis was opened in AERMOD:

FG_03_NQS_ALL1_2018-2022_NO2

Figure 5 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

The 1-hour average NAAQS analysis for NO₂ used 11,479 receptors extending to approximately 50 km from the center of the site. There were 66 on-site sources and 1,831 off-site sources. The off-site sources were no further than 50 km from the center of the site. The highest impact from all sources was 288.8 µg/m³, which exceeds the NAAQS of 188 µg/m³. This result appears in the following table from the 2024 modeling report, “*TABLE 11-5 NAAQS ANALYSIS RESULTS – PROJECT FG LA AND OFF-SITE SOURCES*”.

FG LA, LLC conducted further modeling to show its project was not culpable for the predicted exceedance of the 1-hour average NAAQS for NO₂. Its modeling report states:

As set forth in LDEQ’s AQMP, Section 2.2, at p. 2-5, FG LA “must determine the proposed project’s contribution to the potential exceedance,” for 1-hour NO₂ and 24-hour PM_{2.5}. As per the AQMP, “if the maximum contribution from the proposed project is less than the significance level at the receptor(s) and time(s) of the potential exceedance(s), the proposed project will not cause nor significantly contribute to the potential NAAQS exceedance(s); therefore, no further analysis is required.” LDEQ AQMP, p. 2-6.

This approach is typical for PSD modeling analyses, but fails to respond to the LDEQ request to identify potential NAAQS exceedances in the region and the culpable sources.

FG LA, LLC generated the following file to show the contributions to exceedances of the 1-hour average NAAQS at each receptor:

FG_03_NQS_2018-2022_PM2.5_24-hr_ALL1_8_THRESH_MAXDCONT

The MAXCONT file which provides the culpability of sources to the predicted maximum concentration groups them as “PROJECT1” and “ALL1”. This does not identify the specific sources responsible for the violations as requested by LDEQ.

SO₂

The FG LA, LLC modeling report states:

“The predicted 1-hour CO, 1-hour SO₂, 3-hour SO₂, 24-hour SO₂, and annual SO₂ concentrations are less than their respective SILs. No additional modeling is required for these pollutants and averaging periods.”

Since FG LA, LLC did not conduct a new modeling analysis to respond to the LDEQ request, it used its PSD permit application which shows that the impact of project emissions was below the SIL for SO₂ and so performed no further NAAQS compliance analysis.

3.3 Marathon Petroleum Company LP - St. John the Baptist Parish, Louisiana

3.3.1 Critique Summary

Marathon Petroleum Company LP did provide the figures and list of sources culpable for modeled NAAQS exceedances as required by LDEQ. The submitted files are taken from earlier modeling analysis for two PSD permit applications and also a new evaluation was conducted in response to the request by LDEQ and submitted August 30, 2023. Exceedances of the 1-hour average NAAQS for NO₂ and 1-hour average NAAQS for SO₂ were evaluated. But the response does not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain. In summary, Marathon's submission to LDEQ provided inadequate information as follows: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors within 10 km of the project site where project emissions exceeded the significant impact levels; the lack of closely spaced receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.3.2 Overview of Shortcomings

1. Marathon responded to the LDEQ request by August 30, 2023. It at least provided the information requested by LDEQ evaluating predicted exceedances of the NAAQS found during modeling analyses for two prior PSD permit applications for PSDLA-822 (M1) and PSD-LA-822 (M3). Marathon evaluated exceedances of the 1-hour average NAAQS for NO₂ and 1-hour average NAAQS for SO₂. Despite this, Marathon still failed to identify all possible exceedances in the modeling domain.
2. Marathon provided supporting modeling files for both original permit applications and updated modeling, but did not provide a report explaining the procedures used for the updated modeling.
3. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in 2023, prior to reductions in the SIL and NAAQS for PM_{2.5} in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} needs to be completed.
4. The original modeling analyses for issuance of PSD air permits appear focused on identifying receptors where the project exceeded the SIL, rather than identifying exceedances of the NAAQS by the entire facility or off-site sources. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.
5. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under

Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

3.3.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant. On August 30, 2023, Marathon responded to the LDEQ request for more information regarding predicted violations of the NAAQS based on modeling submitted for its PSD air permit applications for PSDLA-822 (M1) and PSD-LA-822 (M3). The items it provided for NO₂ and SO₂ included the following: 1) A figure mapping the location of each modeled exceedance, labeling UTM coordinates and the receptor number corresponding to the AERMOD file, 2) the list of modeled exceedances, including receptor, location, time of exceedance, and modeled concentration, and 3) a culpability analysis listing the primary contributors to the modeled exceedances.

No report was provided explaining the modeling procedures used to evaluate predicted NAAQS exceedances. Supporting modeling files were provided. These appear to be the original files for the PSD air permit applications and more recent files.

PM_{2.5}

In its request to Marathon, LDEQ does not discuss exceedances of the NAAQS for PM_{2.5}. To review the analysis, the supporting file for the annual NAAQS analysis was opened in AERMOD:

pm25.5Y.lt

Figure 6 provided with this report displays the receptor grid and sources used to determine compliance with the annual NAAQS for PM_{2.5}. The receptors are green crosses and the sources are red circles with cross hatching.

The total predicted concentration was 2.48 µg/m³. Since LDEQ didn't flag this as an exceedance requiring further evaluation, it is assumed this demonstrated compliance with the annual NAAQS for PM_{2.5}, which was likely 12 µg/m³ when the PSD permit was issued. However, there are shortcomings of this modeling analysis for PM_{2.5} which ignores potential NAAQS violations. This analysis used only 735 receptors extending to approximately 2 km from the center of the site. There were 895 total sources with the off-site sources were no further than 22 km from the center of the site. The number of receptors and their short distance from the facility suggest they represent only receptors where the project exceeded the SIL. Many of the off-site sources had no receptors located near them so possible exceedances near the off-site sources would not be predicted.

To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. The additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

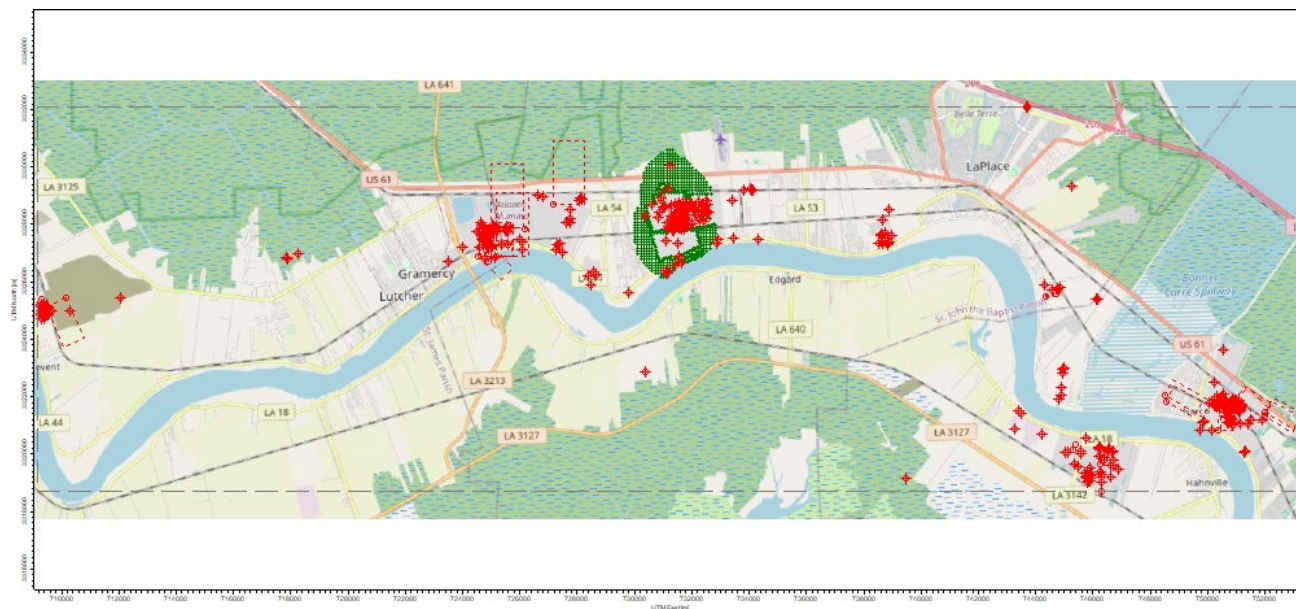


Figure 6 – Marathon Receptors & Sources Evaluating the Annual Average NAAQS for PM_{2.5}

NO₂

The LDEQ request for the exceedance analysis was included in the files from Marathon. It explained that modeling for Permit PSD-LA-822(M3) had predicted a 1-hour NO₂ concentration of 204.19 µg/m³ which is an exceedance of the NAAQS of 188 µg/m³.

The Marathon submittal entitled, *LDEQ_Response_NO₂ Permit PSD-LA-822(M3)*, provides a figure with the receptors with predicted exceedances of the 1-hour average NAAQS for NO₂. The source contributing to these exceedances are identified. Spreadsheets were also provided listed the predicted NAAQS violations and culpable sources.

To review the analysis for NO₂, the supporting file for the 1-hour average NAAQS analysis was opened in AERMOD:

NO₂.5Y.st

Figure 7 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

This analysis used 2,804 receptors extending to approximately 10 km from the center of the site. There were 16 on-site sources and 709 off-site sources. The off-site sources were no further than 30 km from the center of the site.

The number of receptors and their short distance from the facility suggest they represent only receptors where the project exceeded the SIL. Many of the off-site sources had no receptors located near them, so possible exceedances near the off-site sources would not be predicted.

To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. The additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included.

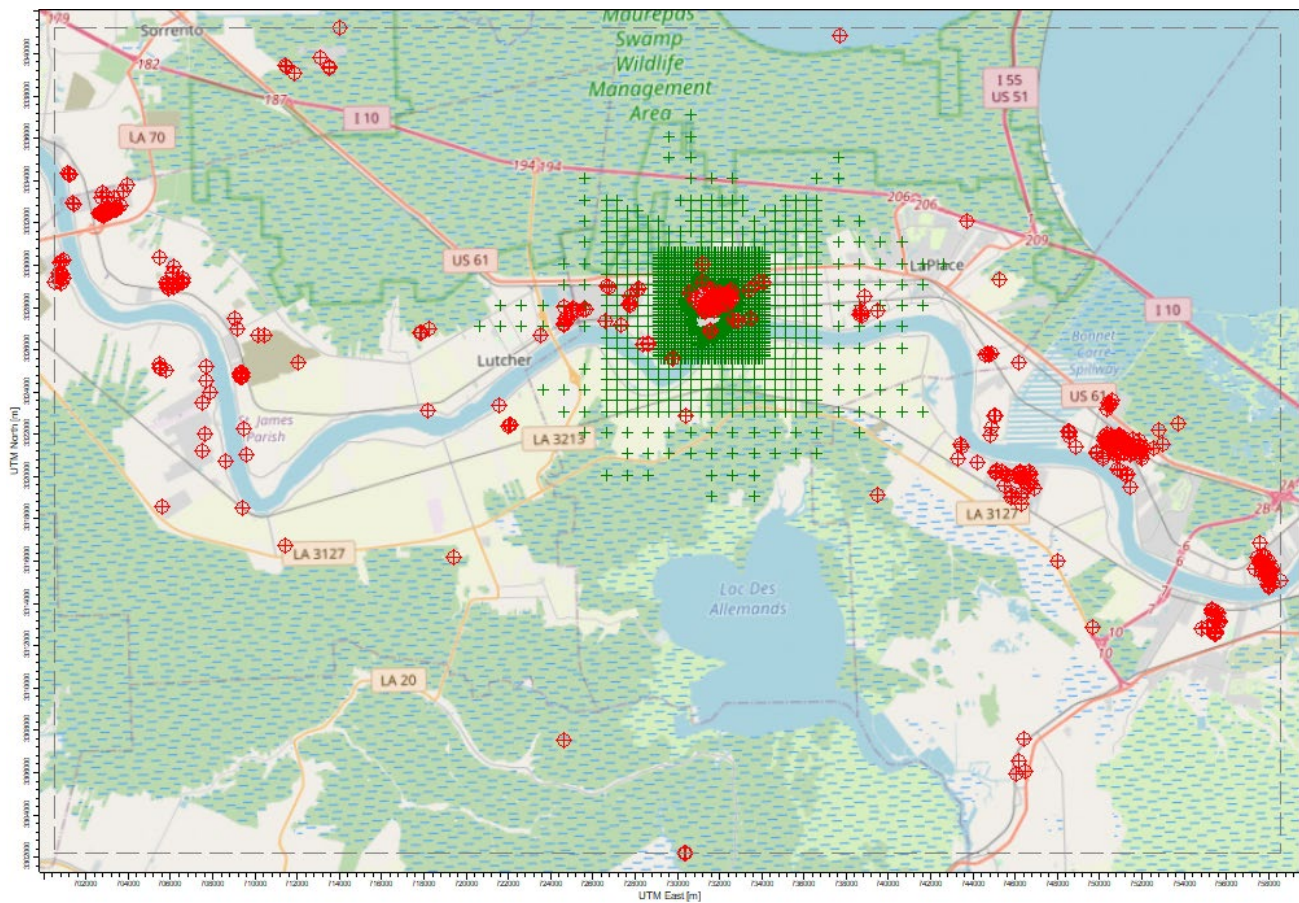


Figure 7 – Marathon Receptors & Sources Evaluating Compliance with 1-hour Average NAAQS for NO₂

SO₂

The LDEQ request for the exceedance analysis was included in the files from Marathon. It explained that modeling for Permit PSD-LA-822(m³) had predicted a 1-hour SO₂ concentration of 533.98 µg/m³ which is an exceedance of the NAAQS of 196 µg/m³.

The Marathon submittal entitled, *LDEQ_Response_SO2 Permit PSD-LA-822(MI)*, provides figures with the receptors with predicted exceedances of the 1-hour average NAAQS for SO₂. The sources contributing to these exceedances are identified. Spreadsheets were also provided listed the predicted NAAQS violations and culpable sources.

There were no supporting AERMOD modeling files provided to LDEQ for the analysis of exceedances of the 1-hour average NAAQS for SO₂. For this reason, it was not possible to review the extent of the modeling receptor grid and position of off-site sources. It is assumed that like PM_{2.5} and NO₂, the receptors were limited to those where the PSD project at Marathon exceeded the SIL for SO₂. Many of the off-site sources likely had no receptors located near them so possible exceedances near the off-site sources would not be predicted.

To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. The additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included.

3.4 Nucor Steel – St. James Parish, Louisiana

3.4.1 Critique Summary

Nucor Steel provided none of the figures or list of sources culpable for modeled NAAQS exceedances as required by LDEQ. Instead, the submitted files are taken from a 2018 modeling analysis for a PSD permit application, so no new evaluation was conducted in response to the request by LDEQ. Exceedances of the 1-hour average NAAQS for NO₂ were evaluated. The response does not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain. In summary, Nucor's submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors with 2 km of the project site where project emissions exceeded the significant impact levels; the lack of closely spaced receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.4.2 Overview of Shortcomings

1. Nucor provided original and addendum modeling files. There is no report to explain when the files were provided or the modeling procedures. The files are dated 2018, so it appears no recent modeling analysis was conducted. These may be the same files provided for a 2018 air permit application for the Logistics Expansion Project. Nucor evaluated exceedances of the 1-hour average NAAQS for NO₂. There are shortcomings with the Nucor analysis such that it failed to identify all possible exceedances in the modeling domain.
2. Nucor did not provide the information requested by LDEQ. There are no figures showing the location of exceedances of the 1-hour average NAAQS for NO₂. The MAXDCONT file that provides the culpability of sources only provides results for the project emission and all other sources. It does not identify specific sources responsible for NAAQS exceedances as requested by LDEQ.
3. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in 2018, prior to reductions in the SIL and NAAQS for PM_{2.5} in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} needs to be completed.
4. The original modeling analysis for issuance of the PSD air permit was focused on identifying receptors where the project exceeded the SIL, rather than identifying exceedances of the NAAQS by the entire facility or off-site sources. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.

5. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

3.4.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

Nucor did not provide a modeling report or explanation of its procedures to address the request from LDEQ to evaluate NAAQS exceedances. Nucor provided the original modeling files from its Air Dispersion Modeling Report for the Logistics Expansion Project in Convent, LA in November 2018. It also provided modeling files for an addendum. The files are dated 2018. The readme file states:

“The SIA receptor grid was broken into five parts to expedite runtime. The MAXDCONT files from each run were combined and sorted in MAXDCONT_processing.xlsx to confirm project impacts were less than the SIL at the time/place of a modeled violation.”

NO₂

To review the analysis for NO₂, the supporting file for the 1-hour average NAAQS analysis was opened within the folders “Addendum Modeling Files, 1_hr_NO2, Part1”:

AERMOD.inp

Figure 8 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

This file shows that Nucor did evaluate contributions to exceedances of the 1-hour average NAAQS for NO₂ as requested by LDEQ. The MAXDCONT receptor grid was broken up into 5 parts. Part 1 had 782 receptors extending at most 2 km from the facility. It had 33 project-related sources and 1,256 other sources including off-site sources. The furthest off-site source was approximately 40 km from the facility.

But Nucor left it difficult or impossible to determine which other sources could be culpable for any violations by grouping them all together. The culpability of sources was inadequately provided in a spreadsheet entitled: MAXDCONT_processing.xlsx. Contributions were provided for two source groups:

CONT_PROJECT and CONT_ALL.

Grouping off-site sources into the CONT_ALL does not provide the information required by LDEQ to identify the culpability of each source responsible for exceedances of the NAAQS.

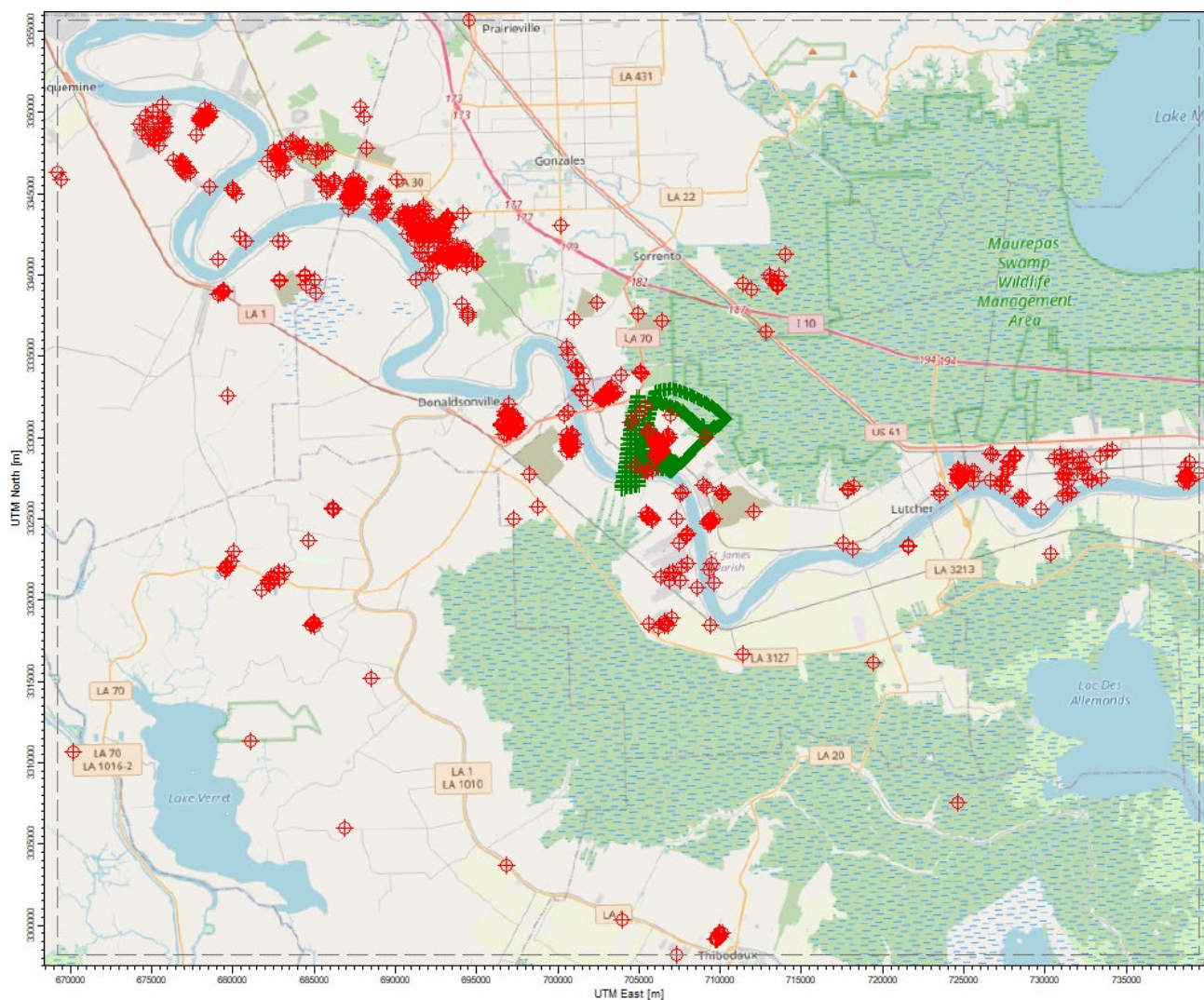


Figure 8 – Nucor Receptors and Sources Evaluating Compliance with 1-hour Average NAAQS for NO₂

3.5 Plaquemines LNG – Plaquemines Parish, Louisiana

3.5.1 Critique Summary

Plaquemines LNG provided the figures and list of sources culpable for modeled NAAQS exceedances. The response submitted to LDEQ does not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors where project emissions exceeded the significant impact levels; the lack of closely spaced receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.5.2 Overview of Shortcomings

1. Plaquemines LNG provided LDEQ modeling files for its culpability analyses. There is no submission letter or report to explain when the files were provided or the modeling procedures, but there is a short summary for the 24-hour average NAAQS for PM_{2.5}, 1-hour average NAAQS for NO₂ and 1-hour average NAAQS for SO₂. The files are dated 2019 so it appears no recent modeling analysis was conducted. There are shortcomings with the Plaquemines LNG analysis such that it failed to identify all possible exceedances in the modeling domain.
2. Plaquemines LNG did provide information requested by LDEQ including Google Earth figures with the receptors exceeding the NAAQS and the culpability of off-site sources. However, this information is limited to the receptors evaluated by Plaquemines LNG and so excludes most of the 50 km modeling domain in which AERMOD provides reliable predictions.
3. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in 2019, prior to reductions in the SIL and NAAQS for PM_{2.5} in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} needs to be completed.
4. For the 24-hour average NAAQS for PM_{2.5}: 1) the exceedance receptor grid was only 3 km from the facility, so the company could not identify violations which may occur from 3 km out to the 50 km limit of the AERMOD model, including any violations due to off-site sources, and 2) since there were no AERMOD files, it could not be determined how far the off-site sources were located from the facility. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. Additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included to

identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

5. For the 1-hour average NAAQS for NO₂: 1) the exceedance receptor grid was only 14 km from the facility so could not identify violations out to the 50 km limit of the AERMOD model and closer to off-site sources, and 2) off-site sources were located up to 32 km from the facility so excluded sources between 32 and 50 km. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. Additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included.
6. For the 1-hour average NAAQS for SO₂: 1) the exceedance receptor grid was only 0.5 km from the facility so could not identify violations out to the 50 km limit of the AERMOD model and closer to off-site sources, and 2) off-site sources were located up to 16 km from the facility so excluded sources between 16 and 50 km. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. Additional off-site sources located throughout the 50 km acceptable modeling domain for AERMOD need to be included.
7. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

3.5.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

Plaquemines LNG has submitted several modeling analyses to LDEQ. Analyses were provided: 1) with the January 27, 2020 Title V significant modification and prevention of significant deterioration permit modification application; 2) with the October 23, 2023 application for the renewal and significant modification of the prevention of significant deterioration permit, and 3) with the March 25, 2024 additional information for Class II air dispersion modeling. The cover letter for the last submission states:

Venture Global Plaquemines LNG, LLC and Venture Global Gator Express, LLC (collectively, Venture Global) are submitting the attached information concerning the air modeling "cause or contribute analysis" that was submitted with the application for the Title V Permit Renewal and Significant Modification and PSD Permit Major Modification of Title V Permit No. 2240-4023-V2

and PSD Permit No. PSD-LA-808(M2) (Application) on October 24, 2023 to the Louisiana Department of Environmental Quality (LDEQ or Department) (see EDMS No. 14040420). The Application is currently being processed by the LDEQ.

It appears that no new modeling analysis was conducted in response to the LDEQ request for an exceedance evaluation, or Plaquemines LNG simply provided information already generated for the 2023 permit application or prior applications. The three documents for PM_{2.5}, NO₂ and SO₂ that summarize the procedures to identify the source contribution from the offsite inventory sources at each NAAQS exceedance receptor were entitled: LDEQ Modeling Archive Index_PM2.5 24-hr.docx, LDEQ Modeling Archive Index_NO2 1-hr.docx, and LDEQ Modeling Archive Index_SO2 1-hr.docx. The meta data for these files stated they were created on May 10, 2022, August 25, 2023, and May 10, 2023, respectively. This suggests the exceedance evaluation was conducted prior to submission of the 2023 permit application, and no new modeling was conducted in response to the LDEQ request.

PM_{2.5}

Plaquemines LNG provided a summary of procedures used to evaluate contributions to exceedances of the 24-hour average NAAQS for PM_{2.5}. The file is:

LDEQ Modeling Archive Index_PM2.5 24-hr.docx

It states:

“There were a total of 836 NAAQS exceedance receptors identified from the PM_{2.5} 24-hr modeling file submitted to the Louisiana Department of Environmental Quality (LDEQ) in support of the Permit PSD-LA-808, issued on April 25, 2019. There were 132 offsite inventory sources included in this model.”

Plaquemines LNG provided a Google Earth figure which showed the location of receptors exceeding the 24-hour average NAAQS for PM_{2.5}:

AI 197379 Plaquemines LNG PSD-LA-808 24-hr PM_{2.5} NAAQS Exceedance Receptors.kmz

This shows the receptor grid is no further than 3 km from the facility. Figure 9 provided with this report displays the Google Earth image of the receptor grid used to determine compliance with the 24-hour NAAQS for PM_{2.5}

Plaquemines LNG provided tables which summarized the contribution to exceedances of the NAAQS from each off-site source:

VG PLQ LNG PM_{2.5} 24hr NAAQS Exceedances & SCont Results 2023-0822 TCI.pdf

Unlike NO₂ and SO₂, no AERMOD modeling files were provided for PM_{2.5} so it was not possible to review the location of the receptors and off-site sources used for the exceedance evaluation. The provided Google Earth file did provide the location of the off-site sources.

The original modeling files for the 2019 PSD permit application were not provided so it is not known how large of a receptor grid was originally used to identify exceedances of the 24-hour NAAQS for PM_{2.5}. I did prepare a previous report evaluating the modeling analysis for the 2020 permit application for a modification of the Plaquemines LNG facility, titled: *Plaquemines LNG, Plaquemines Parish, Louisiana, Evaluation of Compliance with the 1-hour Average NAAQS for NO₂, May 25, 2022*. This report concluded that the analysis used for the 2020 permit application for a modification of the facility did not extend to 50 km so was not adequate to identify all exceedances around the off-site sources. This suggests the 2019 PSD permit modeling analysis evaluated in this report also did not extend the receptor grid to 50 km. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a grid that extends out to 50 km.

Since the modeling analyses was conducted in 2019, *i.e.* prior to the reduction in the annual average NAAQS and SIL for PM_{2.5}, the analyses do not evaluate compliance with current SIL and annual average NAAQS for PM_{2.5}.

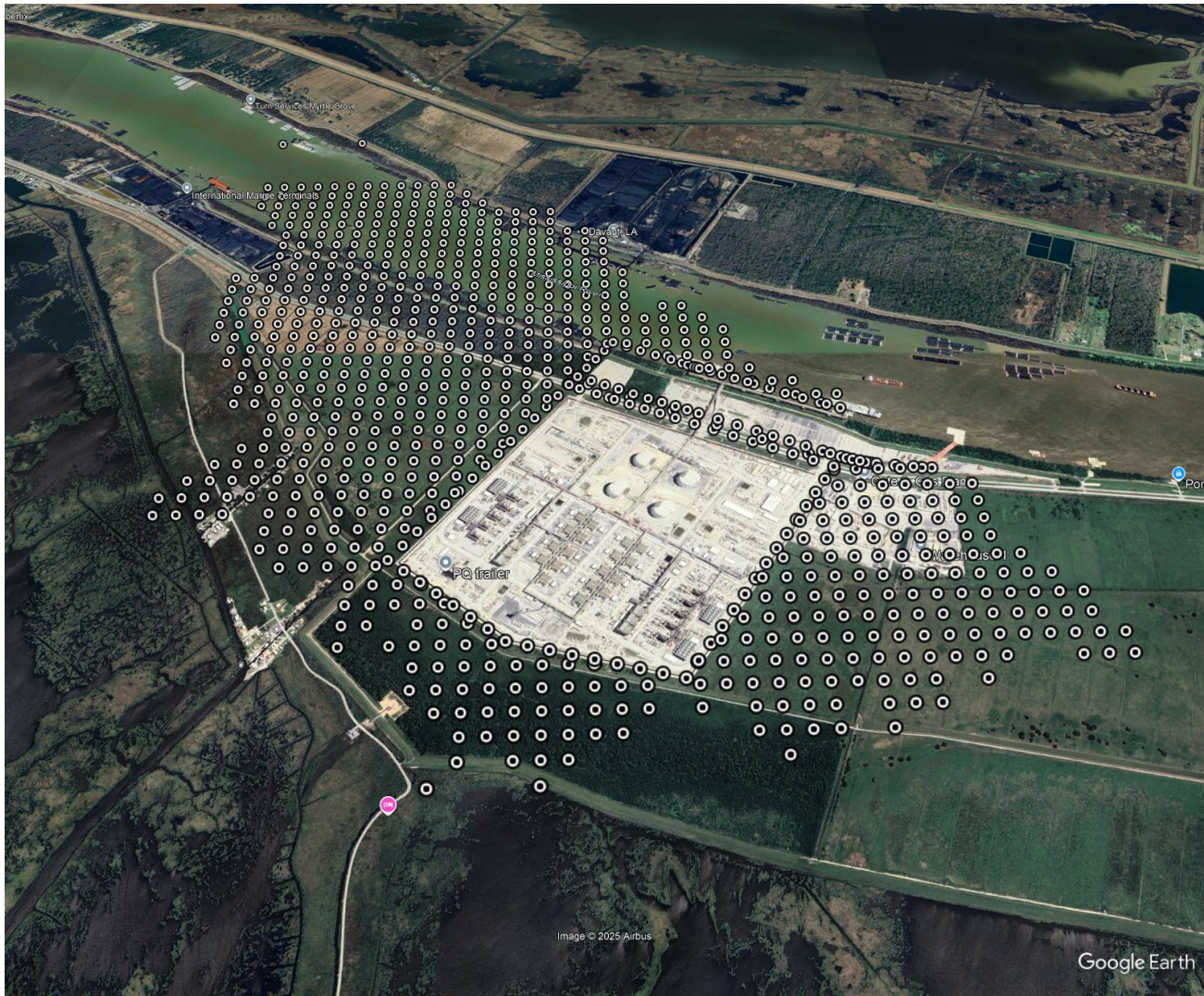


Figure 9 – Plaquemines LNG Receptor Grid Evaluating Compliance with 24-hour Average NAAQS for PM_{2.5}

NO₂

Plaquemines LNG provided a summary of procedures used to evaluate contributions to exceedances of the 1-hour average NAAQS for NO₂. The file is:

LDEQ Modeling Archive Index_NO2 1-hr.docx

It states:

“There were a total of 436 NAAQS exceedance receptors identified from the NO₂ 1-hr modeling file submitted to the Louisiana Department of Environmental Quality (LDEQ) in support of the Permit PSD-LA-808, issued on April 25, 2019. There were 529 offsite inventory sources included in this model. The goal of this modeling exercise is to identify the primary contributing offsite inventory sources at each NAAQS exceedance receptor.”

One of the modeling files used by Plaquemines LNG was opened in AERMOD to review the receptor grid and location of off-site sources. This file was:

VGL_Plaq_Scen2_NAAQS_NO2_1hr_1115_V04_Step2_M1.inp

Figure 10 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

Based on a review of this NO₂ modeling file submitted by Plaquemines LNG, the 399 receptors evaluated by Plaquemines LNG only extend 14 km from facility. The off-site sources were located as far as 36 km from the facility so the receptors were not sufficient to determine if there were NAAQS exceedances near the off-site sources.

The original modeling files for the 2019 PSD permit application were not provided so it is not known how large of a receptor grid was originally used to identify exceedances of the 1-hour average NAAQS for NO₂. I did prepare a previous report evaluating the modeling analysis for the 2020 permit application for a modification of the Plaquemines LNG facility. This was prepared for the Sierra Club and submitted to LDEQ, and entitled: *Plaquemines LNG, Plaquemines Parish, Louisiana, Evaluation of Compliance with the 1-hour average NAAQS for NO₂, May 25, 2022*. This report concluded that the analysis used for the 2020 permit application for a modification of the facility did not extend to 50 km so was not adequate to identify all NO₂ exceedances around the off-site sources. This suggests the 2019 PSD permit modeling analysis evaluated in this report also did not extend the receptor grid to 50 km. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km. This larger receptor grid will estimate

concentrations around many of the off-site sources, like those in the New Orleans metropolitan area located to the northwest. Currently there are no receptors or concentrations predicted near these off-site sources so it is not known if exceedances of the NAAQS will occur.

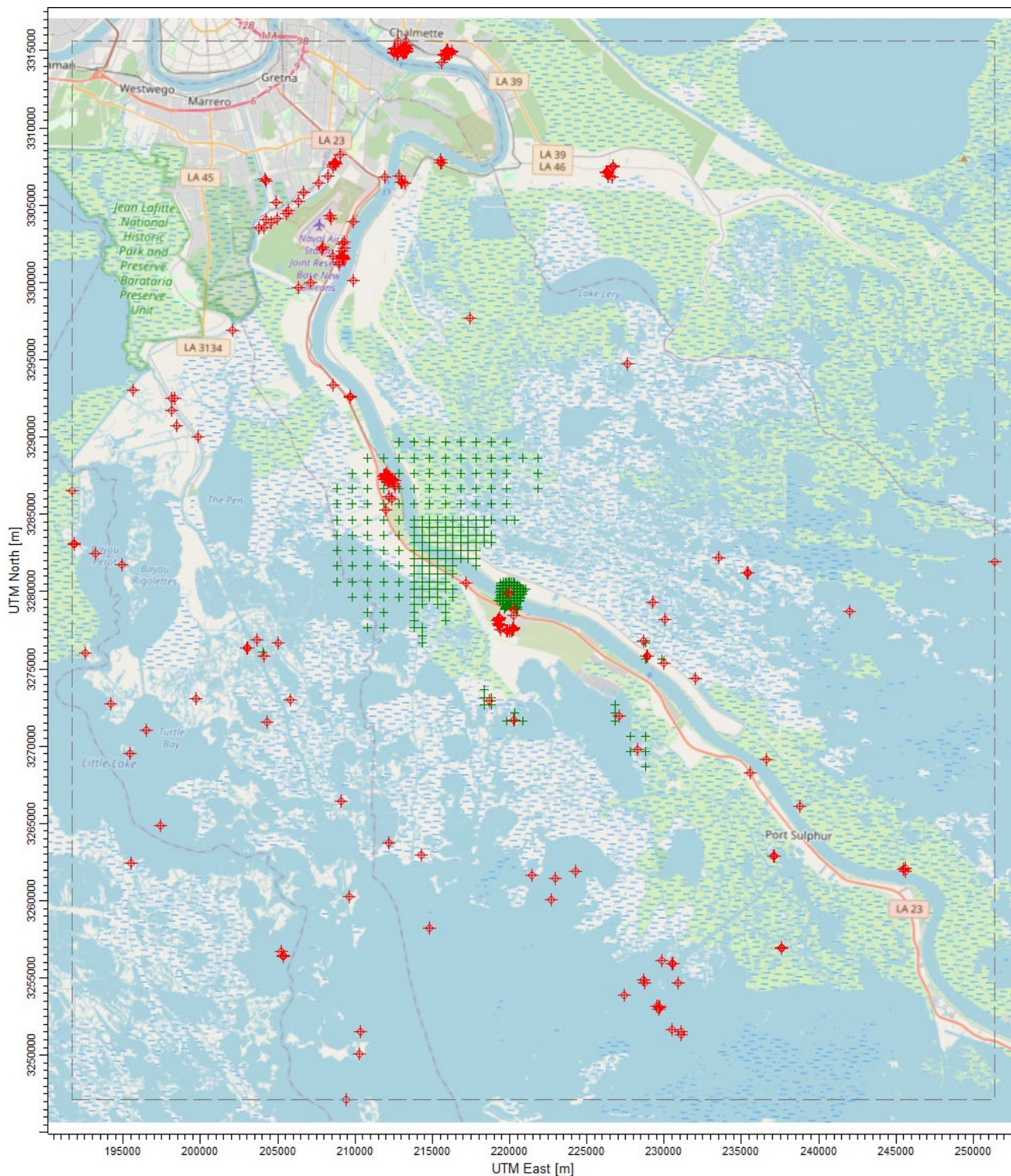


Figure 10 – Plaquemines LNG Receptor Grid & Sources Evaluating Compliance with 1-hour average NAAQS for NO₂

SO₂

Plaquemines LNG provided a summary of procedures used to evaluate contributions to exceedances of the 1-hour average NAAQS for SO₂. The file is:

LDEQ Modeling Archive Index_SO2 1-hr.docx

It states:

“There were a total of 17 NAAQS exceedance receptors identified from the SO₂ 1-hr modeling file submitted to the Louisiana Department of Environmental Quality (LDEQ) in support of the Permit PSD-LA-808, issued on April 25, 2019. There were 91 offsite inventory sources included in this model. Venture Global ran a model with 17 receptors and 91 individual source groups.”

One of the modeling files used by Plaquemines LNG was opened in AERMOD to review the receptor grid and location of off-site sources. This file was:

VGL_Plaq_Scen2_NAAQS_SO2_1hr_1115_v02.inp

Figure 11 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for SO₂. The receptors are green crosses and the sources are red circles with cross hatching.

Based on a review of this SO₂ modeling file submitted by Plaquemines LNG, the 17 receptors evaluated by Plaquemines LNG only extended 0.5 km from facility. The off-site sources were located as far as 16 km from the facility, so the receptors were not sufficient to determine if there were NAAQS exceedances near the off-site sources.

The original modeling files for the 2019 PSD permit application were not provided, so it is not known how large of a receptor grid was originally used to identify exceedances of the 1-hour average NAAQS for SO₂. I did prepare a previous report evaluating the modeling analysis for the 2020 permit application for a modification of the Plaquemines LNG facility. This was prepared for the Sierra Club and submitted to LDEQ, and entitled: *Plaquemines LNG, Plaquemines Parish, Louisiana, Evaluation of Compliance with the 1-hour average NAAQS for NO₂, May 25, 2022*. This report concluded that the analysis used for the 2020 permit application for a modification of the facility did not extend to 50 km so was not adequate to identify all exceedances around the off-site sources. This suggests the 2019 PSD permit modeling analysis evaluated in this report also did not extend the receptor grid to 50 km. To identify all possible exceedances within the 50 km acceptable modeling domain for AERMOD, the modeling for NAAQS compliance needs to be repeated using a receptor grid that extends out to 50 km.

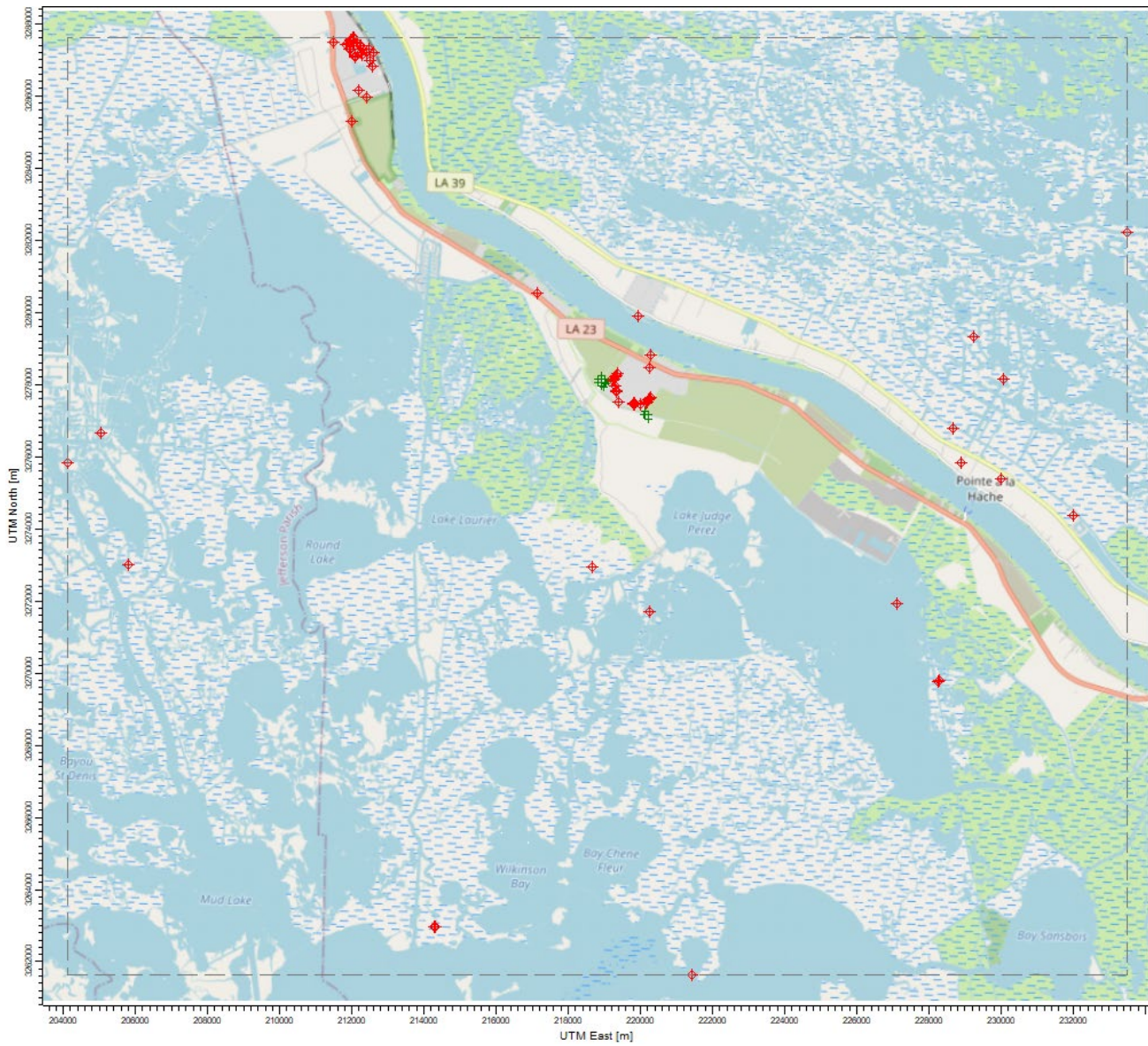


Figure 11 - Plaquemines LNG Receptor Grid & Sources Evaluating Compliance with 1-hour Average NAAQS for SO₂

3.6 Sabine Pass LNG – Cameron Parish, Louisiana

3.6.1 Critique Summary

Sabine Pass LNG provided figures and a list of sources culpable for modeled NAAQS exceedances, but these figures and list of sources did not fully comply with the LDEQ request. The submitted files are taken from a new modeling analysis in 2023 in response to the request by LDEQ. Exceedances of the 1-hour average NAAQS for NO₂ were evaluated. In summary, Sabine Pass LNG's submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons: exceedances were only evaluated for the 8th highest concentration form of the NAAQS but additional exceedances may occur for the 9th, 10th and higher concentrations; the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors where project emissions exceeded the significant impact levels; the lack of receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.6.2 Overview of Shortcomings

1. Sabine Pass LNG provided a modeling analysis to LDEQ on October 9, 2023, evaluating exceedances of the 1-hour average NAAQS for NO₂ predicted during the issuance of PSD Permit PSD-LA-703 (M7) on September 6, 2019. There were shortcomings with the Sabine analysis such that it failed to identify all possible exceedances in the modeling domain.
2. While off-site sources were located throughout the 50 km domain in which AERMOD provided acceptable results, the receptors were spaced as much as 5 km apart so the maximum concentrations due to off-site source would not be predicted. A closely spaced receptor grid among off-site sources should be used to predict potential exceedances. As noted in Section 2.0, The latest version of the LDEQ modeling guidelines from 2006 states under Section 5.6: *“If the maximum concentrations are located in areas where the receptor spacing is greater than 100-m, a 100-m receptor grid should be placed around the maximum concentration to ensure the maximum concentration location is accurately identified.”*
3. The culpability analysis for NO₂ only evaluated the 8th highest 1-hour average concentration. It is likely the 9th, 10th, and lower concentrations also exceed the NAAQS and should be evaluated. For example, Receptor 2146 had an 8th highest concentration of 1,574.81 µg/m³, and had 65 modeled exceedances above the 1-hour average NAAQS of 188 µg/m³. The facilities culpable for each exceedance may change and should be identified.

The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within

50 km beyond the Significant Impact Area.

3.6.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

Sabine Pass LNG provided an October 9, 2023, letter with the subject, “LDEQ Requested Information Re: Predicted Modeled NAAQS Exceedances.” This included an undated letter from LDEQ asking Sabine to evaluate the exceedances of the 1-hour average NAAQS for NO₂ that had been predicted when LDEQ issued PSD Permit PSD-LA-703 (M7) on September 6, 2019, and to provide supporting modeling files.

NO₂

Sabine provided a figure showing the location of receptors which exceeded the 1-hour average NAAQS for NO₂. This figure responded to the LDEQ request. This was a Google Earth file:

NAAQS Exceedance Receptors 2023-1004 TCI.kmz

To review the analysis for NO₂, the supporting file for the 1-hour average NAAQS analysis was opened within the folders “Modeling Files, Step 1, M1”:

LNO18DIHA_Stp1_M1.inp

Figure 12 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

There were 105 project related sources and 881 total sources. The furthest off-site source was located approximately 60 km from the facility. There were 3,480 receptors. After 13 km, the spacing of the receptors was 5 km. The wide 5 km spacing of the receptors around the off-site sources are inadequate to identify potential exceedances of the NAAQS. A finer grid is needed using 100-meter receptors.

Sabine provided pdf and spreadsheet tables which summarized: 1) the maximum modeled concentration and number of additional exceedances at each of 2,295 receptors, and 2) the contribution to maximum modeled concentration (8th highest) at each receptor from each off-site facility. These tables responded to the LDEQ request for source culpability for predicted exceedances of the NAAQS.

The file was identified as:

SPL 1hr NO₂ NAAQS Exceedances Analysis 2023-1004 TCI.pdf

The 8th highest concentration is the first and highest value used to determine compliance with the NAAQS. However, exceedances may still occur using the 9th, 10th and higher concentrations. The exceedance analysis provided by Sabine did not evaluate the 9th and higher concentrations for exceedances and culpability. As explained under Item 2 of Section 3.6.2 Overview of Shortcomings, this still needs to be completed.

3.7 Shintech, Inc. – Iberville Parish, Louisiana

3.7.1 Critique Summary

Shintech, Inc. provided the figures and list of sources culpable for modeled NAAQS exceedances as required by LDEQ. It refers to files, figures and lists of sources from a prior modeling analysis and its appendices. Exceedances of the 1-hour average NAAQS for NO₂ and 24-hour NAAQS for PM_{2.5} were evaluated. In summary, Shintech, Inc.'s submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors where project emissions exceeded the significant impact levels (i.e. 5 km for NO₂ and 2 km for PM_{2.5}); the lack of receptors around off-site sources prevented identifying possible exceedances around these sources; receptors throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.7.2 Overview of Shortcomings

1. Shintech evaluated exceedances of the 1-hour average NAAQS for NO₂ and 24-hour NAAQS for PM_{2.5}. It provided LDEQ with an undated summary called, "Extra Information - NAAQS Exceedances.docx." This identified information in its original modeling analysis which addresses the LDEQ request to evaluate NAAQS exceedances, and supplemental figures showing receptors with exceedances and supporting modeling files. There are shortcomings with the Shintech analysis such that it failed to identify all possible exceedances in the modeling domain.
2. While off-site sources of NO₂ and PM_{2.5} were located throughout the 50 km domain in which AERMOD provided acceptable results, the evaluated receptors extended only to 5 km for the 1-hour average NAAQS for NO₂ and 2 km for the 24-hour average NAAQS for PM_{2.5}. It is not clear if the original NAAQS compliance analysis for the PSD permit application included receptors out to 50 km and were close enough to off-site sources to identify NAAQS exceedances caused by the off-site sources. No evaluation of NAAQS compliance near off-site sources appears to have been completed.
3. There is no exceedance evaluation for the annual average NAAQS for PM_{2.5}. This is likely because the modeling was conducted in 2023, prior to reductions in the SIL and NAAQS for PM_{2.5} in 2024, so a modeling analysis for compliance with the current annual average NAAQS for PM_{2.5} should be completed.
4. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site sources located within 50 km beyond the Significant Impact Area.

3.7.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

NO₂

To review the NO₂ analysis, the following sample file was opened in AERMOD:

Sitewide_NAAQS 1hrNO₂_Grid_Others_H8HallGroups_2018-2022_NO₂_1hr.DTA.

Figure 13 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses, and the sources are red circles with cross hatching.

There were 2,982 receptors extending to only 5 km from the facility. There were 1,782 total sources out to a distance of 50 km from the facility. Since the receptor grid did not extend beyond 5 km, it was not capable of determining if there were NAAQS exceedances around the off-site sources.

PM_{2.5}

To review the PM_{2.5} analysis, a sample file was opened in AERMOD:

Sitewide_NAAQS_24hrPM25_Grid_Others_H8HAllGroups_2018-2022_PM25_24hr.DTA.

Figure 14 provided with this report displays the receptor grid and sources used to determine compliance with the 24-hour NAAQS for PM_{2.5}. The receptors are green crosses, and the sources are red circles with cross hatching.

There were only 70 receptors extending to only 2 km from the facility. There were 4,042 total sources out to a distance of 50 km from the facility. Since the receptor grid did not extend beyond 2 km, it was not capable of determining if there were NAAQS exceedances around the off-site sources.

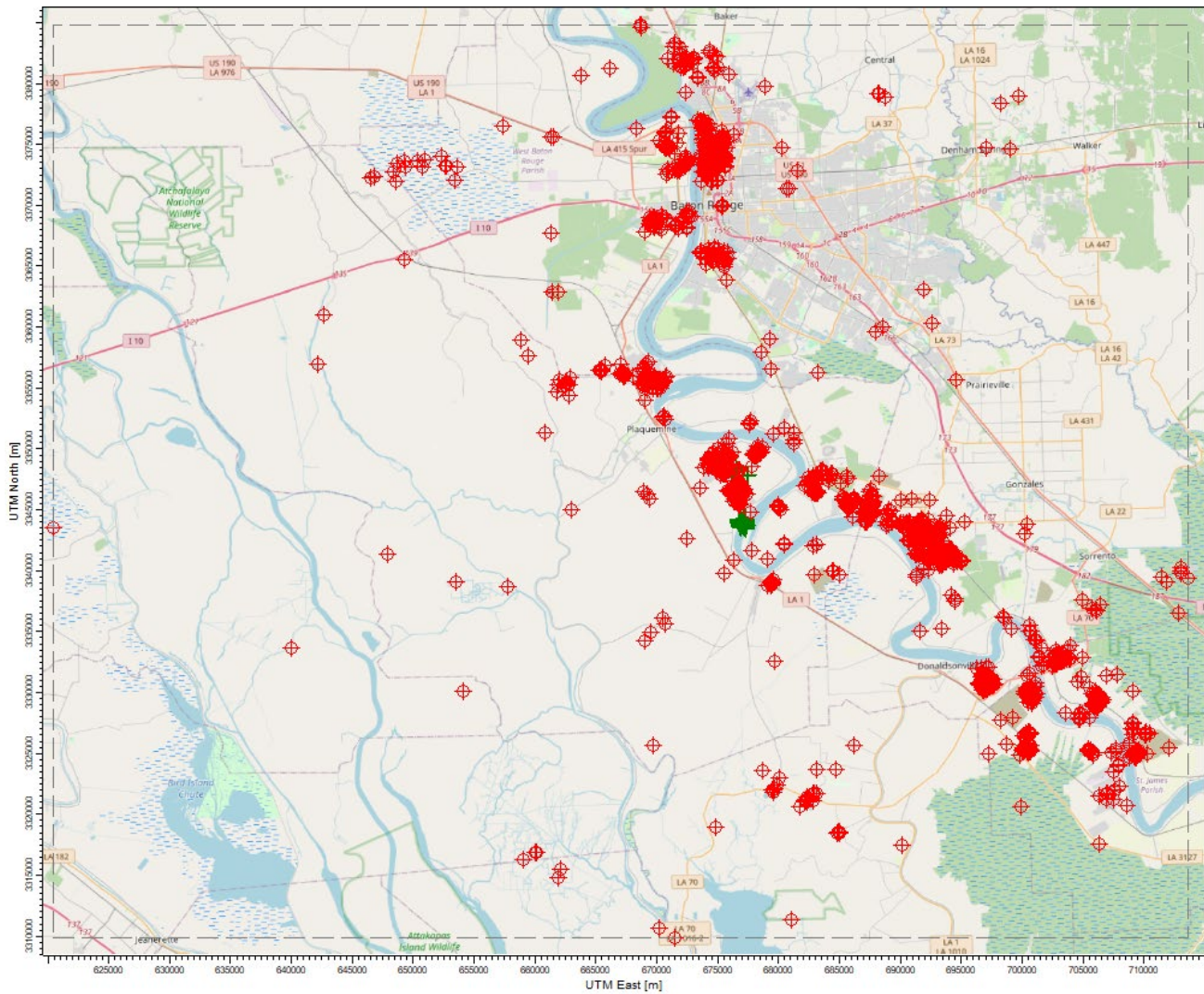


Figure 14 - Shintech Receptors and Sources Evaluating Compliance with 24-hour NAAQS for PM_{2.5}

3.8 Washington Parish Energy Center – Washington Parish, Louisiana

3.8.1 Critique Summary

Washington Parish Energy Center (“WPEC”) provided the figures and list of sources culpable for modeled NAAQS exceedances as required by LDEQ. The submitted files are taken from a new modeling analysis in 2023 in response to the request by LDEQ. Exceedances of the 1-hour average NAAQS for NO₂ were evaluated. In summary, WPEC’s submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons: the receptors and off-site sources were limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed receptors where project emissions exceeded the significant impact levels; the lack of receptors around off-site sources prevented identifying possible exceedances around these sources; receptors and off-site sources throughout the full 50-km range of the AERMOD model were not considered; and, there was no culpability analysis for the most current annual average NAAQS for PM_{2.5}.

3.8.2 Overview of Shortcomings

1. On August 21, 2023, on behalf of Entergy Services, LLC, Providence Engineering and Environmental Group provided LDEQ with an updated air modeling analysis for the Washington Parish Energy Center (WPEC) permit issued on April 27, 2020, Permit PSD-LA-829(M-1). WPEC evaluated the culpability of sources for exceedances of the 1-hour average NAAQS for NO₂. There are shortcomings with the WPEC analysis such that it failed to identify all possible exceedances in the modeling domain.
2. While off-site sources were located throughout the modeling domain, the receptors were either spaced too far apart, or not even close to the sources so the maximum concentrations due to each off-site source would not be predicted. A closely spaced receptor grid among off-site sources should be used to predict potential exceedances. As previously noted, the latest version of the LDEQ modeling guidelines from 2006 states under Section 5.6: *“If the maximum concentrations are located in areas where the receptor spacing is greater than 100-m, a 100-m receptor grid should be placed around the maximum concentration to ensure the maximum concentration location is accurately identified.”*
3. The original modeling analysis for issuance of the PSD air permit in 2020 was focused on identifying receptors where the project exceeded the SIL, rather than identifying exceedances of the NAAQS by the entire facility or off-site sources. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.
4. The off-site inventory of sources should be extended to the full 50 km modeling domain to identify potential NAAQS exceedances throughout the modeling domain. As noted under Section 2.0 of this report, even LDEQ modeling guidance requires consideration of all off-site

sources located within 50 km beyond the Significant Impact Area.

5. .

3.8.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

NO₂

Evaluations were conducted for two operating scenarios - routine and commissioning. To review the NO₂ analysis, a sample file was opened in AERMOD for the “routine” scenario:

WPEC_SS_Sitewide_Cumulative_ARM2_2012-2016_NO₂_1hr_Routine.DTA.

There were 6 receptors extending to 1 km from the facility. There were 26 total sources out to a distance of 15 km from the facility.

To review the NO₂ analysis, a sample file was opened in AERMOD for the “commissioning” scenario:

WPEC_Commissioning_Sitewide_Cumulative_ARM2_r1_2012_2016_NO₂_1hr_Commissioning.DTA.

Figure 15 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂ for the commissioning scenario. A figure for the routine scenario would look similar. The receptors are green crosses and the sources are red circles with cross hatching.

There were 1,437 receptors extending to 15 km from the facility. There were 40 total sources out to a distance of 28 km from the facility. At the outside of the grid, receptors were spaced 1 km apart. Since the receptor grid did not extend beyond 15 km, it was not capable of determining if there were NAAQS exceedances around the off-site sources.

As requested by LDEQ, figures were provided identifying receptors with predicted exceedances in the August 21, 2023 submittal. In the files LDEQ provided, title pages were provided but there were no figures. As requested by LDEQ, spreadsheets were provided which showed the culpability of specific off-site sources to predicted exceedances. The culpability was provided only for the receptors evaluated in the model analysis. These receptors were too few and too far apart to identify all potential exceedances of the NAAQS around the off-site sources.

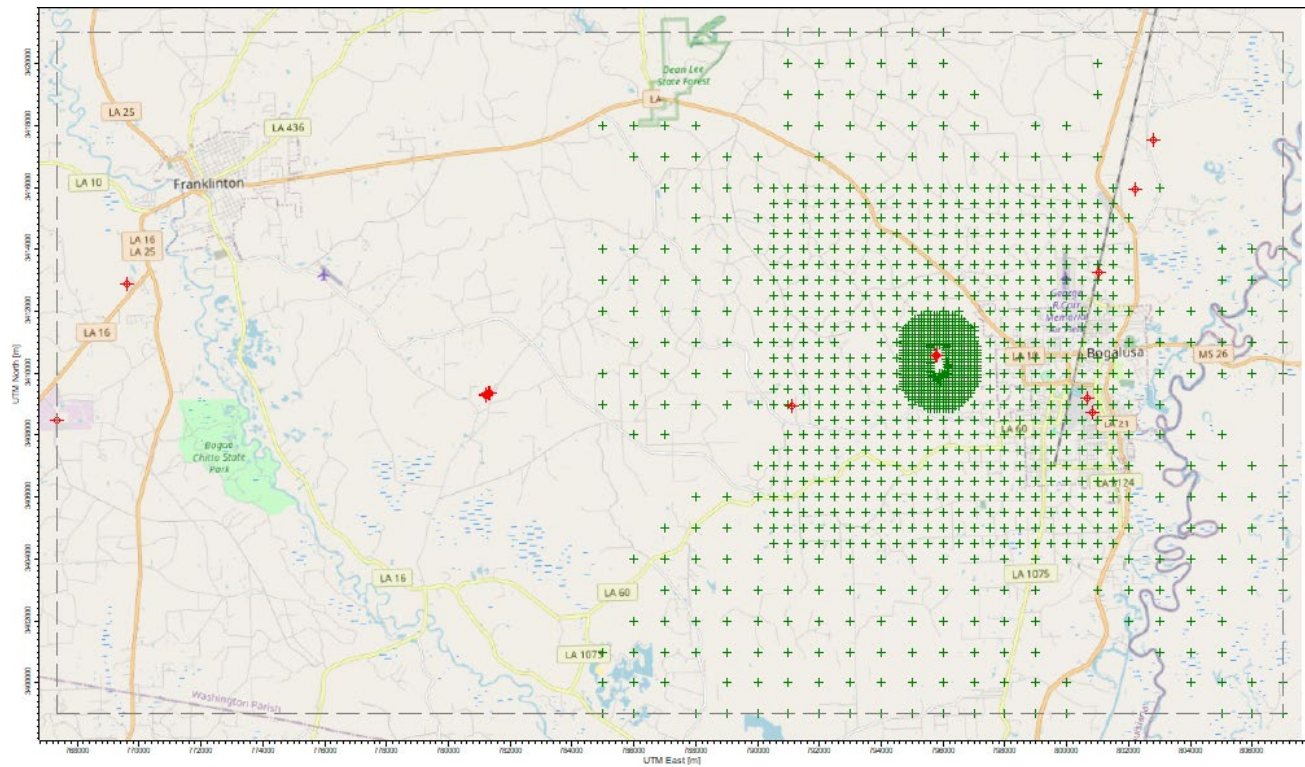


Figure 15 - WPEC Receptors and Sources Evaluating Compliance with 1-hour Average NAAQS for NO₂

3.9 Venture Global - Calcasieu Pass – Cameron Parish, Louisiana

3.9.1 Critique Summary

Venture Global’s Calcasieu Pass provided supporting modeling files for a culpability analysis but no report explaining the modeling procedures or summarizing the supporting files. There were also no modeling files for the original modeling analysis conducted for the issuance of a PSD air permit to the Calcasieu Pass project. There is a folder entitled, “Modeling DVD”, with numerous modeling scenarios, and a folder entitled, “1-hour NO₂”, which appears to be the culpability analysis for predicted exceedances of the 1-hour average NAAQS for that pollutant. In summary, Venture Global’s Calcasieu Pass’ submission to LDEQ did not evaluate all of the potential NAAQS exceedances in the AERMOD modeling domain, for the following reasons:: the receptors and off-site sources appear to be limited to those from the original PSD permit application modeling analyses; the exceedance culpability analysis only reviewed a limited number of receptors, perhaps where project emissions exceeded the significant impact levels; the lack of finely spaced receptors around off-site sources prevented identifying possible exceedances around these sources; and, since the original modeling was conducted several years ago, there was no compliance analysis for the most current annual average NAAQS for PM_{2.5} adopted in 2024.

3.9.2 Overview of Shortcomings

1. The culpability modeling analysis included off-site sources located throughout the 50 km modeling domain. The furthest off-site source was 58 km from the facility, but the furthest receptor was 41 km. There were many off-site sources with no nearby receptors to determine NAAQS compliance.
2. Receptors near the facility were closely spaced (i.e. 100 meters). However, receptors used around some of the off-site sources were spaced too far apart (i.e. 5,000 meters) to be able to determine the maximum concentrations due to each off-site source. A dense receptor grid among off-site sources should be used to predict potential exceedances. Using a dense receptor grid around the highest concentrations is a typical modeling procedure. As previously noted, the latest version of the LDEQ modeling guidelines from 2006 states under Section 5.6: *“If the maximum concentrations are located in areas where the receptor spacing is greater than 100-m, a 100-m receptor grid should be placed around the maximum concentration to ensure the maximum concentration location is accurately identified.”*
3. Since the supporting files for the original modeling analysis for issuance of the PSD air permit were not provided, the full extent of the original receptor grid is not known. It appears the receptors evaluated for the culpability analysis are only those where the project was predicted to exceed the SIL. This approach, which is limited by either a lack of receptors or of densely spaced receptors around off-site sources, would provide no information about potential NAAQS exceedances around off-site sources located within the 50 km modeling

domain of AERMOD. The NAAQS compliance analysis for the original PSD air permit should be updated with a more extensive receptor grid throughout the 50 km modeling domain where AERMOD provides accurate predictions.

3.9.3 Background

This section explains the steps that were taken to review the evaluation of NAAQS exceedances for each air pollutant that was submitted to LDEQ by the PSD permit applicant.

NO₂

The supporting modeling files contain a folder entitled, Modeling DVD, which appears to be the original analysis for compliance with the 1-hour average NAAQS for NO₂. There is a folder entitled, 1-hour NO₂, which appears to be the culpability analysis.

To review the NO₂ analysis, a sample file was opened in AERMOD from the following supporting file folders: Modeling DVD / Step 1_Facility Contribution / Group 1:

VGCLSCCTNNO21HD-G1.inp

This AERMOD file shows there were 1,729 discrete receptors extending as far as 41 km from the facility. The receptor spacing varied from 100 meters close to the facility to 5,000 meters after 10 km from the facility.

Figure 16 provided with this report displays the receptor grid and sources used to determine compliance with the 1-hour average NAAQS for NO₂. The receptors are green crosses and the sources are red circles with cross hatching.

There were 19 sources associated with the facility and 1,210 off-site sources. The furthest off-site source was approximately 58 km from the facility.

Figure 16 includes a blue circle which is 50 km from the facility. This is the modeling domain in which AERMOD provides acceptable modeling results.

As requested by LDEQ, the supporting files included figures identifying receptors with predicted exceedances. These were provided as kmz files that could be opened in Google Earth. An example file was as follows:

AI 194203 Calcasieu Pass PSD-LA-805(M-3) 1-hr NO2 NAAQS Exceedances Receptors (2023-09-11).kmz

The aforementioned file shows that 1-hour average concentrations were predicted for NO₂ to

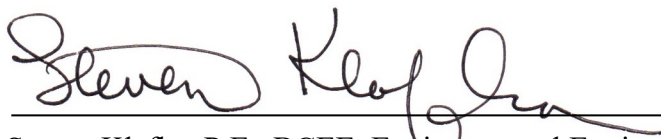
generate the 8th highest concentration used for comparison with the NAAQS. To assist with the evaluation of all evaluations of the NAAQS, the analysis also generated the 9th through 365th highest concentrations and included 1,228 source groups to generate impacts from each facility and every off-site source.

A pdf file was provided that summarizes the number of NAAQS exceedances predicted at each of the 1,729 receptors. For the highest concentration each receptor, the culpability of each source is provided. This file is as follows:

AI 194203 Calcasieu Pass PSD-LA-805(M-3) 1-hr NO2 NAAQS Exceedances and SCont Results (2023-09-11).pdf

The contribution of each source to predicted NAAQS exceedances was provided only for the 1,729 receptors evaluated in the culpability model analysis. There may be more receptor locations within the 50 km modeling domain of AERMOD which have NAAQS exceedances. The original receptor grid used to evaluate project impacts was not provided for review so it was not possible to determine how the 1,729 receptors were selected. Receptors located further away from the facility are spaced 5,000 meters apart. Without a refined receptor grid spaced no further than 100 meters apart, it is not known if there are NAAQS exceedances between the widely spaced receptors. Additionally, there are no receptors near many of the off-site sources. Without a refined receptor grid around each off-site source, the number and size of NAAQS exceedances around each off-site is not known.

Respectfully submitted,

A handwritten signature in black ink that reads "Steven Klafka". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Steven Klafka, P.E., BCEE, Environmental Engineering, Wingra Engineering