To: Ahmed Omar (Ahmed.Omar@tceq.texas.gov)[Ahmed.Omar@tceq.texas.gov]; Sean O'Brien[Sean.OBrien@tceq.texas.gov]; Thomasson, Lance E[Lance.E.Thomasson@invista.com]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Snyder, Erik[snyder.erik@epa.gov]; smohan@trinityconsultants.com[smohan@trinityconsultants.com]; Melissa Ryan[MRyan@trinityconsultants.com]
From: Periapattanam, Gopal
Sent: Mon 4/4/2016 9:46:20 PM
Subject: RE: INVISTA (Victoria, Texas) - NSR Permit 7186 DCS Application - PSD Modeling Protocol
removed.txt
Revised INVISTA PSD Modeling Protocol for ADN 2016-0404.pdf

Ahmed,

Attached is the revised ADN modeling protocol to reflect the updated ozone impact analysis in section 13 of the request.

Also appendix D is added which provides the supporting monitor and EI data.

Please contact me if you have any questions or need further information.

Thanks

Gopal Periapattanam

Global Air Capability Manager

INVISTA S.á.r.l.

4800 Sugar Grove Blvd., Suite 620

Stafford, Texas

Off – (281) 690-4705

Cell – (281) 221-7315

From: Thomasson, Lance E
Sent: Friday, February 19, 2016 9:18 AM
To: Sean O'Brien
Cc: Mohr.Ashley@epa.gov; snyder.erik@epa.gov; Periapattanam, Gopal
Subject: INVISTA (Victoria, Texas) - NSR Permit 7186 DCS Application - PSD Modeling Protocol

Sean,

As discussed during our teleconference on 2/17/16, attached is the INVISTA (Victoria, Texas) Adiponitrile Unit (ADN) PSD Modeling Protocol (dated February 2016) as part of NSR Permit Application 7186 submitted to the TCEQ in March 2015 (addendum provided in January 2016).

If you have any questions or need further information, then please reach out to me at the contact information provided below.

Regards.

Lance

Lance Thomasson, PMP

Environmental Manager

Victoria, Texas

Office: (361) 572-2317

Cell: (361) 212-0447

lance.e.thomasson@invista.com

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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Tue 3/22/2016 4:09:36 PM
Subject: Modeling Protocol - 7186 Invista s.a r.l
Modeling Protocol - 7186 Invista s.a r.l.docx
ADN PSD Modeling Protocol 2-18-16 1645.pdf

Ashley,

Attached are the modeling protocol submitted by Invista S A R L (permit No. 7186) and TCEQ comments on the modeling protocol.

Please let me know if you have any question.

Regards,

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

March 22, 2016

Subject: Invista S.A R.L. Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) and Minor New Source Review (NSR) Air Quality Analysis (AQA) Protocol for the Invista S.A R.L. project (Adiponitrile Unit) located at the Victoria Plant in Victoria, Victoria County, Texas, dated February 2016. The comments in section 13.5 need to be addressed prior to submitting the AQA. Please submit a revised protocol addressing these comments to the TCEQ and EPA Region 6. The rest of the comments are reminders for information to be included with the AQA.

1.0 Executive Summary – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or PSD Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

The protocol indicates that a single property line designation (SPLD) exists between Invista, DuPont, and Equistar. The single property line boundary should be used as the basis for receptor placement as well as identifying "site-wide" sources for the minor NSR analyses. However, single property line agreements do not apply to PSD modeling and ambient air starts at the applicant's fence line or other physical barrier to public access. Be sure to include a copy of the SPLD agreement, as well as the associated property line map, with the AQA.

The protocol notes that as the VOC project emissions increase is greater than 100 tons per year, a qualitative ozone analysis will be performed in accordance with TCEQ guidelines. The protocol did not provide sufficient information on the proposed project emissions of VOCs and NO_x. The proposed project emissions of VOCs and NO_x should be documented in the AQA as part of the ozone impact analysis.

3.1.3 State Property Line Analysis – While the text in this section mentions H_2S, Table 3-3 of the protocol does not list H_2S. Be sure that the documentation included with the AQA is consistent between the text and data presented in tables.

3.1.4 State Health Effects Evaluation (ESL Evaluation) – Be sure to use the most recent ESL list from the Toxicology Division (September 2015). If a contaminant is not on the ESL list, be sure to provide verification from the Toxicology Division for the ESL used.

3.2 General Modeling Approach – The protocol notes that for this project, it is not

expected that any criteria pollutant will show a significant impact; thus, a full impacts analysis is not expected to be required. If the expected results change and the model predictions are greater than or equal to the applicable de minimis levels, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

5.0 Plot Plan – Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

6.1 Pre-Construction Monitoring – The protocol notes that it is expected that CO and NO_2 predictions associated with the project will be less than the corresponding significant monitoring concentrations (SMCs) and preconstruction monitoring will not be required. Be aware that if the modeled concentrations are greater than the SMC, a revised protocol that discusses the preconstruction monitoring analysis will need to be submitted prior to submitting the AQA. For future projects, the preconstruction monitoring requirement should be addressed in the modeling protocol since data are available.

7.1 On-Property Project Sources – Be sure to provide a copy of the Table 1(a) that was submitted with the permit application with the AQA. In addition, be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA.

7.1.1.1 Point Sources – Be sure to provide flare effective stack diameter calculations with the AQA.

The protocol provides a calculation formula for the exit velocity for a tilted stack without providing any information about the tilted stack. If the tilted stack releases emissions into the atmosphere at any angle from the vertical greater than zero but less than or equal to 45 degrees, then the modeled stack velocity should be set equal to the vertical velocity component. The vertical velocity component should be calculated by multiplying the velocity by the cosine (cos) of the offset angle from the vertical.

However, if the tilted stack releases emissions into the atmosphere at any angle from the vertical greater than 45 degrees, then the release of emissions into the atmosphere should be considered horizontal and the default exit gas velocity of 0.001 m/s should be used in the modeling demonstration. For more information about modeling emissions

from tilted stacks, refer to the following guidance:

https://www.tceq.texas.gov/assets/public/permitting/air/memos/tiltstck.pdf

7.1.2 Modeled Emission Rates Determination – Be sure to verify project sources that will be included in the modeling demonstration, as well as the emission rates to model with the permit reviewer before submitting the AQA.

10.2 Modeling Equivalent Building Dimensions – The meaning of the title of this section, Modeling Equivalent Building Dimensions, is not clear. However, the input data to the downwash analyses should be consistent with the aerial photography and the plot plan.

12.0 Meteorological Data – The protocol notes that the land use surrounding the Victoria Plant is predominantly cultivated land, grassland, and deciduous forest with a moderate density of existing commercial, industrial, and residential structures. The typical surface roughness for this type of land use is generally between 0.1 – 0.7 m, which corresponds to the medium surface roughness category. Therefore, the TCEQ meteorological file containing medium surface roughness parameters will be used in this analysis. The ADMT recommends that an AERSURFACE analysis be conducted to support the selection of the meteorological data set. Otherwise, provide the source of data to support that the listed land use types have typical roughness lengths on the range of 0.1 – 0.7. If an AERSURFACE analysis is used to determine the surface roughness length, be sure to provide the AERSURFACE files with the AQA.

The protocol notes that the wind roses for Victoria Regional Airport from the years

considered in this modeling analysis are provided in Figure 12 - 1 through Figure 12 - 5

to supplement the meteorological data used in the modeling analyses. The wind roses show the direction towards which the wind is blowing. The standard convention for the wind rose is to show the directions in which the winds are blowing from. Be sure the documentation in the AQA is clear and figures follow the standard convention.

13.3 State Property Line Analysis – The protocol notes that the maximum modeled

ground - level concentrations of SO_2 at and beyond the property line obtained using the

approach described in Section 3 will be compared with applicable concentration standards. Note that section 3 does not contain any approach that describes how the

maximum modeled ground - level concentrations of SO_2 will be determined. Be sure that the documentation in the AQA is clear and complete.

13.4 State Health Effects Evaluation – The protocol notes that the maximum modeled ground - level concentrations for each compound listed in Table 3 - 3 of the protocol will be obtained using the approach described in Section 3 to determine if refined air dispersion modeling or effects review is necessary in the MERA analysis. Note that section 3 does not contain any approach that describes how the maximum modeled ground - level concentrations for the health effects compounds will be determined. Be sure that the documentation in the AQA is clear and complete.

13.5 Ozone Impact Analysis – The protocol notes that Invista will perform a qualitative analysis for ozone impacts based on TCEQ guidance, and that Victoria County is NO_x-limited, based on methodologies described in TCEQ guidance. Based on the area being characterized as NO_x-limited, Invista will employ EPA's recommended ozone impacts screening approach. Note that the TCEQ Air Quality Modeling Guidelines indicates that the guidance on conducting an ambient ozone impacts analysis is under further review. Also, the method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories.

If the local atmosphere's ozone formation is NO_x-limited, then following EPA's recommended ozone impacts screening approach is appropriate; however, the applicant will also need to add the ozone impacts of the recent project from the facility (Permit No. PSDTX1416) to the ozone background concentrations since it would not be reflected in the monitor.

The protocol did not identify any ozone monitors that would be used in the analysis; justification for proposed monitors that would be relied on was not provided; nor did the protocol include the applicable monitoring concentrations for review.

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on whether the area is NO_x-limited or VOC-limited, and the ozone monitor selection. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used.

13.6.3 Visibility Impairment Analysis – The protocol notes that per TCEQ guidance, Class II areas do not require a visibility impairment analysis. This is incorrect; TCEQ guidance does not state that Class II areas do not require a visibility impairment analysis. The visibility analysis is required; however, the applicant can meet the requirement by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111.

If you have any questions, please contact Ahmed Omar at (512) 239-1285, by fax at (512) 239-1400, or by email at Ahmed.Omar@tceq.texas.gov.

March 21, 2016

Subject: Golden Spread Electric Cooperative, Inc. Air Quality Analysis Protocol

We have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for Golden Spread Electric Cooperative, Inc. located near Denver City, Yoakum County, Texas, dated February 2016, and our comments are provided below. The comments in sections 2.0, 5.0, 6.1, 6.2, 7.1, 7.2, and Additional Impacts should be addressed in a revised protocol before the AQA is submitted.

2.0 Project Overview – The protocol does not specify which pollutants evaluated in the AQA require PSD review and which pollutants require a minor New Source Review (NSR) analysis. This information is needed to fully understand all subsequent sections of the modeling protocol and to make sure that applicable items have been addressed (for example, addressing secondary $PM_{2.5}$ formation). Please provide this information in a revised protocol.

In addition, the protocol includes a discussion on the backup generator DGFEN2. Section 6.0 refers to this generator as DGEN2. Please ensure that all sections of the AQA are consistent.

3.0 Plot Plan – Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site fence line, property line, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. Also, please note that the plot plan should be independent of any model input software.

5.0 Air Quality Monitoring Data – The protocol discusses which monitors will be used in the modeling analysis, but does not provide any justification for these monitors. A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on the monitor selection. Be sure to provide the justification for the selected monitors and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for each monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

In addition, the revised protocol should provide more detail on how the monitor data will be used. Monitor data can be used to address background concentrations for NAAQS analyses, address the pre-application analysis (section 7.2), and justify the $PM_{2.5}$ de minimis levels (section 6.2).

Please note the Hobbs $PM_{2.5}$ monitor data may not meet completeness criteria for 2014.

6.1 On-Property Sources in the Permit Application – The protocol notes that DGEN2 and HEAT1A will be modeled using the POINTCAP source type. As noted in the protocol, this source type is classified as a non-default/beta option in AERMOD. The revised protocol should include justification for this modeling approach. The EPA "Model Clearinghouse Review of the Use of the ADJ_U* Beta Option in the AERMET Meteorological Processor (Version 15181) for

the Donlin Mine Compliance Demonstration" memo can be used as a basis for the justification. The memo includes a discussion on the POINTCAP and POINTHOR source types.

The protocol notes that DGEN2 can be classified as an intermittent source. However, the protocol failed to show that the source operations would not contribute significantly to the modeled design value of the annual distribution of daily maximum 1-hr concentrations. Additional information should be provided in a revised protocol on the expected source operations with respect to the total annual operating hours, as well as the frequency and duration of the operations.

The protocol notes that HEAT1A will not be considered in any short-term modeling. Be sure to coordinate with the permit reviewer on the scope of the project before excluding HEAT1A from short-term modeling.

The protocol briefly mentions the annual NO_2 NAAQS and PSD Increment in the discussion of HEAT1A. As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. The protocol should discuss which pollutants require PSD review and which pollutants require a minor NSR analysis. Be sure to identify all applicable standards that will be addressed in the relevant sections of the revised protocol.

6.2 Other On-Property and Off-Property Sources – The protocol notes that a retrieval of nearby sources will be requested from the TCEQ. The size of the retrieval will be based on the applicable pollutants' radius of impact plus 50 kilometers (km). Note that the retrieval distance can be limited to 50 km, the distance applicable for near-field modeling with AERMOD.

In addition, be aware that applicants are not limited to using only APAD as a data source. If the applicant is aware of data not contained in the retrieval, such as recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

The protocol describes how the use of the $PM_{2.5}$ SILs will be justified. Please note that the proposed approach is appropriate for justifying the SILs for use in the NAAQS analysis. If the proposed project triggers PSD review for $PM_{2.5}$, then justification for use of the SILs in the Increment analysis will need to be provided in a revised protocol.

For the Increment analysis, note that the area of impact (AOI) will be the same one used in the PSD NAAQS analysis, except for those criteria pollutants with NAAQS that are statistically-based (i.e. multi-year average). While the SILs for both NAAQS and Increment are identical, the procedures to determine significance (that is, predicted concentrations to compare to the SIL) are different. This difference occurs because for those NAAQS that are statistically-based, the corresponding Increments are exceedance-based. For criteria pollutants with NAAQS that are statistically-based, determine the AOI following the convention of exceedance-based NAAQS (i.e., maximum predicted concentration).

For example, when modeling $PM_{2.5}$, use the maximum predicted concentrations from all

receptors to determine the AOI for the 24-hour and annual averaging times instead of the five-year average of the maximum predicted concentrations from the NAAQS analysis.

6.3 Scaling Factors – The protocol notes that a non-default option for the conversion of NO_x to NO_2 may be used depending on initial results using the Tier 2 ARM. If a Tier 3 model option will be used, a revised protocol must be sent to the TCEQ and EPA Region 6 for review prior to submitting the AQA. Furthermore, if a Tier 3 model option is used, the revised protocol must include a discussion and sufficient technical justification for the in-stack NO_2/NO_x ratio that will be used. In addition, full documentation and technical justification for the ozone data selected to be used with the Tier 3 model option and how it is representative of the project site must be provided with the revised protocol. Please note that the use of the Tier 3 PVMRM2 model option would require approval from the EPA Model Clearinghouse.

The protocol also notes the possibility of using the beta ARM2 model option for the conversion of NO_x to NO_2 instead of the Tier 3 options. Please note that the EPA proposal to make ARM2 a default model option is not sufficient justification. If ARM2 will be used, a revised protocol must be sent to the TCEQ and EPA Region 6 for review prior to submitting the AQA. If the default criteria for using ARM2, as noted in EPA's September 30, 2014 clarification memo "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard," are followed, then the protocol will not require prior approval by EPA Region 6 and the Modeling Clearinghouse. However, any deviation from the default criteria will need to be evaluated and approved prior to submitting the AQA.

7.0 Models Proposed and Modeling Techniques – The protocol notes that the most recent version of AERSURFACE is 08009. Please note that the most recent version is 13016.

The protocol notes that the SILs are listed in Table 6-1. Please note that the SILs are actually listed in Table 6-4. Please ensure that all sections of the AQA are consistent.

As noted in section 6.3, a revised protocol must be submitted to TCEQ and EPA Region 6 if ARM2 or one of the Tier 3 model options will be used.

The last paragraph of this section discusses requesting a primary retrieval of off-property sources from the TCEQ. Please note that the APAD retrieval does not have primary and/or secondary search options.

7.1 Full Impact Modeling Approach (PSD Increment and NAAQS) – As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. Please update this section in a revised protocol. The protocol should discuss which pollutants require PSD review and which pollutants require a minor NSR analysis. Be sure to identify all applicable standards that will be addressed in this section.

7.2 Significant Monitoring Concentration (SMC) – As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. Please update this section in a revised protocol. The protocol should discuss which pollutants require PSD review and which pollutants

require a minor NSR analysis. All pollutants that require PSD review should be addressed in this section.

Be aware that if the modeled concentrations associated with the project sources are greater than the SMC, a pre-application analysis will need to be conducted for the applicable pollutants.

The protocol notes that EPA promulgated SMCs for all criteria pollutants. However, the $PM_{2.5}$ SMC was vacated. A pre-application analysis will need be conducted for $PM_{2.5}$.

In addition, the general approach for addressing the SMCs documented in the protocol is based on older guidance. The procedures documented in Appendix H of the TCEQ Air Quality Modeling Guidelines should be followed with regards to the pre-application analysis.

The protocol briefly mentions FGE sources. Please note that FGE corresponds to a different modeling project. Please ensure that all sections of the AQA are consistent.

11.0 Receptor Grid - Design – Be aware that ambient air for minor NSR analyses starts at the property line; however, for PSD modeling, ambient air starts at the fence line or other physical barrier to public access.

Additional Impacts – Please note that the first paragraph of this section references old guidance that is no longer applicable to the ozone analysis. In addition, the information presented in the second paragraph does not add to the argument that the project area is NOx-limited. This information can be omitted from the revised protocol.

The protocol did not provide sufficient information on the proposed project emissions of VOC and NO_x to determine if an ozone analysis is required. If the net project emissions of VOC and NO_x are less than 100 tons per year (tpy), then an ozone impact analysis is not required and this conclusion should be documented in the AQA. However, if the net project emissions of VOC and/or NOx are greater than 100 tpy, an ozone analysis must be conducted.

The protocol discusses which monitor will be used in the ozone analysis, but does not provide any justification for the monitor. A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on the monitor selection. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used.

The proposed approach of modeling NO_x emissions to evaluate the impact that the proposed NO_x emissions will have on ozone concentrations in the area is reasonable, provided that the area is NO_x-limited. The method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from reported emissions inventories. In addition, the ozone analysis should assume 90% conversion of NO_x to NO_2, per EPA guidance.

The NO_x emissions evaluated in this ozone analysis should cover different operating scenarios, like startup/shutdown operations. Also, be aware that the EPA intermittent source guidance

should not be used in this proposed ozone analysis.

Please note that the nearest Class I area, Salt Creek Wilderness, is located approximately 165 km from the project site.

The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area. The applicant may contact the applicable Federal Land Manager to discuss any potential Class I analyses for air quality related values.

The protocol did not include the Additional Impacts Analysis. Please submit a revised protocol that includes this analysis.

The protocol did not include an analysis of the secondary formation of $PM_{2.5}$ due to the proposed project emissions. Please address this analysis in a revised protocol.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Rhys Davies at 512-239-1134 or Matthew Kovar at 512-239-0180, by fax at 512-239-1400, or by email at Rhys.Davies@tceq.texas.gov or Matthew.Kovar@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Dianne Anderson[dianne.anderson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]
From: Rachel Melton
Sent: Wed 3/16/2016 9:42:09 PM
Subject: Protocol Response: TOTAL PETROCHEMICALS & REFINING USA INC (permit #PSDTX1426, 122353)
PAR Side Cracker Modeling Protocol Response 10-Mar-2016.docx
Third Modeling Protocol - 122353 TOTAL PETROCHEMICALS & REFINING USA INC.docx

Ashley,

Attached is the TCEQ's response for the Total Petrochemicals & Refining USA Inc. third Modeling Protocol, Permit No.: PSDTX1426, 122353. Please respond to verify receipt of this information.

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

T: 512-239-2358

E: Rachel.Melton@tceq.texas.gov

March 16, 2016

Subject: Total Petrochemicals & Refining USA, Inc. Air Quality Analysis Protocol

On January 25, 2016, the Air Dispersion Modeling Team (ADMT) sent additional comments via e-mail regarding the revised Prevention of Significant Deterioration (PSD) New Source Review (NSR) Air Quality Analysis (AQA) Protocol for Total Petrochemicals & Refining USA, Inc. Port Arthur Ethane Side Cracker located in Port Arthur, Jefferson County, Texas, dated December 7, 2015. The applicant submitted responses in response to the ADMT additional comments on March 10, 2016. My comments regarding the responses are provided below.

3.2 State NAAQS Analysis Step 2

Original ADMT Comment: See section 2.1.3 Area of Impact (AOI) Analysis regarding the approach in which monitoring data is used in lieu of off-property sources.

Similar to the comment above, if a specific distance is used to develop the off-property inventory; adequate justification should be provided prior to submitting the AQA as to why a specific radius is appropriate.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Applicant Response: TOTAL understands. Please refer to proposed response to Section 2.1.3 for additional discussions on (1) potential usage of ambient monitoring data "in lieu" of modeling off-property sources and/or (2) specific distance used to develop the off-property inventory.

ADMT Additional Comment: Single property line designations (SPLDs) are designated by regulated entity number not SIC code. If Total Petrochemicals & Refining USA, Inc. is no longer part of the SPLD, please provide adequate documentation demonstrating the SPLD has been voided before submitting the AQA.

Applicant Response: The proposed project requires a State National Ambient Air Quality Standards (NAAQS) analysis for Sulfur Dioxide (SO_2). For the State NAAQS analysis, the initial receptor grid will reflect the Single Property Line Designation (SPLD) between Total Petrochemicals & Refining USA, Inc. (TOTAL) [RN102457520], Enterprise Refined Products Company LLC (Enterprise) [RN100228717], and BASF Total Petrochemicals LP (BTP) [RN100216977]. If required, site-wide modeling will include applicable emission rates from all facilities in the SPLD.

Preliminary information indicates that the proposed project will comply with the Significant Impact Level (SIL) for SO_2. As such, the AOI analysis and/or development of an off-property inventory for SO_2 should not be

required. TOTAL understands that if the SIL analysis does not produce predicted concentrations under the SILs, TOTAL will provide additional justification on the representativeness of the monitor used, as well as additional justification for the use of the AOI plus 20 kilometers and consult with TCEQ concerning pending or recently permitted facilities to be included in the modeling analysis.

ADMT Comment: The approach outlined to address the State NAAQS analysis is appropriate.

Section 4 State Property Line Analyses

Original ADMT Comment: Note the state property line standard for sulfur dioxide for Jefferson County is 817 µg/m³.

The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a single property line designation (SPLD). Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: TOTAL has the following comments:

- **The AQA will use the indicated state property line standard for Jefferson County.**
- **The proposed facility is not included in existing single property line designation (SPLD) at the facility. The Side Cracker facility has a different 2-digit Standard Industrial Classification (SIC) code and is a different "source" for the purposes of air quality permitting. This issue has been previously discussed with TCEQ during a meeting on September 2, 2014. The meeting was attended by Rebecca Partee, Kristi Mills-Jurach, Matt Earnest, Don Ruggeri, Daniel Menendez and others from the TCEQ. Don Clauson (Total) and Randy Parmley (Sage) were also present. We can provide the PowerPoint presentation made during the meeting upon request. It was TOTAL's understanding that TCEQ confirmed that the Refinery and Side-Cracker Ethylene Production sources will be treated as separate sources, irrespective of the RN referenced.**

ADMT Additional Comment: Single property line designations (SPLDs) are designated by regulated entity number not SIC code. If Total Petrochemicals & Refining USA, Inc. is no longer part of the SPLD, please provide adequate documentation demonstrating the SPLD has been voided before submitting the AQA.

Applicant Response:

TOTAL has the following comments:

- **The AQA will use the indicated state property line standard for Jefferson County.**
- **For the State Property Line analysis, the receptor grid will reflect the SPLD between TOTAL, Enterprise, and BTP. If required, site-wide modeling will include applicable emission rates from all facilities in the SPLD.**

ADMT Comment: The approach outlined to address the State Property Line analysis is appropriate.

Section 5 State Effects Review Analyses

Original ADMT Comment: The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a SPLD. Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

ADMT Additional Comment: See the comment above in section 4.

Applicant Response: For the State Effects Review Analysis, the receptor grid will reflect the SPLD between TOTAL, Enterprise, and BTP. If required, site-wide modeling will include applicable emission rates from all facilities in the SPLD.

ADMT Comment: The approach outlined to address the State Effects Review analysis is appropriate.

6.6 Receptor Grids

Original ADMT Comment: A single property line designation agreement (SPLD) exists between Total Petrochemicals & Refining USA, Inc., Enterprise Refined Products Company LLC, and BASF FINA Petrochemicals LP. Be sure to include a copy of the SPLD agreement, as well as the associated property line map with the AQA.

Please note that receptors will need to be placed on Enterprise Refined Products Company LLC and BASF FINA Petrochemicals LP for all federal (PSD NAAQS and Increment) analyses.

In addition, for all state analyses (minor NSR NAAQS, state property line, and state

health effects analyses), the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

ADMT Additional Comment: See the comment above in section 4.

Response:

TOTAL has the following comments:

- **The AQA will include a copy of SPLD agreement, as well as the associated property line map.**
- **For federal Prevention of Significant Deterioration (PSD) analyses, receptors will be placed on Enterprise and/or BTP analyses.**
- **For State NAAQS, State Property Line, and/or State Effects Review analyses, the receptor grid will reflect the SPLD between TOTAL, Enterprise, and BTP. If required, site-wide modeling will include applicable emission rates from all facilities in the SPLD.**

ADMT Comment: The receptor grid design outlined above is appropriate. To clarify, the receptor grid for all federal Prevention of Significant Deterioration (PSD) analyses should start at the fence line or physical barrier to public access.

6.9.4 Multi-Point Ground Flare (Routine Activity and/or Planned MSS Activities)

Original ADMT Comment: Please provide the calculation of the effective stack diameter as part of the documentation with the AQA. Additionally, coordinate with the permit reviewer regarding the proposed adjusted method for calculating the individual effective diameter for each active nozzle. Be sure to document how the different operating scenarios are being taken into account; the number of active nozzles and the resulting effective diameter will depend on the flow going to the flare.

For the flaring operations, it is not clear from the information provided that the activity is intermittent. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Applicant Response: The following represents a response to TCEQ comments:

- **Attachment C discusses representation of Multi-Point Ground Flare (MPGF) in the AQA.**
- **Attachment D presents additional documentation to justify**

"intermittent source policy" for 1-Hour Nitrogen Dioxide (NO_2) National Ambient Air Quality Standards (NAAQS) and 1-Hour Sulfur Dioxide (SO_2) NAAQS in the AQA.

ADMT Additional Comment: Attachment D of the revised protocol includes a proposal to exclude the multipoint ground flare emissions from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses. Exclusion of this source from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses is not appropriate. Furthermore, based on the information provided in Attachments C and D, it is not clear if the multipoint ground flare qualifies as an intermittent source. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA if intermittent source guidance is relied on for the multipoint ground flare.

Applicant Response: The AQA will include appropriate emission rates from the multipoint ground flare (MPGF) in the 1-Hour Nitrogen Dioxide (NO_2) and 1-Hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standards (NAAQS) analyses. For the MPGF, the appropriate emission rates will reflect the following:

<u>Emission Rates from Routine Operations</u>

For routine operations from the MPGF, the emission calculation reflects continuous operation. Since the routine operations are not limited on operational hours, the "intermittent source policy" will not be used for the 1-Hour NO_2 NAAQS and the 1-Hour SO_2 NAAQS analyses. For routine operations, the appropriate emission rate will reflect the potential to emit (PTE).

<u>Emission Rates from Planned Maintenance, Startup, and Shutdown (MSS) Activities</u>

For planned MSS activities from the MPGF, the emission calculation reflects an operational limit of 500-hours-per-year (hrs/yr). Since the planned MSS activities are limited on operational hours (and intermittent vents are both infrequent and short duration by nature), the "intermittent source policy" should be applicable for the 1-Hour NO_2 NAAQS and the 1-Hour SO_2 NAAQS analyses.

To support the use of "intermittent source policy" for planned MSS activities at the MPGF, TCEQ requested the following additional documentation: number of events per year, duration for each event, and whether planned MSS activities may occur simultaneously with other intermittent vents and/or routine operations from the MPGF. After some inquiry, TOTAL has determined that the detailed MSS flaring information requested by TCEQ is not currently available and proposes to conduct the air quality modeling analysis without using the "intermittent source policy" for planned MSS activities from the MPGF. Under this scenario, the appropriate emission rate for the MPGF will reflect the potential to emit (PTE). Alternatively, if the additional documentation requested by TCEQ is

developed to support the use of "intermittent source policy" for planned MSS activities from the MPGF, the requested additional documentation will be provided to TCEQ.

ADMT Comment: If the operation details of the MPGF are determined later and the applicant would like to model the planned MSS activities following intermittent guidance, please provide a revised protocol to TCEQ and EPA Region 6 before submitting the AQA.

If you have any questions please contact Rachel Melton at 512-239-2358, by fax at 512-239-1330, or by email at Rachel.Melton@tceq.texas.gov.

March 8, 2016

Sent via e-mail to jkupper@disorboconsult.com and Joseph.Janecka@tceq.texas.gov.

Subject: PSD Air Quality Analysis Protocol TCEQ Permit Nos. 3214 and 3219 OP-3 Unit Expansion Project

I have reviewed the modeling protocol for Shell Chemical LP, located at Deer Park, Harris County, Texas, dated February 2016, and my comments are provided below. The comment in section 5.5 should be addressed before the air quality analysis (AQA) is submitted. The remaining comments are reminders for information to be included with the AQA.

1.2 Project Overview – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or Prevention of Significant Deterioration (PSD) Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

1.4 Constituents evaluated – Table 1-1 of the protocol lists the SO_2 30-minute State Property Line standard as 1021 $\mu g/m^3$. However, the standard for Harris County is 715 $\mu g/m^3$.

3.0 Maps and Plot Plan – The protocol notes that Figure 3-1 depicts the property line; however, according to TCEQ records, this boundary represents a Single Property Line Designation (SPLD) boundary. The boundary for the SPLD is applicable for minor new source review (NSR) NAAQS, State Property Line, and Health Effects analyses. The SPLD boundary is not applicable for PSD analyses. For the PSD analysis of CO, the fence line or other barriers to public access to the project site should be used in the analysis. Please provide an area map or plot plan that shows the Shell Chemical LP fence line with the AQA.

Figures 3-2 and 3-3 of the protocol do not contain labels for the downwash structures. Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site fence line, property line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. Also, please note that the plot plan should be independent of any model input software.

4.0 Air Quality Monitoring Data – The protocol notes that preliminary modeling results indicate that all pollutants and averaging periods are below the SILs; therefore Step 2 modeling is not required and ambient monitoring data is not needed for the air quality analysis. Please note that if the preliminary results change and model predictions are greater than or equal to an applicable de minimis level, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that addresses the development of the applicable off-property source inventories,

the gathering of background concentrations used in the NAAQS analysis, and how the pre-application analysis will be addressed. The revised protocol should include full documentation and justification for any proposed modeling techniques and proposed monitoring stations.

The protocol notes that to demonstrate a monitor's representativeness, emissions, topography, and sources in the area surrounding the Shell Deer Park Complex and the Baytown monitor (AQS Site 48-201-0058) were determined to be comparable. Please provide the comparison of the emissions surrounding the Shell Deer Park Complex and the Baytown monitor with the AQA.

Please note that the TCEQ has recently made available the 2014 Point Source Emissions Inventory. The inventory can be downloaded at the web site listed below:

http://www.tceq.texas.gov/airquality/point-source-ei/psei.html

Use the most recent TCEQ emissions inventory for the comparison of the emissions surrounding the Shell Deer Park Complex and the Baytown monitor.

The protocol notes that the 2015 data from the EPA Air Quality System (AQS) Data Mart system are not complete for the Baytown monitor. If the 2015 data from the EPA AQS Data Mart system is complete by the time the AQA is submitted, please make use of the data.

5.0 Modeling Emissions Inventory – The protocol notes that negative emission rates will be used in the PM_{10} and $PM_{2.5}$ analysis for furnaces that will be removed from operation. Please coordinate with the permit reviewer on the sources and emissions rates to evaluate prior to submitting the AQA.

5.1 Source Parameter Justification – The protocol indicates that flares will be modeled using parameters per TCEQ guidance. Be sure to provide flare effective stack diameter calculations with the AQA.

Table 5-3 of the protocol shows data for the effective stack diameter calculations for the flares proposed to be included in the analysis. Model ID FLR_RTN has a heat input of 373 MMBTU/hr, a gross heat release of 515,792 cal/sec, and an effective stack diameter of 0.63 meters. However, if the heat release is 373 MMBTU/hr, then the gross heat release should be 26,110,000 cal/sec and the effective stack diameter should be 4.45 meters. Please update the information, as needed, for Model ID FLR_RTN in the AQA.

5.2 Operating Scenarios – If modeling refinement is necessary, be sure to provide detailed documentation and justification for the modeling scenarios used. Please demonstrate that the worst-case scenario has been represented in the AQA.

5.3 Scaling Factors – The protocol notes that for the decoke drum (EPN VP31142B), an average emission rate will be used for the 24-hr PM_{10} and $PM_{2.5}$ analysis. Please provide the calculations used to determine the modeled emission rates for the 24-hr averaging period with the AQA.

5.5 Intermittent Sources – Table 5-4 of the protocol lists the expected duration and total events per year (listed in the frequency column) for planned MSS activities to support the use of intermittent guidance. It is not clear from the information provided with the protocol that the MSS activities qualify as intermittent sources. Please indicate how often (e.g., the number of times per month, week, or day) the sources are expected to be operated, prior to submitting the AQA.

Please note that the use of intermittent guidance only applies to the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses and does not apply for the SO_2 State Property Line analysis.

6.1 Dispersion Model Section – AERSCREEN version 15181 has been released. Please use this version of AERSCREEN if the screening model will be used.

The protocol notes that ISC-PRIME will be used for the State NAAQS and State Property Line analyses. AERSCREEN is the screening version of AERMOD, and was proposed to be used for the CO modeling analysis. Once an applicant has used AERMOD or AERSCREEN for a major NSR permit, AERMOD or AERSCREEN should be used for minor NSR permits as well.

Additionally, AERMOD has been relied upon in the past by Deer Park Energy Center (RN100222033) which is a member of the SPLD agreement for the project site. Therefore, AERMOD should continue to be used for all sites within the SPLD agreement. This will ensure consistency in the technical review process as modeled concentrations will be calculated under the requirements of the same modeling system.

6.2 AERSCREEN Modeling Procedures – The protocol notes that the 1-hr average pollutant concentrations will be converted to longer averaging periods applicable to each standard using conservative scaling factors approved by the TCEQ. It should be noted that scaling factors exist for the AERMOD/AERSCREEN model. These scaling factors can be found in the AERSCREEN User's Guide.

6.2.1 Urban/Rural Option – The protocol notes that the urban option will be used in AERSCREEN. Please be sure to provide the justification used in the protocol in the AQA.

6.2.2 Receptors – For the CO analysis, be sure to use the Shell Chemical LP fence line rather than the SPLD property line.

6.2.3 Building Wake Effects (Downwash) – Provide a table listing all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

Ensure that all GEP heights used in BPIP PRIME are justified according to Guideline for Determination of Good Engineering Practice Stack Height:

http://www.epa.gov/scram001/guidance/guide/gep.pdf

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this

approach.

6.2.4 Terrain – The protocol notes that flat terrain will be used for the AERSCREEN modeling. Please be sure that the modeled downwash structures do not have elevations, to be consistent with the modeled sources and receptors.

6.2.5 Meteorological Data – Please be sure to provide the AERSURFACE files with the AQA associated with the modeling analyses.

6.3 ISC-Prime Modeling Procedures – If AERMOD is used (see comment above in section 6.1), this section of the AQA will need to discuss AERMOD modeling procedures.

6.3.2 Building Wake Effects (Downwash) – Please see the comments above in section 6.2.3.

6.3.3 Receptor Grid – It is not sufficient to say that the TCEQ guidance will be followed. Please discuss the spacing of receptors along the property line/fence line and discuss how far tight (25 meter), medium (100 meter) and coarse (500 meter) receptor grids will extend from the sources being modeled in the AQA. Be sure to include a copy of the SPLD agreement, as well as the associated property line map, with the AQA.

For pollutants that require a site-wide health effects analysis, be sure to include emissions from the other regulated entities associated with the SPLD agreement.

6.3.4 Meteorological Data – Given that AERMOD has been used for this SPLD "site," if AERMOD is used for any of the analyses (see comment above in section 6.1), then this section of the AQA should be updated to discuss AERMOD meteorological data. The TCEQ has two data sets available for Harris County based on two different surface station locations (one at the George Bush International Airport and one at the Houston Hobby Airport). Justification for the meteorological data selected should include a discussion of proximity and land surface characteristics.

7.1 PSD NAAQS Analyses – The protocol notes that for each averaging period with a concentration greater than a SIL, a site-wide modeling analysis will be required. Please refer to comments in section 4.0.

7.2 State NAAQS and Property Line Analyses – The protocol notes for the State NAAQS analysis that a representative monitor background concentration will be added to each of the maximum modeled ground level concentrations for comparison to the NAAQS. It should be noted that if off-property sources will be evaluated with ambient monitoring data, the AQA will need to have supporting documentation for the approach. Be sure to also consider any new or recently permitted sources that will not be accounted for with the existing ambient background concentrations.

8.0 Additional Impacts Analysis – The protocol notes that the facility impacts on growth, soils, vegetation, and visibility will be discussed in the final AQA. Please provide these analyses with the AQA.

When documenting the AQA, please site 30 TAC Chapter 111 when stating that the project will comply with the applicable visibility and opacity requirements to satisfy the Class II visibility analysis.

The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal land manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area.

The proposed site is located beyond 100 km from the nearest Class I area and would not require a Class I analysis. However, the applicant may contact the applicable federal land manager to discuss any potential Class I analyses.

Deliverables – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Bob Castro at (512) 239-1314, by fax at (512) 239-1400, or by email at Roberto.Castro@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Mon 2/29/2016 7:59:28 PM
Subject: Modeling Protocol - 810 Invista S A R L
INVISTA AA PSD Modeling Protocol_2016-02-18.pdf
Modeling Protocol - 810 Invista s.a r.l.docx

Ashley,

Attached are the modeling protocol submitted by Invista S A R L (permit No. 810) and TCEQ comments on the modeling protocol.

Please let me know if you have any question.

Regards,

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Clark, David
Sent: Mon 2/29/2016 4:18:48 PM
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling
FutureFuel Facility Location (Fig 2-1).pdf

Ashley & Erik,

Attached is a figure provided by Trinity (working for FutureFuel) that they say may be useful during this afternoon's call.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Clark, David
Sent: Monday, February 29, 2016 9:10 AM
To: 'Mohr, Ashley'
Cc: Snyder, Erik; Montgomery, William; McCorkle, Mark
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley & Eric,

Today's call attendees include:

Mark, Will Montgomery, and myself for ADEQ.

Representing Entergy will be David Tripplet and Tracy Johnson with Entergy, Rich Hamel with ERM, Debra Jezouit with Baker Botts, and Chad Wood with the Gill Law firm.

Representing Future Fuel will be Philip Antici, Chuck Buttry and Sarah Haley from Trinity Little Rock, and Jon Hill from Trinity NC.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 9:23 AM

To: Clark, David; McCorkle, Mark
Cc: Snyder, Erik
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Thanks David. We will use the same call in details that we used yesterday (provided below). I will send out the invite to the HQs folks to get on their calendar. Let me know if you have questions. Otherwise, we will talk again on Monday.

Conference Line 866-299-3188

Conference Code Ex. 6 - Personal Privacy

Have a nice weekend!

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, February 26, 2016 8:27 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; McCorkle, Mark <MAC@adeq.state.ar.us>
Cc: Snyder, Erik <snyder.erik@epa.gov>
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley,

Monday February 29 from 2-3 works for us. Let me verify who will be on the call on our end and what information we have put together at this point that we can provide in advance.

I'll be back in touch,

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 7:55 AM
To: McCorkle, Mark; Clark, David
Cc: Snyder, Erik
Subject: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Mark & David,

I spoke with George Bridgers regarding setting up a time to discuss the use of Adjusted U* and the Model Clearinghouse approval process. Below are the best times for the first part of the week (proposed 1 hour block for the call). If these do not work, I can coordinate with George to see what times later in the week might work.

Monday: 2:00 – 3:00 PM

Wednesday: 8:00 – 9:00 AM; 8:30 – 9:30 AM; 9:00 – 10:00 AM; 9:30 – 10:30 AM

We anticipate the following to participate in the call from EPA: Myself, Erik Snyder, George Bridgers, and James Thurman. Let me know what time works best for you and the company/consultants. Please also provide any additional project specific information you may have available in advance of the call.

Once we have a day/time set, I will send out call in details. Let me know if you have any questions.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Clark, David
Sent: Mon 2/29/2016 3:09:54 PM
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley & Eric,

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Mark, Will Montgomery, and myself for ADEQ.

Representing Entergy will be David Tripplet and Tracy Johnson with Entergy, Rich Hamel with ERM, Debra Jezouit with Baker Botts, and Chad Wood with the Gill Law firm.

Representing Future Fuel will be Philip Antici, Chuck Buttry and Sarah Haley from Trinity Little Rock, and Jon Hill from Trinity NC.

David

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 9:23 AM
To: Clark, David; McCorkle, Mark
Cc: Snyder, Erik
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

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Conference Line	Ex. 6 - Personal Privacy
Conference Code	

Have a nice weekend!

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, February 26, 2016 8:27 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; McCorkle, Mark <MAC@adeq.state.ar.us>
Cc: Snyder, Erik <snyder.erik@epa.gov>
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley,

Monday February 29 from 2-3 works for us. Let me verify who will be on the call on our end and what information we have put together at this point that we can provide in advance.

I'll be back in touch,

David

David W. Clark, M.S.

Epidemiologist

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 7:55 AM
To: McCorkle, Mark; Clark, David
Cc: Snyder, Erik
Subject: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Mark & David,

I spoke with George Bridgers regarding setting up a time to discuss the use of Adjusted U* and the Model Clearinghouse approval process. Below are the best times for the first part of the week (proposed 1 hour block for the call). If these do not work, I can coordinate with George to see what times later in the week might work.

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Wednesday: 8:00 – 9:00 AM; 8:30 – 9:30 AM; 9:00 – 10:00 AM; 9:30 – 10:30 AM

We anticipate the following to participate in the call from EPA: Myself, Erik Snyder, George Bridgers, and James Thurman. Let me know what time works best for you and the company/consultants. Please also provide any additional project specific information you may have available in advance of the call.

Once we have a day/time set, I will send out call in details. Let me know if you have any questions.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
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(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
From: McCorkle, Mark
Sent: Thur 2/25/2016 6:14:54 PM
Subject: RE: SO2 Designations

That'll work. Thanks Ashley.

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, February 25, 2016 10:23 AM
To: McCorkle, Mark
Cc: Snyder, Erik; Clark, David
Subject: RE: SO2 Designations

We will plan to take the call in one of our conference rooms. So, lets plan on using the following call-in:

Conference Line	866-299-3188
Conference Code	Ex. 6 - Personal Privacy

Thanks,

Ashley

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From: McCorkle, Mark [mailto:MAC@adeq.state.ar.us]
Sent: Thursday, February 25, 2016 10:22 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>

Subject: RE: SO2 Designations

Sounds good Ashley. We'll ring you up then.

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, February 25, 2016 9:26 AM
To: McCorkle, Mark
Cc: Snyder, Erik; Clark, David
Subject: RE: SO2 Designations

Mark,

I spoke with Erik, and we should have some time today. Would 2 PM work for you all?

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: McCorkle, Mark [mailto:MAC@adeq.state.ar.us]
Sent: Wednesday, February 24, 2016 2:26 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>
Subject: SO2 Designations

Hi Ashley,

I've tried to call Eric but his phone message hasn't updated for a while and I don't like leaving messages. David Clark and I have a few questions regarding modeling for SO2 designations. We would like to have a short conference call with you and/or Eric at your earliest convenience. Please advise regarding a good time for us to call. Thanks – Mark

Mark McCorkle

Environmental Program Coordinator

Planning and Air Quality Analysis. Air Division

Arkansas Department of Environmental Quality

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Texas Commission on Environmental Quality
Atmospheric Dispersion Modeling Protocol

REXtac, LLC
Odessa Plant

Odessa, Ector County
Air Quality Account ID No. EG-A013-M
Regulated Entity No. RN103719704
Customer No. CN603530866

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EXECUTIVE SUMMARY

REXtac, LLC (REXtac) is proposing to construct an expansion of its Odessa Plant in Odessa, Ector County, Texas. The facility (or "project") to be constructed will consist of modifications to the existing Line 2 process train as well as the addition of three additional process trains: Line 3, Line 4, and Line RGP (Refinery Grade Propylene). This modeling protocol outlines the air quality analysis methodology to be used in support of REXtac's project proposal. It includes PSD and State NAAQS demonstrations, a state property line demonstration, and a health effects review.

This modeling protocol was prepared in accordance with the TCEQ's April 2015 "Air Quality Modeling Guidelines – APDG 6232."

SECTION 1.0

PROJECT IDENTIFICATION INFORMATION

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Permit Application No.: Permit No. 16963
PSD Permit TBD

Nearest City and County: Odessa,Ector County

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SECTION 2.0

PROJECT OVERVIEW

This modeling protocol is being performed to demonstrate protectiveness for the Odessa Plant Permit No. 16963 amendment application, TCEQ Project No. 245476. The modeling effort will analyze the off-property impacts of the emission increases proposed in this application.

Detailed information on the layout of the Odessa Plant, as well as documentation of emission calculations, can be found in the appropriate sections of the permit application. Emission Summary Tables are provided in Appendix A of this protocol.

2.1 Type of Permit Review

The project proposes PSD-significant emission increases of volatile organic compounds (VOC), which are a precursor for ozone (O_3), as well as PSD-significant emissions increases of carbon monoxide (CO). An ozone ambient impact analysis will be required as a result of the proposed VOC increase, and a PSD NAAQS analysis will be required for CO. The project also proposes minor increases in NO_2, PM_{10}, $PM_{2.5}$, and SO_2. A state NAAQS analysis will be required for NO_2, PM_{10}, $PM_{2.5}$, and SO_2.

A state property line analysis will be conducted for proposed hydrogen sulfide (H_2S) and sulfur dioxide (SO_2) emission increases.

In addition, a health effects review will be conducted for all non-criteria air contaminants for which the project proposes emissions increases.

2.2 Constituents to be Evaluated

The applicable SIL levels and NAAQS standards for criteria pollutants are provided in the table below. Since no Class I area is located within 100 km of the project site, no Class I area analysis will be required.

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Table 1. Pollutant Standards for State Property Line, and PSD/State NAAQS

Pollutant	Averaging Period	SIL (µg/m³)	SMC (µg/m³)	PSD (CO, O_3 only) /State Primary NAAQS (µg/m³)	PSD (CO, O_3 only) Secondary NAAQS (µg/m³)
CO	1-hr	2,000	-	40,000	-
CO	8-hr	500	575	10,000	-
NO_2	1-hr	7.5 [a]	-	188	-
NO_2	Annual	1	14	100	100
O_3	8-hr	-	-	147	137.4 (70 ppb)
PM_{10}	24-hr	5	10	150	150
PM_{10}	Annual	1	-	-	-
$PM_{2.5}$	24-hr	1.2	-	35	35
$PM_{2.5}$	Annual	0.3	-	12	15
SO_2	30-min	State property line: 20.42	-	State property line: 1,021	-
SO_2	1-hr	7.8	-	196	-
SO_2	3-hr	25	-	-	1300
SO_2	24-hr	5	13	365	-
SO_2	Annual	1	-	80	-
H_2S	30-min	State property line: 2.16 (non-industrial) 3.24 (industrial)	0.2	State property line: 108 (non-industrial) 162 (industrial)	-

a. Interim SIL

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Table 2 below details the non-criteria pollutants to be analyzed in the health effects review.

Table 2. Pollutants for State Health Effects Analysis

Pollutant	CAS No.	Short-Term ESL (µg/m³)	Long-Term ESL (µg/m³)
2-butoxyethanol	111-76-2	2900	3700
Acetone	67-64-1	7800	4800
Triethyl Aluminum	97-93-8	20 (PM10)	2 (PM10)
Ammonia	7664-41-7	180	92
Polydimethylsiloxane	63148-62-9	1000 (vapor)	100 (vapor)
APAO*	--	50	5
aliphatic hydrocarbon blend	69430-33-7	2450	245
1,3-Butadiene	106-99-0	510	9.9
n-Butane	106-97-8	66000	7200
1-Butene	106-98-9	19000	1600
Catalyst*	--	20	2
n-Octane	111-65-9	3500	350
dimethylcyclopentane, all isomers	--	3500	350
Ethylbenzene	100-41-4	26000	570
Ethylene	74-85-1	1400	34
n-Heptane	142-82-5	3500	350
1-Hexene	592-41-6	1700	170
Isopropanol	67-63-0	4920	492
Maleic Anhydride	108-31-6	10	1
Methanol	67-56-1	3900	2100
Methyl Ethyl Ketone	78-93-3	18000	2600
Methyl Acetylene-Propadiene mixture	59355-75-8	16400	1640
Methane	74-82-8	N/A – Simple Asphyxiant	
Ethane	74-84-0	N/A – Simple Asphyxiant	
Propane	74-98-6	N/A – Simple Asphyxiant	
Propylene	115-07-1	N/A – Simple Asphyxiant	
Paraffin Oil	8012-95-1	1000 (vapor)	100 (vapor)
1-Octene	111-66-0	3400	340
Oil Distillate	64742-63-8	1000	100
n-Pentane	109-66-0	59000	7100
1-Pentene	109-67-1	290	600
Petroleum Distillates	--	3500	350
Toluene	108-88-3	4500	1200
m-Xylene	108-38-3	2200	180

*ESL provided by Tiffany Bredfeldt of the TCEQ on Feb. 11, 2013. See Appendix E.

Methane, ethane, propane, and propylene emissions are on the toxicology screening list classified as simple asphyxiants and therefore do not require health effects review.

Emissions from boilers, engines, or other combustion units fueled only by pipeline quality natural gas are also on the toxicology screening list and do not require health effects review. Therefore, units RGPBOILER01, RGPBOILER02, and BOILERST3 are exempt from the health effects review analysis and will not be included in the final analysis.

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SECTION 3.0

PLOT PLAN

The Odessa Plant is shown on the enclosed plot plan in Appendix B. The plot plan includes a clearly marked scale, all property lines, all fence lines and controlled access areas that will be in place when the project starts operation, all emission points associated with the Odessa Plant, a true north arrow, a UTM coordinate grid, reference UTM coordinates, and all buildings and structures which could create downwash effects. The UTM coordinates are based on North American Datum (NAD 1983) system. The length, width, and heights of the buildings and structures are summarized in a table on the plot plan.

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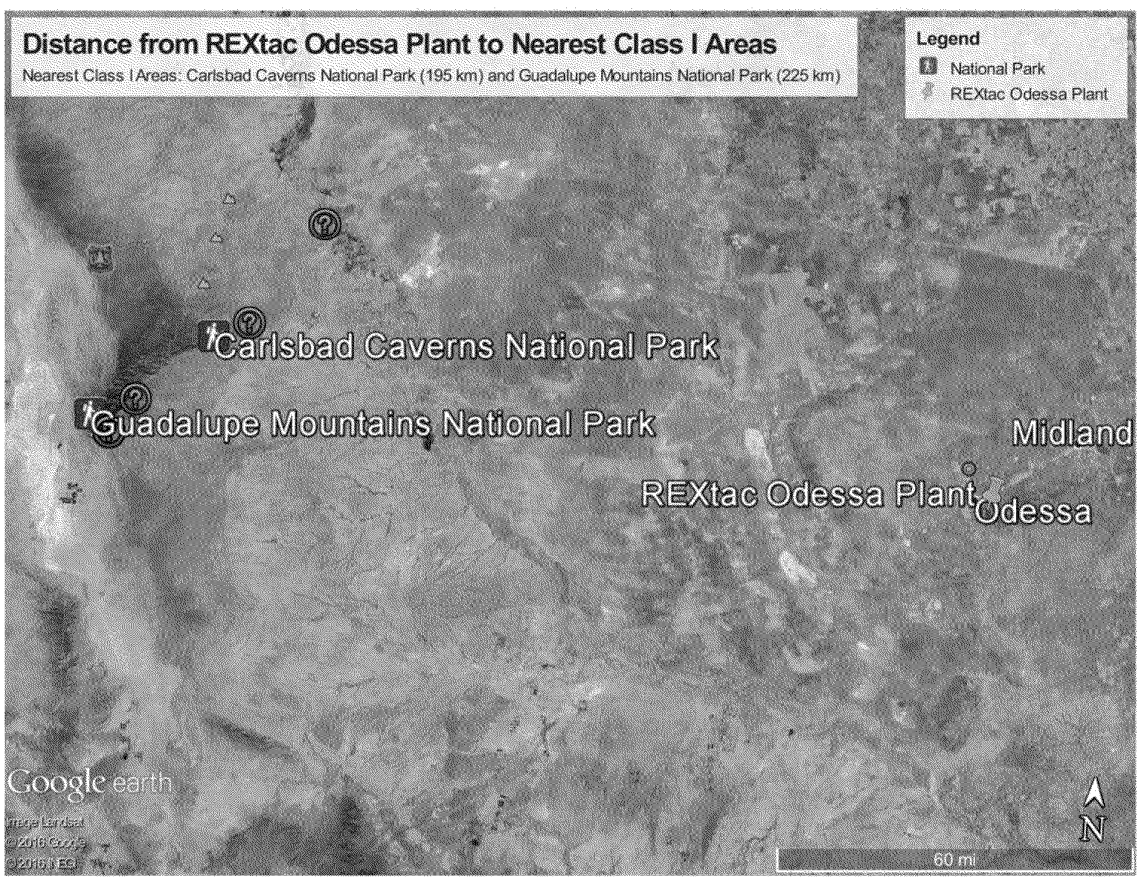
SECTION 4.0

AREA MAP

A copy of the area map submitted with the permit application is provided in Appendix C. It is an excerpt of a United States Geological Survey (USGS) 7.5-minute quadrangle. This area map displays a UTM coordinate grid, property/fence lines, and a 3,000-ft radius from the plant.

There are no schools located within 3,000 feet of the Odessa Plant property line. The nearest Class I areas are Carlsbad Caverns National Park and Guadalupe Mountains National Park. Carlsbad Caverns National Park is located approximately 195 km from the Odessa Plant. Guadalupe Mountains National Park is located approximately 225 km from the Odessa Plant. Figure 1 shows the location of the Odessa Plant relative to Carlsbad Caverns National Park and Guadalupe Mountains National Park.

Figure 1. Location of REXtac Odessa Plant Relative to Nearest Federal Class I Areas



SECTION 5.0

AIR QUALITY MONITORING DATA

Preliminary modeling results have been collected for the PSD NAAQS, State NAAQS, State Property Line Analysis, and MERA Analysis tests. Table 3 summarizes whether these preliminary impacts exceeded any applicable Significant Impact Levels (SILs) or Significant Monitoring Concentrations (SMCs).

Table 3. Preliminary Project Impact Determination

Pollutant	Averaging Time	Preliminary Modeling Concentrations (µg/m³)	SIL (µg/m³)	SMC (µg/m³)	Preliminary Results Exceed SIL?	Preliminary Results Exceed SMC?
CO	1-hr	108.80	2000	-	No	-
CO	8-hr	54.31	500	575	No	No
NO_2	1-hr	20.53	7.5	-	Yes	-
NO_2	Annual	0.28	1	NA, not PSD	No	NA, not PSD
O_3	See Ozone Ambient Impact Analysis in Appendix D.					
H_2S	30-min, state Property Line	0.006	2.16	-	No	-
SO_2	30-min, State Property Line	63.67	20.42	-	Yes	-
SO_2	1-hr	63.67	7.8	-	Yes	-
SO_2	3-hr	58.34	25	-	Yes	-
SO_2	24-hr	11.57	5	NA, not PSD	Yes	NA, not PSD
SO_2	Annual	0.04	1	-	No	-
PM_{10}	24-hr	2.92	5.0	NA, not PSD	No	NA, not PSD
PM_{10}	Annual	0.16	1	-	No	-
$PM_{2.5}$	24-hr	1.28	1.2	-	Yes	-
$PM_{2.5}$	Annual	0.16	0.3	-	No	-

During preliminary model runs, it was determined that CO (the only PSD NAAQS-applicable criteria pollutant) did not exceed its SIL or SMC; therefore, no PSD pre-application analysis is required.

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Preliminary state NAAQS modeling determined that the NO_2 1-hour averaging time, $PM_{2.5}$ 24-hour averaging time, and SO_2 1-hour, 3-hour, and 24-hour averaging times exceeded their respective SILs and will require further analysis of available ambient monitoring data. The preliminary state NAAQS model determined that NO_2 annual averaging time, SO_2 3-hour averaging time, SO_2 24-hour averaging time, SO_2 annual averaging time, PM_{10} 24-hour averaging time, PM_{10} annual averaging time, and $PM_{2.5}$ annual averaging time did not exceed their respective SILs. H_2S did not exceed either the industrial or non-industrial state property line SIL. SO_2 exceeds the industrial and non-industrial state property line SIL; therefore, site-wide modeling of SO_2 1-hour averaging time will be conducted for all on-property sources of SO_2.

The following sections cover the representative monitoring data retrieved for the state NAAQS demonstration.

5.1 Monitor Selection

In order to provide an analysis of existing ambient air quality in the vicinity of the project, continuous monitoring data was obtained from the EPA's Air Data website[1] and the TCEQ's Continuous Air Monitoring (CAMs) website[2] for NO_2 1-hour averaging time, $PM_{2.5}$ 24-hr averaging time, and SO_2 1-hour, 3-hour, and 24-hour averaging times. There are no on-site monitors for $PM_{2.5}$, NO_2, or SO_2 at the REXtac Odessa Plant.

$PM_{2.5}$ Monitor

The Odessa Hays C47/A160 CAMS 122 [AQS Site 48-135-0003] located at Barrett and Monhans Streets, Odessa, Ector County, TX is an active CAMS monitor located just 4000 feet northwest of the REXtac Odessa Plant. It has complete data for $PM_{2.5}$ found on the TCEQ CAMS website. This specific monitor shows up as inactive on the EPA database as of 2010, so recent data has not been validated by EPA. However, all the data from this TCEQ CAMS monitor up to mid-2015 has been validated via the state agency and is acceptable to use as representative monitoring data. The Odessa Hays Monitor does not include data for NO_2 or SO_2.

SO_2 Monitor

The Dallas Hinton Monitor [AQS Site 48-113-0069] located at 1415 Hinton Street, Dallas, Dallas County, TX is proposed to provide SO_2 monitoring data for the REXtac Odessa Plant. Because there are no other active SO_2 monitors in the Odessa, Ector County region or in the adjacent surrounding counties (see Figures 2 and 3), the Dallas Hinton Monitor is proposed to provide SO_2 monitoring data because it is the closest available monitor located in an industrial area that: 1) monitors the pollutant of interest, 2) provides complete data for all averaging times and sufficient observation

[1] www.epa.gov/airquality/airdata/
[2] http://www.tceq.state.tx.us/cgi-bin/compliance/monops/site_info.pl

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percentages, 3) has more surrounding sources for the pollutant of interest than does the Odessa Plant, and 4) has a larger population than the Odessa – Ector County region. Criteria 1) and 2) above are justified in Figures 2 and 3 below, and criteria 3) and 4) above will be justified in further detail in the following sections. Although the Dallas Hinton Monitor provides NO_2 data, the TCEQ 2014 Emissions Inventory[3] shows that there are fewer sources of NOx surrounding the Dallas Hinton Monitor than the Odessa Plant; therefore, a different monitor is proposed to provide a conservative NO_2 background concentration.

NO_2 Monitor

The next largest industrial region is San Antonio. Therefore, the San Antonio Calaveras Lake Monitor [AQS Site 48-029-0059] located at 14620 Laguna Rd, San Antonio, Bexar County, TX is proposed to provide NO_2 monitoring data for the REXtac Odessa Plant. Because there are no other active NO_2 monitors in the Odessa, Ector County region or in the adjacent surrounding counties (see Figures 2 and 3), the San Antonio Calaveras Lake Monitor is proposed to provide NO_2 monitoring data because it is the closest available monitor located in an industrial area that: 1) monitors the pollutant of interest, 2) provides complete data for all averaging times and sufficient observation percentages, 3) has more surrounding sources for the pollutant of interest than does the Odessa Plant, and 4) has a larger population than the Odessa – Ector County region. Criteria 1) and 2) above are justified in Figures 2 and 3 below, and criteria 3) and 4) above will be justified in further detail in the following sections.

Neighboring Monitors

As shown in Figure 2, all closer NO_2, CO, and SO_2 monitors to the Odessa Plant are either inactive, have incomplete data (i.e. missing all recent data years, missing required observation percentage), or have fewer surrounding sources and lower population than around the Odessa Plant (will be justified in further detail in the following sections). Figure 3 shows that besides the incomplete or inactive monitors west of Odessa, the closest active monitors are east of Odessa in Dallas and San Antonio. Although Dallas and San Antonio are relatively far from Odessa, the Dallas and San Antonio monitors have more industrial and anthropogenic sources nearby than the Odessa Plant site and therefore are expected to have conservative background concentrations in comparison.

[3] https://www.tceq.texas.gov/airquality/point-source-ei/psei.html

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Figure 2. Aerial Map of SO_2, NO_2, and $PM_{2.5}$ Monitors Located in Ector County and Adjacent Surrounding Counties [4]

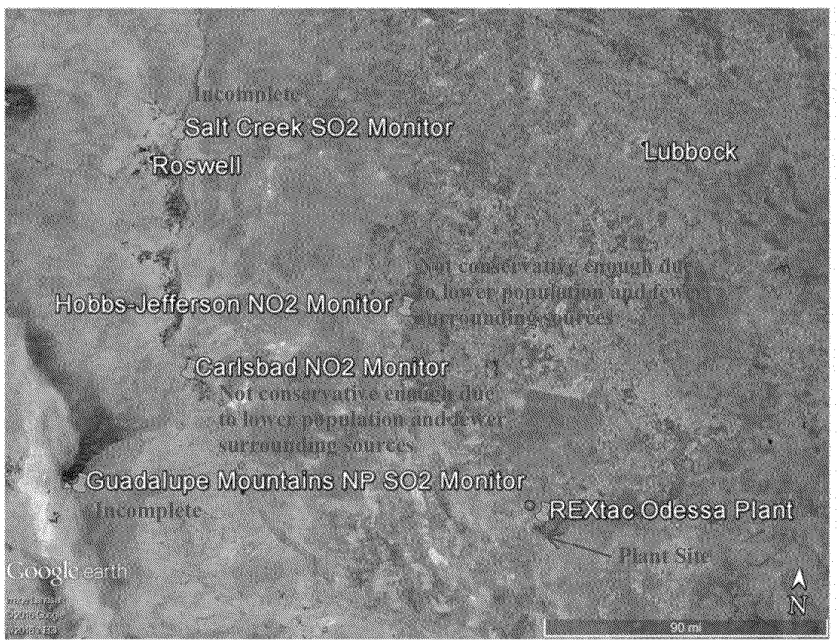
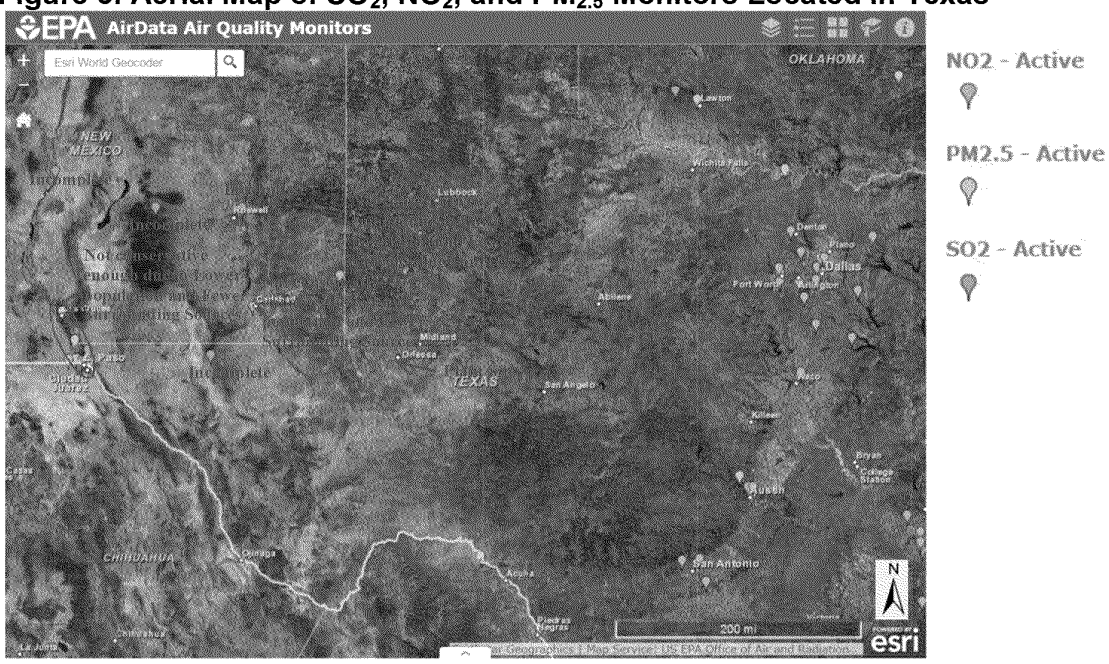


Figure 3. Aerial Map of SO_2, NO_2, and $PM_{2.5}$ Monitors Located in Texas[5]



[4] http://www3.epa.gov/airquality/airdata/ad_maps.html
[5] http://www3.epa.gov/airquality/airdata/ad_maps.html

5.1.1 Neighboring Industrial Sources Assessment

The Odessa Hays Monitor proposed for $PM_{2.5}$ is located in Odessa just 4000 feet northwest of the REXtac Odessa Plant; therefore, the neighboring sources justification is not necessary for $PM_{2.5}$. Similar to the immediate vicinity of the project site, the Dallas Hinton and San Antonio Calaveras Lake monitors are located adjacent to urban/industrial areas. Although the Dallas and San Antonio monitors are located relatively far from the Odessa Plant, the surrounding emissions are conservative in comparison to the project site.

A 20-km emissions inventory was performed to account for several large industrial sources just outside of the default 10-km range that would have an impact at the representative background monitors. The 20-km emissions inventory was performed in both the EPA 2011 NEI Database and the TCEQ 2014 EI State Summary Database. The coordinate locations for all RN Numbers based in counties that were within 20-km of the proposed monitor sites and REXtac facility were researched on the TCEQ website in order to determine which facilities fall within 20 km of either the REXtac facility or the proposed monitors.

As demonstrated in Table 4 below, the emissions surrounding the proposed representative monitors surpass those surrounding the project site. This provides a reasonable gauge that the background data from the monitor provides a conservative estimate for the background concentrations at the project site. The emissions by source type are provided in Appendix F. As shown in Table 4, the Dallas Hinton NOx emission totals from the TCEQ 2014 EI State Summary Data are less than the NOx emission totals surrounding the Odessa Plant; therefore, the Dallas Hinton Monitor was not chosen for use in representing the Odessa background emissions. Note that there was a significant discrepancy in NOx emissions between the EPA and TCEQ data, which was primarily due to the Dallas Love Field Air Traffic Controls located at 2702 Love Field Dr, 2.2 km away from the Dallas Hinton Monitor, not being included in the TCEQ data.

Table 4. 20-km Emissions Inventory from EPA 2011 NEI[6] and TCEQ 2014 EI State Summary Data[7] around Odessa Plant and non-Odessa Monitor Sites

Site Name	EPA 2011 NEI		TCEQ 2014 EI	
	NO_X (tpy)	SO_2 (tpy)	NO_X (tpy)	SO_2 (tpy)
REXtac Odessa Plant (Project Site)	1829	115	1663	247
Dallas Hinton [AQS Site 48-113-0069]	4203	651	358	286
San Antonio Calaveras Lake [AQS Site 48-029-0059]	9038	--	7423	--

[6] http://www.epa.gov/ttnchie1/net/2011inventory.html
[7] https://www.tceq.texas.gov/airquality/point-source-ei/psei.html

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5.1.2 Population/Land Use Assessment

The 2014 census data[8] for Ector, Dallas, and Bexar Counties were also collected, as shown in Table 5, to provide greater insight for these monitor selections. Dallas and Bexar Counties are both more densely populated than Ector County where the Odessa Plant and Odessa Hays Monitor are located. Higher population reflects increased human activity, not just industrial, but also day-to-day anthropogenic activities that can lead to emissions (commuting, cooking, etc.). All three cities (Odessa, Dallas, San Antonio) are also main industrial hubs in Texas. This data provides further justification that the Dallas Hinton and San Antonio Calaveras Lake monitors provide a conservative representation of background concentrations for the Odessa Plant analysis.

Table 5. County-wide Population Comparison

Site Name	County	2014 Population
REXtac Odessa Plant (Project Site)/ Odessa Hays Monitor [AQS Site 48-135-0003]	Ector County	153,904
Dallas Hinton [AQS Site 48-113-0069]	Dallas County	2,518,638
San Antonio Calaveras Lake [AQS Site 48-029-0059]	Bexar County	1,855,866

5.1.3 Representative Monitor Justification

Given the comparison of emissions surrounding the project site and the monitoring sites, as well as the comparison of land use and population around Odessa, Dallas, and San Antonio, the background concentration data sets from the Odessa Hays, Dallas Hinton, and San Antonio Calaveras Lake monitors are proposed to be used as a surrogate for background data at the project site for the purposes of this state NAAQS analysis.

5.2 State NAAQS Demonstration Monitoring Data

Screening or monitoring background data are not required for those pollutants and averaging periods with project impacts that do not exceed the applicable SIL or SMC. Table 3 above shows the preliminary results of the project impacts analyses. The project NO_2 1-hour, $PM_{2.5}$ 24-hour, and SO_2 30-minute state property line, 1-hour, 3-hour, and 24-hour averaging time demonstrations are expected to exceed their respective SILs, which therefore necessitates establishing monitoring background concentrations for these pollutants. Furthermore, current EPA modeling guidance states that use of the 24-hr and annual $PM_{2.5}$ SILs must be justified. Therefore, a

[8] http://quickfacts.census.gov/qfd/states/

representative ambient monitoring background concentration must be determined for the 24-hour and annual averaging times for $PM_{2.5}$ regardless of the project impacts.

5.2.1 $PM_{2.5}$ Monitoring Data and SIL Justification

$PM_{2.5}$ Monitoring Data

Project $PM_{2.5}$ 24-hour averaging time concentration impact exceeds the SIL. There are no on-site fine Particulate Matter ($PM_{2.5}$) monitoring locations at the Odessa Plant, but there is a TCEQ-controlled monitor 4000 feet northwest of the Odessa Plant located at the southeast corner of Hays Magnet Elementary School that has complete current/recent data. The following tables present the data from the Odessa Hays Monitor. Data from the three most recent complete years (2012-2014) were used; the 2015 data did not achieve an observation percentage of at least 75% complete per quarter because the data from the last half of 2015 has not yet been verified. The $PM_{2.5}$ annual averaging time monitoring data is included only to support the $PM_{2.5}$ SIL justification below for the use of the annual $PM_{2.5}$ SIL. The project $PM_{2.5}$ annual averaging time concentration impact does not exceed the SIL.

Table 6. 98th Percentile of the 24-hr Averaged Value $PM_{2.5}$ Monitoring data from Odessa Hays Monitor [AQS Site 48-135-0003]

3-Year Average (2012 through 2014)	18.56 µg/m³	Data Completeness
2014	19.192 µg/m³	99%
2013	18.86 µg/m³	98%
2012	17.64 µg/m³	99%

Table 7. Annual $PM_{2.5}$ Monitoring data from Odessa Hays Monitor [AQS Site 48-135-0003]

3-Year Average (2012 through 2014)	8.43 µg/m³	Data Completeness
2014	8.4 µg/m³	99%
2013	8.0 µg/m³	98%
2012	8.9 µg/m³	99%

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$PM_{2.5}$ SIL Justification

The EPA has recently published guidance on the appropriateness of using SILs for $PM_{2.5}$ modeling. The SILs used in the modeling analysis are 1.2 µg/m^3 for the 24-hour averaging time and 0.3 µg/m³ for the annual averaging time. The guidance from the EPA states the following[9]:

> *"If the preconstruction monitoring data are sufficiently representative of the air quality in existence before the increase in emissions from the proposed source and the difference between the $PM_{2.5}$ NAAQS and the measured $PM_{2.5}$ background concentrations in the area is greater than or equal to the SIL value selected from the vacated Sections 51.166(k)(2) and 52.21(k)(2), then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a source with an impact equal to or below that SIL value will not cause or contribute to a violation of the NAAQS and to forego a cumulative modeling analysis for $PM_{2.5}$ with respect to the NAAQS."*

Table 8 below presents the required comparison of NAAQS and monitoring information to justify the use of the $PM_{2.5}$ SILs.

Table 8. $PM_{2.5}$ SIL Justification with Odessa Hays Monitor Data [AQS 48-135-0003]

Averaging Time	Proposed SIL (µg/m³)	NAAQS (µg/m³)	Ambient Monitored Concentration (µg/m³)	Difference between NAAQS and Monitored Concentration (µg/m³)	Is Difference Greater than SIL?
24-hour	1.2	35	18.56	16.44	Yes
Annual	0.3	12	8.43	3.57	Yes

5.2.2 SO_2 Monitoring Data

Project NO_2 1-hour, 3-hour, and 24-hour averaging times' concentration impacts exceed the SIL. As described in Section 5.1 above, the Dallas Hinton Monitor is proposed to represent SO_2 background concentrations for the REXtac facility. The following tables present the data from the Dallas Hinton monitor. For all averaging times, SO_2 monitoring requires at least an observation percentage of 75% complete per quarter in order to be acceptable for use as a background concentration. Data from the three most recent complete years (2012-2014) were used; the 2015 data did not achieve an observation percentage of at least 75% complete per quarter.

[9] http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

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Table 9. 99% Daily Maximum 1-hr SO_2 Monitoring Data from Dallas Hinton Monitor [AQS Site 48-113-0069]

3-Year Average (2012 through 2014)	**5.17 ppb**	**9.72 µg/m³**	**Data Completeness**
2014	4.6 ppb	8.65 µg/m³	99%
2013	5.0 ppb	9.41 µg/m³	98%
2012	5.9 ppb	11.1 µg/m³	99%

Table 10. H2H 3-hr SO_2 Monitoring data from Dallas Hinton Monitor [AQS Site 48-113-0069]

	First Max	Second Max	**Data Completeness**
2014	4.0 ppb / 7.53 µg/m³	**3.9 ppb / 7.34 µg/m³**	99%

Table 11. H2H 24-hr SO_2 Monitoring data from Dallas Hinton Monitor [AQS Site 48-113-0069]

	First Max	Second Max	**Data Completeness**
2014	1.4 ppb / 2.63 µg/m³	**1.3 ppb / 2.45 µg/m³**	99%

5.2.3 NO_2 Monitoring Data

Project NO_2 1-hour averaging time concentration impact exceeds the SIL. As described in Section 5.1 above, the San Antonio Calaveras Lake Monitor is proposed to represent NO_2 background concentrations for the REXtac facility. The following table presents the data used from the San Antonio Calaveras Lake monitor. For the 1-hour averaging time, NO_2 monitoring requires at least an observation percentage of 75% complete per quarter in order to be acceptable for use as a background concentration. The 1-hour averaging time data used was from 2012-2014 because the fourth quarter for 2015 is not at least 75% complete.

Table 12. 98% Daily Max 1-hr NO_2 Monitoring Data from the San Antonio Calaveras Lake Monitor [AQS Site 48-029-0059]

3-Year Average (2012 through 2014)	33.30 ppb	**62.65 µg/m³**	**Data Completeness**
2014	30.9 ppb	58.14 µg/m³	95%
2013	35.2 ppb	66.23 µg/m³	95%
2012	33.8 ppb	63.59 µg/m³	90%

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SECTION 6.0

MODELING EMISSIONS INVENTORY

6.1 On-Property Sources to be Reviewed

The initial NAAQS modeling analysis will consider only the sources of proposed emissions increases to be added to the Odessa Plant in this current project. Appendix A lists all proposed sources. Impacts from the project increases of NO_2, CO, PM_{10}, $PM_{2.5}$, SO_2, and H_2S will be compared to applicable SIL values listed in Section 2.2. If the modeled project impacts are less than these SILs, the demonstration will be considered complete for that pollutant-averaging time couple. However, if any of the modeled impacts are above a given SIL, a site-wide modeling analysis will be conducted, which will include all sources from the Odessa Plant that are expected to emit that pollutant.

Each of the non-criteria pollutants listed in Section 2.0 will be reviewed according to procedures specified in the MERA guidance document.

6.2 Other On-Property and Off-Property Sources

This project will analyze the impact from adding several new units to the Odessa Plant. If site-wide modeling is required due to an exceedance of a significant impact level as discussed in Section 6.1, all other on-site facilities that are capable of emitting the applicable contaminant will be included in the cumulative modeling analysis. The pollutants and averaging times that are expected to exceed the SIL are NO_2 1-hour averaging time, $PM_{2.5}$ 24-hour averaging time, and SO_2 1-hour, 3-hour, and 24-hour averaging times. An APAD retrieval has been requested for these criteria pollutants. Those sources will be evaluated for inclusion in the refined AERMOD sitewide modeling analysis, and any exclusions will be justified in the final modeling report.

As per the Air Quality Modeling Guidelines Appendix F, no off-property sources will be included in the site-wide SO_2 1-hour averaging time state property line standard analysis.

6.3 EPN and Model Input File Source ID Number Cross-Reference

A source ID number cross-reference list can be found in Appendix A.

6.4 Stack Parameter Justification

The following section provides justification for emission sources to be modeled at the Odessa Plant. Specific emissions sources are called out when their modeling parameters require additional consideration.

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Emission Rates

The tables in Appendix A summarize the emission rates of each contaminant that will be included in the initial project modeling and the site-wide modeling.

MSS emissions for the East Plant (Lines 2, 3, 4) and West Plant (Line RGP), while grouped in some cases for the permit application for regulatory purposes, will be split into individual component activities for the modeling analysis. This is a result of different MSS activities impacting different equipment and different physical areas, and emitting as different source types (i.e. pseudo-point, volume). The plot plan in Appendix B shows the location of each EPN along with their descriptions. The permit EPN vs. modeling EPN cross-reference table in Appendix A lists the individual MSS activities and their modeled EPNs as well as their associated permit EPNs. The individual MSS activity emission rates are included in Appendix A as well.

Source Types

Emissions that will be modeled in this air quality analysis include:

- boilers
- cooling towers
- flares
- additive transfers
- pellet or intermediate storage, transfer, blending, and packaging
- regenerative thermal oxidizer
- loading/unloading of trucks/rail/drum – solid pellets
- spent xylene loading – liquid sludge
- tank vents
- Process Vents
    - bagfilter
    - baghouse
    - cyclone
    - suction filter
    - additive
    - feeder
    - load out filter
- API Pond emissions
- Lab emissions
- Process Fugitive Releases
- MSS emissions
    - aerosol can usage
    - calibration gas/analyzer maintenance
    - combustion shutoff devices maintenance
    - drum filling
    - flare entries

- pump maintenance
- equipment/vessel openings – primarily columns
- tank openings
- vacuum truck loading
- water washing
- bag filter maintenance
- extruder maintenance
- material handling)

According to the TCEQ "Air Quality Modeling Guidance" dated April 2015, the point source characterization is used to simulate emissions that are emitted from a stack. Unless stated otherwise, the stack parameters for each EPN will be the actual stack height, velocity, diameter, and temperature associated with that EPN. In this permit, the cooling towers, boilers, flares, process vents, thermal oxidizer, spent xylene loading, and pellet storage/transfer/blending operations will be modeled as point sources because these emissions are released through a stack.

The pseudo-point source characterization will be used to simulate emissions at the REXtac facility that originate from a single stack, but do not have an appreciable amount of plume rise. Examples of sources that are planned to be modeled as pseudo-point sources are small vents and ducts (a few feet in diameter), and covered, obstructed, or horizontal stacks. Pseudo-point sources have minimal velocity and are emitted at ambient temperature. Spent xylene loading consists of offgassing from heated xylene liquid sludge loaded from a large diameter pipe stack and is not considered a pseudo-point source due to the high temperature of the material and the large diameter piping. The MSS calibration gas/analyzer maintenance vent and MSS combustion shutoff devices maintenance vent will be modeled as pseudo-point sources with the following default parameters:

- Exit gas velocity = 0.001 meters per second
- Exit gas temperature = 0 Kelvin (Ambient)
- Height of release = actual release height
- Stack diameter = 0.001 m

All flares will be modeled as special elevated point sources with the following default parameters:

- Exit gas velocity = 20 meters per second
- Exit gas temperature = 1273 Kelvin
- Height of release = actual height of the flare tip
- Effective stack diameter (D) in meters calculated using equations:
  - $D=\sqrt{(10\text{-}6\ qn)}$
  - $qn=q(1-0.048\sqrt{MW})$

  where q = gross heat release in calories per second
  qn = net heat release in calories per second
  MW = weighted (by volume) average molecular weight of the compound being flared

The MSS activity associated with vessel depressuring to flare is also modeled as a flare point source activity. However, the flare entries MSS activity is considered a volume source type (further detail below).

The area source characterization is used to simulate emissions that initially disperse in two dimensions with little or no plume rise. In this permit, the Lines 2, 3, 4, and RGP-related fugitives, the Lab emissions, and the API Pond emissions will be modeled as area sources. All area sources are situated at an angle of -17°.

The volume source characterization is used to simulate emissions that initially disperse in three dimensions with little or no plume rise.

The storage tank vents, tank openings MSS, drum filling MSS, and equipment/vessel (column) opening MSS in this permit will be modeled as single, elevated volume sources on or adjacent to buildings. The Initial Lateral Dimension (Sigma Y) will be calculated as the volume side length divided by 4.3. The Initial Vertical Dimension (Sigma Z) will be calculated as the building height (i.e. tank structure) divided by 2.15. The tank, drum, and column-related activities are modeled as volume sources as opposed to pseudo-point sources to account for a 3' plume (initial vertical dimension) expected above the top of the tank, drum, and column when the roof or lid is opened, and there is not a single vent stack point associated with the tanks. The equipment/vessel opening MSS refers only to the columns, which are at least 40 feet tall.

All other volume sources are single volume surface-based sources with an effective source release height at half the height of the volume. The Initial Lateral Dimension (Sigma Y) will be calculated as the volume side length divided by 4.3. The Initial Vertical Dimension (Sigma Z) will be calculated as the vertical dimension of the volume divided by 2.15. These single volume surface-based sources consist of: solid pellet loading/unloading, additive transfers, aerosol can degassing MSS, flare entries MSS, pump maintenance MSS, vacuum truck loading MSS, water washing MSS, extruder maintenance MSS, bag filter maintenance MSS, and material handling MSS. The flare entries MSS activity involves closing off the top of the flare and opening up the flare header and vertical flare stack at various points, so emissions are occurring the entire height of the flare.

Source Locations

The locations of all on-site point, volume, and area sources are shown on the plot plan in Appendix B. MSS emissions have been split out into individual activities and locations, as described in the "Emission Rates" section above, but the "grouped" permit EPN names used in the permit application (e.g. MSS-AAA, MSS-ABA, MSSWEST) are also included in the plot plan list for completeness.

For the health effects review MERA Step 5 Quick-look tables X*Ei analysis, the distance used for each modeled EPN is the distance from the EPN to the property line plus an additional 500 feet. Maximum predicted concentration occurs at the property line, and there are no non-industrial receptors and no productive agricultural or wildlife use areas within 500 feet of the property line. This distance is based on the MERA guidance:

> *"If the maximum predicted concentration occurs at the property line, the permit reviewer may consider the surrounding land use to decide if a concentration at a distance other than the property line may be used for this step. The applicant must demonstrate to the permit reviewer that the area from the property line to the closest receptor or 500 feet—whichever is closer—will not be used for any public purpose and is not productive for agricultural or wildlife use."*

As shown in Figure 4, the receptors immediately surrounding the REXtac Odessa Plant are all industrial. The region between the West Plant and East Plant belongs to Flint Hills, and the closest non-industrial receptors is the Credit Union (pictured below), which is beyond 500 feet of the property line. The region south of the plant is predominantly oil and gas facilities. The residential areas northwest of the plant and east of the plant are at least a half mile away. Several 500' radius circles are included in the figure below at the outskirts of the plant to provide a scale. No appreciable public, agricultural, or wildlife use occurs within a 500' radius of the plant due to the significant amount of oil and gas activity in the surrounding region.

Figure 4. Receptors Surrounding the REXtac Odessa Plant

Release Height

The modeled release heights for point sources will be the proposed release heights of the stacks as listed in the permit application Table 1a. All physical stacks will be modeled at their actual or proposed release heights.

The area sources will be modeled with various release heights, depending on operation activity. These heights are listed in the permit application Table 1a. The lab release height is from the top of the corresponding bagging building, the pond/brine pits have a release height at the top level of the pond, the process fugitives have release heights at the midpoint of the equipment/piping, and the transfer operations have a release height at the height of transfer.

For the surface-based volume sources, the effective source release height will be half the height of the volume vertical dimension. The tank, drum, and equipment vessel/column elevated sources on or adjacent to a building (i.e. structure) will be modeled using a vertical dimension of 3 feet above the top of the structure. The effective source release height is the midpoint between the top of the structure and the vertical dimension of the volume, or the height of the structure + 1.5 feet. Note that the equipment/vessel openings MSS only refers to tall columns over 40 feet.

Temperature

The modeled stack exit temperatures for point sources will be the predicted exhaust temperatures of the stacks. The flares will be modeled at a stack exit temperature of 1832 F (1273.15 K), as specified in the TCEQ's guidance on modeling flares[10]. The cooling towers, which are represented as a series of point sources, with one point for each roof-top fan, will be modeled at ambient release temperature (0 K). The pseudo-point sources will be modeled at ambient release temperature (0 K) as well.

Exit Velocity

Vertical vents will be modeled as point sources using proposed stack exit velocities. The flares will be modeled at a stack exit velocity of 65.6 ft/sec (20 m/sec), as specified in the TCEQ's flare modeling guidance[4]. The pseudo-point sources will be modeled at a stack exit velocity of 0.001 m/s.

Exit Diameter

Vertical vents will be modeled as point sources using actual proposed stack diameters. The flares will be modeled using the effective flare tip diameter. The

[10] http://www.tceq.state.tx.us/assets/public/permitting/air/memos/flareparameters.pdf

calculation of the effective flare tip diameter is provided below. The effective flare tip diameter has been determined based on TCEQ guidance[4].

Effective Flare Tip Diameter Calculation

$$\frac{\text{[illegible]}}{\text{[illegible]}}$$

$$\text{[illegible]}$$

$$\text{[illegible]}$$

$$\frac{\text{[illegible]}}{\text{[illegible]}}$$

$$\text{[illegible]}$$

$$\text{[illegible]}$$

6.5 Scaling Factors

An NO_2/NO_X ratio of 0.8 will be used for hourly NO_2 modeling, while a ratio of 0.75 will be used for annual NO_2 modeling. Both of these ratios come from the Ambient Ratio Method, or Tier II analysis strategy.

SECTION 7.0

MODELS AND MODELING TECHNIQUES

EPA's dispersion model AERMOD, version 15181, will be used for the PSD NAAQS analysis, state-property line analysis, and health effects review non-criteria pollutants which do not pass the Step 5 significant test using the X*Ei method. The model will be used to predict off-property concentrations over the applicable averaging periods for each pollutant. The high first high (H1H), high second high (H2H), multi-year average, etc. will be used as specified in TCEQ's Air Quality Modeling Guidelines, dated April 2015. Regulatory default options will be used for each of these periods.

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SECTION 8.0

SELECTION OF DISPERSION OPTION

The AERMOD program assumes rural dispersion coefficients as default. The Odessa Plant is not located in an area where the use of urban dispersion coefficients can be justified. Therefore, the rural coefficients will be used in this analysis.

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SECTION 9.0

BUILDING WAKE EFFECTS (DOWNWASH)

Existing and proposed building downwash structures will be included in this analysis to account for any possible interference with the dispersion of pollutants at the site. The locations of all buildings and structures are provided in the plot plan. There were no structures excluded from the downwash. Appendix B provides a table listing all downwash structure heights.

The building downwash parameters input into the AERMOD model will be prepared using the BPIP building downwash model (version 04274). All heights to be used in the BPIP model are justified according to the "Guideline for Determination of Good Engineering Practice Stack Height" dated June 1985. The "P" flag will be set for preparing downwash related data for a model run utilizing the AERMOD program. Input and output for the BPIP program will be provided in the modeling analysis report.

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SECTION 10.0

RECEPTOR GRID - TERRAIN

The modeling analysis for the Odessa Plant will use terrain heights extracted from a GeoTIFF file obtained from the USGS' Seamless Data Server[11]. AERMAP Terrain Processor Version 9.1.0 within the AERMOD program will be used to process terrain data from the elevation files and to assign base elevation heights to each receptor, building, and emission source.

[11] http://seamless.usgs.gov/website/seamless/viewer.htm

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SECTION 11.0

RECEPTOR GRID - DESIGN

The receptor grid that will be used in this analysis will be based on UTM coordinates (NAD 1983). The plot plan shows the relationship between the property line, the fence lines/controlled access areas that will be in place when the project starts operation, and UTM coordinates. Receptors will be placed on the property line every 25 meters. A receptor grid with 25 meter receptor spacing will then be used starting at the property line and extending out to 100 meters away from the property line. A receptor grid with 100-meter spacing will then be extended to a total of 1,000 meters from the property line. A 500-meter grid spacing will then be extended to a total of 5,000 meters from the property line to encompass the full radius of significant impact. The results of each modeling simulation will be plotted to ensure that the maximum concentration is fully accounted for.

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SECTION 12.0

METEOROLOGICAL DATA

Surface and upper-air meteorological data spanning from 2008 to 2012 available from the TCEQ's web site will be used in the modeling analysis. Meteorological data for Ector County uses surface data from Odessa Schlemeyer Field (ODO). Upper air data is used from Midland (MAF). The base elevation for the surface data from Odessa Schlemeyer Field is 915 meters. Either one or five years of meteorological data will be used, as appropriate for each type of analysis and as specified in TCEQ's Air Quality Modeling Guidelines, dated April 2015. Five years of meteorological data will be used for CO since that pollutant is subject to PSD review.

The meteorological data set used in this analysis will be prepared using AERMET (version 12345). TCEQ provides three separate sets of meteorological data for each county – low, medium, and high surface roughness data sets. The AERSURFACE model gives an average surface roughness of 0.289 m for the site, which corresponds to a medium surface roughness for a typical urban/industrial area (0.1 to 0.7) per the TCEQ's AERMOD Training Guidance. Therefore, the medium surface roughness from the Ector County data set will be used in this modeling analysis.

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SECTION 13.0

MODELING REPORT OUTLINE

Upon completion of all the simulations described in this protocol report, a full modeling analysis write-up will be submitted to the TCEQ, which will include all of the information stated in this document. The report will cover all of the information the TCEQ Air Dispersion Modeling Team will need to understand how each reported result was determined. In addition to the written report, a disk will be included in the submittal that contains all of the modeling input and output files of this analysis. This includes, but is not limited to:

- AERSURFACE input/output
- Meteorological data files
- Downwash input/output (includes all building heights)
- Receptor grid files
- Plot plan and area map
- Terrain and elevation input files
- Monitoring background concentration files
- AERMOD input files and output concentration files
- Concentration plots needed to illustrate significant impact areas, etc.

APPENDIX A

EMISSIONS SUMMARY TABLE AND MODELING PARAMETERS

Permit EPN/Modeling EPN ID Cross Reference Table

Permit EPN	AERMOD EPN ID (8 Character Limit, No Special Characters)	Description
RGPBOILER01	RGPBOIL1	RGP Boiler 1*
RGPBOILER02	RGPBOIL2	RGP Boiler 2*
EY001CT	EY001CT	East Cooling Tower
EYPRCSFL	EYPRCSFL	Air Assist Flare
MSSWEST	MSSWCAL	West Plant Calibration Gas/Analyzer Maintenance
MSSWEST	MSSWCSD	West Plant Combustion Shutoff Devices Maintenance
MSSWEST	MSSWDRUM	West Plant Drum Filling
MSSWEST	MSSWFLAR	West Plant Flare Entries
MSSWEST	MSSWMAT	West Plant Material Handling
MSSWEST	MSSWPUMP	West Plant Pump Maintenance
MSSWEST	MSSWEQOP	West Plant Equipment Openings
MSSWEST	MSSWWW	West Plant Water Washing
MSSWEST	MSSWAER	West Plant Aerosol Can Degassing
MSSWEST	MSSWVAC	West Plant Vacuum Truck Loading
PO001FL	PO001FL	High-Pressure Polyolefin Flare
PP4026CT	PP4026CT	Cooling Tower
POLP2FL/PO002FL	POLP2FL	Low-Pressure Flares
MSS-AAA	MSSAER	East Plant Aerosol Can Usage
MSS-AAA	MSSCAL	East Plant Calibration Gas/Analyzer Maintenance
MSS-ABA	MSSCSD	East Plant Combustion Shutoff Devices Maintenance
MSS-ABA	MSSDRUM	East Plant Drum Filling
MSS-ABA	MSSFLAR	East Plant Flare Entry
MSS-ABA	MSSPUMP	East Plant Pump Maintenance
MSS-EO	MSSEO	East Plant Equipment/Vessel Opening
MSS-TO	MSSTO	East Plant Tank Opening
MSS-WW	MSSWW	East Plant Water Washing
MSS-EM	MSSEM	East Plant Extruder Maintenance
MSS-BM	MSSBM	East Plant Bag Filter Maintenance
PP1001LR	PP1001LR	Spent Xylene Loading
PP2001LR	PP2001LR	Loading/Unloading - Truck, Rail, and Drum
BOILERST3	BOILRST3	2nd 300 Psi Boiler
PPRTO	PPRTO	Regenerative Thermal Oxidizer
PP31465VN	P31465VN	Additive Vent for BF-1465
PP31477VN	P31477VN	Additive Vent for BF-1477

PP31478VN	P31478VN	Feeder Vent for Additive Feeder
PP31487VN	P31487VN	Additive Bin Filter Vent BF-1487
PPMU1862AVN	PMU1862A	C-1862A Suction Filter Vent
PPMU1866VN	PMU1866V	C-1866 Suction Filter Vent
PPMU1833VN	PMU1833V	C-1830A Suction Filter Vent
PPMU1864AVN	PMU1864A	C-1864A Suction Filter Vent
PP31868VN	P31868VN	Product Storage (V-1868A/B)
PP31835VN	P31835VN	Packaging Warehouse, BF-1835 Vent
PKGWH	PKGWH	Packaging Warehouse Cyclones
PP31865VN	P31865VN	Intermediate and Product Storage
PP44401AVN	P44401AV	Additive Bag Filter F-4401A
PP4570VN	PP4570VN	Pellet Blender BL-570
PP4MU573VN	P4MU573V	C-571 Suction Filter Vent
PP4ME493VN	P4ME493V	C-561-2 Suction Filter Vent
PP4C624VN	P4C624VN	BF-612 Load Out Filter Vent
PP2001FE	PP2001FE	Process Fugitives
PP3001FE	PP3001FE	Process Fugitives
PP4001FE	PP4001FE	Process Fugitives
POAPIPND	POAPIPND	API Pond
EY901FE	EY901FE	Fract Area Fugitives
UP011FE	UP011FE	Flare Area Fugitives
BPITFE	BPITFE	Brine Pit Fugitives
EYSTOWELFE	EYSTWLFE	Storage Well Fugitives
UTILFE	UTILFE	Utilities Area Fugitives
PP12100TK	PP12100T	Xylene Storage TK-2100
PP12101TK	PP12101T	Xylene Storage TK-2101

MODELING SOURCE PARAMETERS - POINT SOURCES

Permit EPN	Modeled EPN	Source Description	UTM		Source Height		Exit Velocity		Exit Temp		Diameter *		Source Type
			East (m)	North (m)	(ft)	(m)	(ft/s)	(m/s)	(F)	(K)	(ft)	(m)	--
POLP2FL	POLP2FL	Low-Pressure Flares	753286	3524513	42	12.8016	65.62	20.000	1832	1273.15	2.18	0.6645	Flare-point
PO001FL	PO001FL	High-Pressure Polyolefin Flare	753256	3524552	90	27.4320	65.62	20.000	1832	1273.15	5.48	1.6703	Flare-point
PP4026CT	PP4026CT	Cooling Tower	753298	3524436	60	18.2880	56.8	17.3126	75	297.04	18	5.4864	Point
PP1001LR	PP1001LR	Spent Xylene Loading	753251	3524370	20	6.096	0.003	0.0010	200	366.48	1.33	0.4054	Point
PPRTO	PPRTO	Regenerative Thermal Oxidizer	753152	3524193	50	15.240	23.20	7.0714	161	344.82	5	1.5240	Point
EY001CT	EY001CT	East Cooling Tower	752248	3523642	47	14.326	28.90	8.8087	Ambient	0	28	8.5344	Point
EYPRCSFL	EYPRCSFL	Air Assist Flare	752002	3523155	90	27.432	65.62	20.000	1832	1273.2	21.6	6.5837	Flare-point
RGPBOILER01	RGPBOLRS	RGP Boiler 1*	752175	3523774	9	2.7432	17.5	5.3	350	450	65.00	19.812	Point
RGPBOILER02		RGP Boiler 2*											Point
BOILERST3	BOILRST3	2nd 300 Psi Boiler	753134	3524280	9	2.7432	17.5	5.3	350	450	65.00	19.812	Point
MSS-AAA	MSSCAL	East Plant Calibration Gas/Analyzer Maintenance	753390	3524294	12.00	3.66	0.003	0.001	Ambient	0	0.003	0.0010	Pseudo-point
MSS-ABA	MSSCSD	East Plant Combustion Shutoff Devices Maintenance	753150	3524260	15.00	4.57	0.003	0.001	Ambient	0	0.003	0.0010	Pseudo-point
MSSWEST	MSSWCAL	West Plant Calibration Gas/Analyzer Maintenance	752063	3523728	12.00	3.66	0.003	0.001	Ambient	0	0.003	0.0010	Pseudo-point
MSSWEST	MSSWCSD	West Plant Combustion Shutoff Devices Maintenance	752158	3523771	15.00	4.57	0.003	0.001	Ambient	0	0.003	0.0010	Pseudo-point
PP31465VN	P31465VN	Additive Vent for BF-1465	753340	3524300	85.00	25.91	66.44	20.25	100.000	310.9278	0.920	0.280	Point
PP31477VN	P31477VN	Additive Vent for BF-1477	753346	3524303	67.50	20.57	29.24	8.91	100.000	310.9278	0.500	0.152	Point
PP31478VN	P31478VN	Feeder Vent for Additive Feeder	753346	3524303	72.00	21.95	10.82	3.30	100.000	310.9278	0.840	0.256	Point
PP31487VN	P31487VN	Additive Bin Filter Vent BF-1487	753346	3524303	76.00	23.16	29.24	8.91	100.000	310.9278	0.500	0.152	Point
PPMU1862AVN	PMU1862A	C-1862A Suction Filter Vent	753316	3524283	9.30	2.83	152.26	46.41	150.000	338.7056	0.708	0.216	Point
PPMU1866VN	PMU1866V	C-1866 Suction Filter Vent	753292	3524221	11.00	3.35	99.78	30.41	150.000	338.7056	0.875	0.267	Point
PPMU1833VN	PMU1833V	C-1830A Suction Filter Vent	753213	3524219	11.75	3.58	99.78	30.41	150.000	338.7056	0.875	0.267	Point
PPMU1864AVN	PMU1864A	C-1864A Suction Filter Vent	753343	3524253	12.00	3.66	48.51	14.78	150.000	338.7056	0.875	0.267	Point
PP31868VN	P31868VN	Product Storage (V-1868A/B)	753066	3524092	35.00	10.67	0.003	0.001	Ambient	0.0000	1.330	0.405	Point
PP31835VN	P31835VN	Packaging Warehouse, BF-1835 Vent	753354	3524250	8.00	2.44	1.18	0.36	Ambient	0.0000	2.350	0.716	Point
PKGWH	PKGWH	Packaging Warehouse Cyclones	753069	3524076	20.00	6.10	59.41	18.11	Ambient	0.0000	0.920	0.280	Point
PP31865VN	P31865VN	Intermediate and Product Storage	753353	3524242	35.00	10.67	0.003	0.001	120.000	322.0389	1.300	0.396	Point
PP44401AVN	P44401AV	Additive Bag Filter F-4401A	753375	3524355	68.00	20.73	57.97	17.67	90.000	305.3722	0.667	0.203	Point
PP4570VN	PP4570VN	Pellet Blender BL-570	753124	3524170	75.00	22.86	271.49	82.75	120.000	322.0389	0.500	0.152	Point
PP4MU573VN	P4MU573V	C-571 Suction Filter Vent	753129	3524175	16.50	5.03	88.65	27.02	120.000	322.0389	0.875	0.267	Point
PP4ME493VN	P4ME493V	C-561-2 Suction Filter Vent	753084	3524174	12.50	3.81	63.32	19.30	120.000	322.0389	0.875	0.267	Point
PP4C624VN	P4C624VN	BF-612 Load Out Filter Vent	753058.6	3524060.9	8.25	2.51	25.96	7.91	Ambient	0.0000	1.808	0.551	Point

*RGP Boilers are modeled as a single unit as emissions are combined.

MODELING SOURCE PARAMETERS - AREA SOURCES

Permit EPN	Modeled EPN	Source Description	UTM		Effective Source Release Height (h_e)		X Length of Area		Y Length of Area		Area	Angle from North
			East (m)	North (m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(m^2)	(deg)
PP2001FE	PP2001FE	Process Fugitives	753198	3524217	10	3.05	768	234.09	768	234.09	54796	-17
PP3001FE	PP3001FE	Process Fugitives	753330	3524265	10	3.05	120	36.58	600	182.88	6689	-17
PP4001FE	PP4001FE	Process Fugitives	753376	3524285	10	3.05	120	36.58	600	182.88	6689	-17
POAPIPND	POAPIPND	API Pond	753140	3524428	5.00	1.5240	167.00	50.9	81.00	24.7	1257	-17
EY901FE	EY901FE	Fract Area Fugitives	751944	3523670	4.00	1.2192	282.15	86.0	282.15	86.0	7396	-17
UP011FE	UP011FE	Flare Area Fugitives	751948	3523148	3.28	0.9997	403.54	123.0	403.54	123.0	15129	-17
BPITFE	BPITFE	Brine Pit Fugitives	751923	3523811	3.00	0.9144	597.00	182.0	597.00	182.0	33111	-17
EYSTOWELFE	EYSTWLFE	Storage Well Fugitives	751987	3523404	3.00	0.9144	492.13	150.0	492.13	150.0	22500	-17
UTILFE	UTILFE	Utilities Area Fugitives	752152	3523916	1.00	0.3048	164.04	50.0	164.04	50.0	2500	-17

MODELING SOURCE PARAMETERS - VOLUME SOURCES

Permit EPN	Modeled EPN	Source Description	UTM		Effective Source Release Height (h_e)		Vertical Dimension of Volume		Side Length		Sigma Y	Sigma Z	Source Type	
			East (m)	North (m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(m)	(m)	--	--
PP2001LR	PP2001LR	Loading/Unloading - Truck, Rail, and Drum	753275	3524133	5.00	1.52	10.00	3.05	10.0	3.0	0.71	1.42	SV	SB
PP12100TK	PP12100T	Xylene Storage TK-2100	753244	3524330	19.5	5.9436	3.00	0.91	11.0	3.4	0.78	8.372	SV	ESA
PP12101TK	PP12101T	Xylene Storage TK-2101	753236	3524328	16.5	5.0292	3.00	0.91	11.0	3.4	0.78	6.977	SV	ESA
PP2003FE	PP2003FE	Additive Transfer	753242	3524295	5.0	1.524	10.00	3.05	3.28	1.0	0.23	1.42	SV	SB
PP2F4902VN	P2F4902V	Additive Transfer	753242	3524295	2.0	0.6096	4.00	1.22	3.28	1.0	0.23	0.57	SV	SB
MSS-AAA	MSSAER	Aerosol Can Degassing	753277	3524340	3.00	0.91	6.00	1.83	768	234	54.4	0.851	SV	SB
MSS-ABA	MSSDRUM	East Plant Drum Filling	753277	3524340	5.50	1.68	3.00	0.91	768	234	54.4	1.86	SV	ESA
MSS-ABA	MSSFLAR	East Plant Flare Entry	753277	3524340	10.00	3.05	20.00	6.10	768	234	54.4	2.84	SV	SB
MSS-ABA	MSSPUMP	East Plant Pump Maintenance	753277	3524340	1.00	0.30	2.00	0.61	768	234	54.4	0.28	SV	SB
MSS-VL	MSSVL	Vacuum Truck Loading	753277	3524340	5.0	1.5	10.00	3.05	768	234	54.4	1.418	SV	SB
MSS-EO	MSSEO	East Plant Equipment/Vessel Opening	753277	3524340	41.50	12.65	3.00	0.91	768	234	54.4	18.60	SV	ESA
MSS-TO	MSSTO	East Plant Tank Opening	753277	3524340	11.50	3.51	3.00	0.91	768	234	54.4	4.65	SV	ESA
MSS-WW	MSSWW	East Plant Water Washing	753277	3524340	1.50	0.46	3.00	0.91	768	234	54.4	0.425	SV	SB
MSS-EM	MSSEM	East Plant Extruder Maintenance	753277	3524340	5.00	1.52	10.00	3.05	768	234	54.4	1.418	SV	SB
MSS-BM	MSSBM	East Plant, Bag Filter Maintenance	753277	3524340	5.00	1.52	10.00	3.05	768	234	54.4	1.418	SV	SB
MSSWEST	MSSWDRUM	West Plant Drum Filling	752065	3523675	5.50	1.68	3.00	0.91	1000	305	70.9	1.86	SV	ESA
MSSWEST	MSSWFLAR	West Plant Flare Entries	752082	3523695	10.00	3.05	20.00	6.10	500	152	35.4	2.835	SV	SB
MSSWEST	MSSWMAT	West Plant Material Handling	752153	3523767	1.50	0.46	3.00	0.91	50	15	3.5	0.425	SV	SB
MSSWEST	MSSWPUMP	West Plant Pump Maintenance	752082	3523695	1.00	0.30	2.00	0.61	500	152	35.4	0.284	SV	SB
MSSWEST	MSSWEQOP	West Plant Equipment Openings	752085	3523695	41.50	12.65	3.00	0.91	500	152	35.4	18.60	SV	ESA
MSSWEST	MSSWWW	West Plant Water Washing	752065	3523675	1.50	0.46	3.00	0.91	1000	305	70.9	0.425	SV	SB

1) Proposed Hourly Emission Increase (lb/hr):

Permit EPN	**Modeled EPN (8 Character Limit)**	EPN Description	CO	NO_x	NO_2 [1]	PM_{10}	$PM_{2.5}$	SO_2
RGPBOILER01	**RGPBOIL1**	RGP Boiler 1*	8.0880	2.2300	1.7840	1.6614	1.6614	0.1312
RGPBOILER02	**RGPBOIL2**	RGP Boiler 2*						
EY001CT	**EY001CT**	East Cooling Tower	NO INCREASE	NO INCREASE	NO INCREASE	0.1137	0.1137	NO INCREASE
EYPRCSFL	**EYPRCSFL**	Air Assist Flare	458.4400	115.0400	92.0320	NO INCREASE	NO INCREASE	289.0232
MSSWCAL	**MSSWCAL**	West Plant, Calibration Gas/Analyzer Maintenance	0.0037	NO INCREASE	NO INCREASE	NO INCREASE	NO INCREASE	NO INCREASE
MSSWMAT	**MSSWMAT**	West Plant, Material Handling	NO INCREASE	NO INCREASE	NO INCREASE	0.0020	0.0020	NO INCREASE
PO001FL	**PO001FL**	High-Pressure Polyolefin Flare	9.3630	4.7100	3.7680	NO INCREASE	NO INCREASE	NO INCREASE
MSS-BM	**MSSBM**	Bag Filter Maintenance	NO INCREASE	NO INCREASE	NO INCREASE	0.3080	0.1030	NO INCREASE
BOILERST3	**BOILRST3**	2nd 300 Psi Boiler	1.4527	1.3566	1.0853	0.2968	0.2968	0.0234
PPRTO	**PPRTO**	Regenerative Thermal Oxidizer	0.3400	0.4110	0.3288	0.0280	0.0280	0.0500
PP31465VN	**P31465VN**	Additive Vent for BF-1465	NO INCREASE	NO INCREASE	NO INCREASE	0.0016	0.0016	NO INCREASE
PP31477VN	**P31477VN**	Additive Vent for BF-1477	NO INCREASE	NO INCREASE	NO INCREASE	0.0002	0.0002	NO INCREASE
PP31478VN	**P31478VN**	Feeder Vent for Additive Feeder	NO INCREASE	NO INCREASE	NO INCREASE	0.0002	0.0002	NO INCREASE
PP31487VN	**P31487VN**	Additive Bin Filter Vent BF-1487	NO INCREASE	NO INCREASE	NO INCREASE	0.0002	0.0002	NO INCREASE
PPMU1862AVN	**PMU1862A**	C-1862A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0019	0.0019	NO INCREASE
PPMU1866VN	**PMU1866V**	C-1866 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0019	0.0019	NO INCREASE
PPMU1833VN	**PMU1833V**	C-1830A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0019	0.0019	NO INCREASE
PPMU1864AVN	**PMU1864A**	C-1864A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0009	0.0009	NO INCREASE
PP31868VN	**P31868VN**	Product Storage (V-1868A/B)	NO INCREASE	NO INCREASE	NO INCREASE	0.00004	0.00004	NO INCREASE
PP31835VN	**P31865VN**	Packaging Warehouse, BF-1835 Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0021	0.0021	NO INCREASE
PKGWH	**PKGWH**	Packaging Warehouse Cyclones	NO INCREASE	NO INCREASE	NO INCREASE	0.0031	0.0031	NO INCREASE
PP31865VN	**P31865VN**	Intermediate and Product Storage	NO INCREASE	NO INCREASE	NO INCREASE	0.0003	0.0003	NO INCREASE
PP44401AVN	**P44401AV**	Additive Bag Filter F-4401A	NO INCREASE	NO INCREASE	NO INCREASE	0.0007	0.0007	NO INCREASE
PP4570VN	**PP4570VN**	Pellet Blender BL-570	NO INCREASE	NO INCREASE	NO INCREASE	0.0280	0.0280	NO INCREASE
PP4MU573VN	**P4MU573V**	C-571 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0019	0.0019	NO INCREASE
PP4ME493VN	**P4ME493V**	C-561-2 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0014	0.0014	NO INCREASE
PP4C624VN	**P4C624VN**	BF-612 Load Out Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0024	0.0024	NO INCREASE

Note: 1) NO_2 = 0.8 (NO_x emission rate)

2) Proposed Annual Emission Increase (tons/yr):

Permit EPN	**Modeled EPN (8 Character Limit)**	Description	CO	NO_x	NO_2 [1]	PM_{10}	$PM_{2.5}$	SO_2
RGPBOILER01	**RGPBOILS**	RGP Boiler 1*	35.4255	9.7674	7.3256	7.0851	7.0851	0.5745
RGPBOILER02		RGP Boiler 2*						
EY001CT	**EY001CT**	East Cooling Tower	NO INCREASE	NO INCREASE	NO INCREASE	0.4981	0.4981	NO INCREASE
EYPRCSFL	**EYPRCSFL**	Air Assist Flare	106.1800	26.6600	19.9950	NO INCREASE	NO INCREASE	32.4102
MSSWCAL	**MSSWCAL**	West Plant, Calibration Gas/Analyzer Maintenance	0.0002	NO INCREASE	NO INCREASE	NO INCREASE	NO INCREASE	NO INCREASE
MSSWMAT	**MSSWMAT**	West Plant, Material Handling	NO INCREASE	NO INCREASE	NO INCREASE	0.0007	0.0007	NO INCREASE
PO001FL	**PO001FL**	High-Pressure Polyolefin Flare	41.4100	20.7700	15.5775	NO INCREASE	NO INCREASE	NO INCREASE
MSS-BM	**MSSBM**	Bag Filter Maintenance	NO INCREASE	NO INCREASE	NO INCREASE	0.0039	0.0013	NO INCREASE
BOILERST3	**BOILRST3**	2nd 300 Psi Boiler	6.3630	5.9419	4.4564	1.3001	1.3001	0.1026
PPRTO	**PPRTO**	Regenerative Thermal Oxidizer	1.2000	1.4700	1.1025	0.0970	0.0970	0.1900
PP31465VN	**P31465VN**	Additive Vent for BF-1465	NO INCREASE	NO INCREASE	NO INCREASE	0.0070	0.0070	NO INCREASE
PP31477VN	**P31477VN**	Additive Vent for BF-1477	NO INCREASE	NO INCREASE	NO INCREASE	0.0009	0.0009	NO INCREASE
PP31478VN	**P31478VN**	Feeder Vent for Additive Feeder	NO INCREASE	NO INCREASE	NO INCREASE	0.0009	0.0009	NO INCREASE
PP31487VN	**P31487VN**	Additive Bin Filter Vent BF-1487	NO INCREASE	NO INCREASE	NO INCREASE	0.0009	0.0009	NO INCREASE
PPMU1862AVN	**PMU1862A**	C-1862A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0082	0.0082	NO INCREASE
PPMU1866VN	**PMU1866V**	C-1866 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0082	0.0082	NO INCREASE
PPMU1833VN	**PMU1833V**	C-1830A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0082	0.0082	NO INCREASE
PPMU1864AVN	**PMU1864A**	C-1864A Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0040	0.0040	NO INCREASE
PP31868VN	**P31868VN**	Product Storage (V-1868A/B)	NO INCREASE	NO INCREASE	NO INCREASE	0.0002	0.0002	NO INCREASE
PP31835VN	**P31835VN**	Packaging Warehouse, BF-1835 Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0094	0.0094	NO INCREASE
PKGWH	**PKGWH**	Packaging Warehouse Cyclones	NO INCREASE	NO INCREASE	NO INCREASE	0.0137	0.0137	NO INCREASE
PP31865VN	**P31865VN**	Intermediate and Product Storage	NO INCREASE	NO INCREASE	NO INCREASE	0.0006	0.0006	NO INCREASE
PP44401AVN	**P44401AV**	Additive Bag Filter F-4401A	NO INCREASE	NO INCREASE	NO INCREASE	0.0032	0.0032	NO INCREASE
PP4570VN	**PP4570VN**	Pellet Blender BL-570	NO INCREASE	NO INCREASE	NO INCREASE	0.0840	0.0840	NO INCREASE
PP4MU573VN	**P4MU573V**	C-571 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0084	0.0084	NO INCREASE
PP4ME493VN	**P4ME493V**	C-561-2 Suction Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0060	0.0060	NO INCREASE
PP4C624VN	**P4C624VN**	BF-612 Load Out Filter Vent	NO INCREASE	NO INCREASE	NO INCREASE	0.0105	0.0105	NO INCREASE

Note: 1) NO_2 = 0.75 (NO_x emission rate)

ED_001261_00097753

MSS LINE 2 -- Speciated Emissions for Routine Maintenance/Start-up/Shutdown Emissions

CAS No.	Activity	Aerosol Can Degassing		Calibration Gas / Analyzer Maintenance [1]		Combustion Shutoff Devices Maintenance		Drum Filling [2]		Flare Entry		Pump Maintenance [3]		Equipment Openings		Tank Openings		Vacuum Truck Loading [3]		Water Washing		Extruder Maintenance	
	Emission Rate (lb/hr)	1.02		3.32		0.12		2.77		0.041		11		1.59		5.59		0.16		3.42		0.07	
	Emission Rate (tons/yr)	0.25		0.033		0.00028		0.0061		0.00088		0.15		0.29		0.007		0.002		0.01		0.00011603	
		Weight Fraction																					
	Component	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually
67-64-1	Acetone	0.3	0.21																				
NA	APAO light ends									0.01	0.01	0.01	0.001	0.2	0.1	0.1	0.1			0.1	0.01		
7664-41-7	Ammonia									0.01	0.001	0.01	0.001	0.01	0.01	0.01	0.01						
106-97-8	Butanes			0.02	0.02			0.05	0.01	1	1	0.2	0.1	0.05	0.01	0.1	0.1	0.05	0.02	1	0.75		
9003-28-5	Butenes			0.01	0.01			0.25	0.25	0.75	0.75	0.2	0.05	0.25	0.25	0.2	0.2	0.05	0.02	0.2	0.05		
106-99-0	Butadiene			0	0																		
111-76-2	2-Butoxy Ethanol	0.05	0.02																				
NA	C9s+	0.5	0.1															0.1	0.05				
1638-26-2	Dimethylcyclopentane							0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.01	0.1	0.001	0.01	0.001		
100-41-4	EB							0.01	0.001	0.15	0.15	0.2	0.1	0.01	0.001	0.2	0.2	0.1	0.001	0.2	0.1		
74-85-1	Ethylene			0.01	0.01	0.02	0.02	0.01	0.001	1	0.5	0.15	0.15	0.25	0.15	0.15	0.15			0.15	0.15	0.01	0.01
142-82-5	Heptanes							1	0.6	0.25	0.5	0.25	0.1	0.5	0.5	1	1	1	0.1	1	1	0.01	0.01
9016-80-2	Hexenes									0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001			0.001	0.001		
67-63-0	IPA	0.05	0.02					1	0.001	0.15	0.15	0.25	0.1	0.1	0.05			0.1	0.05				
108-31-6	Maleic Anhydride											0.001	0.001	0.001	0.001	0.001	0.001			0.001	0.001		
67-56-1	Methanol	0.3	0.21																				
59355-75-8	Methy Acetylene Propadiene Mixture			0.000025	0.00001																		
78-93-3	Methyl Ethyl Ketone	0.05	0.02																				
8042-47-5	Mineral Oil							0.05	0.01	0.05	0.01	0.1	0.1	0.05	0.01			1	0.02				
111-66-0	Octenes									0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001			0.001	0.001		
NA	Oil	0.25	0.03					0.05	0.01	0.01	0.01	0.1	0.1	0.05	0.01	0.25	0.25	1	0.1	0.25	0.1		
NA	Organosilane							0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.01	0.1	0.001	0.01	0.01		
646-04-8	Pentenes							0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.01	0.1	0.05	0.01	0.001		
8002-05-9	Petroleum Distillates							0.1	0.01	0.01	0.01	0.1	0.05	0.1	0.05			0.1	0.01				
74-98-6	Propane			0.25	0.2	0.2	0.2	0.01	0.01	0.5	0.25	0.1	0.05	0.1	0.05			0.05	0.05			0.08	0.08
115-11-7	Propylene			0.85	0.8	0.75	0.75	0.01	0.01	1	0.75	0.1	0.5	1	1							0.9	0.9
108-88-3	Toluene	0.5	0.4					0.15	0.01	0.15	0.15	0.05	0.05	0.1	0.1	0.05	0.05	0.1	0.1	0.05	0.05		
1330-20-7	Xylene	0.05	0.02					1	0.1	0.5	0.35	0.25	0.1	1	0.1			1	0.4	0	0		
NA	VOC Total	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

CAS No.	Activity	Aerosol Can Degassing-MSS-AAA		Calibration Gas / Analyzer Maintenance [1] - MSS-AAA		Combustion Shutoff Devices Maintenance - MSS-ABA		Drum Filling [2] - MSS-ABA		Flare Entry - MSS-ABA		Pump Maintenance - MSS-ABA		Equipment Openings - MSS-EO		Tank Openings - MSS-TO		Vacuum Truck Loading [3] - VL		Water Washing - MSS-WW		Extruder Maintenance - MSS-EM	
		Emission Estimate																					
	Contaminant	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
67-64-1	Acetone	0.306	0.0525																				
NA	APAO Light Ends									0.00041	0.0000088	0.11	0.00015	0.318	0.029	0.559	0.0007			0.342	0.0001		
7664-41-7	Ammonia									0.00041	0.00000088	0.11	0.00015	0.0159	0.0029	0.0559	0.00007						
106-97-8	Butanes			0.0664	0.00066			0.1385	0.000061	0.041	0.00088	2.2	0.015	0.0795	0.0029	0.559	0.0007	0.008	0.00004	3.42	0.0075		
9003-28-5	Butenes			0.0332	0.00033			0.6925	0.001525	0.03075	0.00066	2.2	0.0075	0.3975	0.0725	1.118	0.0014	0.008	0.00004	0.684	0.0005		
106-99-0	Butadiene			0	0																		
111-76-2	2-Butoxy Ethanol	0.051	0.005																				
NA	C9s+	0.51	0.025															0.016	0.0001				
1638-26-2	Dimethylcyclopentane							0.0277	0.0000061	0.00041	0.00000088	0.11	0.00015	0.0159	0.00029	0.0559	0.00007	0.016	0.000002	0.0342	0.00001		
100-41-4	EB							0.0277	0.0000061	0.00615	0.000132	2.2	0.015	0.0159	0.00029	1.118	0.0014	0.016	0.000002	0.684	0.001		
74-85-1	Ethylene			0.0332	0.00033	0.0024	0.0000056	0.0277	0.0000061	0.041	0.00044	1.65	0.0225	0.3975	0.0435	0.8385	0.00105			0.513	0.0015	0.0007	1.1603E-06
142-82-5	Heptanes							2.77	0.00366	0.01025	0.00044	2.75	0.015	0.795	0.145	5.59	0.007	0.16	0.0002	3.42	0.01	0.0007	1.1603E-06
9016-80-2	Hexenes									0.000041	0.00000088	0.011	0.00015	0.00159	0.00029	0.00559	0.000007			0.00342	0.00001		
67-63-0	IPA	0.051	0.005					2.77	0.0000061	0.00615	0.000132	2.75	0.015	0.159	0.0145			0.016	0.0001				
108-31-6	Maleic Anhydride											0.011	0.00015	0.00159	0.00029	0.00559	0.000007			0.00342	0.00001		
67-56-1	Methanol	0.306	0.0525																				
59355-75-8	Methyl Acetylene Propadiene Mixture			0.000083	0.00000033																		
78-93-3	Methyl Ethyl Ketone	0.051	0.005																				
8042-47-5	Mineral Oil							0.1385	0.000061	0.00205	0.0000088	1.1	0.015	0.0795	0.0029			0.16	0.00004				
111-66-0	Octenes									0.000041	0.00000088	0.011	0.00015	0.00159	0.00029	0.00559	0.000007			0.00342	0.00001		
NA	Oil	0.255	0.0075					0.1385	0.000061	0.00041	0.0000088	1.1	0.015	0.0795	0.0029	1.3975	0.00175	0.16	0.0002	0.855	0.001		
NA	Organosilane							0.0277	0.0000061	0.00041	0.0000088	0.11	0.0015	0.0159	0.00029	0.0559	0.00007	0.016	0.000002	0.0342	0.0001		
646-04-8	Pentenes							0.0277	0.0000061	0.00041	0.00000088	0.11	0.00015	0.0159	0.00029	0.0559	0.00007	0.016	0.0001	0.0342	0.00001		
8002-05-9	Petroleum Distillates							0.277	0.000061	0.00041	0.0000088	1.1	0.0075	0.159	0.0145			0.016	0.00002				
74-98-6	Propane			0.83	0.0066	0.024	0.000056	0.0277	0.000061	0.0205	0.00022	1.1	0.0075	0.159	0.0145			0.008	0.0001			0.0056	9.2821E-06
115-11-7	Propylene			2.822	0.0264	0.09	0.00021	0.0277	0.000061	0.041	0.00066	1.1	0.075	1.59	0.29							0.063	0.00010442
108-88-3	Toluene	0.51	0.1					0.4155	0.000061	0.00615	0.000132	0.55	0.0075	0.159	0.029	0.2795	0.00035	0.016	0.0002	0.171	0.0005		
1330-20-7	Xylene	0.051	0.005					2.77	0.000864	0.0205	0.000308	2.75	0.015	1.59	0.0016			0.16	0.0008				

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, actual emissions will remain below the proposed emission rates.

1) Includes filter and screen replacements
2) Drum filling, equipment openings, tank openings and water washing activities will be limited to one type event per hour, i.e., these events will not occur simultaneously
3) In addition to restrictions above, xylene pump maintenance and vacuum truck loading will not be performed simultaneously with drum filling, equipment openings, tank openings and water washing activities..

ED_001261_00097753

RGP MSSWEST -- Speciated Emissions for Routine Maintenance/Start-up/Shutdown Emissions

Activity		Aerosol Can Degassing		Calibration Gas / Analyzer Maintenance		Combustion Shutoff Devices Maintenance		Drum Filling [1]		Flare Entry		Materials Handling		Pump Maintenance		Equipment Openings		Vacuum Truck Loading		Water Washing	
Emission Rate		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
		1.02	0.13	1.53	0.0153	0.13	0.00033	1.15	0.015	2.00	0.013	30.0	0.180	3.80	0.020	59.6	0.098	0.42	0.01	2.54	0.04
Weight Fraction																					
CAS No.	**Component**	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually	Hourly	Annually
67-64-1	Acetone	0.3	0.25																		
7664-41-7	Ammonia									0.01	0.001			0.05	0.001						
106-97-8	Butanes			0.02	0.02			0.1	0.1	1	0.5			0.25	0.1	0.06	0.06	0.05	0.14	1	0.75
111-76-2	2-Butoxy Ethanol	0.05	0.1																		
NA	C9s+	0.5	0.2															0.1	0.15		
74-85-1	Ethylene			0.01	0.01	0.02	0.02	0.05	0.05	0.05	0.008	0.02	0.02	0.05	0.1	0.005	0.001			0.15	0.139
67-56-1	Methanol	0.3	0.25																		
59355-75-8	Methyl Acetylene Propadiene Mixture			0.000025	0.00001											0.00007	0.00007				
78-93-3	Methyl Ethyl Ketone	0.05	0.1																		
8042-47-5	Mineral Oil							0.1	0.1	0.05	0.01			0.125	0.1			1	0.15		
NA	Oil	0.25	0.1					0.1	0.1	0.01	0.01			0.125	0.1			1	0.2	0.25	0.1
NA	Organosilane							0.05	0.05	0.01	0.01			0.05	0.01			0.1	0.01	0.01	0.01
109-66-0	Pentanes							0.1	0.1	0.01	0.001			0.05	0.001			0.1	0.1	0.01	0.001
8002-05-9	Petroleum Distillates							0.30	0.3	0.01	0.01			0.10	0.05			0.1	0.1		
74-98-6	Propane			0.25	0.20	0.20	0.20	0.1	0.1	0.5	0.15	0.20	0.20	0.10	0.05	0.235	0.235	0.05	0.15		
115-11-7	Propylene			0.85	0.77	0.78	0.78	0.1	0.1	1	0.3	0.78	0.78	0.10	0.488	0.8	0.703930				
NA	**VOC Total**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

	Activity	Aerosol Can Degassing		Calibration Gas / Analyzer Maintenance		Combustion Shutoff Devices Maintenance		Drum Filling [1]		Flare Entry		Materials Handling		Pump Maintenance		Equipment Openings		Vacuum Truck Loading		Water Washing		TOTAL	
CAS No.	**Emission Rate**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(tons/yr)**
67-64-1	Acetone	0.306	0.0325																			0.31	0.033
7664-41-7	Ammonia									0.02	0.000013			0.19	0.00002							0.21	0.000033
106-97-8	Butanes			0.0306	0.000306			0.115	0.0015	2.0	0.0065			0.95	0.002	3.576	0.00588	0.021	0.0014	2.54	0.03	5.5	0.018
111-76-2	2-Butoxy Ethanol	0.051	0.013																			0.051	0.013
NA	C9s+	0.51	0.026															0.042	0.0015			0.55	0.028
74-85-1	Ethylene			0.0153	0.000153	0.0026	0.0000066	0.0575	0.00075	0.1	0.000104	0.6	0.0036	0.19	0.002	0.298	0.000098			0.381	0.00556	0.6	0.0087
67-56-1	Methanol	0.306	0.0325																			0.31	0.033
59355-75-8	Methyl Acetylene Propadiene Mixture			3.825E-05	1.53E-07																	0.000038	0.00000015
78-93-3	Methyl Ethyl Ketone	0.051	0.013																			0.051	0.013
8042-47-5	Mineral Oil							0.115	0.0015	0.1	0.00013			0.475	0.002			0.42	0.0015			1	0.0051
NA	Oil	0.255	0.013					0.115	0.0015	0.02	0.00013			0.475	0.002			0.42	0.002	0.635	0.004	1.2	0.023
NA	Organosilane							0.0575	0.00075	0.02	0.00013			0.19	0.0002			0.042	0.0001	0.0254	0.0004	0.25	0.0012
109-66-0	Pentanes							0.115	0.0015	0.02	0.000013			0.19	0.00002			0.042	0.001	0.0254	0.00004	0.25	0.0026
8002-05-9	Petroleum Distillates							0.345	0.0045	0.02	0.00013			0.38	0.001			0.042	0.001			0.44	0.0066
74-98-6	Propane			0.3825	0.00306	0.026	0.000066	0.115	0.0015	1.0	0.00195	6.0	0.036	0.38	0.001	14.006	0.02303	0.021	0.0015			16.0	0.032
115-11-7	Propylene			1.3005	0.011781	0.1014	0.0002574	0.115	0.0015	2.0	0.0039	23.4	0.1404	0.38	0.00976	47.68	0.06898514					51.0	0.096

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, actual emissions will remain below the proposed emission rates.

1) Drum filling, equipment openings, tank openings and water washing activities will be limited to one type event per hour, i.e., these events will not occur simultaneously

APPENDIX B

PLOT PLAN

To: Ahmed Omar (Ahmed.Omar@tceq.texas.gov)[Ahmed.Omar@tceq.texas.gov]; Sean O'Brien[Sean.OBrien@tceq.texas.gov]; Thomasson, Lance E[Lance.E.Thomasson@invista.com]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Snyder, Erik[snyder.erik@epa.gov]; smohan@trinityconsultants.com[smohan@trinityconsultants.com]; Melissa Ryan[MRyan@trinityconsultants.com]
From: Periapattanam, Gopal
Sent: Mon 4/4/2016 9:46:20 PM
Subject: RE: INVISTA (Victoria, Texas) - NSR Permit 7186 DCS Application - PSD Modeling Protocol
removed.txt
Revised INVISTA PSD Modeling Protocol for ADN 2016-0404.pdf

Ahmed,

Attached is the revised ADN modeling protocol to reflect the updated ozone impact analysis in section 13 of the request.

Also appendix D is added which provides the supporting monitor and EI data.

Please contact me if you have any questions or need further information.

Thanks

Gopal Periapattanam

Global Air Capability Manager

INVISTA S.á.r.l.

4800 Sugar Grove Blvd., Suite 620

Stafford, Texas

Off – (281) 690-4705

Cell – (281) 221-7315

From: Thomasson, Lance E
Sent: Friday, February 19, 2016 9:18 AM
To: Sean O'Brien
Cc: Mohr.Ashley@epa.gov; snyder.erik@epa.gov; Periapattanam, Gopal
Subject: INVISTA (Victoria, Texas) - NSR Permit 7186 DCS Application - PSD Modeling Protocol

Sean,

As discussed during our teleconference on 2/17/16, attached is the INVISTA (Victoria, Texas) Adiponitrile Unit (ADN) PSD Modeling Protocol (dated February 2016) as part of NSR Permit Application 7186 submitted to the TCEQ in March 2015 (addendum provided in January 2016).

If you have any questions or need further information, then please reach out to me at the contact information provided below.

Regards.

Lance

Lance Thomasson, PMP

Environmental Manager

Victoria, Texas

Office: (361) 572-2317

Cell: (361) 212-0447

lance.e.thomasson@invista.com

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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Tue 3/22/2016 4:09:36 PM
Subject: Modeling Protocol - 7186 Invista s.a r.l
Modeling Protocol - 7186 Invista s.a r.l.docx
ADN PSD Modeling Protocol 2-18-16 1645.pdf

Ashley,

Attached are the modeling protocol submitted by Invista S A R L (permit No. 7186) and TCEQ comments on the modeling protocol.

Please let me know if you have any question.

Regards,

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

March 22, 2016

Subject: Invista S.A R.L. Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) and Minor New Source Review (NSR) Air Quality Analysis (AQA) Protocol for the Invista S.A R.L. project (Adiponitrile Unit) located at the Victoria Plant in Victoria, Victoria County, Texas, dated February 2016. The comments in section 13.5 need to be addressed prior to submitting the AQA. Please submit a revised protocol addressing these comments to the TCEQ and EPA Region 6. The rest of the comments are reminders for information to be included with the AQA.

1.0 Executive Summary – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or PSD Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

The protocol indicates that a single property line designation (SPLD) exists between Invista, DuPont, and Equistar. The single property line boundary should be used as the basis for receptor placement as well as identifying "site-wide" sources for the minor NSR analyses. However, single property line agreements do not apply to PSD modeling and ambient air starts at the applicant's fence line or other physical barrier to public access. Be sure to include a copy of the SPLD agreement, as well as the associated property line map, with the AQA.

The protocol notes that as the VOC project emissions increase is greater than 100 tons per year, a qualitative ozone analysis will be performed in accordance with TCEQ guidelines. The protocol did not provide sufficient information on the proposed project emissions of VOCs and NO_x. The proposed project emissions of VOCs and NO_x should be documented in the AQA as part of the ozone impact analysis.

3.1.3 State Property Line Analysis – While the text in this section mentions H_2S, Table 3-3 of the protocol does not list H_2S. Be sure that the documentation included with the AQA is consistent between the text and data presented in tables.

3.1.4 State Health Effects Evaluation (ESL Evaluation) – Be sure to use the most recent ESL list from the Toxicology Division (September 2015). If a contaminant is not on the ESL list, be sure to provide verification from the Toxicology Division for the ESL used.

3.2 General Modeling Approach – The protocol notes that for this project, it is not

expected that any criteria pollutant will show a significant impact; thus, a full impacts analysis is not expected to be required. If the expected results change and the model predictions are greater than or equal to the applicable de minimis levels, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

5.0 Plot Plan – Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

6.1 Pre-Construction Monitoring – The protocol notes that it is expected that CO and NO_2 predictions associated with the project will be less than the corresponding significant monitoring concentrations (SMCs) and preconstruction monitoring will not be required. Be aware that if the modeled concentrations are greater than the SMC, a revised protocol that discusses the preconstruction monitoring analysis will need to be submitted prior to submitting the AQA. For future projects, the preconstruction monitoring requirement should be addressed in the modeling protocol since data are available.

7.1 On-Property Project Sources – Be sure to provide a copy of the Table 1(a) that was submitted with the permit application with the AQA. In addition, be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA.

7.1.1.1 Point Sources – Be sure to provide flare effective stack diameter calculations with the AQA.

The protocol provides a calculation formula for the exit velocity for a tilted stack without providing any information about the tilted stack. If the tilted stack releases emissions into the atmosphere at any angle from the vertical greater than zero but less than or equal to 45 degrees, then the modeled stack velocity should be set equal to the vertical velocity component. The vertical velocity component should be calculated by multiplying the velocity by the cosine (cos) of the offset angle from the vertical.

However, if the tilted stack releases emissions into the atmosphere at any angle from the vertical greater than 45 degrees, then the release of emissions into the atmosphere should be considered horizontal and the default exit gas velocity of 0.001 m/s should be used in the modeling demonstration. For more information about modeling emissions

from tilted stacks, refer to the following guidance:

https://www.tceq.texas.gov/assets/public/permitting/air/memos/tiltstck.pdf

7.1.2 Modeled Emission Rates Determination – Be sure to verify project sources that will be included in the modeling demonstration, as well as the emission rates to model with the permit reviewer before submitting the AQA.

10.2 Modeling Equivalent Building Dimensions – The meaning of the title of this section, Modeling Equivalent Building Dimensions, is not clear. However, the input data to the downwash analyses should be consistent with the aerial photography and the plot plan.

12.0 Meteorological Data – The protocol notes that the land use surrounding the Victoria Plant is predominantly cultivated land, grassland, and deciduous forest with a moderate density of existing commercial, industrial, and residential structures. The typical surface roughness for this type of land use is generally between 0.1 – 0.7 m, which corresponds to the medium surface roughness category. Therefore, the TCEQ meteorological file containing medium surface roughness parameters will be used in this analysis. The ADMT recommends that an AERSURFACE analysis be conducted to support the selection of the meteorological data set. Otherwise, provide the source of data to support that the listed land use types have typical roughness lengths on the range of 0.1 – 0.7. If an AERSURFACE analysis is used to determine the surface roughness length, be sure to provide the AERSURFACE files with the AQA.

The protocol notes that the wind roses for Victoria Regional Airport from the years

considered in this modeling analysis are provided in Figure 12 - 1 through Figure 12 - 5

to supplement the meteorological data used in the modeling analyses. The wind roses show the direction towards which the wind is blowing. The standard convention for the wind rose is to show the directions in which the winds are blowing from. Be sure the documentation in the AQA is clear and figures follow the standard convention.

13.3 State Property Line Analysis – The protocol notes that the maximum modeled

ground - level concentrations of SO_2 at and beyond the property line obtained using the

approach described in Section 3 will be compared with applicable concentration standards. Note that section 3 does not contain any approach that describes how the

maximum modeled ground - level concentrations of SO_2 will be determined. Be sure that the documentation in the AQA is clear and complete.

13.4 State Health Effects Evaluation – The protocol notes that the maximum modeled ground - level concentrations for each compound listed in Table 3 - 3 of the protocol will be obtained using the approach described in Section 3 to determine if refined air dispersion modeling or effects review is necessary in the MERA analysis. Note that section 3 does not contain any approach that describes how the maximum modeled ground - level concentrations for the health effects compounds will be determined. Be sure that the documentation in the AQA is clear and complete.

13.5 Ozone Impact Analysis – The protocol notes that Invista will perform a qualitative analysis for ozone impacts based on TCEQ guidance, and that Victoria County is NO_x-limited, based on methodologies described in TCEQ guidance. Based on the area being characterized as NO_x-limited, Invista will employ EPA's recommended ozone impacts screening approach. Note that the TCEQ Air Quality Modeling Guidelines indicates that the guidance on conducting an ambient ozone impacts analysis is under further review. Also, the method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories.

If the local atmosphere's ozone formation is NO_x-limited, then following EPA's recommended ozone impacts screening approach is appropriate; however, the applicant will also need to add the ozone impacts of the recent project from the facility (Permit No. PSDTX1416) to the ozone background concentrations since it would not be reflected in the monitor.

The protocol did not identify any ozone monitors that would be used in the analysis; justification for proposed monitors that would be relied on was not provided; nor did the protocol include the applicable monitoring concentrations for review.

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on whether the area is NO_x-limited or VOC-limited, and the ozone monitor selection. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used.

13.6.3 Visibility Impairment Analysis – The protocol notes that per TCEQ guidance, Class II areas do not require a visibility impairment analysis. This is incorrect; TCEQ guidance does not state that Class II areas do not require a visibility impairment analysis. The visibility analysis is required; however, the applicant can meet the requirement by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111.

If you have any questions, please contact Ahmed Omar at (512) 239-1285, by fax at (512) 239-1400, or by email at Ahmed.Omar@tceq.texas.gov.

March 21, 2016

Subject: Golden Spread Electric Cooperative, Inc. Air Quality Analysis Protocol

We have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for Golden Spread Electric Cooperative, Inc. located near Denver City, Yoakum County, Texas, dated February 2016, and our comments are provided below. The comments in sections 2.0, 5.0, 6.1, 6.2, 7.1, 7.2, and Additional Impacts should be addressed in a revised protocol before the AQA is submitted.

2.0 Project Overview – The protocol does not specify which pollutants evaluated in the AQA require PSD review and which pollutants require a minor New Source Review (NSR) analysis. This information is needed to fully understand all subsequent sections of the modeling protocol and to make sure that applicable items have been addressed (for example, addressing secondary $PM_{2.5}$ formation). Please provide this information in a revised protocol.

In addition, the protocol includes a discussion on the backup generator DGFEN2. Section 6.0 refers to this generator as DGEN2. Please ensure that all sections of the AQA are consistent.

3.0 Plot Plan – Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site fence line, property line, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. Also, please note that the plot plan should be independent of any model input software.

5.0 Air Quality Monitoring Data – The protocol discusses which monitors will be used in the modeling analysis, but does not provide any justification for these monitors. A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on the monitor selection. Be sure to provide the justification for the selected monitors and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for each monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

In addition, the revised protocol should provide more detail on how the monitor data will be used. Monitor data can be used to address background concentrations for NAAQS analyses, address the pre-application analysis (section 7.2), and justify the $PM_{2.5}$ de minimis levels (section 6.2).

Please note the Hobbs $PM_{2.5}$ monitor data may not meet completeness criteria for 2014.

6.1 On-Property Sources in the Permit Application – The protocol notes that DGEN2 and HEAT1A will be modeled using the POINTCAP source type. As noted in the protocol, this source type is classified as a non-default/beta option in AERMOD. The revised protocol should include justification for this modeling approach. The EPA "Model Clearinghouse Review of the Use of the ADJ_U* Beta Option in the AERMET Meteorological Processor (Version 15181) for

the Donlin Mine Compliance Demonstration" memo can be used as a basis for the justification. The memo includes a discussion on the POINTCAP and POINTHOR source types.

The protocol notes that DGEN2 can be classified as an intermittent source. However, the protocol failed to show that the source operations would not contribute significantly to the modeled design value of the annual distribution of daily maximum 1-hr concentrations. Additional information should be provided in a revised protocol on the expected source operations with respect to the total annual operating hours, as well as the frequency and duration of the operations.

The protocol notes that HEAT1A will not be considered in any short-term modeling. Be sure to coordinate with the permit reviewer on the scope of the project before excluding HEAT1A from short-term modeling.

The protocol briefly mentions the annual NO_2 NAAQS and PSD Increment in the discussion of HEAT1A. As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. The protocol should discuss which pollutants require PSD review and which pollutants require a minor NSR analysis. Be sure to identify all applicable standards that will be addressed in the relevant sections of the revised protocol.

6.2 Other On-Property and Off-Property Sources – The protocol notes that a retrieval of nearby sources will be requested from the TCEQ. The size of the retrieval will be based on the applicable pollutants' radius of impact plus 50 kilometers (km). Note that the retrieval distance can be limited to 50 km, the distance applicable for near-field modeling with AERMOD.

In addition, be aware that applicants are not limited to using only APAD as a data source. If the applicant is aware of data not contained in the retrieval, such as recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

The protocol describes how the use of the $PM_{2.5}$ SILs will be justified. Please note that the proposed approach is appropriate for justifying the SILs for use in the NAAQS analysis. If the proposed project triggers PSD review for $PM_{2.5}$, then justification for use of the SILs in the Increment analysis will need to be provided in a revised protocol.

For the Increment analysis, note that the area of impact (AOI) will be the same one used in the PSD NAAQS analysis, except for those criteria pollutants with NAAQS that are statistically-based (i.e. multi-year average). While the SILs for both NAAQS and Increment are identical, the procedures to determine significance (that is, predicted concentrations to compare to the SIL) are different. This difference occurs because for those NAAQS that are statistically-based, the corresponding Increments are exceedance-based. For criteria pollutants with NAAQS that are statistically-based, determine the AOI following the convention of exceedance-based NAAQS (i.e., maximum predicted concentration).

For example, when modeling $PM_{2.5}$, use the maximum predicted concentrations from all

receptors to determine the AOI for the 24-hour and annual averaging times instead of the five-year average of the maximum predicted concentrations from the NAAQS analysis.

6.3 Scaling Factors – The protocol notes that a non-default option for the conversion of NO_x to NO_2 may be used depending on initial results using the Tier 2 ARM. If a Tier 3 model option will be used, a revised protocol must be sent to the TCEQ and EPA Region 6 for review prior to submitting the AQA. Furthermore, if a Tier 3 model option is used, the revised protocol must include a discussion and sufficient technical justification for the in-stack NO_2/NO_x ratio that will be used. In addition, full documentation and technical justification for the ozone data selected to be used with the Tier 3 model option and how it is representative of the project site must be provided with the revised protocol. Please note that the use of the Tier 3 PVMRM2 model option would require approval from the EPA Model Clearinghouse.

The protocol also notes the possibility of using the beta ARM2 model option for the conversion of NO_x to NO_2 instead of the Tier 3 options. Please note that the EPA proposal to make ARM2 a default model option is not sufficient justification. If ARM2 will be used, a revised protocol must be sent to the TCEQ and EPA Region 6 for review prior to submitting the AQA. If the default criteria for using ARM2, as noted in EPA's September 30, 2014 clarification memo "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard," are followed, then the protocol will not require prior approval by EPA Region 6 and the Modeling Clearinghouse. However, any deviation from the default criteria will need to be evaluated and approved prior to submitting the AQA.

7.0 Models Proposed and Modeling Techniques – The protocol notes that the most recent version of AERSURFACE is 08009. Please note that the most recent version is 13016.

The protocol notes that the SILs are listed in Table 6-1. Please note that the SILs are actually listed in Table 6-4. Please ensure that all sections of the AQA are consistent.

As noted in section 6.3, a revised protocol must be submitted to TCEQ and EPA Region 6 if ARM2 or one of the Tier 3 model options will be used.

The last paragraph of this section discusses requesting a primary retrieval of off-property sources from the TCEQ. Please note that the APAD retrieval does not have primary and/or secondary search options.

7.1 Full Impact Modeling Approach (PSD Increment and NAAQS) – As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. Please update this section in a revised protocol. The protocol should discuss which pollutants require PSD review and which pollutants require a minor NSR analysis. Be sure to identify all applicable standards that will be addressed in this section.

7.2 Significant Monitoring Concentration (SMC) – As noted in section 2.0, the scope of the project is not known with regards to PSD applicability. Please update this section in a revised protocol. The protocol should discuss which pollutants require PSD review and which pollutants

require a minor NSR analysis. All pollutants that require PSD review should be addressed in this section.

Be aware that if the modeled concentrations associated with the project sources are greater than the SMC, a pre-application analysis will need to be conducted for the applicable pollutants.

The protocol notes that EPA promulgated SMCs for all criteria pollutants. However, the $PM_{2.5}$ SMC was vacated. A pre-application analysis will need be conducted for $PM_{2.5}$.

In addition, the general approach for addressing the SMCs documented in the protocol is based on older guidance. The procedures documented in Appendix H of the TCEQ Air Quality Modeling Guidelines should be followed with regards to the pre-application analysis.

The protocol briefly mentions FGE sources. Please note that FGE corresponds to a different modeling project. Please ensure that all sections of the AQA are consistent.

11.0 Receptor Grid - Design – Be aware that ambient air for minor NSR analyses starts at the property line; however, for PSD modeling, ambient air starts at the fence line or other physical barrier to public access.

Additional Impacts – Please note that the first paragraph of this section references old guidance that is no longer applicable to the ozone analysis. In addition, the information presented in the second paragraph does not add to the argument that the project area is NOx-limited. This information can be omitted from the revised protocol.

The protocol did not provide sufficient information on the proposed project emissions of VOC and NO_x to determine if an ozone analysis is required. If the net project emissions of VOC and NO_x are less than 100 tons per year (tpy), then an ozone impact analysis is not required and this conclusion should be documented in the AQA. However, if the net project emissions of VOC and/or NOx are greater than 100 tpy, an ozone analysis must be conducted.

The protocol discusses which monitor will be used in the ozone analysis, but does not provide any justification for the monitor. A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on the monitor selection. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used.

The proposed approach of modeling NO_x emissions to evaluate the impact that the proposed NO_x emissions will have on ozone concentrations in the area is reasonable, provided that the area is NO_x-limited. The method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from reported emissions inventories. In addition, the ozone analysis should assume 90% conversion of NO_x to NO_2, per EPA guidance.

The NO_x emissions evaluated in this ozone analysis should cover different operating scenarios, like startup/shutdown operations. Also, be aware that the EPA intermittent source guidance

should not be used in this proposed ozone analysis.

Please note that the nearest Class I area, Salt Creek Wilderness, is located approximately 165 km from the project site.

The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area. The applicant may contact the applicable Federal Land Manager to discuss any potential Class I analyses for air quality related values.

The protocol did not include the Additional Impacts Analysis. Please submit a revised protocol that includes this analysis.

The protocol did not include an analysis of the secondary formation of $PM_{2.5}$ due to the proposed project emissions. Please address this analysis in a revised protocol.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Rhys Davies at 512-239-1134 or Matthew Kovar at 512-239-0180, by fax at 512-239-1400, or by email at Rhys.Davies@tceq.texas.gov or Matthew.Kovar@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Dianne Anderson[dianne.anderson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]
From: Rachel Melton
Sent: Wed 3/16/2016 9:42:09 PM
Subject: Protocol Response: TOTAL PETROCHEMICALS & REFINING USA INC (permit #PSDTX1426, 122353)
PAR Side Cracker Modeling Protocol Response 10-Mar-2016.docx
Third Modeling Protocol - 122353 TOTAL PETROCHEMICALS & REFINING USA INC.docx

Ashley,

Attached is the TCEQ's response for the Total Petrochemicals & Refining USA Inc. third Modeling Protocol, Permit No.: PSDTX1426, 122353. Please respond to verify receipt of this information.

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

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February 22, 2016

Subject: REXtac, LLC Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for REXtac, LLC located in Odessa, Ector County, Texas, dated February 2016, and my comments are provided below. The comments in section 5.1 and Appendix D should be addressed in a revised protocol.

2.2 Constituents to be Evaluated – The table in section 2.2 of the protocol lists the primary ozone NAAQS as 75 parts per billion. Please note that the primary ozone NAAQS is 70 ppb.

In addition, the table lists the annual PM_{10} NAAQS. Please note that the annual averaging period does not need to be evaluated since the project is minor for PM_{10}.

The table notes that the 1-hr NO_2 Significant Impact Level (SIL) is an interim value. Please note that the 1-hr SO_2 SIL is also an interim value.

3.0 Plot Plan – The protocol notes that the plot plan depicts all property lines and fence lines. However, the plot plan does not appear to depict the fence line. Be aware that ambient air for minor new source review (NSR) analyses starts at the property line; however, for PSD modeling, ambient air starts at the fence line or other physical barrier to public access.

In addition, the western parcel of the property depicted on the plot plan is not consistent with the air dispersion modeling team's geodatabase. According to the geodatabase, this property is owned by Flint Hills Resources Odessa LLC (RN101867554). Please provide supporting data in the AQA for including this parcel as part of REXtac property.

5.0 Air Quality Monitoring Data – The protocol notes that preliminary modeling results for 24-hr and annual PM_{10}, annual NO_2, annual SO_2, annual $PM_{2.5}$, and all averaging periods of CO are below the respective SILs. If the model predictions are greater than or equal to an applicable SIL or De Minimis level, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on the monitor selection. Be sure to provide the justification for the selected monitors and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for each monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

The protocol notes that CO did not exceed its SIL or Significant Monitoring Concentration (SMC); therefore, no PSD pre-application analysis is required. Please note that a pre-application analysis is always required. The AQA should note that CO is exempt from the pre-application analysis due to project impacts being less than the SMC.

In addition, the protocol notes that 2012-2014 monitor data will be used to develop the background concentrations. Be aware that 2013-2015 monitor data should be used if complete

2015 data become available.

The protocol notes that the preliminary State NAAQS model determined that the 3-hr and 24-hr SO_2 concentrations did not exceed their respective SILs. This is not consistent with Table 3. Please ensure that all sections in the AQA are consistent.

5.1 Monitor Selection – The protocol did not include sufficient justification for the proposed NO_2 and SO_2 monitors. Appendix D notes that the project area has seen enormous industrial growth, predominately in oil and gas operations. The oil and gas operations are most likely not accounted for in the emission assessments between the project site and the proposed monitor sites. Given this information, the applicant should submit a revised evaluation of the proposed monitor sites, taking into account oil and gas operations, in a revised protocol.

5.2.2 SO_2 Monitoring Data – The protocol notes that project NO_2 1-hr, 3-hr, and 24-hr impacts exceed the respective SILs; the reference to NO_2 should be SO_2. Please ensure that documentation in all sections of the AQA is consistent.

6.2 Other On-Property and Off-Property Sources – The protocol notes that a retrieval from the TCEQ Air Permits Allowable Database (APAD) will be obtained for NAAQS pollutants that exceed the applicable SIL. Please be aware that applicants are not limited to using only APAD as a data source. If the applicant is aware of data not contained in the retrieval, such as recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

6.4 Stack Parameter Justification – The protocol notes that some emissions will be modeled as area sources. Some of the area sources depicted on the plot plan are quite large. Be sure to provide justification in the AQA that supports the size of the area sources with respect to the emissions being modeled. In addition, provide justification for the modeled volume source sizes as well.

In addition, the protocol notes that equipment/vessel openings MSS will be modeled as elevated volume sources on or adjacent to a building. This is not appropriate since the tall columns will not present a significant obstruction to the wind flow; the columns should not be treated as downwash structures. The equipment/vessel openings MSS should be modeled as elevated volume sources not on or adjacent to a building.

Be sure to include the effective stack diameter calculations for all modeled flares in the AQA.

The protocol notes that the MERA Step 5 analysis will not evaluate concentrations at locations within 500 feet of the property line. A concentration other than the GLCmax can be used for MERA Step 5 only with prior approval by the permit reviewer.

9.0 Building Wake Effects (Downwash) – The plot plan indicates that some of the process areas and the associated piping components will be included as downwash structures. These areas will not present a significant obstruction to wind flow and should not be considered

downwash structures.

10.0 Receptor Grid - Terrain – The protocol notes that AERMAP Version 9.1.0 will be used to process terrain data from elevation files and to assign base elevation heights to each receptor, building, and emission source. Please note that the most recent version of AERMAP is version 11103.

11.0 Receptor Grid - Design – The protocol notes that the receptor grid starts at the property line. Be aware that ambient air for minor NSR analyses starts at the property line; however, for PSD modeling, ambient air starts at the fence line or other physical barrier to public access.

In addition, the eastern parcel of the property is in a single property line agreement with two other regulated entities, Flint Hills Resources Odessa LLC (RN101867554) and Orrex Plastics Company LLC (RN100694884). The single property line boundary should be used for the receptor grid boundary for the minor NSR analyses. Any site-wide modeling conducted for the minor NSR analyses should include all applicable sources of emissions from RNs 101867554 and 100694884. Please note that the single property line designation boundary does not apply to the CO modeling analysis since CO triggers PSD review.

12.0 Meteorological Data – The protocol notes that one or five years of meteorological data may be used for the modeling analysis. It should be noted the meteorological data used must be consistent for all averaging times. For example, when modeling 1-hr SO_2 with five years of meteorological data, the modeling for the 3-hr, 24-hr, and annual averaging times should also use five years.

Appendix A – Be sure to coordinate with the permit reviewer on the modeled emission rates prior to conducting the modeling analysis.

Appendix D – The proposed ozone monitor is reasonable. Be sure to provide all supporting data used to develop Tables 1 and 3, as well as the calculations for the background concentrations.

The emissions assessment section of the appendix is not sufficient to demonstrate that the proposed project emissions will not have a significant impact on ozone formation in the area. First, the protocol notes that reported emissions data indicate the project area is VOC-limited. The method for determining if the project area is NOx-limited or VOC-limited should be based on ambient concentrations in the area and not from reported emissions inventories.

Second, since the project area was represented to be VOC-limited, the ozone analysis should evaluate the impact that the proposed VOC emissions will have on the ozone concentrations in the area. The protocol only discusses the percentage of the proposed VOC emissions relative to the total VOC emissions in the area. Please submit a new ozone analysis in a revised protocol.

The protocol did not include an Additional Impacts Analysis. An Additional Impacts Analysis must be included as part of the AQA.

Deliverables – All modeling and downwash input and output files should be sent electronically

via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Matthew Kovar at 512-239-0180, by fax at 512-239-1400, or by email at Matthew.Kovar@tceq.texas.gov.

February 19, 2016

Subject: AES Generation Development, LLC Air Quality Analysis Protocol

We have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for AES Generation Development, LLC located in Pasadena, Harris County, Texas, dated February 2016, and our comments are provided below. The comments in sections 2.3.2, 2.6.1, 2.6.2, and 3.1 should be addressed in a revised protocol before the AQA is submitted.

1.3 Applicable Pollutants - Be sure to coordinate with the permit reviewer on the PSD netting calculations documented in Table 1-2 of the protocol prior to conducting the modeling analysis.

In addition, confirm with the permit reviewer that it is appropriate to exclude NO_x from the GE 7FA.05 simple cycle turbines analysis and CO from the GE 7HA.01 and GE 7HA.02 combined cycle turbines analyses.

Table 1-3 of the protocol notes that the 1-hr SO_2 NAAQS SIL is 7.9 $\mu g/m^3$. Please note that the 1-hr SO_2 NAAQS SIL is 7.8 $\mu g/m^3$. Table 1-3 also notes that the 8-hr CO NAAQS is 5,000 $\mu g/m^3$. Please note that the 8-hr CO NAAQS is 10,000 $\mu g/m^3$.

Footnote F to Table 1-3 notes that, for the $PM_{2.5}$ 24-hour NAAQS analysis, the modeled concentration is the 98th percentile of the 5-year averages of the maximum modeled 24-hour average $PM_{2.5}$ concentrations. Please note that the modeling concentration is the highest of the 5-year averages of the 98th percentile of the maximum modeled 24-hour average $PM_{2.5}$ concentrations.

Table 1-5 of the protocol notes that the SO_2 State Property Line Standard is 730 $\mu g/m^3$. Please note that the SO_2 State Property Line Standard for Harris County is 715 $\mu g/m^3$.

2.2.1 Regulatory Default and Non-Default Options - The protocol notes that a non-default option for the conversion of NO_x to NO_2 may be used depending on initial results using the Tier 2 ARM. If a Tier 3 model option will be used, a revised protocol must be sent to the TCEQ and EPA Region 6 for review prior to submitting the AQA. Furthermore, if a Tier 3 model option is used, the revised protocol must include a discussion and sufficient technical justification for the in-stack NO_2/NO_x ratio that will be used. In addition, full documentation and technical justification for the ozone data selected to be used with the Tier 3 model option and how it is representative of the project site must be provided with the revised protocol.

2.2.3 Urban/Rural Dispersion - The protocol does not include a discussion on the population that will be entered for the AERMOD urban option. This discussion should be included in the AQA. The population should be determined following EPA guidance from Section 5 of the AERMOD Implementation Guide.

2.3.4 CT Short-Term Stack Parameters - The "Frankenstein" scenario proposed for the combined cycle operations appears to be reasonable. However, according to the provided plot

plans, it appears that the source and building locations vary for the different turbine models. Please document in a revised protocol how these variations will be accounted for in the "Frankenstein" scenario.

The protocol notes that start-up and shutdown operations of the turbines can be classified as intermittent sources. Although information in support of classifying the start-up and shutdown operations as intermittent sources was provided in the protocol, the protocol failed to show that the operations would not contribute significantly to the modeled design value of the annual distribution of daily maximum 1-hr concentrations based on the total number of hours of start-up and shutdown operations. Additional information should be provided in a revised protocol on the start-up and shutdown operations with respect to the frequency and duration of the operations. In addition, the protocol should discuss if the start-up and shutdown operations can occur simultaneously for multiple turbines.

The protocol notes the 3-hr and 24-hr SO_2 analyses will use base load emission rates since the SO_2 emissions do not vary due to start-up and shutdown emissions. In addition, base load emission rates will be used for the 24-hr $PM_{10}/PM_{2.5}$ analyses since the base load emissions are larger than start-up and shutdown emissions on a pound per hour basis. Please note that start-up and shutdown scenarios should also be evaluated if the corresponding stack parameters differ from normal operations.

The protocol notes that the emergency generator and fire pump will be excluded from the modeling for the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses. These sources should not be excluded from the short-term analyses, but modeled with average hourly emission rates per EPA intermittent guidance.

Please note that the project is located within the Houston-Galveston-Brazoria ozone nonattainment area. Title 30 Texas Administrative Code (30 TAC) Chapter 117 includes operational restrictions for diesel engines in the ozone nonattainment areas. The operation of diesel engines for testing or maintenance purposes cannot occur between the hours of 6 am and 12 pm. The total hours per year available for testing or maintenance would be 6570 hours (18 hours per day multiplied by 365 days per year). The modeled hourly emission rate for the emergency generator and fire pump would be equal to the maximum hourly emission rate multiplied by 100/6570.

The protocol notes that the emergency generator and fire pump will use average short-term emission rates for the 8-hr CO and 24-hr $PM_{10}/PM_{2.5}$ modeling analyses. Be sure to provide a discussion and corresponding calculations to support the modeled emission rates if this approach is used.

Be sure to coordinate with the permit reviewer on the modeled emission rates documented in Table 2-3 of the protocol prior to conducting the modeling analysis.

Please review how the modeled stack diameter, stack temperature, and stack exit velocity were determined for the "Frankenstein" scenario. The values listed in the "Frankenstein Scenario" table do not correspond to the lowest stack parameter values in Table 2-3.

The protocol notes that the auxiliary boiler can be classified as an intermittent source. Although information in support of classifying the auxiliary boiler as an intermittent source was provided in the protocol, the protocol failed to show that the operations would not contribute significantly to the modeled design value of the annual distribution of daily maximum 1-hr concentrations based on the total number of hours of auxiliary boiler operations. Additional information should be provided in a revised protocol on the auxiliary boiler operations with respect to the frequency and duration of the operations.

The protocol notes that the size of the auxiliary boiler and cooling tower can vary depending on the turbine model. Be sure that this variation is accounted for in the "Frankenstein" scenario.

2.6.1 Justification of Use of $PM_{2.5}$ SILs - The protocol includes justification for the use of the $PM_{2.5}$ SILs in the NAAQS analysis, but does not include justification for the use of the SILs in the Increment analysis. Please provide this justification in a revised protocol.

2.6.2 Significance Analysis Modeling Procedures - The protocol notes that an additional 100 percent load/maximum emissions scenario may be evaluated in addition to the "Frankenstein" scenario. It is not clear why this additional evaluation is proposed, since the "Frankenstein" scenario should result in the maximum predicted concentrations. Please elaborate on the reason for this approach in a revised protocol.

As stated in section 2.3.4, the emergency generator and fire water pump should be included in the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses.

For the Increment analysis, note that the area of impact (AOI) will be the same one used in the PSD NAAQS analysis, except for those criteria pollutants with NAAQS that are statistically-based (i.e. multi-year average). While the SILs for both NAAQS and Increment are identical, the procedures to determine significance (that is, predicted concentrations to compare to the SIL) are different. This difference occurs because for those NAAQS that are statistically-based, the corresponding Increments are exceedance-based. For criteria pollutants with NAAQS that are statistically-based, determine the AOI following the convention of exceedance-based NAAQS (i.e., maximum predicted concentration).

For example, when modeling $PM_{2.5}$, use the maximum predicted concentrations from all receptors to determine the AOI for the 24-hour and annual averaging times instead of the five-year average of the maximum predicted concentrations from the NAAQS analysis.

2.6.5.1 NO_x to NO_2 Conversion Options - As stated in 2.2.1, a revised protocol will need to be submitted to the TCEQ and EPA Region 6 if one of the Tier 3 model options will be used.

3.1 Background Data - The proposed background monitor is reasonable. Be sure to provide the background concentrations and supporting calculations in a revised protocol. In addition, the three most recent years of complete data should be used.

5.0 Class I Area Impact Analysis - Please note that the areas listed in Table 5-1 are not defined

as Class I areas by the EPA.

5.1 PSD Class I Area Increment Analysis - Please note that the nearest Class I area, Caney Creek Wilderness, is located approximately 530 kilometers from the project site.

The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 kilometers of a Class I area. The applicant may contact the applicable Federal Land Manager to discuss any potential Class I analyses for air quality related values.

7.1 Visibility Impairment Analysis - Please note that the requirement for the Class II visibility analysis can be met by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Rhys Davies at 512-239-1134 or Matthew Kovar at 512-239-0180, by fax at 512-239-1400, or by email at Rhys.Davies@tceq.texas.gov or Matthew.Kovar@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]; Snyder, Erik[snyder.erik@epa.gov]
Cc: Periapattanam, Gopal[Gopal.Periapattanam@invista.com]; Thomasson, Lance E[Lance.E.Thomasson@invista.com]; david.reyna@tceq.texas.gov[david.reyna@tceq.texas.gov]
From: Lauterbach, Paul D
Sent: Thur 2/18/2016 2:03:31 PM
Subject: INVISTA S.a'r.l. Victoria Adipic Acid AQ PSD Modeling Protocol
INVISTA AA PSD Modeling Protocol_2016-02-18.pdf

Dear Ashley Mohr and Erik Snyder:

Please find attached the above captioned modeling protocol. This protocol has been discussed with TCEQ prior to this submission. Let me know if you would also prefer to see this document delivered in hard copy format and if you have any questions, comments or concerns.

Paul Lauterbach

Environmental Air Engineer

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To: Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Ron Thomas[Ron.Thomas@tceq.texas.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Snyder, Erik
Sent: Mon 1/25/2016 11:26:33 PM
Subject: FW: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters
Response to SC critique - NRG Parish Station - 20160125.pdf
1.25.16 Supplemental SO2 Modeling Analysis_WAP & LMS.PDF

FYI – updated info from NRG. Didn't see TCEQ on the email list.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
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From: zachary.craft@bakerbotts.com [mailto:zachary.craft@bakerbotts.com]
Sent: Monday, January 25, 2016 5:10 PM
To: Donaldson, Guy <Donaldson.Guy@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>; Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Craig.Eckberg@nrg.com; Lindsay.Little@nrg.com; matthew.kuryla@bakerbotts.com; Richard.Hamel@erm.com; Mark.Garrison@erm.com; Beth.Barfield@erm.com
Subject: RE: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

Ashley, Erik, Guy –

Please find attached NRG's clarification regarding the stack parameters, as well as our response to the Sierra Club comment letter. We have also presented modeling results relating to both the confirmed stack parameters and the most recent dispersion modeling submitted by Sierra Club for NRG's Parish and Limestone plants. Please do not hesitate to contact us if you would like to discuss.

Thanks,

--Zach

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, January 14, 2016 11:42 AM
To: Craig.Eckberg@nrg.com; Richard Hamel; Mark Garrison; daniel.menendez@tceq.texas.gov
Cc: Donaldson, Guy; Snyder, Erik
Subject: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

All –

Based on our ongoing review of the modeling analyses submitted for the NRG Limestone and WA Parish facilities related to the SO2 Designations, we have identified potential discrepancies in modeled stack parameters and are requesting additional clarification or information from both industry and TCEQ regarding these stack parameters. This email outlines the additional information we are requesting and also provides a copy of a comment letter recently received from Sierra Club that identifies a discrepancy for one of the units located at the WA Parish facility.

Limestone:

Below is a table showing the stack parameter information from the most recent Industry modeling, most recent Sierra Club modeling, and the 2014 Emissions Inventory Questionnaire (EIQ) pulled from the TCEQ's website. As you can see differences exist in both the stack height

and stack diameter values.

	LMS1 and LMS2	
	Stack Height (ft)	**Stack Diameter (ft)**
Industry	565	23.6
Sierra Club	563	26.9
2014 EIQ	450	27

We are asking that both industry and TCEQ review these values and provide any additional information available to document what the actual stack parameters are for the two main stacks located at the Limestone Facility.

<u>WA Parish:</u>

We conducted a similar review and comparison for WA Parish and found the following differences for 4 of the modeled units at WA Parish:

	UNIT2A/2B		UNIT4		UNIT7		UNIT8	
	Stack Height (ft)	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diamete (ft)**
Industry	167.8	18	182	18	500	24	500	22.5
Sierra Club	Not modeled	Not modeled	Not modeled	Not modeled	500	22	500	22.5
2014 EIQ	168	10.5	191	22.5	500	22	500	22

As I previously mentioned, we did receive a comment letter from Sierra Club that referenced the stack diameter discrepancy for Unit 7. Again, we request you all to review this information and provide additional documentation and/or clarification regarding the potential discrepancies in the modeled stack parameters.

If you have any questions, please feel free to contact me. We are also available to set up a

specific time to discuss in more detail, if necessary.

Thanks,

Ashley

Ashley N.Q. Mohr
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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Dianne Anderson[dianne.anderson@tceq.texas.gov]; Daniel Jamieson[daniel.jamieson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]
From: Rachel Melton
Sent: Mon 1/25/2016 5:51:17 PM
Subject: Protocol Reponse: OCCIDENTAL CHEMICAL CORPORATION (permit #35335)
Modeling Protocol Response - 35335 OCCIDENTAL CHEMICAL CORPORATION.docx
OxyChem Modeling Protocol August 2015.pdf

Ashley,

Attached is the TCEQ's response for the OCCIDENTAL CHEMICAL CORPORATION Modeling Protocol, Permit No.: 35335. Please respond to verify receipt of this information.

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

T: 512-239-2358

E: Rachel.Melton@tceq.texas.gov

January 25, 2016

Subject: Occidental Chemical Corporation Air Dispersion Modeling Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) Air Dispersion Modeling Protocol for Occidental Chemical Corporation, located in Ingleside, San Patricio County, Texas, dated August 2015, and my comments are provided below. The comments in sections 2.0, 8.3, and 12.0 should be addressed before the air quality analysis (AQA) is submitted. The remaining comments are reminders and recommendations for information to be included with the AQA.

1.0 Project Overview – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

The protocol notes that a PSD ozone impact analysis is not required since the proposed project emissions of VOC will be less than 100 tons per year (tpy). It should be noted that an ozone impact analysis is required when the net project emissions of NO_x and/or VOCs exceed 100 tpy. Be sure to verify with the permit reviewer on all applicable pollutants to evaluate.

When conducting the PSD Significance analyses, consider all new and increased emissions from the site related to the project. For pollutants that exceed the associated de minimis levels, conduct a NAAQS analysis that considers all allowable emissions at the site, including emissions associated with all planned Maintenance, Start up, and Shutdown (MSS) activities, and emissions from off-property sources and activities. For the same pollutants, conduct a PSD Increment analysis that considers all PSD Increment consuming sources.

When conducting the Minor New Source Review (NSR) analyses, consider all new and increased emissions from the site related to the project, including emissions associated with all planned MSS activities. For pollutants and averaging periods that exceed the associated de minimis levels, conduct a full Minor NSR NAAQS analysis that considers all allowable emissions at the site, including emissions associated with all planned MSS activities, and emissions from off-property sources and activities.

When conducting the State Property Line analysis, consider all emissions at the site. The AQA must include justification why some emissions have not been modeled and how site-wide emissions have been considered in the demonstration of compliance with

the standards.

When conducting the Health Effects analysis, consider all new and increased emissions from the site related to the project. For all health effects pollutants evaluated, provide the corresponding Chemical Abstract Service (CAS) numbers, as applicable, with the AQA. Be sure to use the most recent list of Effects Screening Levels (ESLs), currently September 28, 2015.

2.0 Project Emissions – Be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA.

The protocol notes that fugitive emissions will be modeled as area sources. Be sure to include justification for the modeled area source dimensions (length and width) in the AQA.

In addition, please provide more details regarding the types of start-ups (cold, warm, and hot) for the two turbine options as applicable. Be sure to also explain how the different operating loads for the two turbine options will be addressed prior to submitting the AQA (i.e., a load analysis).

3.0 Plot Plan – Provide a plot plan with the AQA (electronic format preferred) that depicts the entire site. The plot plan should include the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any buildings or structures represented in the AQA. Please be sure to clearly label all of these features on the plot plan.

5.0 Meteorological Data – The protocol states that AERMOD version 14134 will be used in the modeling demonstration. Please note a newer version of AERMOD (version 15181) is available and should be used for the demonstration. Also, be aware that AERSURFACE computes the surface characteristics [albedo, Bowen ratio, and surface roughness], and not AERMET.

Be sure to include the meteorological data files with the AQA associated with the modeling analysis, including the AERSURFACE files and any concatenated files that may be used.

It is not clear from the protocol if the five years of meteorological data will be concatenated. Be aware of model limitations when using a concatenated meteorological data set with multiple averaging times in the same model run. For example, when modeling NO_2 with a concatenated five-year meteorological data set in AERMOD and both the 1-hr and annual averaging times are selected, AERMOD will compute five-year average concentrations for both averaging times. This is not appropriate for the NO_2 annual averaging time. The ADMT recommends that 1-hr NO_2, 1-hr SO_2, and $PM_{2.5}$ (NAAQS) be evaluated using a single concatenated file in order to get the results that are consistent with guidance (i.e. five-year average) and to make use of the built-in processing of AERMOD.

Note for the Increment analysis, $PM_{2.5}$ will need to be evaluated modeling individual years to determine maximum predictions.

7.0 Class I Areas – The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 kilometers of a Class I area. The applicant may contact the applicable Federal Land Manager to discuss any potential Class I analyses for air quality related values.

8.1 Model Selection – The protocol notes that AERMOD version 14134 will be used in the modeling demonstration. As noted above in section 5, a newer version of AERMOD (version 15181) is available and should be used for the demonstration.

Be sure to document and technically justify all model selections in the AQA.

8.2 Building Downwash Analysis – Provide all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

Ensure that all GEP heights used in BPIP PRIME are justified according to Guideline for Determination of Good Engineering Practice Stack Height:

http://www.epa.gov/scram001/guidance/guide/gep.pdf

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

Be sure that piping structures are not included as downwash structures in the downwash analysis unless sufficient justification can be provided.

8.3 Modeling Approach

Federal Standards – The protocol notes that it is expected that all of the maximum predicted concentrations from the project will be less than the applicable significant impact levels (SILs). If these results change and the model predictions of any pollutant are greater than or equal to an applicable de minimis level, then a revised protocol will need to be submitted to the TCEQ that includes a discussion on how site-wide emissions and off-property sources will be addressed in the AQA.

The revised protocol must also include a discussion on the monitor selection for ambient background concentrations. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site, containing sufficient data to meet the completeness criteria, county emission comparisons, and

county population comparisons. The justification for each monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to the type and amount of nearby sources of emissions.

Be aware that annual PM_{10} will need to be evaluated in order to determine if an Increment analysis is required.

State Guidelines and Standards – As stated above, if the preliminary results change and the model predictions of any pollutant are greater than or equal to an applicable de minimis level or threshold, then a revised protocol will need to be submitted to the TCEQ that includes a discussion on how site-wide emissions and off-property sources will be addressed in the AQA. The revised protocol must also include a discussion on the monitor selection for ambient background concentrations. See the comment above in section 8.3 *Federal Standards* regarding monitor justification.

Normal Plant Operations and Maintenance, Start-up and Shutdown (MSS) Modeling –The protocol notes that the 1-hr NO_2 modeling of the start-up and shutdown activities of the cogeneration unit will be based on average hourly emission rates (i.e. applying EPA's intermittent guidance). It is not clear from the information provided in the protocol that the start-up and shutdown activities of the cogeneration unit qualify as intermittent sources. Information such as the number of times per day, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA. Also, as noted above, be sure to provide more details regarding the types of start-ups (cold, warm, and hot) prior to submitting the AQA.

Please note that if EPA's intermittent guidance only applies to the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses. The annual average emission rates should not be used for any other short-term averaging times and pollutants, including the SO_2 State Property Line analysis and ozone analysis.

The Use of Vacated SILs for $PM_{2.5}$ Modeling – The summary of the analysis for justifying the $PM_{2.5}$ De Minimis levels for the NAAQS analysis is appropriate. Be sure to include this information with the AQA. However, prior to submitting the AQA, please address why the use of the $PM_{2.5}$ De Minimis levels for the $PM_{2.5}$ Increment analysis would also be considered appropriate. The applicant should review the procedures for justifying the SILs for PSD Increment in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232).

If justification for the $PM_{2.5}$ De Minimis levels is not provided for the Increment analysis, the applicant will need to search and identify all major sources of $PM_{2.5}$ that have increment consuming emissions (related to the $PM_{2.5}$ major source baseline date [October 20, 2010]), as well as minor sources that have increment consuming emissions (related to the minor source baseline date for San Patricio County [December 20, 2011]). Be sure to document how this information was obtained in the AQA.

9.0 Receptor Grid – Based on information available to the ADMT, a single property line designation (SPLD) agreement exists between Occidental Chemical Corporation, The Chemours Company FC, LLC, and Air Liquide Large Industries U.S. LP. Be sure to include a copy of the SPLD agreement, as well as the associated property line map with the AQA.

Please note that receptors will need to be placed on The Chemours Company FC, LLC, and Air Liquide Large Industries U.S. LP properties for all federal (PSD NAAQS and Increment) analyses.

In addition, for all minor NSR analyses (minor NSR NAAQS, state property line, and state health effects analyses), the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

The protocol references the terms of the sales contract with the Port of Corpus Christi Authority and states that for state models, receptors are placed along the channel easement instead of the water's edge. Please provide documentation of this contract when submitting the AQA to support the development of the modeled receptor grid.

Note the first set of receptors should consist of 25 meter spaced receptors extending out to 200 – 300 meters from the sources being evaluated.

10.0 Background Sources – The protocol states that background concentration are not expected to be required since the maximum off-property impacts for all pollutants and averaging periods are not expected to exceed their respective SILs. If the model predictions are greater than or equal to the applicable SILs, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that address how background concentrations will be accounted for, including how off-property sources will be evaluated.

Additionally, complete documentation and technical justification for the selected background monitor will also need to be provided prior to submitting the AQA. See comment above in section 8.3 *Federal Standards* regarding monitor justification.

12.0 Additional Impacts Analysis

<u>Ozone Analysis</u> – The protocol notes that a PSD ozone impact analysis is not required since the proposed project emissions of VOC will be less than 100 tpy. As noted above, an ozone impact analysis is required when the net project emissions of NO_x and/or VOCs exceed 100 tpy.

Table 1 of the protocol lists the NO_x tpy emissions for EPN:CG-3 for the Siemens SGT6-5000 F4 Turbine and Duct Burner option as 255 tpy. This is not consistent with the Table1(a) NO_x emissions of 79.4 tpy. Please clarify the NO_x tpy emissions for the Siemens SGT6-5000 F4 Turbine and Duct Burner option prior to submitting the AQA.

Note, if the net project emissions are greater than 100 tpy, a revised protocol will need to be provided to the TCEQ and EPA Region 6 that outlines a specific methodology for addressing the ozone analysis and includes a discussion on the monitor selection and whether the project area is NO_x-limited or VOC-limited.

Secondary $PM_{2.5}$ Analysis – The protocol states that an approach that assumes 100% conversion of NO_x to $(NH_4)NO_3$ and SO_2 to $(NH_4)_2SO_4$ will likely be used. The applicant should provide a detailed analysis of how these data will be used as part of the secondary formation of $PM_{2.5}$ prior to submitting the AQA. For more information, see the following web link from EPA:

http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

Pre-application Analysis for PSD Pollutants

The protocol notes that the projects impacts for all pollutants are expected to be less than the applicable significant monitoring concentrations (SMCs). If the expected results change and the model predictions of any pollutant are greater than or equal to an applicable SMC, then a revised protocol will need to be submitted to the TCEQ that addresses the pre-construction monitoring requirement. The purpose of the pre-construction monitoring requirements is to provide an analysis of the existing ambient air quality in the area that the major source or major modification would affect. The pre-construction monitoring requirement can be addressed by providing representative monitoring data to establish the existing air quality in the area.

If representative ambient monitoring data are relied on to address the pre-construction monitoring requirement, be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. See the comment above in section 8.3 *Federal Standards* regarding monitor justification.

It should be noted that the SMC for $PM_{2.5}$ has been vacated and is no longer applicable; therefore, the pre-construction monitoring requirements for $PM_{2.5}$ must be addressed. The monitor selection, justification, and monitoring concentration should be provided prior to submitting the AQA.

Deliverables – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Rachel Melton at (512) 239-2358, by fax at (512) 239-1400, or by email at Rachel.Melton@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Dianne Anderson[dianne.anderson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Daniel Jamieson[daniel.jamieson@tceq.texas.gov]
From: Rachel Melton
Sent: Mon 1/25/2016 5:34:37 PM
Subject: Protocol Response: TOTAL PETROCHEMICALS & REFINING USA INC (permit #PSDTX1426)
Modeling Protocol Response 07-Dec-2015.pdf
Second Modeling Protocol Response- PSDTX1426 TOTAL PETROCHEMICALS & REFINING USA INC.docx

Ashley,

Attached is the TCEQ's response for the Total Petrochemicals & Refining USA Inc. second Modeling Protocol, Permit No.: PSDTX1426. Please respond to verify receipt of this information .

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

T: 512-239-2358

E: Rachel.Melton@tceq.texas.gov

Total Petrochemicals & Refining USA, Inc.
Port Arthur Refinery

December 7, 2015

Texas Commission on Environmental Quality
Daniel Guthrie (MC-161)
P.O. Box 13087
Austin, Texas 78711-3087

Re: Response to TCEQ Comments to Project No. 215222 Modeling Protocol
Total Petrochemicals & Refining USA, Inc. – Port Arthur Refinery
TCEQ Account Number: JE-0005-H
Customer Identification Number: 600582399
Registered Entity Identification Number: 02457520

Mr. Guthrie:

On July 31, 2014, Total Petrochemicals & Refining USA, Inc. (TOTAL) submitted a permit application to the Texas Commission on Environmental Quality (TCEQ) for the proposed Port Arthur Ethane Side Cracker Plant (also referred to as *"Port Arthur Ethane Side Cracker"* and/or *"Ethane Side Cracker"* in this document). The proposed Ethane Side Cracker will be located near Port Arthur, Texas (Jefferson County). The new facility will produce up to 1,000 kilotons per annum (KTA) of ethylene. Upon approval, the Ethane Side Cracker will be permitted under New Source Review (NSR) Permit Number 122353/PSDTX1426 (please note that the corresponding TCEQ Project Number is 215222).

In July 2015, TOTAL submitted an air dispersion modeling protocol, which describes methodologies and/or procedures to demonstrate compliance with federal Prevention of Significant Deterioration (PSD) and/or TCEQ permitting requirements.

On October 13, 2015, TCEQ offered comments on the modeling protocol. TCEQ indicated that comments in Sections 2.1.3, 2.2, 2.3, 2.4, 6.9.4, 6.9.5, 7.5.1, and 7.6 should be addressed before the air quality analysis (AQA) is submitted.

Please find attached a scanned copy of the comments provided by email on 13-Oct-2015, which includes Total's responses to your comments in a *"question and answer"* format. If TCEQ requires additional follow-up to address concerns, TOTAL requests a meeting and/or conference call to discuss an appropriate path forward for the *"Air Quality Analysis"* (or *"AQA"*).

Total Petrochemicals & Refining USA, Inc.
Port Arthur Refinery

Please do not hesitate to contact me at 281-476-3811 if you have any additional questions or concerns.

Sincerely,

Don Clauson

cc: Randy Parmley, 12727 Featherwood, Suite 210, Houston, TX 77034

From: Daniel Guthrie [Daniel.Guthrie@tceq.texas.gov] **Sent: 10/13/2015**
To: Don Clauson
CC:
Subject: FW: Protocol Response for: TOTAL PETROCHEMICALS & REFINING USA INC
Attachment: Modeling Protocol Response - TOTAL PETROCHEMICALS & REFINING USA INC.docx (Attached below)

Hello Don,

The Air Dispersion Modeling Team has finished the review of the modeling protocol document for the Side Cracker Project. Please see the comments on the protocol in the document attached to this email. As requested in the email below, please respond to the ADMT's comments prior to submitting the air quality analysis (AQA) for this project. Let me know if you have any questions.

Daniel Guthrie
Chemical Section
TCEQ Air Permits Division
(512) 239-1319

From: Rachel Melton
Sent: Tuesday, October 13, 2015 10:52 AM
To: Daniel Guthrie
Subject: Protocol Reponse for: TOTAL PETROCHEMICALS & REFINING USA INC

Daniel,

The ADMT has completed the review of the modeling protocol for TOTAL PETROCHEMICALS & REFINING USA INC. Attached are the ADMT's comments regarding the protocol. The comments in section 2.1.3, 2.2, 2.3, 2.4, 6.9.4, 6.9.5, 7.5.1, and 7.6 will need to be addressed prior to submitting the air quality analysis (AQA).

Thanks,
Rachel Melton
Texas Commission on Environmental Quality
Air Permits Division
Air Dispersion Modeling Team
T: 512-239-2358
E: Rachel.Melton@tceq.texas.gov

Attachment: Modeling Protocol Response - TOTAL PETROCHEMICALS & REFINING USA INC.docx

I have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis Protocol for the Total Petrochemicals & Refining USA, Inc. Port Arthur Ethane Side Cracker located in Port Arthur, Jefferson County, Texas, dated July 2015, and my comments are provided below. The comments in sections **2.1.3, 2.2, 2.3, 2.4, 6.9.4, 6.9.5, 7.5.1, and 7.6** should be addressed before the air quality analysis (AQA) is submitted. The remaining comments are reminders and recommendations for information to be included with the AQA.

1.1 Scope of Modeling Analyses - The protocol notes that the speciation of non-criteria pollutants may change and will be included in the final report. Please coordinate with the permit reviewer on the scope of the project and be in agreement on the speciation of non-criteria pollutants before submitting the AQA.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above.**

1.3 Area Map and Plot Plan - Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above. Based upon TCEQ record retention policies, TOTAL will not submit confidential information in electronic format.**

2.1.1 Significant Impact Level (SIL) Analysis - In general, report the predicted high, first high (H1H) concentration for each pollutant. The results of the modeling for the $PM_{2.5}$ and 1-hr NO_2 National Ambient Air Quality Standard (NAAQS) analyses should be presented as the highest five-year average of the maximum modeled $PM_{2.5}$ and 1-hr NO_2 concentrations predicted each year at each receptor, consistent with EPA guidance.

Note that 24-hr and annual $PM_{2.5}$ will need to be evaluated modeling the individual years to determine if a PSD full increment analysis will be required. While the SILs for both the NAAQS and increment are identical for $PM_{2.5}$, the procedures to determine significance (that is, predicted concentrations to compare to the SILs) are different. This difference occurs because the NAAQS for $PM_{2.5}$ are statistically-based, but the corresponding increments are exceedance-based.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above.**

2.1.2 Preconstruction Monitoring Analysis - See comment below in section 7.1 *Preconstruction Monitoring Requirements* regarding the appropriate justification for selecting representative monitors.

Table 2-1 of the protocol lists 4.0 $\mu g/m^3$ as the$PM_{2.5}$ significant monitoring concentration (SMC). Please note that the SMC for $PM_{2.5}$ was vacated; therefore, this value should be removed from Table 2-1.

Response: **TOTAL understands. The AQA will be finalized based upon the considerations above. Please refer to proposed response to Section 7.1 for additional discussion regarding selection of representative monitors.**

2.1.3 Area of Impact (AOI) Analysis - The protocol states that due to the significant amount of ambient air monitoring performed near the facility, Total proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds. Additional justification would need to be provided demonstrating that the background monitor is adequately representing emission from the sources to be excluded from the NAAQS analysis. Depending on where the monitors and source are located, the applicant may be able to use the monitor to represent some sources and model the rest. Please address before submitting the AQA.

The protocol also notes that if the approach mentioned above is not accepted, a retrieval from the TCEQ Air Permits Allowable Database (APAD) will be obtained for NAAQS pollutants that exceed the applicable SIL. In addition, the protocol notes that a search radius of the AOI plus 20 kilometers (km) will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate prior to submitting the AQA. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

Response: **The proposed project requires federal Prevention of Significant Deterioration (PSD) review for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Inhalable Particulates (PM_{10}), Fine Particulates ($PM_{2.5}$), and volatile organic compounds (VOC). Additionally, the proposed project requires a State National Ambient Air Quality Standards (NAAQS) analysis for Sulfur Dioxide (SO_2). As a precursor for Ozone, VOC is analyzed differently (please see Section 2.4 for additional information); therefore, the Area of Impact (AOI) is not required.**

Preliminary information indicates that the proposed project will comply with the Significant Impact Level (SIL) for CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. As such the following portions of the response to protocol comments may not be applicable to the proposed project:

- **Section 2.1.2 – Preconstruction Monitoring Analysis.**
- **Section 2.1.3 – Area of Impact (AOI) Analysis.**
- **Section 2.2 – NAAQS Analysis.**
- **Section 2.3 – PSD Increment Analysis.**
- **Section 3.2 – State NAAQS Analysis Step 2.**

TOTAL understands that if the SIL analysis does not produce predicted concentrations under the SILs, TOTAL will provide additional justification on the representativeness of the monitor used,

as well as additional justification for the use of the AOI plus 20 kilometers and consult with TCEQ concerning pending or recently permitted facilities to be included in the modeling analysis.

2.2 NAAQS Analysis - See section 2.1.3 *Area of Impact (AOI) Analysis* regarding the approach in which monitoring data are used in lieu of modeling off-property sources.

Please note when modeling PM_{10} with five individual years of meteorological data, the concentration should be reported as the maximum high, second high (H2H). If using five years of concatenated meteorological data, report the maximum high, sixth high (H6H) predicted concentration.

See comment below in section 7.2 *Adjusted Background Concentration* regarding the use of an adjusted background.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Response: TOTAL understands this comment and wishes to submit the following:

- **Please refer to proposed response to Section 2.1.3 for additional discussions on potential usage of ambient monitoring data *"in lieu"* of modeling off-property sources.**
- **As indicated by TCEQ, the AQA will use the appropriate PM_{10} concentration(s) based upon the selected meteorological data.**
- **As indicated by TCEQ, the analysis will not use the *"adjusted background concentration"* methodology in the AQA.**
- **TOTAL will contact the Air Dispersion Modeling Team (ADMT) if the dispersion model predicts any potential NAAQS exceedance.**

2.3 PSD Increment Analysis - See comment below in section 7.5 *Justification to use $PM_{2.5}$ Significant Impact Level (SIL)* regarding the use of the $PM_{2.5}$ SILs for Increment.

The proposed alternative approach is not acceptable.

Note the minor source baseline date for $PM_{2.5}$ for Jefferson County is January 1, 2013 and the PM_{10} minor source baseline date is November 11, 1977.

The protocol references using actual emission rates; however, it is unclear how these data will be determined for off-property sources for both the long-term and short-term averaging times. Be aware that the APAD retrieval provides the allowable emission rates, and not actual emission rates. If actual emission rates will be relied on in the PSD Increment analysis, provide the full details on how these data were determined, as well as the justification to support the values prior to submitting the AQA.

The protocol states that a search radius of the AOI plus 20 km will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Please note, the ADMT recommends updating any missing information from the APAD retrieval

with default parameters as listed in the AQMG. If any updates or corrections are made to the off property retrieval data, be sure to provide all supporting materials with the AQA.

The protocol states to reduce the number of sources included in the PSD Increment inventory, the analysis may merge similar off-property emission sources. Note without adequate justification, this approach is not appropriate for Increment modeling. Furthermore, simply providing the title to a guidance document that covers many topics does not justify its use. The applicant should always explicitly explain how the guidance document is applicable to their project and how the approach will be implemented.

If you become aware of any potential Increment exceedances, please contact the ADMT before revising and/or submitting the AQA.

Response: TOTAL understands this comment and wishes to submit the following:

- **Appendix A addresses secondary formation of $PM_{2.5}$ associated with the proposed project. Please refer to proposed response to Section 7.1 for additional information for selection of background monitors.**
- **As indicated by TCEQ, the analysis will not use the *"alternative approach"* methodology for the PSD Increment analysis as described in the AQA.**
- **If required, the AQA will use the indicated minor source baseline dates for PM_{10} and $PM_{2.5}$ as provided by TCEQ.**
- **If actual emission rates are used in the AQA, the modeling report will contain sufficient documentation.**
- **Please refer to proposed response to Section 2.1.3 for additional discussions on specific distance (i.e., AOI plus 20-km) and facilities that are not included in TCEQ records.**
- **As indicated by TCEQ, the analysis will include supporting documentation for any similar sources that are merged to reduce the number of sources in the off-property inventory.**
- **TOTAL will contact the ADMT if the dispersion model predicts any potential PSD Increment exceedance.**

2.4 Ozone Impact Analysis - The protocol notes that the TCEQ's Air Quality Modeling Guidelines (AQMG) from April 2015 will be relied on for conducting the analysis. Please note that Appendix Q of the TCEQ's AQMG has not been finalized and therefore should not be documented as being relied on. In addition, general references to literature or guidance are made throughout the protocol, but no one specific approach is outlined. Be sure to provide details of the analysis and specify a specific approach for estimating ozone impacts in lieu of referencing guidance with the revised protocol.

The protocol states that a conservative screening analysis based on NO_x modeling will be used to estimate the potential impact of ozone levels and that the methodology is only valid if the local atmosphere's ozone formation is NO_x-limited (i.e, the county-wide VOC/NO_x ratio is 1.3 to 1). First, the determination of whether the project area is VOC or NO_x-limited should be established before conducting the screening analysis. Second, supporting information on the relevance of the ratio of 1.3 to 1 was not provided with the protocol. Note that additional

technical information and supporting documentation will need to be provided if this ratio is to be relied on to determine if the project area is VOC or NO_x-limited before submitting the AQA.

The protocol also states that the screening approach appears to be conservative given the difference in biogenic VOC emissions found near Cumberland, TN vs. biogenic VOC emissions in Jefferson County. It is unclear what the basis is for making this statement. Additionally, no documentation of the actual biogenic VOC emissions or justification was provided to validate this statement.

As mentioned above, the validation of the area being NO_x-limited should be done ahead of time. The method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories. Information from the BPA 1997 Eight-Hour Ozone Redesignation Request and Maintenance Plan SIP could be used to support the ozone analysis, particularly section 4.2 - *FUTURE EMISSIONS AND VERIFICATION OF CONTINUED ATTAINMENT*. This section contains analyses demonstrating that for the Beaumont-Port Arthur (BPA) area, reducing NO_X emissions is more effective in reducing the eight-hour ozone Design Value (DV) than reducing VOC emissions.

The protocol also did not provide justification for the selected ozone monitor. Be sure to provide the justification for the selected monitor and include the monitoring concentration that would be used with the revised protocol. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions (ozone precursor emissions).

Be aware that the intermittent source guidance should not be used for the ozone screening analysis. Also, be sure to convert the predicted ozone concentration from $\mu g/m^3$ to parts per billion (ppb) before adding to the ozone monitoring concentration for comparison to the NAAQS in the AQA.

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that outlines a specific methodology for addressing the ozone analysis and also includes a discussion on the monitor selection and whether the area is NO_x-limited or VOC-limited.

Please note the new ozone standard of 70 ppb will be in effect 60 days after publication of the final rule in the federal register.

Response: As mentioned in TCEQ's comments on the modeling protocol, Appendix Q from TCEQ's Air Quality Modeling Guidelines (AQMG) has not been finalized at this time. As such, TCEQ has not adopted a single approach applicable for the entire state of Texas; therefore, TCEQ evaluates each application on a *"case-by-case"* basis. Based upon preliminary information, Appendix E contains a conservative screening (i.e., qualitative) ozone ambient impact analysis, which demonstrates that additional review should not be required for the proposed project. If the indicated procedure is acceptable, TOTAL will provide a finalized analysis based upon the following: final project

information, the indicated methodology, & supporting documentation. If the indicated procedure requires refinement, TOTAL requests a conference call with TCEQ to discuss the appropriate path forward.

2.6 Class I Area Analysis - The TCEQ follows 40 Code of Federal Regulations §52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal land manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area.

The proposed site is located beyond 100 km from the nearest Class I area and would not require a Class I analysis. However, the applicant may contact the applicable federal land manager to discuss any potential Class I analyses.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

3.1 State NAAQS Analysis Step 1 - See comments below in section 6.2 *Meteorological Data*, regarding the use of five years of meteorological data versus one year.

Please note the 1-hr SO_2 NAAQS is 196 μg/m³.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

3.2 State NAAQS Analysis Step 2 - See section 2.1.3 *Area of Impact (AOI) Analysis* regarding the approach in which monitoring data is used in lieu of off-property sources.

Similar to the comment above, if a specific distance is used to develop the off-property inventory, adequate justification should be provided prior to submitting the AQA as to why a specific radius is appropriate.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Response: TOTAL understands. Please refer to proposed response to Section 2.1.3 for additional discussions on (1) potential usage of ambient monitoring data *"in lieu"* of modeling off-property sources and/or (2) specific distance used to develop the off-property inventory.

Section 4 State Property Line Analyses - Note the state property line standard for sulfur dioxide for Jefferson County is 817 μg/m³.

The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a single property line designation (SPLD). Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Response: TOTAL has the following comments:

- **The AQA will use the indicated state property line standard for Jefferson County.**
- **The proposed facility is not included in existing single property line designation (SPLD) at the facility. The Side Cracker facility has a different 2-digit Standard Industrial Classification (SIC) code and is a different "source" for the purposes of air quality permitting. This issue has been previously discussed with TCEQ during a meeting on September 2, 2014. The meeting was attended by Rebecca Partee, Kristi Mills-Jurach, Matt Earnest, Don Ruggeri, Daniel Menendez and others from the TCEQ. Don Clauson (Total) and Randy Parmley (Sage) were also present. We can provide the PowerPoint presentation made during the meeting upon request. It was TOTAL's understanding that TCEQ confirmed that the Refinery and Side-Cracker Ethylene Production sources will be treated as separate sources, irrespective of the RN referenced.**

Section 5 State Effects Review Analyses - The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a SPLD. Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

6.1 Dispersion Models - The most recent version of AERMOD, version 15181, should be used. Additionally, be sure to document and technically justify all model selections in the AQA.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

6.2 Meteorological Data - The protocol notes that one or five years of meteorological data may be used for the State NAAQS. It should be noted the meteorological data used must be consistent for all averaging times. For example, when modeling 1-hr SO_2 with five years of meteorological data, the modeling for the 3-hr, 24-hr, and annual averaging times should also use five years.

Additionally, if five years of meteorological data are used and concatenated together, be aware of model limitations when using a concatenated meteorological data set with multiple averaging times in the same model run. For example, when modeling NO_2 with a concatenated five-year meteorological data set in AERMOD and both the 1-hr and annual averaging times are selected, AERMOD will compute five-year average concentrations for both averaging times. This is not appropriate for the NO_2 annual averaging time.

One year of meteorological data (2012) is appropriate for the state health effects review and state property line review.

Be sure to provide the AERSURFACE files and the meteorological data files associated with the modeling analysis with the AQA.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

6.4 Building Downwash Analysis - Provide all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

6.6 Receptor Grids - A single property line designation agreement (SPLD) exists between Total Petrochemicals & Refining USA, Inc., Enterprise Refined Products Company LLC, and BASF FINA Petrochemicals LP. Be sure to include a copy of the SPLD agreement, as well as the associated property line map with the AQA.

Please note that receptors will need to be placed on Enterprise Refined Products Company LLC and BASF FINA Petrochemicals LP for all federal (PSD NAAQS and Increment) analyses.

In addition, for all state analyses (minor NSR NAAQS, state property line, and state health effects analyses), the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

6.9 Emission Source Characterization - Be sure to include a copy of the Table 1(a), full documentation for each source characterization, and complete technical justification for the associated source parameters in the AQA.

If average emission rates will be modeled instead of the maximum hourly rate, be sure to clearly identify which pollutants/sources this approach will be used and provide the associated calculations in the AQA.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

6.9.2 Heater Decoking - The protocol notes the modeling for the heaters will include a reasonable worst-case approach. Be sure to provide full documentation and justification for any worst-case determinations relied on in the analysis.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

6.9.4 Multi-Point Ground Flare (Routine Activity and/or Planned MSS Activities) - Please provide the calculation of the effective stack diameter as part of the documentation with the AQA. Additionally, coordinate with the permit reviewer regarding the proposed adjusted method for calculating the individual effective diameter for each active nozzle. Be sure to document how the different operating scenarios are being taken into account; the number of active nozzles and the resulting effective diameter will depend on the flow going to the flare.

For the flaring operations, it is not clear from the information provided that the activity is intermittent. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Response: The following represents a response to TCEQ comments:

- **Attachment C discusses representation of Multi-Point Ground Flare (MPGF) in the AQA.**
- **Attachment D presents additional documentation to justify *"intermittent source policy"* for 1-Hour Nitrogen Dioxide (NO_2) National Ambient Air Quality Standards (NAAQS) and 1-Hour Sulfur Dioxide (SO_2) NAAQS in the AQA.**

6.9.5 Emergency Generator (Engine) - The protocol notes that the emergency engine will be modeled following EPA's intermittent guidance. However, it is not clear from the information provided with the protocol that the emergency engine listed in this section qualifies as an intermittent source. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Please note if hour-of-day scalars are used in the model, the annual average rate calculations will need to take this into account (i.e. do not rely on 8760 hours).

Response: The following represents a response to TCEQ comments:

- **Attachment D presents additional documentation to justify *"intermittent source policy"* for 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS in the AQA.**
- **As indicated by TCEQ, calculations for annual average emission rates will account for *"hour of day scalars"* if used in the AQA.**

6.9.6 Cooling Tower - Prior to submitting the AQA, please provide justification for the selected source characterization that will be modeled for each source.

Response: TOTAL understands. The AQA will include justification for the selected source characterization for each source.

6.9.7 Fugitive (Piping) Components - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

Response: TOTAL understands. The AQA will include justification for the selected source characterization for each source.

6.9.8.1 Equipment Maintenance - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

> Response: **TOTAL understands. The AQA will include justification for the selected source characterization for each source.**

6.9.8.4 Inherently Low Emitting Sources - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

> Response: **TOTAL understands. The AQA will include justification for the selected source characterization for each source.**

6.9.8.5 Catalyst Charging/Handling - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

> Response: **TOTAL understands. The AQA will include justification for the selected source characterization for each source.**

7.1 Preconstruction Monitoring Requirements - The protocol includes a discussion on the monitor data that will be used to fulfill the preconstruction monitoring requirement if predicted concentrations from the project exceed the applicable SMC.

The AQA should include documentation explaining why the proposed monitors are appropriate. In addition to the proximity of the monitor to the project site, monitor justification should also include the following:

- Types of sources and amounts of emissions surrounding the monitor site versus the project site.
- Topographic and land-use comparison of areas surrounding the monitor site versus the project site.
- Site location relative to predominant wind direction.

The selected monitors in Table 7-1 of the protocol to represent the project site are reasonable. Be sure to include with the AQA the monitor background concentrations data and the supporting calculations.

> Response: **The AQA will include documentation explaining why the proposed monitors are appropriate. In addition, the AQA will include the associated background concentrations and (if applicable) supporting calculations.**

7.1.2 Surrogate Monitors for Nitrogen Dioxide - Please note that NO_2 is formed through atmospheric reactions.

> Response: **TOTAL understands. The AQA will be finalized based upon the considerations above. Please refer to proposed response to Section 7.1 Preconstruction Monitoring Requirements.**

7.1.4 Surrogate Monitors for Fine Particulate ($PM_{2.5}$) - Please note the selected monitor (482450021) to represent the project site for 24-hr and annual $PM_{2.5}$ is reasonable and therefore, the additional monitors listed in Table 7-2 of the protocol are not necessary.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above. Please refer to proposed response to Section 7.1 Preconstruction Monitoring Requirements.**

7.1.5 Surrogate Monitors for Sulfur Dioxide (SO_2) - Note that SO_2 does not trigger federal review and therefore, preconstruction monitoring is not required.

The selected monitor (482450009) to represent the project site for SO_2 may be reasonable; however, it is unclear why the second closest monitor is being selected. See the comment in section 7.1 *Preconstruction Monitoring Requirements* regarding monitor justification.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above. Please refer to proposed response to Section 7.1 Preconstruction Monitoring Requirements.**

7.1.6 Surrogate Monitors for Ozone (O_3) - Please note the selected monitor (482450102) to represent the project site for ozone is reasonable and therefore, the additional monitors listed in Table 7-3 of the protocol are not necessary.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above. Please refer to proposed response to Section 7.1 Preconstruction Monitoring Requirements.**

7.2 Adjusted Background Concentration - As mentioned above, the request to use the unadjusted measured monitored concentrations in lieu of modeling off-property sources is not acceptable. Related to this, adjusting the background concentration in which the modeled off-property concentrations at the monitor location are subtracted from the monitor data is also not acceptable.

> **Response: The following represents a response to TCEQ comments:**

- **Monitoring *"In Lieu"* of Off-Property Inventory**

  In earlier TCEQ comments for Section 2.1.3, TCEQ indicated the following: *"The protocol states that due to the significant amount of ambient air monitoring performed near the facility, TOTAL proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds. Additional justification would need to be provided demonstrating that the background monitor is adequately representing emission from the sources to be excluded from the NAAQS analysis. Depending on where the monitors and source are located, the applicant may be able to use the monitor to represent some sources and model the rest".* As such, TOTAL assumes that TCEQ may still consider this

methodology for the proposed project. Please refer to proposed response to Section 2.1.3 for additional information on this subject.

- **Adjusted Background Concentrations.**

  TOTAL understands. The AQA will not include the *"adjusted background concentration"* based upon the considerations above.

7.3 Regional Ozone Background Concentration - Please note this analysis is not required.

Response: TOTAL understands. The AQA will be finalized based upon the considerations above.

7.5 Justification to use $PM_{2.5}$ Significant Impact Level (SIL) - The justification provided to use the $PM_{2.5}$ SILs for the NAAQS analysis is appropriate; however please see the comment above in section 7.1 *Preconstruction Monitoring Requirements* regarding the monitor justification.

Before submitting the AQA, please provide a discussion on why the use of the $PM_{2.5}$ SILs for the $PM_{2.5}$ Increment analysis would be considered appropriate. See the following EPA guidance regarding $PM_{2.5}$:

http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

Response: Appendix A contains justification for $PM_{2.5}$ Significant Impact Levels (SILs) in the PSD Increment analysis. Please refer to proposed response to Section 7.1 for additional information for background monitor selection.

7.5.1 $PM_{2.5}$ Secondary Formation Applicability - Please revise the protocol to address the secondary formation of $PM_{2.5}$ associated with the proposed project emissions.

Additional information is requested since an evaluation of the project emissions of precursor emissions of NO_2 was not discussed. The ADMT recommends that the evaluation be supplemented in the protocol by reviewing speciated $PM_{2.5}$ monitor data from the Port Arthur Memorial School monitor (please note that speciated data are only available through 2010). Begin by reviewing and reporting the nitrate concentrations from the monitor. Then demonstrate how the proposed NO_x project emissions are a small fraction of the NO_x emissions for the air shed, and discuss how secondary formation associated with proposed NO_x emissions would be expected to be considerably smaller than the monitored concentrations of nitrates. This demonstration should also acknowledge that the maximum estimated impacts associated with secondary formation of $PM_{2.5}$ are not expected to occur near the project site nor are they expected to significantly increase the predicted results from the modeling of direct $PM_{2.5}$ emissions. Be sure to provide a conclusion stating why secondary $PM_{2.5}$ formation would not be expected to contribute significantly to the total concentration.

If the Port Arthur Memorial School monitor is used to obtain speciated $PM_{2.5}$ data, be sure to include justification for the selected monitor with the AQA.

Response: Appendix B addresses secondary formation of $PM_{2.5}$ associated with the proposed project. Please refer to proposed response to Section 7.1 for additional information for selection of background monitors.

7.6 Intermittent Source Policy - The proposed methodology for modeling intermittent sources for both total operational hours and total alternative operating scenario hours is not acceptable in regards to excluding sources which are limited to 100 hours or less of operation.

It is not clear from the protocol what sources qualify as intermittent emissions. Prior to submitting the AQA, information should be provide for each source including the number of operating events per year, the duration for each event, and whether events will occur simultaneously or separately.

Be aware if hour of day scalars are used for intermittent sources, this must be accounted for in the calculation of the annual average emission rates.

Response: The following represents a response to TCEQ comments:

- **As indicated by TCEQ, the intermittent policy will not be used to exclude sources that are limited to 100 hours or less of operation. It should be noted that other states in EPA Region VI have adopted this approach.**
- **Attachment D presents additional documentation to justify *"intermittent source policy"* for 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS in the AQA.**
- **As indicated by TCEQ, calculations for annual average emission rates will account for *"hour of day scalars"* if used in the AQA.**

7.7 Common Industrial Stack Parameters - A valid source was not provided to support the use of the common industrial stack parameters provided in Table 7-9 of the protocol. The values listed in Table 7-9 may be reasonable to update any missing information from the APAD retrieval given proper justification and documentation is provided supporting the appropriateness of each.

If justification is not provided for the use of these common industrial stack parameters, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. Please note if any updates or corrections are made to the off-property retrieval data, all documentation in which the Air Permits Division can validate should be provided.

Response: Attachment F contains a derivation of *"common industrial stack parameters"* from a search of public records in Louisiana. TOTAL requests that TCEQ determine if this represents sufficient documentation for use as *"common industrial stack parameters"* in Texas. Alternatively, TCEQ default parameters will be used unless sufficient documentation for alternative parameters is supplied in the AQA.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

> **Response: TOTAL understands. The AQA will be finalized based upon the considerations above.**

If you have any questions please contact Rachel Melton at 512-239-2358, by fax at 512-239-1330, or by email at Rachel.Melton@tceq.texas.gov.

ATTACHMENT A
JUSTIFICATION FOR SIL USE IN $PM_{2.5}$ ANALYSES

Attachment A contains justification for Fine Particulates ($PM_{2.5}$) Significant Impact Level (SIL) in Prevention of Significant Deterioration (PSD) Increment analyses.

Submitted Information	Page
A.1 Justification for $PM_{2.5}$ SILs for PSD Increment	A-02
A.2 Additional Information for Selected $PM_{2.5}$ Monitoring Site	A-03

Recently, the Texas Commission on Environmental Quality (TCEQ) reissued their "*Air Quality Modeling Guidelines*" (APDG April 2015), which is also referred to as *"AQMG"* in this document. In the AQMG, Appendix A (Page 33 to Page 36) discusses *"Justifying the Use of the Significant Impact Levels"* (or SIL) for the following:

- Significant Impact Level (SIL) Analysis.
  - National Ambient Air Quality Standards (NAAQS), and/or
  - Prevention of Significant Deterioration (PSD) Increment.
- Significant Monitoring Concentration (SMC), also known as Preconstruction Monitoring Exemption Level.

In the protocol comments, TCEQ stated the following: *"The justification provided to use the $PM_{2.5}$ SILs for the NAAQS analysis is appropriate* [...] *Before submitting the AQA, please provide a discussion on why the use of the $PM_{2.5}$ SILs for the $PM_{2.5}$ Increment analysis would be considered appropriate."* Section A.1 provides the requested justification using the *"Procedure for PSD Increment"* as described in AQMG (Page 35 to Page 36).

A.1 Justification for $PM_{2.5}$ SILs for PSD Increment

Based upon United States Environmental Protection Agency (EPA) guidance[1,2] (and discussion presented in Section 7.5 in the modeling protocol), the concept of the Significant Impact Level (SIL) is valid; however, the permitting authority should not be limited by the SILs from requesting more comprehensive modeling if warranted. To determine if more comprehensive $PM_{2.5}$ modeling is warranted (i.e., justify the use of SILs), TCEQ proposes that representative $PM_{2.5}$ monitoring data may be used. Instead of installing and/or operating a new $PM_{2.5}$ preconstruction monitor, the facility proposes the Port Arthur Memorial (PAM) School ambient monitor (Monitor Id 482450021) as a representative monitoring location. Based upon this monitor, the following observations may be drawn:

- For the 24-Hour averaging period, the $PM_{2.5}$ PSD Increment is 9.00 micrograms per cubic meter ($\mu g/m^3$). For the PAM, the current (2014) high-second-high (H2H) measured concentration is 31.70 $\mu g/m^3$; the major source baseline (2010) H2H measured concentration is 52.60 $\mu g/m^3$. As such, the difference between current and baseline measurements is -20.90 $\mu g/m^3$ [i.e., 31.70 $\mu g/m^3$ - 52.60 $\mu g/m^3$]. The difference between the PSD Increment [9.00 $\mu g/m^3$] and the change in measured H2H concentrations [-20.90 $\mu g/m^3$] is 29.90 $\mu g/m^3$. This difference is greater than the associated SIL [1.20 $\mu g/m^3$].
- For the annual averaging period, the $PM_{2.5}$ PSD Increment is 4.00 $\mu g/m^3$. For the PAM, the current (2014) annual average concentration is 8.50 $\mu g/m^3$; the major source baseline date (2010) annual average concentration is 10.50 $\mu g/m^3$. As such, the difference between current and baseline measurements is -2.00 $\mu g/m^3$ [i.e., 8.50 $\mu g/m^3$ - 10.50 $\mu g/m^3$]. The difference

[1] Available at: http://www.epa.gov/nsr/documents/20130304qa.pdf
[2] Available at: http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

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between the PSD Increment [4.00 μg/m^3] and the change in measured average concentrations [-2.00 μg/m^3] is 6.00 μg/m^3. This difference is greater than the associated SIL [0.30 μg/m^3].

The observations show that the difference between the $PM_{2.5}$ PSD Increment and the absolute change in measured $PM_{2.5}$ concentrations is greater than the EPA's $PM_{2.5}$ SIL value. According to TCEQ guidance, *"If the difference between the PSD increment and the difference in measured background concentrations is greater than or equal to the SIL, then it would be sufficient to conclude that a source with an impact less than the SIL would not cause or contribute to a violation of the PSD increment and forego a cumulative modeling analysis"*. The following table summarized measurements from the PAM monitor (please note that the AQA will include supporting documentation for these values):

Monitor Number	Year	24-Hour Maximum (μg/m^3)	24-Hour High-2nd-High (μg/m^3)	24-Hour 98th Percentile (μg/m^3)	Annual Maximum (μg/m^3)
482450021	2014	34.10	31.70	20.00	8.58
	2013	33.00	25.30	20.80	8.50
	2012	33.80	26.50	20.86	9.58
	2011*	39.60	33.30	21.29	9.99
	2010	67.80	52.60	25.74	10.65
	2009*	27.60	25.10	22.81	9.93
	2008*	45.20	33.60	25.84	10.34

Note:

* The indicated year of ambient monitoring data is not used in the AQA.

A.2 Additional Information for Selected $PM_{2.5}$ Monitoring Site

As represented in Section 7.0 in the modeling protocol, the following table summarizes information for the proposed ambient monitor for Fine Particulates ($PM_{2.5}$):

Compounds	Monitor Number	Location	Distance (km)	Surrounding Land Use	Monitor Location Type
$PM_{2.5}$	482450021	PAM School	4.5	Residential	Urban and Center City

According to Section 7.1.4 of TCEQ's comments on the modeling protocol, *"Please note the selected monitor (482450021) to represent the project site for 24-hr and annual $PM_{2.5}$ is reasonable"*. According to Section 7.1 of TCEQ's comments on the modeling protocol, *"The*

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AQA should include [additional] *documentation explaining why the proposed monitors are appropriate".* The following additional information is provided for the Port Arthur Memorial (PAM) School (Monitoring Id 482450021):

A.2.1 Operation and Capture Efficiency

For the previous three (3) years, TCEQ operated the PAM monitor. For each year, the capture efficiency for the PAM monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). The following documents capture efficiency for the monitor:

Monitor Number	Year	Annual Capture (%)	1st Quarter Capture (%)	2nd Quarter Capture (%)	3rd Quarter Capture (%)	4th Quarter Capture (%)
482450021	2014	93.60%	98.94%	95.70%	83.24%	96.83%
	2013	96.20%	99.26%	99.27%	88.27%	98.28%
	2012	98.70%	99.27%	99.68%	96.51%	99.55%
	2011*	83.30%	98.19%	98.26%	89.81%	47.28%
	2010	96.30%	92.73%	93.64%	99.46%	99.32%
	2009*	98.50%	99.31%	99.45%	98.46%	96.97%
	2008*	93.70%	99.04%	96.93%	79.44%	99.59%

Note:
* The indicated year of ambient monitoring data is not used in the AQA.

A.2.2 Proximity of the monitor to the project site

At 4.5-kilometers, this monitor is the closest ambient $PM_{2.5}$ monitor to the facility.

A.2.3 Types of Sources and Amounts of Emissions Surrounding the Monitor Site Versus the Project Site.

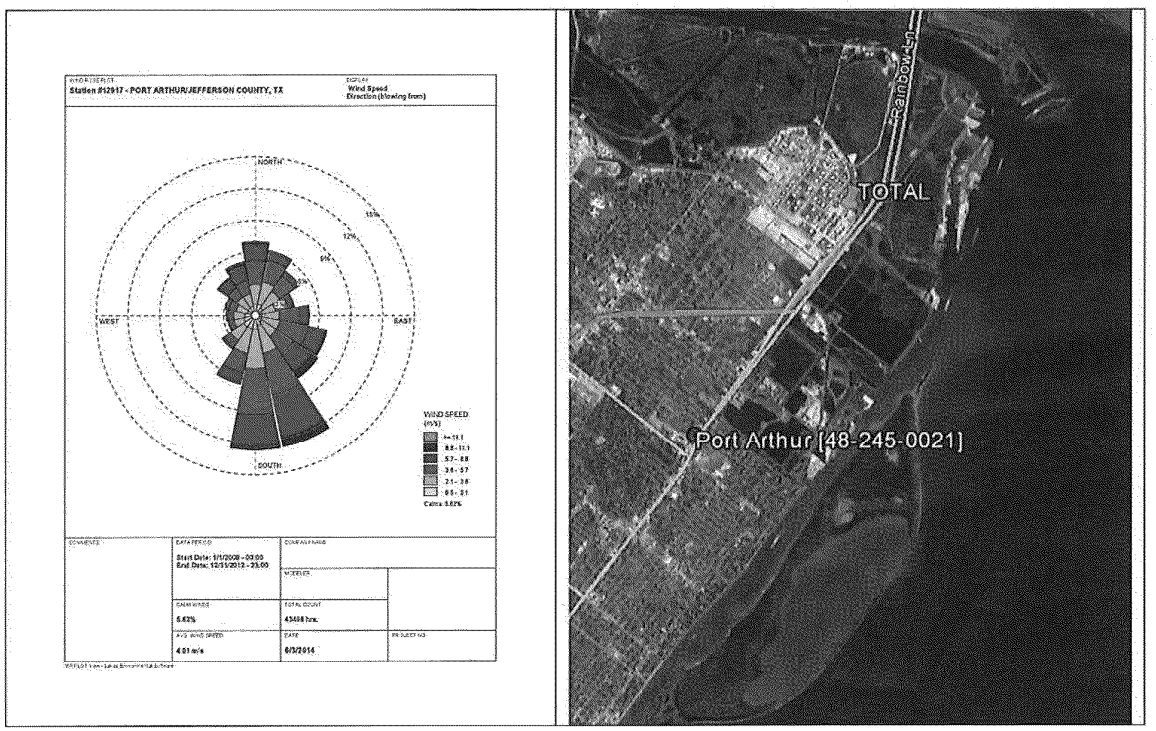
Due to close proximity (i.e., less than 10-kilometers between the monitor site and project site), the industrial base (i.e., types of sources and amounts of emissions) that surrounds this monitor is very similar to the industrial base that surrounds the facility.

A.2.4 Topographic and Land Use Comparison of Areas Surrounding the Monitor Site Versus the Project Site.

Due to close proximity (i.e., less than 10-kilometers between the monitor site and project site), the topography and land use surrounding this ambient monitor is very similar to the region surrounding the facility.

A.2.5 Site Location Relative to Predominant Wind Direction.

The ambient monitor is located predominantly upwind of the facility. The following figure illustrates both (1) the latest windrose in *"blowing from"* format and (2) the location of the PAM monitor in relation to the TOTAL facility:



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ATTACHMENT B
$PM_{2.5}$ SECONDARY FORMATION APPLICABILITY

Attachment B discusses secondary formation applicability for Fine Particulates ($PM_{2.5}$) analyses.

Submitted Information	Page
$PM_{2.5}$ Secondary Formation Applicability	B-02

In the protocol comments, TCEQ stated the following: *"Please revise the protocol to address the secondary formation of $PM_{2.5}$ associated with the proposed project emissions."* On May 20, 2014, the United States Environmental Protection Agency (EPA) published guidance on modeling procedures for Fine Particulate ($PM_{2.5}$)[3]. Using EPA guidance, the potential secondary $PM_{2.5}$ formation is not considered significant due to the following:

1. Maximum Potential Increase from $PM_{2.5}$ Secondary Formation (as discussed in Section B.1).
2. Regional Potential Increase from $PM_{2.5}$ Secondary Formation (as discussed in Section B.2).

B.1 Maximum Potential Increase from $PM_{2.5}$ Secondary Formation

Fine Particulates ($PM_{2.5}$) may be emitted directly from a facility (i.e., as a primary pollutant) and/or formed from a complex reaction that includes Oxides of Nitrogen (NO_X) and Sulfur Dioxide (SO_2) in the atmosphere (i.e., as a secondary pollutant). The following table summarizes the projected emission rate increases of the direct $PM_{2.5}$ and precursor compounds of NO_X and SO_2:

Compound	Project Increase (tpy)[01]	PSD Applicability Threshold (tpy)	PSD Review Required (Yes/No)	Regional Offset Ratios (dimensionless)[02]	Equivalent $PM_{2.5}$ Value (tpy)[03]
Direct Emissions					
Fine Particulate ($PM_{2.5}$)	38.08	10.00	YES	--	38.08
Precursor Compounds					
Oxides of Nitrogen (NO_X)	196.79	40.00	YES	200	0.98
Sulfur Dioxide (SO_2)	8.67	40.00	NO	40	--

Notes:

[01]. Obtained from latest permit application in tons-per-year (tpy).

[02]. The regional average offset ratio represents the appropriate interpollutant trading ratios that are recommended by EPA and/or National Association of Clean Air Agencies (NACAA) in Appendix D of EPA $PM_{2.5}$ guidance[4]. At this time, regional average offset ratios have not been established; therefore, national values are used. The national ratio for NOx is 100 for western states and 200 for eastern states (please note that the ratio for eastern states should be applicable to Port Arthur, Texas). Although not applicable to this project, the national average offset ratio for SO_2 is 40.

[3] Available at: http://www3.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf
[4] Available at: http://www3.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

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[03]. For compounds subject to PSD review, the Equivalent $PM_{2.5}$ Value represents the Project Increase divided by regional average offset ratios.

For the Side Cracker project, the potential maximum increase from $PM_{2.5}$ Secondary Formation is determined from the following formula:

$$PM2.5\ \ Increase\ (\%) \equiv \frac{Direct\ PM2.5\ Rate\ (tpy) + Equivalent\ PM2.5\ Rate(tpy)}{Direct\ PM2.5\ Rate\ (tpy)}$$

$$PM2.5\ \ Increase\ (\%) \equiv \frac{38.08\ (tpy) + 0.98\ Rate(tpy)}{38.08\ (tpy)} \equiv 1.028129$$

Using national offset ratios, the maximum potential impacts from $PM_{2.5}$ secondary formation should be less than 2.9%. An implicit conservatism to this maximum potential impact is that the primary and secondary impacts occur at the same location(s) and the same time(s). Secondary $PM_{2.5}$ formation occurs as a result of chemical transformations that occur in the atmosphere gradually over time and only a portion of the SO_2 and NOx emissions would be affected. Additionally, this estimate should be considered conservative since it represents national defaults and does not account for local environmental factors.

B.2 Regional Potential Increase from $PM_{2.5}$ Secondary Formation

From direct emission rates of NO_X and SO_2, $PM_{2.5}$ secondary formation typically represents ammonium nitrate (-NH_4NO_3) and ammonium sulfate (-$(NH_4)_2SO_4$) respectively. As such, ambient monitoring sites may measure ammonium nitrate (further referred to as *"nitrates"* in this document) and ammonium sulfate (further referred to as *"sulfates"* in this document) near the facility. These measurements may provide insights into regional $PM_{2.5}$ Secondary Formation.

According to Section 7.1.4 of TCEQ's comments on the modeling protocol, *"Please note the selected monitor (482450021) to represent the project site for 24-hr and annual $PM_{2.5}$ is reasonable"*. This ambient monitor is located approximately 4.5-km from the TOTAL facility (please see Attachment A for additional information on this ambient monitor). The proposed project is not subject to Prevention of Significant Deterioration (PSD) review for Sulfur Dioxide (SO_2); therefore, additional review of sulfates is not required. Appendix D of EPA $PM_{2.5}$ guidance[5] discusses nitrate measurements from the Port Arthur Memorial School monitor (482450021) (Page D-3):

[5] Available at: http://www3.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf.

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"The Port Arthur monitor [is] *located in Port Arthur, Texas*[...] *The most recently available five years of data for this site was for 2006-2010 and was obtained from the USEPA. The data shows that nitrate makes up 2.6 percent of the average of the 24-hour concentrations of $PM_{2.5}$ and 2.3 percent of the 5-year average concentration. On the day with the highest 24-hour average $PM_{2.5}$ measurement, nitrate was 2.2 percent of the $PM_{2.5}$ concentration.*

In general, the generation of $PM_{2.5}$ occurs more from nitrate during colder winter months than during the summer. Examination of the worst 10% of $PM_{2.5}$ days during the colder months (November through February) at the Port Arthur monitor for 2006-2010 reveals that the average nitrate contribution is 2.9 percent, only slightly higher than the 5-year average concentration. Thus, even on days with high $PM_{2.5}$ concentrations in the colder months, particulate nitrate is still a relatively small portion of the total $PM_{2.5}$ concentrations."

These measurements would represent all potential sources of NOx compounds. For Jefferson County, the following represents NOx emissions from the National Emissions Inventory (NEI): 28,233-tpy (2008[6]) and 23,013-tpy (2011[7]).

The Side Cracker project proposes to increase NOx emission rates ($PM_{2.5}$ precursor compound) by approximately 197 tons-per-year (tpy), which is a small percentage of reported NOx in Jefferson County. Based on (1) potential small change in NOx precursor emissions in Jefferson County due to the proposed project and (2) relatively low fraction of particulate nitrate in the observed $PM_{2.5}$, it is clear that secondary formation of particulate nitrate is not significant for the proposed project.

[6] Available at: http://www3.epa.gov/ttnchie1/net/2008inventory.html
[7] Available at: http://www3.epa.gov/ttnchie1/net/2011inventory.html

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ATTACHMENT C
MULTI-POINT GROUND FLARE (MPGF)

In the protocol comments (Section 6.9.4), TCEQ requested additional documentation for the Multi-Point Ground Flare (MPGF). Attachment C contains the requested information:

Submitted Information	Page
MPGF General Operation	C-02
MPGF Routine Operations	C-02
MPGF Planned MSS Activities	C-03
TCEQ/TOTAL Correspondence on Effective Diameter Calculation	C-04

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C.1 MPGF General Operation

Instead of sending routine and/or intermittent process vents to an elevated flare stack, the MPGF routes process vents to a series of low profile burners that are equally spaced from each other. The number of burners in operation at one time is proportional to the total flow to the MPGF system. The multiple burners are designed to light nearby burners; therefore, the required number of pilots is minimized. The multiple burners are enclosed in a heat containment shroud that accommodates the thermal demands for combustion and that regulates the flow of combustion air; therefore, the MPGF operates with the same heat buoyancy effect as a single flare. This approach has been accepted by TCEQ for several other projects in Texas.

C.2 MPGF Routine Operations

For routine operations, the emission calculation will reflect expected flowrates to the flare excluding intermittent process vents. The emission calculation (and associated heat release) will reflect these flowrates as occurring continuously. As such, the emission calculation will not be limited on operational hours; therefore, the modeled emission rate for the 1-Hour NO_2 NAAQS and the 1-Hour SO_2 NAAQS will reflect the potential-to-emit (PTE).

For routine operations, the MPGF flare is modeled according to flare guidance in TCEQ guidelines (Appendix K – Source Characterizations) as follows:

- Stack Height = Height of heat containment shroud (including any elevation changes due to ground improvements and/or operating requirements).
- Stack Temperature = TCEQ Default Parameter of 1832°F (or 1273°K).
- Stack Velocity = TCEQ Default Parameter of 65.60-ft/s (or 20 m/s).
- Stack Diameter = Calculated by equations presented in Section C.3.

C.3 MPGF Planned Maintenance, Startup, and Shutdown (MSS) Activities

Based upon process knowledge, TOTAL determined that specific high-volume intermittent vents would be better controlled by a multi-point ground flare (MPGF). The intermittent vents occur at low frequency with high volumes, such as during planned maintenance, startup, and shutdown (MSS) activities (e.g., de-inventory of large process vessels to the flare, etc.). Planned start-up and shutdown intermittent flaring is anticipated to occur very infrequently (3 – 5 year cycle). Intermittent flaring from planned maintenance or operational transitions will occur on as needed, unregimented schedule and would be anticipated to occur in durations as small as 15 minutes or as much as several hours. Based upon these assumptions, the emission calculation (and associated heat release) will reflect a reasonable, worst-case intermittent vents based upon process knowledge and definitions of planned MSS activities (i.e., exclusion of upsets and/or emergency conditions). These proposed intermittent flaring from the MPGF will be limited to be no more than 500-hours-per-year; therefore, the modeled emission rate for the 1-Hour NO_2

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NAAQS and the 1-Hour SO_2 NAAQS will reflect the annualized emission rate based upon the following formula:

Annualized Rate (lb/hr) = [Annual Rate (tpy)]x[(2,000 lb/ton/8760 hr/yr)]

For planned MSS activities, the MPGF flare is modeled according to flare guidance in TCEQ guidelines (Appendix K – Source Characterizations) as follows:

- Stack Height = Height of heat containment shroud (including any elevation changes due to ground improvements and/or operating requirements).
- Stack Temperature = TCEQ Default Parameter of 1832°F (or 1273°K).
- Stack Velocity = The analysis may use the TCEQ Default Parameter of 65.60-ft/s (or 20 m/s). Additionally, the analysis may use 984 ft/s (or 300-m/s) account for potential sonic flow to the flare during planned MSS activities. It should be noted that TCEQ recently approved this methodology for a MPGF in Texas.
- Stack Diameter = Calculated by equations presented in Section C.3.

C.3 MPGF Effective Diameter Calculation

As previously discussed with TCEQ, the calculation of the effective diameter will be adjusted by dividing the gross heat release by the number of active nozzles which provides an individual effective diameter at each nozzle. The individual effective diameter will then be multiplied by the number of active nozzles to get a final value to use as flare effective diameter. The resulting equation used in the effective diameter calculation will be as follows:

$$Q_n = \frac{Q\left(1 - 0.048\sqrt{MW}\right)}{n}$$

$$D_{eff} = n\sqrt{\frac{Q_n}{10^6}}$$

Where "Q" is the gross heat release (cal/s), "Qn" is the net heat release (cal/s), "Deff" is the effective diameter (m), "MW" is the weighted molecular weight of flared compounds (lb/mol), and "n" is the number of active ground flare nozzles.

ATTACHMENT D
INTERMITTENT SOURCE POLICY DOCUMENTATION

In the protocol comments (Section 7.6), TCEQ requested additional documentation to apply *"intermittent source policy"* for 1-Hour Nitrogen Dioxide (NO_2) National Ambient Air Quality Standards (NAAQS) and 1-Hour Sulfur Dioxide (SO_2) NAAQS. Attachment D provides the requested information.

Analysis	Page
Intermittent Source Policy Documentation	D-02

We understand EPA *"recommends that compliance demonstrations for the 1-Hour NO_2 NAAQS address emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations based on existing modeling guidelines,* ***which provide sufficient discretion for reviewing authorities to not include intermittent emissions from emergency generators or startup/shutdown operations from compliance demonstrations for the 1-hour NO_2 standard under appropriate circumstances."***[8] **(Emphasis added)**. We believe that the sources proposed as intermittent cannot logically be assumed to be relatively continuous or occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations for reasons outlined in the following paragraphs. As such, based on EPA guidance clarified in the March 1, 2011 memorandum, it is appropriate to exclude the proposed emergency generator and multi-point ground flare (MPGF) from the 1-Hour NO_2 NAAQS analysis and the 1-Hour SO_2 NAAQS analysis. However, the annualized emissions for the emergency generator and MPGF are conservatively included in the 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS analyses. Additional information for these activities is provided below:

D.1 Emergency Generator

The proposed project includes one (1) engine as an emergency generator. The permit entry for an engine represents testing conditions only. As such, actual use of the engine for unpredictable maintenance, back-up operation, and/or emergency condition are excluded from the permitting process. To ensure proper operation when needed for emergencies, the testing of each engine occurs on a weekly basis for approximately 1-hour per engine. As such, each engine should only operate between 52 and 100 hours-per-year. Additionally, 30 TAC Chapter 117 rules preclude testing of the engine from 6 am to noon, which are hours during the day that these types of sources should have the highest probability to contribute to a 1-hour daily maximum value. Furthermore, the proposed engines are anticipated to be tested on the same day of each week (for example, all proposed engines tested on Wednesday). The combination of testing hours on the same day of the week and the exclusion of some high probability hours (6 am to noon) from the testing operation of the engines supports the exclusion of engine testing from the 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS analyses. However, the current version of the AQA includes a conservative approach to application of the intermittent source guidance and annualizes the engine emissions in the model to account for the probability of the emissions being emitted in a given hour (even hours that are prohibited by rule).

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[8] EPA Memorandum, *"Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard"*. March 1, 2011. Available at: http://www3.epa.gov/scram001/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf.

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D.2 Multipoint Ground Flare (MPGF)

TOTAL proposes to control high-volume, intermittent vents using a multi-point ground flare (MPGF). The MPGF will be operated on an infrequent basis that is predictable but not able to be scheduled during the permitting process (i.e., years in advance). The high-volume, intermittent vents are associated with operational transitions and/or planned MSS activities which occur on an *"as-needed basis"* and are scheduled accordingly. As such, the intermittent emissions from the MPGF are not anticipated to occur in the same month, on the same days, for the same durations, or with same frequency (i.e., period between occurrences) from year-to-year. Factors that affect when and how much intermittent emissions occur from the MPGF in a given year include, but are not limited to:

- Need for and extent of shutdown or start-up for maintenance,
- Safety considerations,
- Contractor availability/contracts,
- Vendor/customer needs/commitments, and
- Weather conditions/events

Based on the discussion above, TOTAL proposes that the MPGF be excluded from the 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS analyses. However, the current version of the AQA includes a conservative approach to application of the intermittent source guidance and annualizes the flare emissions in the model to account for the probability of the emissions being emitted in a given hour.

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ATTACHMENT E
OZONE AMBIENT IMPACT SCREENING ANALYSIS

Appendix E presents a screening (or qualitative) ozone ambient impact analysis that demonstrates additional review should not be required for the proposed project.

Submitted Information	Page
Ozone Ambient Impact Screening Analysis	E-02

E.1 Ozone Ambient Impact Analysis

The proposed project includes a net emission rate increase of Oxides of Nitrogen (NO_X) and Volatile Organic Compounds (VOC) greater than 100 tons-per-year (tpy); therefore, 40 Code of Federal Regulations (CFR) 52.21 requires an Ozone (O_3) Ambient Impact Analysis. The following screening (or qualitative) ozone ambient impact analysis demonstrates that additional review should not be required for the proposed project:

1. Determine the Dominant Precursor Compound,
   Ozone (O_3) forms from a complex *"free-radical"* reaction of precursor compounds of Volatile Organic Compounds (VOC) and Oxides of Nitrogen (NO_X), which depends upon regional atmospheric factors (i.e., sunlight, the –OH radical formation, the conversion of NO to NO_2, etc). In 2011, the United States Environmental Protection Agency (EPA) National Emissions Inventory (NEI)[9] reports the following precursor emission rates for Jefferson County: 22,205 tons-per-year (tpy) of NO_X and 127,971-tpy of VOC. As such, the local atmosphere's ozone formation should be NOx-limited (i.e., the county-wide VOC/NOx ratio is 1.3/1 or greater). The permit application for the Side Cracker Project included the following emission rate increases for precursor compounds: 197-tpy of NOx and 272-tpy of VOC. As such, the proposed project VOC/NOx ratio is also 1.3/1 or greater.

   Additionally, the Port Arthur facility is located in the Beaumont-Port Arthur (BPA) maintenance area; therefore, Texas Commission on Environmental Quality (TCEQ) performed photochemical modeling analysis for State Implementation Plan (SIP). According to 2012 TCEQ memorandum[10] on the ozone formation modeling (Page 4-3 to Page 4-4 in Section 4.2 Future Emissions and Verification of Continued Attainment):

   > *"Although there is a slight estimated increase in VOC over the 16 years projected for the BPA maintenance plan, it has been established that NOx emissions reductions are more effective than VOC reductions at reducing ozone design values in the BPA area. In fact, photochemical modeling analysis adopted with the 2008 BPA maintenance plan showed that reductions in NOx emissions are 3.76 times as effective as VOC reductions at reducing the BPA-area ozone design value. In its proposed approval of the 2008 plan in the Federal Register (75 FR 27514), the EPA supported the 2008 demonstration by stating that "based on photochemical modeling analyses showing that the formation of ozone in the BPA area is more sensitive to NOx than to VOC emissions, the increase in VOC emissions is expected to be fully offset by the decrease in NOx."*

[9] Available at: http://www.epa.gov/ttn/chief/net/2011inventory.html.
[10] Available at: https://www.tceq.texas.gov/assets/public/implementation/air/sip/bpa/mveb/BPAMVEB_2012005_backup_E.pdf.

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Based on the photochemical modeling analysis included in the original 2008 BPA maintenance plan and supported by the EPA, emissions in the BPA area are expected to remain at levels consistent with attainment for the 1997 eight-hour ozone standard through 2021. Please see Section 4.2: Future Emissions and Verification of Continued Attainment of the original 2008 BPA maintenance plan for further details on the photochemical modeling analysis demonstrating the effectiveness of NOx in reducing ozone design values in the BPA area."

Based upon the county-wide VOC/NOx ratio and prior photochemical modeling analysis performed for the BPA maintenance plan, NOx should be considered the dominant precursor compound; therefore, the screening analysis should focus on NOx emission rates.

2. Determine the Potential Ambient Increase in Ozone Due to the Proposed Project,
The following methodology estimated the potential ambient increase in ozone due to the proposed project:

   a. Develop a circular ring of receptors with 250-meter (m) spacing between 10 kilometers (km) and 11 km from the approximate center point of the NOx sources associated with the proposed project. This distance reflects aircraft sampling downwind of power plants that indicate maximum ozone formation occurs 10 km to 11 km downwind from a large NOx source.

   b. Determine the proposed potential-to-emit (PTE) emission rate increases for NOx (i.e., 197 tpy for the Side Cracker Project). The modeled emission rates will not reflect *"intermittent source policy"* for 1-Hour NO_2 National Ambient Air Quality Standards (NAAQS).

   c. Using AERMOD, develop the NOx concentration at each receptor for the 8-hour averaging period. To reflect the form of the Ozone NAAQS, the five year average of Highest-Fourth-High (H4H) concentrations should be developed at each receptor.

   d. To determine the ambient NO_2 concentrations, multiply the predicted NOx concentrations by a scaling factor of 0.9 (i.e., maximum potential Ambient Ratio Method (ARM) expected).

   e. To estimate maximum ozone increases, multiply the predicted NO_2 concentrations by a factor of 3. The assumption is that 3 parts-per-billion (ppb) of ozone are formed by each 1 ppb of increased NO_2 concentrations. Aircraft sampling of a large power plant plume (Tennessee Valley Authority's Cumberland Station) showed that at a distance of approximately 10 km downwind from the source a molecule of NO_X may yield 2 to 5 ozone molecules.

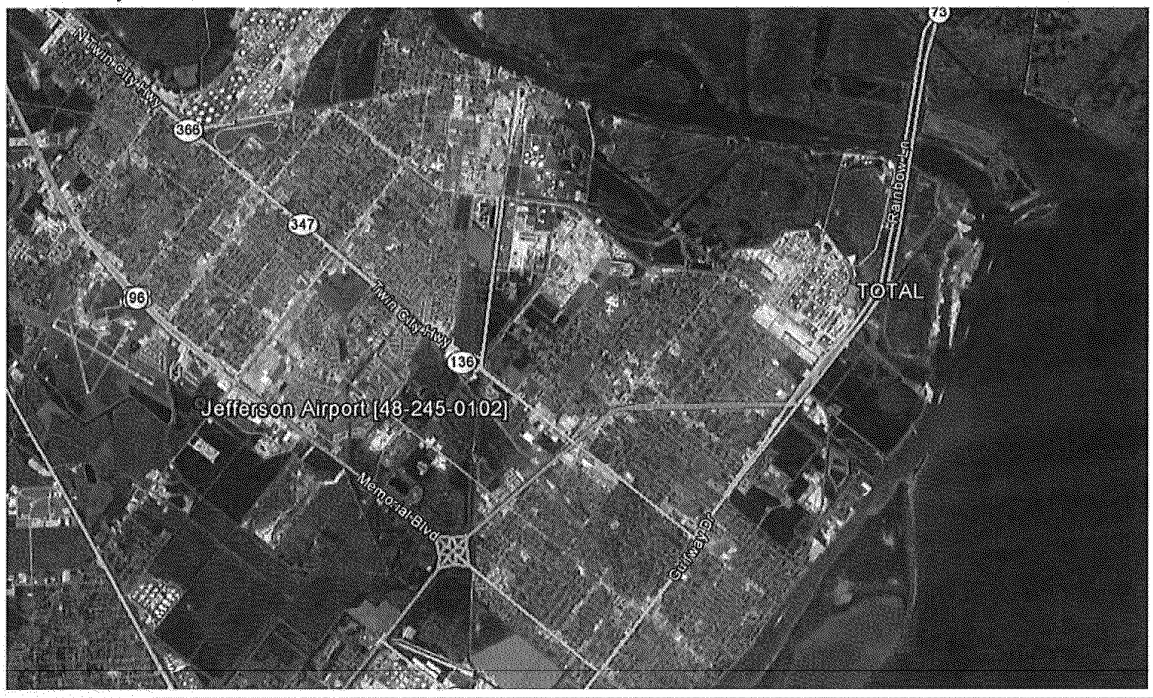
f. Convert predicted concentrations in micrograms-per-cubic-meter ($\mu g/m^3$) to ppb.

Based upon preliminary information, the predicted increase in ambient ozone concentration is **0.80 parts-per-billion (ppb)** of ozone (O_3). This predicted increase is less than a *"screening threshold concentration"*, or *"significant impact level"*, of 2.8 ppb (i.e., 4 % of current Ozone NAAQS of 70 ppb). This *"screening threshold concentration"* is based upon the EPA methodology used to develop interim Significant Impact Level (SIL) for 1-Hour NO_2 NAAQS and 1-Hour Sulfur Dioxide (SO_2) NAAQS.

3. Determine the Representative Background Monitoring Concentration,
In Section 7.1.6 Surrogate Monitors for Ozone (O_3), TCEQ's comments on the modeling protocol states the following: *"Please note the selected monitor (482450102) to represent the project site for ozone is reasonable and therefore, the additional monitors listed in Table 7-3 of the protocol are not necessary"*. As such, the following ambient monitor will be used to develop the representative background concentration:

Compounds	Monitor Number	Location	Distance (km)[1]	Surrounding Land Use	Monitor Location Type
O_3[3]	482450102	Airport	11.0	Residential	Urban and Center City

The following figure illustrates the location of the selected ambient monitor in reference to the facility:



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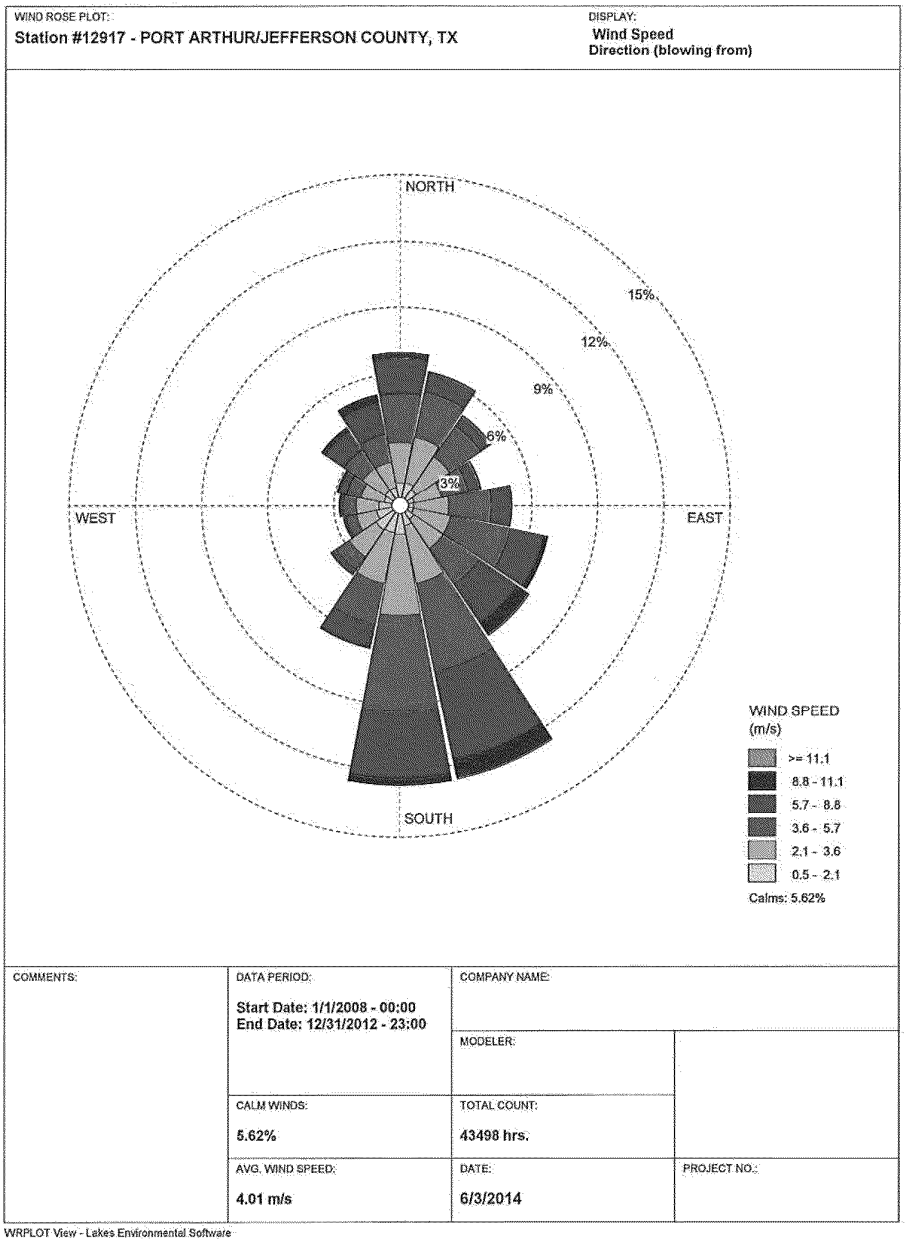
This ambient monitor is located *"predominantly cross-wind"* of the facility based upon the following windrose in *"blowing from"* format:



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Due to the close proximity of the ambient monitor to the facility, the following should be similar between the ambient monitor and the facility: Types of emission sources and industry, Amounts of Emission Rates of precursor compounds, Topographic Considerations, and Land Use Considerations. Based upon TCEQ information[11], the following table demonstrates that the capture efficiency for 1-Hour measurements should meet EPA requirements (i.e., 75% capture per quarter for three consecutive years). It should be noted that 8-Hour capture efficiency is typically higher than 1-Hour capture efficiency based upon method to develop 8-Hour concentration estimates from 1-Hour measurements).

Monitor Number	Year	Annual Capture (%)	1st Quarter Capture (%)	2nd Quarter Capture (%)	3rd Quarter Capture (%)	4th Quarter Capture (%)
482450102	2014	97.40%	98.94%	98.67%	98.14%	93.89%
	2013	96.63%	97.59%	91.48%	98.91%	98.51%
	2012	98.82%	99.18%	99.04%	97.96%	99.09%
	2011	97.41%	95.42%	98.26%	96.97%	98.96%

Based upon EPA information[12], the following table documents the measured ozone concentrations at the indicated monitor:

Monitor Number	Year	City	8-Hour First Max (ppb)	8-Hour 2nd Max (ppb)	8-Hour 3rd Max (ppb)	8-Hour 4th Max (ppb)
482450102	2014	Port Arthur	69.00	66.00	66.00	62.00
	2013	Port Arthur	65.00	59.00	59.00	58.00
	2012	Port Arthur	84.00	78.00	72.00	70.00
	2011	Port Arthur	82.00	76.00	74.00	73.00
	2010	Port Arthur	72.00	72.00	72.00	71.00
	2009	Port Arthur	81.00	80.00	77.00	71.00
	2008	Port Arthur	90.00	84.00	83.00	78.00

[11] Available at: http://www.tceq.state.tx.us/cgi-bin/compliance/monops/site_info.pl.
[12] Available at: : http://www3.epa.gov/airdata/ad_rep_mon.html.

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The Air Quality Analysis (AQA) will include supporting documentation as requested in Section 7.1 Preconstruction Monitoring Requirements. As such, the following table represents concentrations for the representative background concentration:

Monitor Number	2012-2014 Design Value (ppb)[01]	Current Ozone NAAQS (ppb)
482450102	63.33	70.00

Notes:

[01]. The 2012-2014 Design Value (DV) is average of 4th Max (or H4H) from latest three years (i.e., average of 2012 (70 ppb), 2013 (58 ppb), and 2014 (62 ppb)).

4. Determine the Potential Range of Post-Project Ambient Ozone Concentrations.
To determine the estimated post-project ambient ozone concentrations, the potential ambient ozone increase is added to a representative background concentration. For the Side Cracker Project, the following table represents the estimated post-project ozone concentration from the 2012-2014 Design Value:

Monitor Number	2012-2014 Design Value (ppb)	Potential Ambient Ozone Increase (ppb)	Post-Project Ozone Conc. (ppb)
482450102	63.33	0.80	64.13

5. Compare the Post-Project Ambient Ozone Concentrations to NAAQS.
The following table represents the expected potential post-project ambient ozone concentration for the Side Cracker project:

Monitor Number	Post-Project Ozone Conc. (ppb)	Current Ozone NAAQS (ppb)
482450102	64.08	70.00

The predicted post-project ambient ozone concentrations is less than the current ozone NAAQS. As such, the screening (or qualitative) ozone ambient impact analysis demonstrates that additional review should not be required for the proposed project.

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ATTACHMENT F
COMMON INDUSTRIAL STACK PARAMETERS

Attachment F contains a derivation of *"common industrial parameters"* from public records in Louisiana. TOTAL requests that TCEQ determine if this represents sufficient documentation for use as *"common industrial parameters"*.

Submitted Information	Page
Common Industrial Stack Parameters	F-02

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January 25, 2016

Subject: Total Petrochemicals & Refining USA, Inc. Air Quality Analysis Protocol

On October 13, 2015, the Air Dispersion Modeling Team (ADMT) sent comments via e-mail to the applicant regarding the Prevention of Significant Deterioration (PSD) New Source Review (NSR) Air Quality Analysis (AQA) Protocol for Total Petrochemicals & Refining USA, Inc. Port Arthur Ethane Side Cracker located in Port Arthur, Jefferson County, Texas, dated July 2015. The applicant submitted responses and revisions to the modeling protocol in response to the ADMT comments on December 7, 2015. My comments regarding the responses and revisions to the modeling protocol are provided below.

2.1.3 Area of Impact (AOI) Analysis

Original ADMT Comment: The protocol states that due to the significant amount of ambient air monitoring performed near the facility, Total proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds. Additional justification would need to be provided demonstrating that the background monitor is adequately representing emission from the sources to be excluded from the NAAQS analysis. Depending on where the monitors and source are located, the applicant may be able to use the monitor to represent some sources and model the rest. Please address before submitting the AQA.

The protocol also notes that if the approach mentioned above is not accepted, retrieval from the TCEQ Air Permits Allowable Database (APAD) will be obtained for NAAQS pollutants that exceed the applicable SIL. In addition, the protocol notes that a search radius of the AOI plus 20 kilometers (km) will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate prior to submitting the AQA. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

Applicant Response: The proposed project requires federal Prevention of Significant Deterioration (PSD) review for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Inhalable Particulates (PM_{10}), Fine Particulates ($PM_{2.5}$), and volatile organic compounds (VOC). Additionally, the proposed project requires a State National Ambient Air Quality Standards (NAAQS) analysis for Sulfur Dioxide (SO_2). As a precursor for Ozone, VOC is analyzed differently (please see Section 2.4 for additional information); therefore, the Area of Impact (AOI) is not required.

Preliminary information indicates that the proposed project will comply with the Significant Impact Level (SIL) for CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. As such the following portions of the response to protocol comments may not

be applicable to the proposed project:

- **Section 2.1.2 -Preconstruction Monitoring Analysis.**
- **Section 2.1.3-Area of Impact (AOI) Analysis.**
- **Section 2.2 -NAAQS Analysis.**
- **Section 2.3 -PSD Increment Analysis.**
- **Section 3.2 -State NAAQS Analysis Step 2.**

TOTAL understands that if the SIL analysis does not produce predicted concentrations under the SILs, TOTAL will provide additional justification on the representativeness of the monitor used, as well as additional justification for the use of the AOI plus 20 kilometers and consult with TCEQ concerning pending or recently permitted facilities to be included in the modeling analysis.

ADMT Comment: If the model predictions are greater than or equal to the applicable SILs, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6, prior to submitting the AQA, that includes a discussion on how off-property sources will be evaluated, as well as a discussion demonstrating that the selected background monitors are adequately representing emissions from those sources to be excluded from the NAAQS analysis.

2.2 NAAQS Analysis

Original ADMT Comment: See section 2.1.3 Area of Impact (AOI) Analysis regarding the approach in which monitoring data are used in lieu of modeling off-property sources.

Please note when modeling PM_{10} with five individual years of meteorological data, the concentration should be reported as the maximum high, second high (H2H). If using five years of concatenated meteorological data, report the maximum high, sixth high (H6H) predicted concentration.

See comment below in section 7.2 Adjusted Background Concentration regarding the use of an adjusted background.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Applicant Response: TOTAL understands this comment and wishes to submit the following:

- **Please refer to proposed response to Section 2.1.3 for additional discussions on potential usage of ambient monitoring data "in lieu" of modeling off-property sources.**
- **As indicated by TCEQ, the AQA will use the appropriate PM_{10} concentration(s) based upon the selected meteorological data.**
- **As indicated by TCEQ, the analysis will not use the "adjusted background concentration" methodology in the AQA.**
- **TOTAL will contact the Air Dispersion Modeling Team (ADMT) if the**

dispersion model predicts any potential NAAQS exceedance.

ADMT Comment: As stated above in section 2.1.3, if any pollutant exceeds its respective SIL, a revised protocol will need to be provided demonstrating that the selected background monitors are adequately representing emission from those sources to be excluded from the NAAQS analysis.

2.3 PSD Increment Analysis

Original ADMT Comment: See comment below in section 7.5 Justification to use $PM_{2.5}$ Significant Impact Level (SIL) regarding the use of the $PM_{2.5}$ SILs for Increment.

The proposed alternative approach is not acceptable.

Note the minor source baseline date for $PM_{2.5}$ for Jefferson County is January 1, 2013 and the PM_{10} minor source baseline date is November 11, 1977.

The protocol references using actual emission rates; however, it is unclear how these data will be determined for off-property sources for both the long-term and short-term averaging times. Be aware that the APAD retrieval provides the allowable emission rates, and not actual emission rates. If actual emission rates will be relied on in the PSD Increment analysis, provide the full details on how these data were determined, as well as the justification to support the values prior to submitting the AQA.

The protocol states that a search radius of the AOI plus 20 km will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Please note, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. If any updates or corrections are made to the off property retrieval data, be sure to provide all supporting materials with the AQA.

The protocol states to reduce the number of sources included in the PSD Increment inventory, the analysis may merge similar off-property emission sources. Note without adequate justification, this approach is not appropriate for Increment modeling. Furthermore, simply providing the title to a guidance document that covers many topics does not justify its use. The applicant should always explicitly explain how the guidance document is applicable to their project and how the approach will be implemented.

If you become aware of any potential Increment exceedances, please contact the ADMT before revising and/or submitting the AQA.

Applicant Response: TOTAL understands this comment and wishes to submit the following:

- **Appendix A addresses secondary formation of $PM_{2.5}$ associated with the proposed project. Please refer to proposed response to Section 7.1 for additional information for selection of background monitors.**
- **As indicated by TCEQ, the analysis will not use the "alternative approach" methodology for the PSD Increment analysis as described**

in the AQA.

- **If required, the AQA will use the indicated minor source baseline dates for PM_{10} and $PM_{2.5}$ as provided by TCEQ.**
- **If actual emission rates are used in the AQA, the modeling report will contain sufficient documentation.**
- **Please refer to proposed response to Section 2.1.3 for additional discussions on specific distance (i.e., AOI plus 20-km) and facilities that are not included in TCEQ records.**
- **As indicated by TCEQ, the analysis will include supporting documentation for any similar sources that are merged to reduce the number of sources in the off-property inventory.**
- **TOTAL will contact the ADMT if the dispersion model predicts any potential PSD Increment exceedance.**

ADMT Comment: As stated previously, if actual emission rates will be relied on in the PSD Increment analysis, provide the full details on how these data were determined, as well as the justification to support the values prior to submitting the AQA.

Note without adequate justification, reducing the number of sources included in the PSD Increment inventory by merging similar off-property emission sources is not appropriate for Increment modeling. A revised protocol should be provided prior to submitting the AQA if this methodology is relied on.

See the comment above in section 2.1.3 regarding the use of a specific distance (i.e., AOI plus 20-km) and facilities that are to be excluded from the analysis.

2.4 Ozone Impact Analysis

Original ADMT Comment: The protocol notes that the TCEQ's Air Quality Modeling Guidelines (AQMG) from April 2015 will be relied on for conducting the analysis. Please note that Appendix Q of the TCEQ's AQMG has not been finalized and therefore should not be documented as being relied on. In addition, general references to literature or guidance are made throughout the protocol, but no one specific approach is outlined. Be sure to provide details of the analysis and specify a specific approach for estimating ozone impacts in lieu of referencing guidance with the revised protocol.

The protocol states that a conservative screening analysis based on NO_x modeling will be used to estimate the potential impact of ozone levels and that the methodology is only valid if the local atmosphere's ozone formation is NO_x-limited (i.e., the county-wide VOC/NO_x ratio is 1.3 to 1). First, the determination of whether the project area is VOC or NO_x-limited should be established before conducting the screening analysis. Second, supporting information on the relevance of the ratio of 1.3 to 1 was not provided with the protocol. Note that additional technical information and supporting documentation will need to be provided if this ratio is to be relied on to determine if the project area is VOC or NO_x-limited before submitting the AQA.

The protocol also states that the screening approach appears to be conservative given the difference in biogenic VOC emissions found near Cumberland, TN vs. biogenic VOC emissions in Jefferson County. It is unclear what the basis is for making this

statement. Additionally, no documentation of the actual biogenic VOC emissions or justification was provided to validate this statement.

As mentioned above, the validation of the area being NO_x-limited should be done ahead of time. The method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories. Information from the BPA 1997 Eight-Hour Ozone Redesignation Request and Maintenance Plan SIP could be used to support the ozone analysis, particularly section 4.2 - FUTURE EMISSIONS AND VERIFICATION OF CONTINUED ATTAINMENT. This section contains analyses demonstrating that for the Beaumont-Port Arthur (BPA) area, reducing NO_X emissions is more effective in reducing the eight-hour ozone Design Value (DV) than reducing VOC emissions.

The protocol also did not provide justification for the selected ozone monitor. Be sure to provide the justification for the selected monitor and include the monitoring concentration that would be used with the revised protocol. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions (ozone precursor emissions).

Be aware that the intermittent source guidance should not be used for the ozone screening analysis. Also, be sure to convert the predicted ozone concentration from $\mu g/m^3$ to parts per billion (ppb) before adding to the ozone monitoring concentration for comparison to the NAAQS in the AQA.

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that outlines a specific methodology for addressing the ozone analysis and also includes a discussion on the monitor selection and whether the area is NO_x-limited or VOC-limited.

Please note the new ozone standard of 70 ppb will be in effect 60 days after publication of the final rule in the federal register.

Applicant Response: As mentioned in TCEQ's comments on the modeling protocol, Appendix Q from TCEQ's Air Quality Modeling Guidelines (AQMG) has not been finalized at this time. As such, TCEQ has not adopted a single approach applicable for the entire state of Texas; therefore, TCEQ evaluates each application on a "case-by-case" basis. Based upon preliminary information, Appendix E contains a conservative screening (i.e., qualitative) ozone ambient impact analysis, which demonstrates that additional review should not be required for the proposed project. If the indicated procedure is acceptable, TOTAL will provide a finalized analysis based upon the following: final project information, the indicated methodology, & supporting documentation. If the indicated procedure requires refinement, TOTAL requests a conference call with TCEQ to discuss the appropriate path forward.

ADMT Comment: The proposed methodology to address the ozone analysis is generally appropriate; however, please note the following:

- There is no need to document county emissions for characterizing the project

area as NOx-limited. Additionally, no documentation was provided to justify the use of a 1.3/1 ratio when determining if an area is NO_x-or VOC-limited. As mentioned in the last set of comments TCEQ provided, simply referencing the BPA SIP to characterize the area as NOx-limited would be sufficient.

- Since the ozone standard is based on a rolling 8-hr average, the model should be setup to calculate the five-year average of the H1H 8-hr concentrations.
- There is no need to discuss an ozone SIL based on how EPA developed the interim SILs for 1-hr NO_2 and 1-hr SO_2. The project-related results should be added to the background for a comparison to the standard.

Also, consider including the most recent year (2015) of monitoring data.

3.2 State NAAQS Analysis Step 2

Original ADMT Comment: See section 2.1.3 Area of Impact (AOI) Analysis regarding the approach in which monitoring data is used in lieu of off-property sources.

Similar to the comment above, if a specific distance is used to develop the off-property inventory; adequate justification should be provided prior to submitting the AQA as to why a specific radius is appropriate.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Applicant Response: TOTAL understands. Please refer to proposed response to Section 2.1.3 for additional discussions on (1) potential usage of ambient monitoring data "in lieu" of modeling off-property sources and/or (2) specific distance used to develop the off-property inventory.

ADMT Comment: See the comment above in section 2.1.3.

Section 4 State Property Line Analyses

Original ADMT Comment: Note the state property line standard for sulfur dioxide for Jefferson County is 817 $\mu g/m^3$.

The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a single property line designation (SPLD). Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: TOTAL has the following comments:

- **The AQA will use the indicated state property line standard for Jefferson County.**
- **The proposed facility is not included in existing single property line designation (SPLD) at the facility. The Side Cracker facility has a different 2-digit Standard Industrial Classification (SIC) code and is a different "source" for the purposes of air quality permitting. This issue has been previously discussed with TCEQ during a meeting on September 2, 2014. The meeting was attended by Rebecca Partee,**

Kristi Mills-Jurach, Matt Earnest, Don Ruggeri, Daniel Menendez and others from the TCEQ. Don Clauson (Total) and Randy Parmley (Sage) were also present. We can provide the PowerPoint presentation made during the meeting upon request. It was TOTAL's understanding that TCEQ confirmed that the Refinery and Side-Cracker Ethylene Production sources will be treated as separate sources, irrespective of the RN referenced.

ADMT Comment: Single property line designations (SPLDs) are designated by regulated entity number not SIC code. If Total Petrochemicals & Refining USA, Inc. is no longer part of the SPLD, please provide adequate documentation demonstrating the SPLD has been voided before submitting the AQA.

Section 5 State Effects Review Analyses

Original ADMT Comment: The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a SPLD. Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

ADMT Comment: See the comment above in section 4.

6.6 Receptor Grids

Original ADMT Comment: A single property line designation agreement (SPLD) exists between Total Petrochemicals & Refining USA, Inc., Enterprise Refined Products Company LLC, and BASF FINA Petrochemicals LP. Be sure to include a copy of the SPLD agreement, as well as the associated property line map with the AQA.

Please note that receptors will need to be placed on Enterprise Refined Products Company LLC and BASF FINA Petrochemicals LP for all federal (PSD NAAQS and Increment) analyses.

In addition, for all state analyses (minor NSR NAAQS, state property line, and state health effects analyses), the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Applicant Response: The proposed facility is not included in existing single property line designation (SPLD) at the facility. Please see response for Section 4 for additional information on single property line designation (SPLD) applicability.

ADMT Comment: See the comment above in section 4.

6.9.4 Multi-Point Ground Flare (Routine Activity and/or Planned MSS Activities)

Original ADMT Comment: Please provide the calculation of the effective stack

diameter as part of the documentation with the AQA. Additionally, coordinate with the permit reviewer regarding the proposed adjusted method for calculating the individual effective diameter for each active nozzle. Be sure to document how the different operating scenarios are being taken into account; the number of active nozzles and the resulting effective diameter will depend on the flow going to the flare.

For the flaring operations, it is not clear from the information provided that the activity is intermittent. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Applicant Response: The following represents a response to TCEQ comments:

- **Attachment C discusses representation of Multi-Point Ground Flare (MPGF) in the AQA.**
- **Attachment D presents additional documentation to justify "intermittent source policy" for 1-Hour Nitrogen Dioxide (NO_2) National Ambient Air Quality Standards (NAAQS) and 1-Hour Sulfur Dioxide (SO_2) NAAQS in the AQA.**

ADMT Comment: Attachment D of the revised protocol includes a proposal to exclude the multipoint ground flare emissions from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses. Exclusion of this source from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses is not appropriate. Furthermore, based on the information provided in Attachments C and D, it is not clear if the multipoint ground flare qualifies as an intermittent source. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA if intermittent source guidance is relied on for the multipoint ground flare.

6.9.5 Emergency Generator (Engine)

Original ADMT Comment: The protocol notes that the emergency engine will be modeled following EPA's intermittent guidance. However, it is not clear from the information provided with the protocol that the emergency engine listed in this section qualifies as an intermittent source. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Please note if hour-of-day scalars are used in the model, the annual average rate calculations will need to take this into account (i.e. do not rely on 8760 hours).

Applicant Response: The following represents a response to TCEQ comments:

- **Attachment D presents additional documentation to justify "intermittent source policy" for 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS in the AQA.**
- **As indicated by TCEQ, calculations for annual average emission rates will account for "hour of day scalars" if used in the AQA.**

ADMT Comment: Attachment D of the revisions mentions the exclusion of the emergency generator from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses. Exclusion of this source from the 1-hr NO_2 and 1-hr SO_2 NAAQS analyses is not appropriate. Based on the information provided in Attachment D, applying intermittent source guidance to the emergency generator is reasonable. Be sure to include this information with the AQA.

7.2 Adjusted Background Concentration

Original ADMT Comment: As mentioned above, the request to use the unadjusted measured monitored concentrations in lieu of modeling off-property sources is not acceptable. Related to this, adjusting the background concentration in which the modeled off-property concentrations at the monitor location are subtracted from the monitor data is also not acceptable.

Applicant Response: The following represents a response to TCEQ comments:

- **<u>Monitoring "In Lieu" of Off-Property Inventory</u>**

  In earlier TCEQ comments for Section 2.1.3, TCEQ indicated the following: "The protocol states that due to the significant amount of ambient air monitoring performed near the facility, TOTAL proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds. Additional justification would need to be provided demonstrating that the background monitor is adequately representing emission from the sources to be excluded from the NAAQS analysis. Depending on where the monitors and source are located, the applicant may be able to use the monitor to represent some sources and model the rest". As such, TOTAL assumes that TCEQ may still consider this methodology for the proposed project. Please refer to proposed response to Section 2.1.3 for additional information on this subject.

- **<u>Adjusted Background Concentrations.</u>**

  TOTAL understands. The AQA will not include the "adjusted background concertation" based upon the considerations above.

ADMT Comment: As stated above in section 2.1.3, if any pollutant exceeds its respective SIL, a revised protocol will need to be provided demonstrating that the selected background monitors are adequately representing emission from those sources to be excluded from the NAAQS analysis.

7.5 Justification to use $PM_{2.5}$ Significant Impact Level (SIL)

Original ADMT Comment: The justification provided to use the $PM_{2.5}$ SILs for the NAAQS analysis is appropriate; however please see the comment above in section 7.1 Preconstruction Monitoring Requirements regarding the monitor justification.

Before submitting the AQA, please provide a discussion on why the use of the $PM_{2.5}$ SILs for the $PM_{2.5}$ Increment analysis would be considered appropriate. See the following EPA guidance regarding $PM_{2.5}$:

http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Mode

ling.pdf

Applicant Response: Appendix A contains justification for $PM_{2.5}$ Significant Impact Levels (SILs) in the PSD Increment analysis. Please refer to proposed response to Section 7.1 for additional information for background monitor selection.

ADMT Comment: The demonstration for justifying the $PM_{2.5}$ SILs for the increment analysis is generally reasonable. In addition to the information provided, the ADMT recommends that the applicant include a discussion on the types and amounts of increment-affecting sources around the monitor compared to the project site.

7.5.1 $PM_{2.5}$ Secondary Formation Applicability

Original ADMT Comment: Please revise the protocol to address the secondary formation of $PM_{2.5}$ associated with the proposed project emissions.

Additional information is requested since an evaluation of the project emissions of precursor emissions of NO_2 was not discussed. The ADMT recommends that the evaluation be supplemented in the protocol by reviewing speciated $PM_{2.5}$ monitor data from the Port Arthur Memorial School monitor (please note that speciated data are only available through 2010). Begin by reviewing and reporting the nitrate concentrations from the monitor. Then demonstrate how the proposed NO_x project emissions are a small fraction of the NO_x emissions for the air shed, and discuss how secondary formation associated with proposed NO_x emissions would be expected to be considerably smaller than the monitored concentrations of nitrates. This demonstration should also acknowledge that the maximum estimated impacts associated with secondary formation of $PM_{2.5}$ are not expected to occur near the project site nor are they expected to significantly increase the predicted results from the modeling of direct $PM_{2.5}$ emissions. Be sure to provide a conclusion stating why secondary $PM_{2.5}$ formation would not be expected to contribute significantly to the total concentration.

If the Port Arthur Memorial School monitor is used to obtain speciated $PM_{2.5}$ data, be sure to include justification for the selected monitor with the AQA.

Applicant Response: Appendix B addresses secondary formation of $PM_{2.5}$ associated with the proposed project. Please refer to proposed response to Section 7.1 for additional information for selection of background monitors.

ADMT Comment: The qualitative approach for addressing secondary formation is reasonable. Be sure to include this information in the AQA.

7.6 Intermittent Source Policy

Original ADMT Comment: The proposed methodology for modeling intermittent sources for both total operational hours and total alternative operating scenario hours is not acceptable in regards to excluding sources which are limited to 100 hours or less of operation.

It is not clear from the protocol what sources qualify as intermittent emissions. Prior to submitting the AQA, information should be provide for each source including the

number of operating events per year, the duration for each event, and whether events will occur simultaneously or separately.

Be aware if hour of day scalars are used for intermittent sources, this must be accounted for in the calculation of the annual average emission rates.

Applicant Response: The following represents a response to TCEQ comments:

- **As indicated by TCEQ, the intermittent policy will not be used to exclude sources that are limited to 100 hours or less of operation. It should be noted that other states in EPA Region VI have adopted this approach.**
- **Attachment D presents additional documentation to justify "intermittent source policy" for 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS in the AQA.**
- **As indicated by TCEQ, calculations for annual average emission rates will account for "hour of day scalars" if used in the AQA.**

ADMT Comment: Based on the information provided in Attachment D of the revisions, applying intermittent source guidance to the emergency generator is reasonable. Be sure to include this information with the AQA.

As noted above, it is not clear from the information provided if the multipoint ground flare qualifies as an intermittent source. Stating the source will operate in MSS mode for no more than 500 hours per year does not qualify a source as intermittent. If information cannot be provide regarding how the source is expected to operate for MSS mode, such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources, then please note intermittent source guidance should not be applied to the multipoint ground flare.

7.7 Common Industrial Stack Parameters

Original ADMT Comment: A valid source was not provided to support the use of the common industrial stack parameters provided in Table 7-9 of the protocol. The values listed in Table 7-9 may be reasonable to update any missing information from the APAD retrieval given proper justification and documentation is provided supporting the appropriateness of each.

If justification is not provided for the use of these common industrial stack parameters, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. Please note if any updates or corrections are made to the off-property retrieval data, all documentation in which the Air Permits Division can validate should be provided.

Response: Attachment F contains a derivation of "common industrial stack parameters" from a search of public records in Louisiana. TOTAL requests that TCEQ determine if this represents sufficient documentation for use as "common industrial stack parameters" in Texas. Alternatively, TCEQ default parameters will be used unless sufficient documentation for alternative parameters is supplied in the AQA.

ADMT Comment: Attachment F of the revisions did not include any information. As stated before, if justification is not provided for the use of these common industrial stack parameters, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. Please note if any updates or corrections are made to the off-property retrieval data, all documentation in which the Air Permits Division can validate should be provided.

If you have any questions please contact Rachel Melton at 512-239-2358, by fax at 512-239-1330, or by email at Rachel.Melton@tceq.texas.gov.

To: Daniel Menendez[daniel.menendez@tceq.texas.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Eckberg, Craig
Sent: Fri 1/22/2016 2:51:33 PM
Subject: Re: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

Thank you Daniel, there are a few minor updates we will provide to EPA and TCEC early next week. Also, we turned the crank on the model with these minor updates and there was not a meaningful change in the predicted impacts-
Ashley - we will be providing our response directly to you, as well.

Thanks again!
Craig

From: Daniel Menendez <daniel.menendez@tceq.texas.gov>
Date: January 22, 2016 at 8:31:11 AM CST
To: Ashley Mohr (Mohr.Ashley@epamail.epa.gov) <Mohr.Ashley@epamail.epa.gov>
Cc: Eckberg, Craig <Craig.Eckberg@nrg.com>
Subject: FW: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

Hi Ashely,

I received the response below from our emissions inventory section. Please let me know if you need any additional information.

Thanks,

Daniel

From: Danielle Nesvacil
Sent: Wednesday, January 20, 2016 10:58 AM
To: Daniel Menendez; John Vermillion
Cc: Kevin Cauble; Kim Herndon; Steven Hagood; David Brymer; Mike Wilson
Subject: Re: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

Daniel,

Thanks for the email. Here is our response:

The stack parameters EPA forwarded for the Limestone and WA Parish sites match what NRG reported to the TCEQ in the 2014 emissions inventory (see attached spreadsheet). NRG would be the best resource to reconcile any potential questions about parameter accuracy. If discrepancies are found, the TCEQ would appreciate NRG updating the relevant parameters when the company submits the sites' 2015 emissions inventories.

Please let me know if you have any further questions.

Thanks,
Danielle

From: Kevin Cauble
Sent: Thursday, January 14, 2016 3:21 PM
To: Daniel Menendez
Cc: David Brymer; Kim Herndon; Steven Hagood; Mike Wilson
Subject: RE: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

We will check into it and draft a response.

Thanks

Kevin

From: Daniel Menendez
Sent: Thursday, January 14, 2016 3:13 PM
To: Kevin Cauble
Cc: David Brymer; Kim Herndon; Steven Hagood; Mike Wilson
Subject: FW: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

Hi Kevin,

I received the email below from EPA Region 6 regarding modeling conducted for NRG sources listed on the SO2 consent decree. EPA is requesting a response to help resolve differences between the modeling done by Sierra Club, modeling done by NRG, and information included on the 2014 Emission Inventory Questionnaire.

Since the EPA is requesting clarification on the emission inventory data, I think your section would be best suited to provide any answers.

Feel free to contact me if you have any questions,

Daniel

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, January 14, 2016 10:42 AM
To: Craig.Eckberg@nrg.com; Richard Hamel; Mark.Garrison@erm.com; Daniel Menendez
Cc: Donaldson, Guy; Snyder, Erik
Subject: Request for Clarification/Feedback on Limestone and WA Parish Stack Parameters

All –

Based on our ongoing review of the modeling analyses submitted for the NRG Limestone and WA Parish facilities related to the SO2 Designations, we have identified potential discrepancies in modeled stack parameters and are requesting additional clarification or information from both industry and TCEQ regarding these stack parameters. This email outlines the additional information we are requesting and also provides a copy of a comment letter recently received from Sierra Club that identifies a discrepancy for one of the units located at the WA Parish facility.

Limestone:

Below is a table showing the stack parameter information from the most recent Industry modeling, most recent Sierra Club modeling, and the 2014 Emissions Inventory Questionnaire (EIQ) pulled from the TCEQ's website. As you can see differences exist in both the stack height and stack diameter values.

	LMS1 and LMS2	
	Stack Height (ft)	**Stack Diameter (ft)**
Industry	565	23.6
Sierra Club	563	26.9
2014 EIQ	450	27

We are asking that both industry and TCEQ review these values and provide any additional information available to document what the actual stack parameters are for the two main stacks located at the Limestone Facility.

WA Parish:

We conducted a similar review and comparison for WA Parish and found the following differences for 4 of the modeled units at WA Parish:

	UNIT2A/2B		UNIT4		UNIT7		UNIT8	
	Stack Height (ft)	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diameter (ft)**	**Stack Height (ft)**	**Stack Diamete (ft)**
Industry	167.8	18	182	18	500	24	500	22.5
Sierra Club	Not modeled	Not modeled	Not modeled	Not modeled	500	22	500	22.5
2014 EIQ	168	10.5	191	22.5	500	22	500	22

As I previously mentioned, we did receive a comment letter from Sierra Club that referenced the stack diameter discrepancy for Unit 7. Again, we request you all to review this information and provide additional documentation and/or clarification regarding the potential discrepancies in the modeled stack parameters.

If you have any questions, please feel free to contact me. We are also available to set up a specific time to discuss in more detail, if necessary.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
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Dallas, TX 75202
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FAX (214) 665-6762
mohr.ashley@epa.gov

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

To: Zarena Post[zarena.post@tceq.texas.gov]
Cc: Thuy Phi[Thuy.Phi@Tceq.Texas.Gov]; Shantha Daniel[shantha.daniel@tceq.texas.gov]; Mark McCorkle (MAC@adeq.state.ar.us)[MAC@adeq.state.ar.us]; Clark, David[CLARKD@adeq.state.ar.us]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Peters[eric.peters@state.nm.us]; Gi-Dong[gi-dong.kim@state.nm.us]; Feldman, Michael[Feldman.Michael@epa.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]; Schwartz, Colin[Schwartz.Colin@epa.gov]
From: Snyder, Erik
Sent: Thur 1/21/2016 4:12:05 PM
Subject: RE: 1/20 & 21 Region 6 Air Modeling Meeting
Proposed_AERMOD_System_Updates_01_21_2016.pptx
8-New_FLM ISSUES.pptx

Presentations for rest of meeting.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Snyder, Erik
Sent: Wednesday, January 20, 2016 10:26 AM
To: 'Zarena Post' <zarena.post@tceq.texas.gov>
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Subject: RE: 1/20 & 21 Region 6 Air Modeling Meeting

Other presentations for today.

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

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From: Snyder, Erik
Sent: Thur 1/21/2016 2:38:43 PM
Subject: RE: 1/20 & 21 Region 6 Air Modeling Meeting
R6 Examples.pptx
1-12_Treatment_of_PM25_and_Ozone_in_PSD_Compliance_Demos.pdf
2016 Modelers Conference-Region VI (Jan).pptx

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DRR - 20150819webinarslides.pdf
R6 DRR sources.pdf
R6 Modeling_TAD_review.pptx
R6 Monitoring TAD modeling.pptx

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Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Jon Niermann, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 15, 2016

Mr. Ron Curry
Regional Administrator
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Subject: Sulfur dioxide (SO_2) sources identified for further evaluation and air quality characterization

Dear Mr. Curry:

Pursuant to the 2010 SO_2 National Ambient Air Quality Standard (NAAQS) "Data Requirements Rule" (DRR) of August 2015, states and tribes must determine which sources within their borders emit 2,000 or more tons per year (tpy) of SO_2. By January 15, 2016, air agencies are required to provide the United States Environmental Protection Agency (EPA) with a list of the sources determined to fit that DRR specification. The EPA's stated purpose for identification of these sources is to determine the locations where further evaluation and characterization of the air quality in surrounding areas is needed and to determine compliance with the 2010 SO_2 NAAQS in those areas. Enclosed with this letter is a list of 25 total sources in Texas with SO_2 emissions at or above 2,000 tons in 2014.

In developing the enclosed list of sources, the Texas Commission on Environmental Quality (TCEQ) reviewed the 2014 SO_2 emissions inventory data reported to the State of Texas Air Reporting System to identify those sources emitting 2,000 or more tpy of SO_2. The list includes 12 sources identified by the EPA's March 20, 2015 letter for designation by July 2, 2016. The EPA determined that these sources were subject to expedited area designations according to a March 2, 2015 court-ordered consent decree. The TCEQ submitted additional analyses for seven of the 12 sources to the EPA on September 18, 2015, supporting that these areas should be attainment (Sandy Creek Energy Station) and unclassifiable/attainment (Tolk Generating Station, Twin Oaks Power Station, Coleto Creek Power Station, San Miguel Electric Plant, Limestone Generating Station, and W A Parish Electric Generating Station). Along with these 12 sources identified by the EPA, the enclosed list includes 13 additional sources with SO_2 emissions meeting or exceeding 2,000 tpy.

If you have questions, please contact Steve Hagle at 512-239-1295 (Steve.Hagle@tceq.texas.gov), or David Brymer at 512-239-1725 (David.Brymer@tceq.texas.gov).

Sincerely,

Richard A. Hyde, P.E.,
Executive Director

Enclosure

Texas SO_2 Sources with Reported Emissions Greater Than or Equal to 2,000 Tons in 2014

RN	COUNTY	OWNER	SITE	2014 Routine EI (tpy)
101198059	FREESTONE	LUMINANT GENERATION CO LLC	*BIG BROWN STEAM ELECTRIC STATION	57,460
102583093	RUSK	LUMINANT GENERATION CO LLC	*MARTIN LAKE ELECTRICAL STATION	53,660
100888312	FORT BEND	NRG TEXAS POWER LLC	*WA PARISH ELECTRIC GENERATING STATION	43,981
100542927	LIMESTONE	NRG TEXAS POWER LLC	*LIMESTONE ELECTRIC GENERATION STATION	27,862
102147881	MILAM	LUMINANT GENERATION CO LLC	*LUMINANT SANDOW YORKTOWN POWER PLANT	21,943
102285921	TITUS	LUMINANT GENERATION CO LLC	*MONTICELLO STEAM ELECTRIC STATION	20,515
100213370	TITUS	SOUTHWESTERN ELECTRIC POWER CO	WELSH POWER PLANT	18,225
100217975	BEXAR	CITY PUBLIC SERVICE	CALAVERAS PLANT	17,133
100226919	GOLIAD	COLETO CREEK POWER LP	*COLETO CREEK POWER STATION	16,934
100224534	LAMB	SOUTHWESTERN PUBLIC SERVICE CO	*TOLK STATION	16,753
100224849	POTTER	SOUTHWESTERN PUBLIC SERVICE CO	*HARRINGTON GENERATING STATION	15,465
100209287	JEFFERSON	OXBOW CALCINING LLC	OXBOW CALCINING	11,319
100216191	ROBERTSON	OAK GROVE MGMT COMPANY LLC	OAK GROVE STEAM ELECTRIC STATION	7,404
100226539	ATASCOSA	SAN MIGUEL ELECTRIC COOPERATIVE INC	*SAN MIGUEL ELECTRIC PLANT	6,909
100226026	HOWARD	SID RICHARDSON CARBON CO	BIG SPRING CARBON BLACK	5,947
100226570	ROBERTSON	MAJOR OAK POWER LLC	*OPTIM ENERGY TWIN OAKS Power Plant	5,762
100222413	HUTCHINSON	SID RICHARDSON CARBON LTD	BORGER CARBON BLACK PLT	4,863
100209386	ORANGE	ORION ENGINEERED CARBONS LLC	ECHO CARBON BLACK PLANT	4,255
101062255	WILBARGER	PUBLIC SERVICE CO OF OKLAHOMA	OKLAUNION POWER STATION	3,506
100211283	NAVARRO	TRNLWS LLC	STREETMAN PLANT	3,350
100209659	HUTCHINSON	ORION ENGINEERED CARBONS LLC	BORGER CARBON BLACK PLANT	3,027
100214287	HARRISON	SOUTHWESTERN ELECTRIC POWER CO	AEP PIRKEY POWER PLANT	2,916
104136700	MCLENNAN	SANDY CREEK SERVICES LLC	*SANDY CREEK ENERGY STATION	2,648
105369805	MILAM	LUMINANT GENERATION CO LLC	SANDOW 5 GENERATING PLANT	2,260
102579307	HARRIS	EXXONMOBIL REFINING & SUPPLY CO	**BAYTOWN REFINERY	2,204

* Sources identified by the EPA in March 2015.

** ExxonMobil Refining and Supply Company provided the TCEQ with 2015 SO_2 emissions inventory data for its Baytown refinery on January 14, 2016. The data provided indicates that the facility's annual routine SO_2 emissions for 2015 are 1,452 tons. The reduction in SO_2 emissions is due to the implementation of new techniques minimizing or in some cases eliminating the disposal and/or processing of high sulfur content storage tank residual liquids. It is expected that SO_2 emissions at this facility will remain below the 2,000 ton per year threshold.

BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

15 OCT 30 PM 5:24

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF THE SECRETARY

Mr. Ron Curry
Regional Administrator (6RA)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

RE: Applicable Sources Under the SO_2 Data Requirements Rule

Dear Mr. Curry:

On August 21, 2015, the Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard."[1] The final rule requires the Louisiana Department of Environmental Quality (LDEQ) to "submit a list of applicable SO_2 sources identified pursuant to § 51.1202 located in its jurisdiction to the EPA by January 15, 2016."[2] According to 40 CFR 51.1200 and 1202, applicable SO_2 sources are those that are not located in a designated nonattainment area and have annual actual SO_2 emissions of 2,000 tons or more based on the most recently available annual SO_2 emissions data for such sources.

A list of "applicable SO_2 sources" located in Louisiana is attached. This list is based on actual calendar year 2014 emissions as reported to LDEQ's Emissions Reporting and Inventory Center (ERIC).[3]

If you have any questions about this correspondence, please contact Bryan D. Johnston of the Air Permits Division at (225) 219-3450.

Sincerely,

Peggy M. Hatch

Peggy M. Hatch
Secretary

October 22, 2015
Date

PMH:BDJ

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[1] 80 FR 51052
[2] 40 CFR 51.1203(a)
[3] ERIC is a web-based application that allows users to create, edit, and submit emissions inventories online.

Post Office Box 4301 • Baton Rouge, Louisiana 70821-4301 • Phone 225-219-3953 • Fax 225-219-3971

	AI #	AI Name	Parish	Tons/Year	Year
1.	44866	Rain CII Carbon LLC - Norco Coke Plant	St. Charles	2709.79	2014
2.	29884	Oxbow Calcining LLC - Baton Rouge Calcined Coke Plant	East Baton Rouge	4098.16	2014
3.	3439	Rain CII Carbon LLC - Lake Charles Calcining Plant	Calcasieu	4431.75	2014
4.	32804	Rain CII Carbon LLC - Gramercy Coke Plant	St. James	4792.38	2014
5.	133	Reynolds Metals Co - Lake Charles Carbon Co	Calcasieu	4926.37	2014
6.	173682	AA Sulfuric Corp - Sulfuric Acid Plant	Ascension	5582.08	2014
7.	9142	Entergy Gulf States LA LLC - Nelson Industrial Steam Co (NISCO)	Calcasieu	6106.71	2014
8.	2518	Orion Engineered Carbons LLC - Ivanhoe Carbon Black Plant	St. Mary	6266.10	2014
9.	4998	Columbian Chemicals Co - North Bend Plant	St. Mary	6296.58	2014
10.	19901	Cabot Corp - Canal Plant	St. Mary	6366.32	2014
11.	4174	Sid Richardson Carbon Co - Addis Plant	West Baton Rouge	6742.80	2014
12.	1291	Cabot Corp - Ville Platte Plant	Evangeline	8661.39	2014
13.	2922	CLECO Power LLC - Brame Energy Center	Rapides	9711.35	2014
14.	19588	Entergy Gulf States LA LLC - Nelson Electric Generating Plant	Calcasieu	10543.56	2014
15.	585	CLECO Power LLC - Dolet Hills Power Station	DeSoto	14177.17	2014
16.	38867	Louisiana Generating LLC - Big Cajun II Power Plant	Pointe Coupee	34272.60	2014

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

January 11, 2016

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Mr. Ron Curry, Regional Administrator (6RA)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Subject: Oklahoma's List of SO_2 Sources as Required by 40 CFR Part 51, Subpart BB, Data Requirements for Characterizing Air Quality for the Primary SO_2 NAAQS

Dear Administrator Curry:

The Department of Environmental Quality (DEQ), as air agency responsible for implementation of the 2010 SO_2 NAAQS in Oklahoma, is required by EPA's Data Requirements Rule (DRR), 40 CFR Part 51, Subpart BB to submit a list of sources within its jurisdiction that have SO_2 emissions that exceeded 2,000 tons per year during the most recent year for which emissions data are available. The attached list represents the seven sources for which the DEQ will characterize the air quality for compliance with the 2010 SO_2 NAAQS, and the three sources for which area designation recommendations were submitted on August 17, 2015, in compliance with the federal consent decree.

If you desire additional information, or you have any questions concerning this matter, please contact Ms. Cheryl E. Bradley, Data and Planning Manager, at 405-702-4157.

Sincerely,

Eddie Terrill, Director of Air Quality Division
Oklahoma Department of Environmental Quality

cc: Michael Teague, Secretary of Energy and Environment
Scott Thompson, Executive Director, Department of Environmental Quality
Guy Donaldson, Chief, Air Planning Section, US EPA 6
Carrie Paige, Air Planning Section, US EPA 6
Dayana Medina, Air Planning Section, US EPA 6

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Oklahoma's List of SO_2 Sources applicable to 40 CFR Part 51, Subpart BB

EPA EIS ID	Company	Facility Name	2014 SO2 Emissions (tons)	County	State	Latitude	Longitude
8506011	OG&E	† MUSKOGEE GNRTNG STA	20,538	Muskogee	OK	35.76054	-95.28731
8212411	AEP/PSO	PSO NORTHEASTERN PWR STA	16,963	Rogers	OK	36.426265	-95.700203
8519411	OG&E	† SOONER GNRTNG STA	14,077	Noble	OK	36.453496	-97.052666
8522311	GRDA	CHOUTEAU COAL FIRED COMPLEX	12,254	Mayes	OK	36.189963	-95.289291
8464411	Oxbow Calcining	KREMLIN	9,842	Garfield	OK	36.51873	-97.83689
8449511	WFEC	† HUGO GNRTNG STA	8,970	Choctaw	OK	34.01633	-95.32188
7420411	Continental Carbon	PONCA CITY PLT	6,088	Kay	OK	36.66616	-97.07163
8148711	AES Shady Point	COGENERATION PLT	3,934	Le Flore	OK	35.1929	-94.6469
8212211	Holcim	ADA PLT	3,844	Pontotoc	OK	34.76754	-96.69652
8184211	Georgia-Pacific	‡ MUSKOGEE MILL	2,145	Muskogee	OK	35.73385	-95.29733

†Note: Muskogee Generating Station, Sooner Generating Station, and Hugo Generating Station were modeled in conformance with the federal consent decree. Results were submitted to EPA on September 18, 2015.

‡Note: Modeling for Georgia-Pacific's Muskogee Mill was performed in concurrence with OG&E's Muskogee Generating Station, and included in the September 18, 2015 submission.

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ADEQ

A R K A N S A S
Department of Environmental Quality

January 8, 2016

Mr. Mark Hansen
Associate Director for Air Programs - 6MM
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Sulfur Dioxide (SO_2) Sources Identified Pursuant to 40 CFR 51.1202

Dear Mr. Hansen:

The Data Requirements Rule for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard (NAAQS), effective on September 21, 2015, requires air agencies to submit a list of SO_2 sources identified pursuant to 40 CFR 51.1202 to the EPA by January 15, 2016. The Arkansas Department of Environmental Quality has identified the following sources that have actual annual SO_2 emissions of 2,000 tons or more and were not part of the previous "Round 2" designation recommendations associated with the March 2015 consent decree:

- Flint Creek Power Plant 7,968.13 tpy SO2
- FutureFuel Chemical Company 3,174.31 tpy SO2
- Plum Point Energy Station 2,549.46 tpy SO2

A list of SO_2 emissions for all 2014 reporting facilities in Arkansas is enclosed. Should you have any questions regarding this list, please contact Mark McCorkle of my staff by phone at 501-682-0736 or by e-mail at mac@adeq.state.ar.us.

Sincerely,

Stuart Spencer
Associate Director, Office of Air Quality

enclosure

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0506900110	3500110	Entergy Arkansas-White Bluff	34222.59602	Yes	Round 2 Designation
0506300042	3200042	Entergy Arkansas-Independence	30028.88424	Yes	Round 2 Designation
0500700107	400107	Flint Creek Power Plant (SWEPCO)	7968.132552	Yes	Round 3 or 4 Designation
0506300036	3200036	Futurefuel Chemical Company	3174.311308	Yes	Round 3 or 4 Designation
0509300461	4700461	Plum Point Energy Station	2549.461103	Yes	Round 3 or 4 Designation
0508100002	4100002	Domtar AW-Ashdown Mill	1489.213785	No	
0502700028	1400028	Albemarle Corp.-South Plant	1263.301	No	
0506900016	3500016	Evergreen Packaging-Pine Bluff	1077.354893	No	
0505700506	2900506	SWEPCO-John W Turk JR Power Plant	899.1092482	No	
0509300202	4700202	Nucor Yamato Steel	393.0106555	No	
0508100001	4100001	Ash Grove Cement	321.0410844	No	
0502700124	1400124	Petro-Chem Operating (Grayson Smackover Unit)	187.502	No	
0509300233	4700233	Nucor Corp-Nucor Steel Ark-Hickman Mill	172.258	No	
0513100219	6600219	Saint Gobain Proppants-Fort Smith	162.78	No	
0513900040	7000040	El Dorado Chemical-El Dorado	155.27	No	
0512500011	6300011	St-Gobain Ceramic & Plastics (Proppants Plant #3 & Saline Co)	146.0137	No	
0500100008	100008	Riceland Foods, Inc/Soy Div	133.3512884	No	
0502900001	1500001	Green Bay Packaging-AR Kraft-Morrilton	122.8936938	No	
0500300013	200013	Georgia-Pacific, LLC	114.5047302	No	
0511500145	5800145	Superior Graphite Co	106.1158294	No	
0504100036	2100036	Clearwater Paper Corp.-Cyress Bend Mill	90.1304167	No	
0513100274	6600274	Gerdau MacSteel Fort Smith	79.8344622	No	
0504700014	2400014	SGL Carbon LLC	76.922338	No	
0502700004	1400004	Whiting Petroleum Corp. Magnolia MSPU Plant	69.87568767	No	
0513900098	7000098	Clean Harbors El Dorado	54.0741	No	
0505900008	3000008	Acme Brick-Perla Plant	47.3733	No	
0506700033	3400033	Arkansas Steel Associates	41.17495	No	
0503100061	1600061	Arkansas Glass Container Corp.	36.703377	No	
0513900012	7000012	Great Lakes Chemical-El Dorado	36.1032	No	
0513900016	7000016	Lion Oil Company	35.4867256	No	

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0503100101	1600101	Riceland Foods, Inc.-Jonesboro Division	32.17298787	No	
0501900005	1000005	Georgia-Pacific Wood Products South LLC	28.8958206	No	
0506300014	3200014	Arkansas Lime Company	26.408694	No	
0506100016	3100016	Weyerhaeuser NR Co-Dierks Mill	22.9796	No	
0514300144	7200144	Eco-Vista-Waste Mngmt	20.25170007	No	
0506900017	3500017	Mondi Bags (formerly Graphic Flexible Pkg)	19.04738115	No	
0512500010	6300010	Almatic Inc-Bauxite	15.46	No	
0501100004	600004	Potlatch Land & Lumber, LLC-Warren Lumber	14.91000151	No	
0513900543	7000543	Union Power Station-El Dorado	14.14003073	No	
0501900004	1000004	Reynolds Metals Co. Gum Springs	12.4078596	No	
0505900030	3000030	Reynolds Consumer Products LLC-Hot Spring Continuous Rolling	10.1903262	No	
0513900037	7000037	Great Lakes Chemical-South Plant	9.78	No	
0513900039	7000039	Martin Operating Partnership	9.6804	No	
0510300035	5200035	Anthony Timberlands Inc-Bearden	8.0556673	No	
0505300002	2700002	West Fraser Inc-Leola Lumber Mill	7.035903425	No	
0513900480	7000480	Del-Tin Fiber-El Dorado	5.49	No	
0505900015	3000015	Flakeboard America LLC	5.11	No	
0512700049	6400049	West Fraser Mansfield	4.92	No	
0513900013	7000013	West Fraser-Huttig Mill	4.812	No	
0502700037	1400037	Deltic Timber Corp.-Waldo	4.79705	No	
0505900084	3000084	Anthony Timberlands Inc-Malvern	4.4807022	No	
0513900473	7000473	Anthony Forest Prod-Urbana	4.367342853	No	
0506500013	3300013	Unilin Flooring NC-Columbia Flooring	4.2888	No	
0514900009	7500009	Deltic Timber Corp-Ola	4.26164	No	
0502700008	1400008	Weyerhaeuser NR CO.-Emerson Div.	4.00215	No	
0501300212	700212	Georgia-Pacific Wood Products, LLC (Fordyce OSB)	3.40963513	No	
0506900409	3500409	Pine Bluff Energy Center	3.36	No	
0511500014	5800014	West Fraser-Russellville (formerly Bibler Bros)	3.1607	No	
0513100294	6600294	Owens Corning Composite Materials	2.75	No	
0505100002	2600004	Evraz Stratcor Inc	2.713215	No	

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0511900438	6000438	Waste Management-Two Pine Landfill	2.68840641	No	
0502900019	1500019	Green Bay Packaging Inc.-Pinecrest Lumber	2.59261375	No	
0503900058	2000058	Ray White Lumber Company	2.58979	No	
0505900229	3000229	Entergy Ark-Hot Springs Plant	2.55368436	No	
0505900039	3000039	Natural Gas Pipeline Co. of America-306	1.4047947	No	
0510300055	5200055	McClellan Generating Station	1.377234442	No	
0511900003	6000003	3M Industrial Mineral Products Division	1.31	No	
0503900017	2000017	Idaho Timber Corp. of Carthage LLC	1.160315	No	
0506900116	3500116	U.S. Army-Pine Bluff Arsenal	1.154770459	No	
0514500104	7300104	Natural Gas Pipeling of America-#307	1.1044	No	
0514501084	7301084	Fayetteville Express Pipeline-RCS	0.842406305	No	
0509100005	4600005	Cooper Tire Co.	0.8186	No	
0512100076	6100076	Enable-Biggers	0.722330629	No	
0506700111	3400111	Enable-MRT-Tuckerman Comp Station	0.711677853	No	
0509100150	4600150	Natural Gas Pipeling Co of America-#305	0.61924284	No	
0514300270	7200270	Superior Industries International Arkansas	0.61196	No	
0501100014	600014	Armstrong Hardwood Flooring Co.-Witt Plant	0.59	No	
0511901380	6001380	Ark Elec Coop-Oswald Generating Station	0.55214005	No	
0503100412	1600412	Jonesboro City Water and Light-NW Substation	0.522630003	No	
0513901294	7001294	Tetra Technologies	0.503250186	No	
0505700120	2900120	Georgia-Pacific Panel Products-Hope Particle Board Mill	0.460246782	No	
0502300445	1200445	Desoto Gathering Co. West Cutthroat CPF-2	0.43930962	No	
0512100031	6100031	Natural Gas Pipeling Co of America-#308	0.4355667	No	
0509300448	4700448	Associated Elec Coop-Dell	0.423981875	No	
0514501081	7301081	Desoto Gathering Co-MAKO CPF-1	0.360398404	No	
0500300028	200028	Georgia-Pacific Chemicals	0.35028	No	
0514100380	7100380	Cove Creek CPF-4	0.336848368	No	
0503101044	1601044	City of Jonesboro-Yard Waste Facility	0.336776	No	
0502900593	1500593	Desoto Gathering-S. Rainbow 4	0.328990432	No	
0505900011	3000011	Entergy Ark-Lake Catherine	0.3109	No	

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0502900592	1500592	Desoto Gathering Co. LLC-Cove Creek CPF-3	0.291938092	No	
0506100010	3100010	Certainteed Gypsum Manufacturing Inc	0.29	No	
0502900573	1500573	Desoto Gathering Co.-SE Rainbow CPF-2	0.27755296	No	
0514100315	7100315	Gravel Hill CPF-2	0.266234696	No	
0514500987	7300987	Desoto Gathering Co-Tiger CPF-1	0.225071024	No	
0504500969	2300969	Desoto Gathering Co. LLC-New Quitman CPF-2	0.219713153	No	
0505700304	2900304	Arkansas Electric Coop-CTI-Fulton	0.212	No	
0505900337	3000337	Magnet Cove Generating Station	0.2	No	
0502900590	1500590	Desoto Gathering-Phillips MTN CPF-1	0.183208165	No	
0511904196	6004196	LM Wind Power Blades	0.17515169	No	
0511900302	6000302	U of A Medical Center	0.158319575	No	
0509300115	4700115	Viskase Companies Inc	0.151	No	
0508300088	4200088	Enable-Dunn Compressor Station	0.144405263	No	
0514500110	7300110	The Bryce Company	0.137	No	
0501300035	700035	Aerojet Rocketdyne, Inc.	0.136941642	No	
0514100396	7100396	Gravel Hill CPF-4	0.128123566	No	
0514300695	7200695	Harry D. Mattison Power Plant	0.126505129	No	
0511500272	5800272	JW Aluminum	0.117704	No	
0514300205	7200205	Kawneer Company	0.107	No	
0504700012	2400012	Arkansas Electric-Thomas B Fitzhugh Corp	0.10130176	No	
0505900081	3000081	Enable Gas Trans-Malvern	0.096283468	No	
0509300251	4700251	Maverick Tube LLC	0.08754676	No	
0509300914	4700914	Precoat Metals	0.084711	No	
0503300077	1700077	Tate & Lyle Ingredients Americas. LLC Van Buren Plant	0.0803303	No	
0511900689	6000689	Arkansas Children's Hospital-Little Rock	0.074346299	No	
0506900025	3500025	Planters Cotton Oil Mill-Pine Bluff	0.0669	No	
0503700004	1900004	Mueller Copper Tube Products Inc.	0.051156347	No	
0504700071	2400071	Sourcegas-Drake Comp	0.05096362	No	
0508500093	4300093	Enable MRT-Carlisle	0.047358146	No	
0505500256	2800256	American Railcar Industries-Marmaduke	0.044	No	

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0514500127	7300127	Enable-West Point Comp Station	0.043787133	No	
0504500004	2300004	IC Bus Inc.	0.038	No	
0509900058	5000058	Spectra Energy-Hope Compressor	0.0322863	No	
0511900617	6000617	Dassault Falcon Jet	0.0312	No	
0500300065	200065	Emable Miss. River/Rtn. Hill	0.030564754	No	
0513100041	6600041	Baldor Electric	0.03	No	
0506700010	3400010	Norandal USA Inc	0.028902	No	
0505500251	2800251	American Railcar Industries Inc	0.028	No	
0504700068	2400068	Sourcegas-Woolsey Comp	0.02229	No	
0505100022	2600022	Triumph Fabrications-Hot Springs	0.0222306	No	
0505700016	2900016	Southern Bakeries	0.017	No	
0514500123	7300123	Texas Eastern Transmissions LP (TETLP)-Bald Knob	0.0147861	No	
0502700040	1400040	Amfuel-Magnolia	0.01450146	No	
0504700104	2400104	Sourcegas-Lone Elm Comp	0.0137	No	
0514700024	7400024	AECC-Carl E Bailey Generating Station	0.012826257	No	
0504700094	2400094	Sourcegas-Sells Comp	0.01066788	No	
0514300048	7200048	Ball Metal Food Container-Springdale	0.01	No	
0504300057	2200057	Drew Foam Companies Inc.	0.00727116	No	
0507700023	3900023	USA COE Huxtable Pumping Plant	0.007129954	No	
0506900213	3500213	Berenfield Containers	0.0058	No	
0504700088	2400088	Enable-Webb City Comp	0.004292459	No	
0505500060	2800060	Paragould Light Water and Cable	0.003169	No	
0504700090	2400090	Sourcegas-Davis Comp	0.0027758	No	
0502900068	1500068	Enable Gas Co.-Round Mountain	0.002080267	No	
0504700057	2400057	Correll Inc.	0.001514879	No	
0502700186	1400186	Enable Gas Trans-Taylor Comp Station	0.001462545	No	
0503300100	1700100	Arkansas Poly Inc.	0.001168449	No	
0511900090	6000090	Entergy Ark-Mabelvale	0.000968829	No	
0504700083	2400083	Spectra Energy-Noark Compressor (Ozark Gas Trans)	0.0008178	No	
0507900041	4000041	Enable-MRT-Corp Glendale	0.000287968	No	

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Arkansas Facility SO2 Emissions for 2014 Calendar Year

FIPs	AFIN	Facility Name	SO2	SO2 > 2000 TPY	Comments
0500700100	400100	Glad Manufacturing Company	1.47736E-05	No	
0513900400	7000400	Enterprize Refined Prod-El Dorado Terminal	1.09033E-05	No	
0505700090	2900090	Mew Millennium Building LLC	2.15208E-06	No	

New Mexico
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 St. Francis Drive, PO Box 5469
Santa Fe, NM 87502
Phone (505) 827-2109 Fax (505) 827-2836
www.env.nm.gov

SUSANA MARTINEZ
GOVERNOR

JOHN A. SANCHEZ
LIEUTENANT GOVERNOR

RYAN FLYNN
CABINET SECRETARY

BUTCH TONGATE
DEPUTY SECRETARY

January 15, 2016

Ms. Wren Stenger
Division Director (6MM)
Multimedia Planning and Permitting Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Subject: New Mexico Sources Subject to the Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard

Dear Ms. Stenger:

On behalf of the New Mexico Environment Department (NMED), I hereby submit a list of sources in New Mexico subject to the Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS). The following source is the only source in New Mexico to which this rule applies. This facility emits greater than 2,000 tons per year of SO_2.

San Juan Generating Station AIRS #350450902
2014 SO_2 emissions - 4989.4 tons

This information is intended to satisfy the requirement at 40 CFR Part 51, §51.1203(a), air agency requirements, which requires that a list of applicable sources be submitted to U.S. Environmental Protection Agency - Region 6 by January 15, 2016. If you have any questions regarding this submittal, please contact Rita Bates of my staff at (505) 476-4304.

Sincerely,

Michael Vonderheide, Director
Environmental Protection Division

cc: Guy Donaldson, EPA Region 6
Dayana Medina, EPA Region 6
Richard Goodyear, Chief, NMED Air Quality Bureau

To: Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Dianne.Anderson@tceq.texas.gov[Dianne.Anderson@tceq.texas.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Snyder, Erik
Sent: Wed 1/20/2016 1:02:26 PM
Subject: FW: PSD modeling guidance

FYI (2)

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Mohr, Ashley
Sent: Tuesday, January 19, 2016 9:02 AM
To: Randy Hamilton <randy.hamilton@tceq.texas.gov>
Cc: Kordzi, Stephanie <Kordzi.Stephanie@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>
Subject: RE: PSD modeling guidance

Randy –

I wanted to let you know that I received your email and plan to talk with Erik Snyder a bit more on this issue today. Just wanted to let you know that we are working on getting you a response. I also received a voice message from Craig Eckberg late Friday afternoon wanting to follow up on this issue. We will be in touch.

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Randy Hamilton [mailto:randy.hamilton@tceq.texas.gov]
Sent: Wednesday, January 13, 2016 10:12 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Kordzi, Stephanie <Kordzi.Stephanie@epa.gov>
Subject: FW: PSD modeling guidance

Ashley,

I was hoping you might be able to provide some insight into the basis for modeling the "net increase" instead of the "project" in the PSD rules. The below emails provide some background on the question. The PSD rules at 40 CFR 52.21(m) require an analysis of the air quality in the area that the major modification would affect for each pollutant with a significant net emissions increase. This doesn't explicitly say that the significant net emissions increase must be evaluated, but it could be read as an implication.

In the 12/31/2002 NSR Reform rulemaking, EPA added the clarification of what triggers PSD by introducing the term "project" in 52.21(a)(2)(iv)(*a*), while at the same time, they didn't introduce the term "project" in 52.21(m).

Do you know of any more modern explicit references than the 1990 NSR manual? I agree with Liz that something so basic should be carried forward, such as when TCEQ finalized our updated modeling guidance last year.

Thanks for the attention,

Sincerely,

Randy Hamilton, P.E.

Technical Specialist

Air Permits Division

TCEQ
(512) 239-1512

From: Stanko, Elizabeth [mailto:EStanko@trcsolutions.com]
Sent: Monday, December 21, 2015 7:46 AM
To: Randy Hamilton
Cc: Daniel Jamieson; Matthew Kovar
Subject: RE: PSD modeling guidance

Randy,

Thank you for your guidance on this project. Once we receive the modeling protocol comments, perhaps we can to setup a modeling protocol meeting to discuss. I would like to open up some dialogue regarding use of the Draft 1990 New Source Review (NSR) Workshop manual for modeling guidance.

Based on recent permit modeling experiences under new short-term NAAQS for SO2 and NO2, and also the PM2.5 standards (24-hour and annual NAAQS) the EPA has issued a number of clarification memoranda since 2010 that were intended to provide clarification regarding PSD modeling for these new standards. The Draft NSR Workshop document makes no mention of 1-hour NO2 or the PM2.5 standards.

It should be recognized that the EPA proposed revisions to the Guideline on Air Quality Models (CFR Title 40, Part 51, Appendix W) preamble states that modeling should not rely on the Draft NSR Workshop document for these types of evaluations. The proposed rule document states: The EPA has specifically cautioned against the literal and uncritical application of very prescriptive procedures for conducting NAAQS and PSD modeling compliance demonstrations as described in chapter C of the draft NSR Workshop Manual.

Additionally as you pointed out, the 2015 TCEQ AQMG guidance document doesn't specify for a PSD modification, model contemporaneous emissions increases and decreases.

Given more recent guidance for the new NAAQS, the procedures outlined in chapter C of EPA's Draft 1990 NSR Workshop Manual perhaps should only be applicable to the NAAQS listed in Table C-1 of the NSR Workshop Manual. These are my initial thoughts and again, would like to discuss further with you and the TCEQ ADMT.

Thanks,

Elizabeth

Elizabeth Stanko C.C.M.
Air Quality Specialist

10550 Richmond Avenue, Suite 210, Houston, TX 77042

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From: Randy Hamilton [mailto:randy.hamilton@tceq.texas.gov]
Sent: Tuesday, December 15, 2015 4:24 PM
To: Stanko, Elizabeth <EStanko@trcsolutions.com>
Cc: Daniel Jamieson <daniel.jamieson@tceq.texas.gov>; Matthew Kovar <matthew.kovar@tceq.texas.gov>
Subject: PSD modeling guidance

Elizabeth,

The EPA's 1990 NSR Workshop Manual has an Appendix C on PSD modeling guidance. Middle of page C-30 says the AOI modeling includes contemporaneous increases and decreases. I had even highlighted this, many years ago, but long since forgotten. Like much of PSD, it's not intuitive, but isn't entirely illogical.

I looked at our new guidance document and it looks like we leave out what may be a key difference between minor/state and major/PSD modeling – whether you model the project alone or the net changes. At least on page 20 under PSD modeling step one, the first bullet doesn't say

for a PSD modification, model contemporaneous emissions increases and decreases, with decreases input as negative emissions in the model.

When I saw Craig Eckberg, et.al. on a field trip to Cedar Bayou in July, I mentioned that I thought LAER was 5 ppm NOx for the stand-alone boilers. If that bears out, it could also be a way of reducing NO2 impacts, if that's important. I will need to dive back into this project and try to raise all questions in writing soon.

Sincerely,

Randy Hamilton

TCEQ Air Permits Division

(512) 239-1512

To: Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Dianne.Anderson@tceq.texas.gov[Dianne.Anderson@tceq.texas.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Snyder, Erik
Sent: Wed 1/20/2016 1:00:13 PM
Subject: FW: PSD modeling guidance
Net impacts - R744_Ascenzi_8_Dec_89.pdf

FYI – I meant to cc you yesterday but got distracted.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Snyder, Erik
Sent: Tuesday, January 19, 2016 9:30 AM
To: Randy Hamilton <randy.hamilton@tceq.texas.gov>
Cc: Kordzi, Stephanie <Kordzi.Stephanie@epa.gov>; Mohr, Ashley <Mohr.Ashley@epa.gov>
Subject: RE: PSD modeling guidance

Hi Randy,

This is older clarification guidance on the issue, but nothing has changed as far as I know.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Mohr, Ashley
Sent: Tuesday, January 19, 2016 9:02 AM
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Cc: Kordzi, Stephanie <Kordzi.Stephanie@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>
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Sent: Wednesday, January 13, 2016 10:12 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Kordzi, Stephanie <Kordzi.Stephanie@epa.gov>

Subject: FW: PSD modeling guidance

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Randy Hamilton, P.E.

Technical Specialist

Air Permits Division

TCEQ
(512) 239-1512

From: Stanko, Elizabeth [mailto:EStanko@trcsolutions.com]
Sent: Monday, December 21, 2015 7:46 AM
To: Randy Hamilton
Cc: Daniel Jamieson; Matthew Kovar
Subject: RE: PSD modeling guidance

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Thanks,

Elizabeth

Elizabeth Stanko C.C.M.
Air Quality Specialist
10550 Richmond Avenue, Suite 210, Houston, TX 77042

T: 713.244.1039 | F: 713.789.5920 | C: 713.829.3852
Email: estanko@trcsolutions.com

LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

From: Randy Hamilton [mailto:randy.hamilton@tceq.texas.gov]
Sent: Tuesday, December 15, 2015 4:24 PM
To: Stanko, Elizabeth <EStanko@trcsolutions.com>
Cc: Daniel Jamieson <daniel.jamieson@tceq.texas.gov>; Matthew Kovar <matthew.kovar@tceq.texas.gov>
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(512) 239-1512

To: Randy Hamilton[randy.hamilton@tceq.texas.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Dianne.Anderson@tceq.texas.gov[Dianne.Anderson@tceq.texas.gov]
From: Snyder, Erik
Sent: Wed 1/20/2016 12:59:52 PM
Subject: RE: PSD modeling guidance

Hi Randy,

I didn't thoroughly comment on all the points she brought up about recent guidance indicating to not take all the 1990 draft literally. Those comments are primarily aimed at how you build a cumulative inventory and not needing to automatically go out to 50 km but use some judgement for these newer standards. Not sure a call is needed but If they want we could have a call but we should loop in your modelers to the discussion. We are having a workshop today and tomorrow, so the soonest we could have a call if needed would be next week.

-Erik

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To: Mohr, Ashley <Mohr.Ashley@epa.gov>
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From: Randy Hamilton
Sent: Tue 1/19/2016 10:03:45 PM
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From: Snyder, Erik
Sent: Tue 1/19/2016 3:29:41 PM
Subject: RE: PSD modeling guidance
Net impacts - R744_Ascenzi_8_Dec_89.pdf

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January 15, 2016

Subject: Panda Sherman Power II LLC Air Quality Analysis Protocol

On November 24, 2015, the Air Dispersion Modeling Team (ADMT) sent comments to the permit reviewer regarding the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for Panda Sherman Power II LLC located near Sherman, Grayson County, Texas, dated November 2015. The applicant submitted a revised protocol with responses to the ADMT comments on December 22, 2015. My comments related to the responses are provided below.

2.6 Secondary Formation of $PM_{2.5}$

Original ADMT Comment: The method for addressing secondary formation of $PM_{2.5}$ is generally acceptable. As noted in the protocol, the proposed SO_2 emissions are less than 40 tpy; therefore, significant secondary $PM_{2.5}$ formation is not expected, which is consistent with EPA guidance.

The protocol notes that EPA's guidance suggests the offset interpollutant trading ratios can be used to estimate total $PM_{2.5}$ secondary emissions. It should be noted that the EPA no longer supports the "preferred" offset ratios in the 2008 final rule without additional technical demonstration specific to the source(s) and area(s) for which the ratios would be applied. The ADMT recommends supplementing this approach by reviewing speciated $PM_{2.5}$ monitoring data from the Kaufman monitor (EPA AIRS monitor 482570005) and showing that the total nitrates are a small fraction of $PM_{2.5}$. In addition, the applicant should consider the potential contribution of secondary $PM_{2.5}$ from the proposed precursor emissions for the project expansion with a comparison to existing regional $PM_{2.5}$ precursor emissions based on TCEQ's 2013 Point Source Emissions Inventory and demonstrate that the precursor emissions from the project are a small percentage of the precursor emissions from the region. A link to TCEQ's 2013 Point Source Emissions Inventory is provided for your convenience:

http://www.tceq.texas.gov/airquality/point-source-ei/psei.html

The protocol notes that the highest 24-hr and annual $PM_{2.5}$ three-year average monitored concentrations are 24.3 $\mu g/m^3$ and 11.5 $\mu g/m^3$, respectively. However, these values do not reflect any of the monitored concentrations reported in Table 4-2 of the protocol. Be sure to be consistent throughout the AQA when providing any demonstration using monitoring data.

Applicant Response: Secondary $PM_{2.5}$ is formed from gaseous emissions of NO_x and SO_2, which undergo chemical reactions or condensation to form fine particulates. Since Panda Sherman II will have SO_2 emissions well below the PSD SER of 40 tpy (23.7 tpy for Siemens, 25.6 tpy for GE, and 22.9 tpy for Mitsubishi), significant secondary $PM_{2.5}$ formation would not be expected from the SO_2 emissions. Panda Sherman II's NO_x emissions of 136.7 tpy for Siemens, 157.6 tpy for GE, and 137.2 tpy for Mitsubishi are all above the NO_x SER of 40 tpy. However, only a portion of the NO_x emissions would be expected to undergo the chemical transformations that would result in the creation of

secondary $PM_{2.5}$. Also, the secondary $PM_{2.5}$ formation occurs gradually over time, as the plume travels downwind while becoming increasingly diffused. The secondary $PM_{2.5}$ resulting from Panda Sherman II emissions of NO_x and SO_2 would be expected to be less than the impacts from the direct PM2.5 emissions of 96.0 tpy for Siemens, 85.9 tpy for GE, and 93.4 tpy for Mitsubishi.

EPA recently finalized guidance for $PM_{2.5}$ permit modeling (EPA, 2014). When the direct $PM_{2.5}$ emissions exceed the SER, and emissions of NO_x and/or SO_2 exceed the SER, it is recommended that both primary $PM_{2.5}$ impacts and secondary impacts of NO_x and/or SO_2 emissions be assessed. Evaluation of the secondary $PM_{2.5}$ impacts may be qualitative, a hybrid of qualitative and quantitative assessments, or a full quantitative photochemical grid modeling exercise. ECT is of the opinion that modeling of secondary $PM_{2.5}$ emissions is not necessary to determine $PM_{2.5}$ precursors from Panda Sherman II would not, together with the primary $PM_{2.5}$ emissions, cause or contribute significantly to a violation of the $PM_{2.5}$ NAAQS. The hybrid qualitative/quantitative approach is suggested to demonstrate compliance with the $PM_{2.5}$ NAAQS and PSD increments. The use of the SILs should be protective of air quality, given the measured regional air quality levels are well below the $PM_{2.5}$ NAAQS. There are a number of $PM_{2.5}$ monitors throughout the Dallas-Fort Worth area. The highest three-year average based on data collected from 2012 through 2014 for any monitoring site is 23.7 micrograms per cubic meter ($\mu g/m^3$) for the 24-hour average and 10.7 $\mu g/m^3$ for the annual average. The addition of the SIL to these values would result in values well below the NAAQS, i.e., 71 percent of the 24-hour NAAQS of 35 $\mu g/m^3$ and 92 percent of the annual average NAAQS of 12 $\mu g/m^3$.

It should be noted that $PM_{2.5}$ air quality is uniform across the region, varying by only 1.7 $\mu g/m^3$ for the 24-hour three-year average and 1.2 $\mu g/m^3$ for the annual three-year average. These monitors are located in areas with more local sources of $PM_{2.5}$ emissions, as well as emissions of secondary $PM_{2.5}$ precursor emissions, than exist in the vicinity of the Panda Sherman II site.

The guidance suggests the offset interpollutant trading ratios can be used to estimate total $PM_{2.5}$ secondary emissions and impacts. The interpollutant trading ratio for NO_x is 1 ton of $PM_{2.5}$ to 200 tons of NO_x in the eastern United States (see Volume 73, page 28339, Federal Register). Texas is one of the states defined as being in the eastern United States.
The national ratio for SO_2 is 40 per EPA's guidance, these ratios will be used to determine a total equivalent $PM_{2.5}$ emissions rate as follows:

Total equivalent $PM_{2.5}$ for Siemens = primary $PM_{2.5}$ + (SO_2 ÷ 40) + (NO_x ÷ 200) =
96.0 + (23.7 ÷ 40) + (132.7 ÷ 200) =
97.26 tpy
Total $PM_{2.5}$ impact ($\mu g/m^3$) = primary $PM_{2.5}$ impact ($\mu g/m^3$) × A
A = total equivalent $PM_{2.5}$ (tpy) ÷ primary $PM_{2.5}$ (tpy) = 97.25 ÷ 96.0 = 1.01

Total equivalent $PM_{2.5}$ for GE = primary $PM_{2.5}$ + (SO_2 ÷ 40) + (NO_x ÷ 200) =
85.9 + (25.6 ÷ 40) + (157.6 ÷ 200) =
87.34 tpy

Total $PM_{2.5}$ impact ($\mu g/m^3$) = primary $PM_{2.5}$ impact ($\mu g/m^3$) × A
A = total equivalent $PM_{2.5}$ (tpy) ÷ primary $PM_{2.5}$ (tpy) = 87.34 ÷ 85.9 = 1.02

Total equivalent $PM_{2.5}$ for Mitsubishi = primary $PM_{2.5}$ + (SO_2 ÷ 40) + (NO_x ÷ 200) =
93.4 + (22.9 ÷ 40) + (137.2 ÷ 200) =
94.66 tpy
Total $PM_{2.5}$ impact ($\mu g/m^3$) = primary $PM_{2.5}$ impact ($\mu g/m^3$) × A
A = total equivalent $PM_{2.5}$ (tpy) ÷ primary $PM_{2.5}$ (tpy) = 94.66 ÷ 93.4 = 1.01

The total NO_x emissions from the proposed project are approximately 132.7 tpy for Siemens, 150.9 tpy for GE, and 137.2 tpy for Mitsubishi, which would equate to 1.01 tpy for Siemens, 1.02 tpy for GE, and 1.01 tpy for Mitsubishi of secondary $PM_{2.5}$ based on the interpollutant trading ratio. The maximum direct potential $PM_{2.5}$ emissions are 96 tpy for Siemens, 85.9 tpy for GE, and 93.4 tpy for Mitsubishi, which are more than 90 times the potential secondary emissions that could be created from the NO_x and SO_2 emissions.

TCEQ's 2013 point source inventory lists the annual precursor emissions for Region 4 as 16,770 tpy of NO_x, 11,664 tpy of SO_2, and 9,988 tpy of VOC. Region 4 includes Collin, Cooke, Dallas, Denton, Ellis, Erath, Fannin, Grayson, Hood, Johnson, Kaufman, Navarro, Palo Pinto, Parker, Rockwell, Tarrant, and Wise counties. Panda Sherman II maximum emissions of NO_x, SO_2, and VOC will be 0.9, 0.2, and 1.6 percent of the regional point source emissions, respectively. Therefore, the contribution of Panda Sherman II to regional $PM_{2.5}$ from precursor emissions is expected to be small in relation to the contribution from existing point source emissions.

It should be noted that the speciated 24-hour $PM_{2.5}$ data from the Kaufman monitor site (ID 482570005) located in Kaufman County measured a maximum value of 3.05 $\mu g/m^3$ of nitrate in 2005, which was 10 percent of the maximum total 24-hour $PM_{2.5}$ value. On average, nitrate concentrations were 3 percent of the $PM_{2.5}$ concentrations. This indicates nitrates may be a relatively small proportion of the $PM_{2.5}$. In more recent 2013 data from the Midlothian air quality monitor (ID 481390016), the maximum nitrate concentration measured 7.4 percent of total $PM_{2.5}$.

The maximum direct $PM_{2.5}$ impact will be added to a conservative background value to show the total impact will be below the standard. Even though the previously promulgated SILs are no longer in effect, this screening procedure should be adequate to show compliance without performing cumulative modeling for the following reasons:

- **Predicted impacts from the direct $PM_{2.5}$ emissions will be well below the SILs developed by EPA.**
- **Based on the interpollutant trading ratios, the impacts from secondary $PM_{2.5}$ should be much less than from the direct $PM_{2.5}$ emissions.**
- **Impacts from the direct $PM_{2.5}$ emissions will be much less than the SILs at distances where Panda Sherman II emissions are expected to form secondary $PM_{2.5}$.**

A figure will be provided showing the predicted $PM_{2.5}$ impacts in relation to existing offsite sources to demonstrate the proposed project emissions should not threaten the NAAQS.

ADMT Response: When comparing regional emissions to the project-related emissions, the revised protocol notes emissions from all counties included in TCEQ Region 4. The ADMT recommends that the applicant limit the inclusion of all counties when determining the regional emissions. Including all counties may be too large of an area to consider for the comparison. The applicant should limit the review of precursor emissions to the project county (Grayson County) or to the project county and those counties that are adjacent to Grayson County.

3.2 Off-Property Sources

Original ADMT Comment: The protocol notes that the project is expected to exceed Class II significant impact levels (SILs) for $PM_{2.5}$. Be sure to follow the guidance in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232, April 2015) to justify the SILs for $PM_{2.5}$. Also note that there is a separate procedure for justifying the SILs for the $PM_{2.5}$ increment. Justification for the SILs for the $PM_{2.5}$ NAAQS and increment demonstrations should be provided prior to submitting the AQA. A link to APDG 6232 is provided for your convenience:

http://www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/airquality-mod-guidelines6232.pdf

The approach to develop the off-property inventory is generally reasonable. The protocol notes that the applicant will update the retrieval based upon permit information available online. The ADMT recommends that the applicant review the retrievals for completeness and accuracy prior to conducting any modeling. In addition, be sure to clearly identify and justify any changes to the retrieval sources.

In addition, if the applicant is aware of data not contained in the retrieval, such as recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide any retrieval files that were obtained from the TCEQ and all supporting materials with the AQA.

The protocol notes that there is no PSD Class II increment associated with the 1-hr NO_2 averaging time and an increment consumption analysis will not be applicable for this pollutant. Please note that there is a PSD Class II increment associated with the annual NO_2 averaging time, which may need to be addressed.

Applicant Response: The project's air quality impacts are expected to exceed the 1-hour NO_2 PSD Class II SIL for all of the proposed CT/HRSG options. The project is also expected to exceed Class II SILs for $PM_{2.5}$ and possibly PM_{10}. Project impacts are expected to be below PSD Class II SILs for all other modeled pollutants and averaging periods. Accordingly, a cumulative multisource assessment of NAAQS attainment will be required for 1-hour NO_2 impacts, and possibly $PM_{2.5}$ and PM_{10}. Because there is no PSD Class II increment associated with the NO_2 1-hour averaging time, an increment consumption analysis will not be applicable for that pollutant. Although there is an annual NO_2

increment, it is unlikely the project's impacts will exceed the annual SIL. An offsite emissions source inventory will be developed. Emissions information will be requested from TCEQ and supplemented by information obtained from permits information available online. At this time, a file review is not believed to be necessary.

Appendix A in the TCEQ's Air Quality Modeling Guidance (APDG 6232, April 2015) was followed to justify using SILs for both $PM_{2.5}$ NAAQS and PSD increment analyses. As explained in Section 4.3.2, background will be based on the highest values determined at the regional $PM_{2.5}$ monitoring sites. The highest three-year average of 98th percentile 24-hour values was 23.7 µg/m^3, and the highest three-year average of the annual averages was 10.7 µg/m^3. The 24-hour and annual $PM_{2.5}$ SILs are 1.2 and 0.3 µg/m^3, respectively. The difference between NAAQS and background $PM_{2.5}$ concentrations was determined to be greater than the SILs. Therefore, it can be concluded the $PM_{2.5}$ SILs are a reasonable measure of significant impact, i.e., if the Panda Sherman Generation facility's impacts are below SILs, the project will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS.

For the PSD $PM_{2.5}$ increment analysis, the justification analysis is somewhat different. The major source baseline date is October 20, 2010. Comparing annual and 1st and 2nd high 24-hour concentrations measured in the baseline and prior year to the present day measurements will indicate if any degradation of air quality has occurred since the baseline date. If the difference between the PSD increment and the difference in ambient background concentrations between current and prior years is greater than the SIL, the SIL can be used as a reasonable indicator of significant impact. For the time period between 2014 and 2009/2010, the difference was determined to be greater than the SIL (see Table 3-7.). Therefore, it can be concluded the Panda Sherman Generation facility will not cause nor contribute to a violation of the $PM_{2.5}$ PSD increment if its predicted impacts are less than the SILs.

The preliminary conclusions of project impacts will be discussed and fully documented in the air quality impact analysis.

ADMT Response: The demonstration for justifying the $PM_{2.5}$ SILs for the NAAQS is appropriate. The demonstration for justifying the $PM_{2.5}$ SILs for the increment is generally reasonable. In addition to the information provided, the ADMT recommends that the applicant address the types and amounts of increment-affecting sources around the monitors compared to the project site.

4.2 NO_2 Ambient Impact Analysis

Original ADMT Comment: The protocol notes that the NO_2 concentrations will be determined using the Tier 2 ambient ratio method and a NO_2-to-NO_x ratio of 0.8. It should be noted that the NO_2-to-NO_x ratio of 0.8 applies to the 1-hr averaging time, while a NO_2-to-NO_x ratio of 0.75 applies to the annual averaging time.

The protocol notes that the emissions from the emergency engines will be annualized. The ADMT interprets this to mean that EPA's intermittent guidance will be applied to these sources

for the 1-hr NO_2 modeling. It is not clear from the information provided in the protocol that the emergency equipment qualifies as intermittent sources. Information such as the number of engines, the number of times per day, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA. Also note that the intermittent guidance only applies to the 1-hr NO_2 and 1-hr SO_2 NAAQS demonstrations. It should not be used for any other pollutant or averaging time, including the SO_2 State Property Line analysis.

Applicant Response: On January 22, 2010, EPA promulgated a new hourly NO_2 standard of 100 ppb (188 µg/m^3 [highest eighth-highest]) based on the three-year average of the 98th percentile (i.e., highest, eighth-highest) of the annual distribution of daily maximum 1-hour concentrations. The final rule for the new hourly NAAQS was published in the Federal Register on February 9, 2010, and the standard became effective on April 12, 2010.

Emissions of NO_x from combustion sources consist of nitric oxide and NO_2. At stack exit conditions, the primary species is nitric oxide, which typically comprises 90 percent or more of total NO_x.

AERMOD includes three options for estimating NO_2 impacts:

- **Tier 1 - Assumes complete (i.e., 100-percent) conversion of nitric oxide to NO_2.**
- **Tier 2 - Ambient ratio method, which represents the average ambient NO_2/NO_x ratio. Current EPA guidance recommends using a ratio of 0.80 for the 1-hour concentrations and 0.75 for the annual concentrations.**
- **Tier 3 - Incorporates use of either the ozone-limiting method or plume molar volume ratio method in the analysis.**

The Tier 1 option is an AERMOD regulatory default option that may be used without additional regulatory agency approval. The Tier 2 option has been historically accepted for regulatory modeling applications using an average ambient NO_2/NO_x ratio of 0.75 for annual concentrations. In accordance with EPA's March 1, 2011, guidance, Tier 2 will be accepted for regulatory modeling applications if the EPA recommended average ambient NO_2/NO_x ratio of 0.80 is used for the 1-hour concentrations.

The two Tier 3 options are nonregulatory options within AERMOD and, therefore, require justification and regulatory agency approval. For the project 1-hour NO_2 modeling, preliminary modeling indicates use of the Tier 2 procedures will result in acceptable impacts; therefore, use of the Tier 3 procedures are not anticipated at this time. In the event Tier 3 modeling becomes necessary, the project modeling protocol will be amended to describe the proposed Tier 3 options for agency review and approval.

The 1-hour NO_2 modeling analysis will be conducted in accordance with current EPA modeling guidance, including the March 1, 2011, memorandum entitled Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour

NO_2 NAAQS. Specifically, the following guidance from that memorandum will be incorporated into the modeling:

- **The NO_2 concentrations will be determined using the Tier 2 ambient ratio method and an NO_2-to-NO_x ratio of 0.8 for the 1-hour concentration.**
- **The scheduled maintenance hours for the emergency engines will be included in the 1-hour NO_2 modeling. Although the engines will be restricted to 100 hr/yr of nonemergency use, the emissions will be annualized based on 500-hr/yr assumed operation. The scheduled maintenance is expected to occur for one hour or less per day and for one day or less per week.**
- **The interim SIL will be compared to the multiyear (i.e., five-year) average of the highest 1-hour values at all receptors to identify receptors where the new project could have a significant contribution.**

ADMT Response: It is still not clear from the information provided in the revised protocol that the emergency equipment qualifies as intermittent sources. Information such as the number of engines, the number of times per day, the duration for each event, and whether there are simultaneous operations with other sources should be provided in the AQA. If this information is not provided or does not meet the criteria for intermittent sources once submitted, then revised modeling may be required.

7.0 Receptor Grids

Original ADMT Comment: The protocol notes that significant receptors will be used in the cumulative impact analyses. Be aware that justification will need to be provided for limiting the receptors to significant receptors in regard to the $PM_{2.5}$ modeling demonstrations. As stated above, this can be accomplished by following the guidance in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232, April 2015). Also note that there is a separate procedure for justifying the SILs for the $PM_{2.5}$ increment. Justification for the SILs for the $PM_{2.5}$ NAAQS and increment demonstrations should be provided prior to submitting the AQA.

However, since there are not any monitors near the project site, it is unlikely that justification for using the $PM_{2.5}$ SILs for the increment analysis can be provided. Yet the PSD increment analysis could be limited to significant receptors provided that the magnitude and location of the increment affecting emissions are evaluated relative to the proposed project. If nearby increment affecting emissions are small and distant relative to the project site, then a case could be made for limiting the analysis to the significant receptors.

Applicant Response: Receptors will be placed at locations considered to be ambient air, which is defined as "that portion of the atmosphere, external to buildings, to which the general public has access." The entire perimeter of the project site will be fenced. Therefore, the nearest locations of general public access will be at the project fence line.

Consistent with GAQM and TCEQ guidance, the project ambient impact analysis will use the following receptor grids:

- **Fence Line Receptors—Receptors placed on the project fence line spaced 25 meters apart.**
- **Close-in Receptors—Receptors placed at 25 meter spacing to a distance of 200 meters from the modeled sources.**
- **Near-Field Cartesian Receptors—Receptors at 100-meter spacing starting 200 meters from the project fence line receptors and extending to approximately 2,000 meters.**
- **Mid-Field Cartesian Receptors—Receptors at 500-meter spacings starting at 2,500 meters and extending to approximately 5,000 meters.**
- **Far-Field Cartesian Receptors—Receptors at 1,000-meter spacings starting at 5,000 meters and extending out to 50,000 meters.**

Receptor grids used for the ambient impact analysis will be refined following preliminary modeling, as necessary, to ensure the highest ambient impacts for each pollutant and averaging period have been identified using a receptor spacing of no more than 100 meters.

For cumulative modeling analyses, receptor grids will consist of only those receptors that exceeded a PSD Class II SIL for a specific pollutant and averaging period. These grids will include any receptor for which a concentration was modeled equal to or greater than a SIL for any averaging period/year(s) of meteorological data. The NO_2 1-hour interim SIL will be compared to the five-year average of the highest daily 1-hour concentrations at each receptor.

The $PM_{2.5}$ SILs and significant monitoring concentrations promulgated in 40 CFR 52 have been recently vacated by the court. However, there are several reasons to use the previous SILs to justify not performing cumulative modeling:

- **Regional $PM_{2.5}$ monitoring shows levels well below NAAQS.**
- **Modeled $PM_{2.5}$ impacts from the project should be well below the previously established SILs, except locations near the project fence line.**
- **Modeled $PM_{2.5}$ impacts from the project should be well below the $PM_{2.5}$ increment.**
- **Modeled concentrations from the project when added to background values derived from regional monitoring will be well below NAAQS.**

Section 3.2 of this document contains the quantitative assessment to justify use of $PM_{2.5}$ SILs for NAAQS and the PSD increment analyses.

ADMT Response: As noted above, the demonstration for justifying the $PM_{2.5}$ SILs for the increment is generally reasonable. In addition to the information provided, the ADMT recommends that the applicant address the types and amounts of increment-affecting sources around the monitors compared to the project site. This information would also satisfy the request from the original ADMT comment to limit the demonstration to significant receptors provided that the magnitude and location of the increment affecting emissions are evaluated relative to the proposed project. If nearby increment affecting emissions are small and distant

relative to the project site, then a case could be made for limiting the analysis to the significant receptors.

Deliverables – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Justin Cherry at (512) 239-0955 or by fax at (512) 239-1400, or by email at justin.cherry@tceq.texas.gov.

To: vennetta.hayes@la.gov[vennetta.hayes@la.gov]; Snyder, Erik[snyder.erik@epa.gov]; Daniel Menendez[daniel.menendez@tceq.texas.gov]; Daniel Jamieson[daniel.jamieson@tceq.texas.gov]; Zarena Post[zarena.post@tceq.texas.gov]; Jeff Stonesifer[jstonesifer@cabq.gov]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Peters[eric.peters@state.nm.us]; Gi-Dong[gi-dong.kim@state.nm.us]; Eric Milligan[Eric.Milligan@deq.ok.gov]; Lee Warden[lee.warden@DEQ.OK.gov]; Thomas Rheaume[rheaume@adeq.state.ar.us]; Nguyen, Tien[Nguyen.Tien@epa.gov]; Yvette Olmos[Yvette.Olmos@LA.GOV]; Smith, Jim[Smith.Jim@epa.gov]; Clark, David[CLARKD@adeq.state.ar.us]; Mark McCorkle (MAC@adeq.state.ar.us)[MAC@adeq.state.ar.us]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Ron Thomas
Sent: Wed 1/13/2016 6:12:01 PM
Subject: RE: R6 Modeling workshop

There weren't any available last week either.

TCEQ is registered at the Hotel Indigo, about 7 blocks from the EPA bldg.

From: Vennetta Hayes [mailto:Vennetta.Hayes@LA.GOV]
Sent: Wednesday, January 13, 2016 10:35 AM
To: 'Snyder, Erik'; Daniel Menendez; Daniel Jamieson; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; Nguyen, Tien; Yvette Olmos; Smith, Jim; Clark, David; Mark McCorkle (MAC@adeq.state.ar.us)
Cc: Mohr, Ashley; Feldman, Michael; Donaldson, Guy
Subject: RE: R6 Modeling workshop

There are no rooms available at the government rate at Springhill or the nearby Crowne Plaza. Are there other hotels nearby?

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Tuesday, January 05, 2016 12:51 PM
To: Daniel Menendez; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; Vennetta Hayes; Nguyen, Tien; Yvette Olmos; Smith, Jim; Clark, David; Mark McCorkle (MAC@adeq.state.ar.us)
Cc: Mohr, Ashley; Feldman, Michael; Donaldson, Guy
Subject: R6 Modeling workshop

Hi,

Wanted to confirm the dates of the 20th and 21st. We will be on the 12th floor and everyone will have to check in on 7th floor to get a temporary badge (same procedure as 2013 R/S/L). There is a marriott Springhill suites in the west end that people stayed at in 2013 that is about 4 blocks from the office (I have not reserved a block of rooms). Depending on when people will get into town we can either start around 8:30 on the 20th, or 10 if some people are traveling early morning. We will probably wrap at 3 or 4 on Thursday at the latest. Please send me topics areas you want to cover. I am working off the structure/topics of the R5 workshop as that seemed to go pretty well for them. I will adjust this agenda, but please provide input if there are areas you don't see that you want to cover, etc.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Snyder, Erik
Sent: Wednesday, December 16, 2015 2:28 PM
To: 'Daniel Menendez'; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; 'vennetta.hayes@la.gov'; Nguyen, Tien; Yvette Olmos; Smith, Jim; 'Clark, David'; Mark McCorkle (MAC@adeq.state.ar.us)
Cc: Mohr, Ashley; Feldman, Michael
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi,

Making another run at this. I have locked down conference rooms here at the Region for January 20-21st to have a permit modeling workshop with most of the focus on SO2 modeling for CD and DRR sources. Looking at having James Thurman down from RTP and then some others by

teleconference or video. Would be 1.5 to two days. I know we are getting towards the holidays but if you can let Ashley and I know if these dates would work by the end of this week, we can make sure James can get his travel done. I am going to be out of pocket for the rest of this week but please follow up with Ashley on any questions.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Tuesday, September 22, 2015 10:31 AM
To: Snyder, Erik
Cc: Ron Thomas
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi Erik,

Any updates on potential Region 6 modeling meeting?

Thanks,

Daniel

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, August 19, 2015 11:16 AM
To: Daniel Menendez; Daniel Jamieson; Dominic Ruggeri; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; vennetta.hayes@la.gov; Tien Nguyen; Yvette Olmos; Jim Smith
Cc: Mohr, Ashley; Feldman, Michael; Robinson, Jeffrey; Donaldson, Guy
Subject: Potential R6 Modeling workshop in Dallas in early November

Hi,

We haven't had a Region 6 modelers workshop in Dallas in a while. With the final DRR and proposed changes in App. W, thought it might be a good time to have a meeting here in Dallas. I am not planning on discussing photochemical issues other than maybe secondary pollutant analysis for permits. The main focus would be modeling for the SO2 sources as part of the SO2 Phase 3 and 4 designations process (either modeling directly or modeling for monitor locations around a facility). We could also discuss other issues if there is interest. I was thinking some discussion on ozone and PM2.5 impacts from single source for permitting might and what sources should be included in cumulative analysis are two topics that might also be beneficial. At this time I am targeting the first week in November (11/2-11/5) as possible date(s). Would only plan for 1 or two days within this period but we have locked meeting space for M-R currently. I think we will be able to get one or two people from OAQPS that week to come to Dallas (James Thurman and/or George Bridgers most likely). They are available for travel and this would be after the close of the proposed changes to App. W, so we could talk about any of the proposed changes.

Please let me know your interest and availability (if this week works and if M-T, T-W or W-R is best). Also any ideas for specific topics/issues.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Snyder, Erik[snyder.erik@epa.gov]; Daniel Menendez[daniel.menendez@tceq.texas.gov]; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us)[Daniel.Jamieson@tceq.state.tx.us]; Ron Thomas[Ron.Thomas@tceq.texas.gov]; Zarena Post[ZPost@tceq.texas.gov]; Jeff Stonesifer[jstonesifer@cabq.gov]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Peters[eric.peters@state.nm.us]; Gi-Dong[gi-dong.kim@state.nm.us]; Eric Milligan[Eric.Milligan@deq.ok.gov]; Lee Warden[lee.warden@DEQ.OK.gov]; Thomas Rheaume[rheaume@adeq.state.ar.us]; Nguyen, Tien[Nguyen.Tien@epa.gov]; Yvette Olmos[Yvette.Olmos@LA.GOV]; Smith, Jim[Smith.Jim@epa.gov]; Clark, David[CLARKD@adeq.state.ar.us]; Mark McCorkle (MAC@adeq.state.ar.us)[MAC@adeq.state.ar.us]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Vennetta Hayes
Sent: Wed 1/13/2016 4:35:05 PM
Subject: RE: R6 Modeling workshop

There are no rooms available at the government rate at Springhill or the nearby Crowne Plaza. Are there other hotels nearby?

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Tuesday, January 05, 2016 12:51 PM
To: Daniel Menendez; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; Vennetta Hayes; Nguyen, Tien; Yvette Olmos; Smith, Jim; Clark, David; Mark McCorkle (MAC@adeq.state.ar.us)
Cc: Mohr, Ashley; Feldman, Michael; Donaldson, Guy
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Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Snyder, Erik
Sent: Wednesday, December 16, 2015 2:28 PM
To: 'Daniel Menendez'; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; 'vennetta.hayes@la.gov'; Nguyen, Tien; Yvette Olmos; Smith, Jim; 'Clark, David'; Mark McCorkle (MAC@adeq.state.ar.us)
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email: snyder.erik@epa.gov

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]
From: Randy Hamilton
Sent: Wed 1/13/2016 4:11:57 PM
Subject: FW: PSD modeling guidance

Ashley,

I was hoping you might be able to provide some insight into the basis for modeling the "net increase" instead of the "project" in the PSD rules. The below emails provide some background on the question. The PSD rules at 40 CFR 52.21(m) require an analysis of the air quality in the area that the major modification would affect for each pollutant with a significant net emissions increase. This doesn't explicitly say that the significant net emissions increase must be evaluated, but it could be read as an implication.

In the 12/31/2002 NSR Reform rulemaking, EPA added the clarification of what triggers PSD by introducing the term "project" in 52.21(a)(2)(iv)(*a*), while at the same time, they didn't introduce the term "project" in 52.21(m).

Do you know of any more modern explicit references than the 1990 NSR manual? I agree with Liz that something so basic should be carried forward, such as when TCEQ finalized our updated modeling guidance last year.

Thanks for the attention,

Sincerely,

Randy Hamilton, P.E.

Technical Specialist

Air Permits Division

TCEQ

(512) 239-1512

From: Stanko, Elizabeth [mailto:EStanko@trcsolutions.com]
Sent: Monday, December 21, 2015 7:46 AM
To: Randy Hamilton
Cc: Daniel Jamieson; Matthew Kovar
Subject: RE: PSD modeling guidance

Randy,

Thank you for your guidance on this project. Once we receive the modeling protocol comments, perhaps we can to setup a modeling protocol meeting to discuss. I would like to open up some dialogue regarding use of the Draft 1990 New Source Review (NSR) Workshop manual for modeling guidance.

Based on recent permit modeling experiences under new short-term NAAQS for SO2 and NO2, and also the PM2.5 standards (24-hour and annual NAAQS) the EPA has issued a number of clarification memoranda since 2010 that were intended to provide clarification regarding PSD modeling for these new standards. The Draft NSR Workshop document makes no mention of 1-hour NO2 or the PM2.5 standards.

It should be recognized that the EPA proposed revisions to the Guideline on Air Quality Models (CFR Title 40, Part 51, Appendix W) preamble states that modeling should not rely on the Draft NSR Workshop document for these types of evaluations. The proposed rule document states: The EPA has specifically cautioned against the literal and uncritical application of very prescriptive procedures for conducting NAAQS and PSD modeling compliance demonstrations as described in chapter C of the draft NSR Workshop Manual.

Additionally as you pointed out, the 2015 TCEQ AQMG guidance document doesn't specify for a PSD modification, model contemporaneous emissions increases and decreases.

Given more recent guidance for the new NAAQS, the procedures outlined in chapter C of EPA's Draft 1990 NSR Workshop Manual perhaps should only be applicable to the NAAQS listed in Table C-1 of the NSR Workshop Manual. These are my initial thoughts and again, would like to discuss further with you and the TCEQ ADMT.

Thanks,

Elizabeth

Elizabeth Stanko C.C.M.

Air Quality Specialist

10550 Richmond Avenue, Suite 210, Houston, TX 77042

T: 713.244.1039 | F: 713.789.5920 | C: 713.829.3852
Email: estanko@trcsolutions.com

LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

From: Randy Hamilton [mailto:randy.hamilton@tceq.texas.gov]
Sent: Tuesday, December 15, 2015 4:24 PM
To: Stanko, Elizabeth <EStanko@trcsolutions.com>
Cc: Daniel Jamieson <daniel.jamieson@tceq.texas.gov>; Matthew Kovar <matthew.kovar@tceq.texas.gov>
Subject: PSD modeling guidance

Elizabeth,

The EPA's 1990 NSR Workshop Manual has an Appendix C on PSD modeling guidance. Middle of page C-30 says the AOI modeling includes contemporaneous increases and decreases. I had even highlighted this, many years ago, but long since forgotten. Like much of PSD, it's not intuitive, but isn't entirely illogical.

I looked at our new guidance document and it looks like we leave out what may be a key difference between minor/state and major/PSD modeling – whether you model the project alone or the net changes. At least on page 20 under PSD modeling step one, the first bullet doesn't say for a PSD modification, model contemporaneous emissions increases and decreases, with decreases input as negative emissions in the model.

When I saw Craig Eckberg, et.al. on a field trip to Cedar Bayou in July, I mentioned that I thought LAER was 5 ppm NOx for the stand-alone boilers. If that bears out, it could also be a way of reducing NO2 impacts, if that's important. I will need to dive back into this project and try to raise all questions in writing soon.

Sincerely,

Randy Hamilton

TCEQ Air Permits Division

(512) 239-1512

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Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Milligan, Eric
Sent: Tue 1/5/2016 6:54:18 PM
Subject: RE: R6 Modeling workshop

We will probably travel that morning so 10 is better for us.

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Tuesday, January 05, 2016 12:51 PM
To: Daniel Menendez; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Milligan, Eric; Warden, Lee; Thomas Rheaume; vennetta.hayes@la.gov; Nguyen, Tien; Yvette Olmos; Smith, Jim; Clark, David; Mark McCorkle (MAC@adeq.state.ar.us)
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From: Snyder, Erik
Sent: Tue 1/5/2016 6:50:55 PM
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0-Mtg-AGENDA_2015_V4.docx

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October 30, 2015

Mr. Randy Hamilton, P.E.
Office of Air, Air Permits Division
Texas Commission on Environmental Quality (TCEQ)
12100 Park 35 Circle, MC-163
Austin, Texas 78753

Subject: PSD Air Quality Analysis (AQA) Modeling Protocol
Permit Nos. 123117, N204, and PSD-TX-1460
NRG Texas Power LLC
Chocolate Bayou Steam Generating Station
Brazoria County, Texas
Regulated Entity Number: RN100238708
Customer Number: CN603207218

Dear Mr. Hamilton:

On behalf of NRG Texas Power LLC (NRG Texas), TRC Environmental Corporation (TRC) respectfully submits the attached Modeling Protocol in support of an Air Quality Analysis (AQA) to be performed for the subject permit application for construction of a Steam Generating Station in Brazoria County, Texas.

Should you have any questions or require additional information, please feel free to contact me at estanko@trcsolutions.com or (713) 244-1039.

Sincerely,

TRC Environmental Corporation

Elizabeth Stanko
Air Quality Specialist

Attachments

cc: Mr. Craig Eckberg, Director, Environmental, NRG Texas Power LLC
Mr. Jeff Robinson, Chief, Air Permits Section, USEPA Region 6 (electronic submittal)
Mr. Andy Goodridge, Air Section Manager, TCEQ, Region 12 – Houston
Ms. Karen Carroll, Director, Environmental Health, Brazoria County Health Department
Mr. Bruce Broberg, PE, TRC Environmental Corporation, Houston, TX

P:\NRG ENERGY\231136.0000_BRAZORIA INEOS PROJECT\MODELING\PROTOCOL\COVER LETTER.DOCX

Modeling Protocol in Support of an Air Quality Analysis

TCEQ Air Permit No. 123117, N204, and PSD-TX-1460

Chocolate Bayou Steam Generating Station

Alvin, Brazoria County, Texas

October 2015

Prepared For
NRG Texas Power, LLC

10550 Richmond Avenue, Suite 210, Houston, Texas 77042 ● 713.244.1000 Phone ● 713.789.5920 Fax ● www.TRCsolutions.com

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List of Commonly Used Acronyms

μg	Microgram
μm	Micrometer
ACGIH	American Conference of Governmental Industrial Hygienists
Acute REL	Acute reference exposure level
ADMT	Air Dispersion Modeling Team (TCEQ)
AEFA	Average emission factor approach
AEGL	Acute inhalation exposure guidelines
AERMAP	AERMOD terrain pre-processor program
AERMET	AERMOD meteorological processor program
AERMINUTE	AERMET pre-processor program for formatting 1 minute ASOS data
AERMOD	American Meteorological Society/EPA Regulatory Model
AERSURFACE	AERMET pre-processor for calculating surface characteristics
AIEC	Acute inhalation exposure criteria
AIHA	American Industrial Hygiene Association
AMS	American Meteorological Society
AOI	Area of impact
APAD	Air Permits Allowable Database (TCEQ)
APCD	Air pollution control device
APCS	Air pollution control system
AQA	Air quality analysis
AQMG	Air Quality Modeling Guidelines (TCEQ)
AQRV	Air quality related value
ARE	Acute reference exposure
ARM	Ambient ratio method
ASL	Above sea level
ASOS	Automated surface observing system
ASTM	American Society for Testing and Materials
atm	Atmosphere
ATSDR	Agency for Toxic Substances and Disease Registry
AUS	Austin-Bergstrom International Airport
AVO	Audio/visual/olfactory

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BACT	Best Available Control Technology
BAF	Bioaccumulation factor
BCF	Bioconcentration factor
BIF	Boiler and industrial furnace
BPIP	Building profile input program
BPIPPRM	Building profile input program for the PRIME downwash program
Btu	British thermal unit
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAS	Chemical Abstracts Service
CCS	Carbon capture and storage
CD	Compact disk (computer)
CFR	Code of Federal Regulations
cm	Centimeters
CO	Carbon monoxide
CO_2	Carbon dioxide
COPC	Compound of potential concern
CTG	Combustion turbine generator
CWA	Clean Water Act
DB	Duct burner
DEM	Digital elevation model
dL	Decaliter
DOE	Department of Energy
DRE	Destruction and removal efficiency
EPACA	U.S. Environmental Protection Agency Correlation Approach
EPN	Emission point number
EQL	Estimated quantitation limit
ERPG	Emergency response planning guidelines
ESL	Effects screening level
F	Fahrenheit (degrees)
FIP	Federal Implementation Plan
FLAG	FLM air quality related values work group
FLM	Federal land manager
Ft	Feet

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FW	Fresh weight (or whole/wet weight) of plant or animal tissue
g	Grams
GAQM	Guideline to Air Quality Models
GC	Gas chromatography
GE	General Electric
GEP	Good engineering practice
GHG	Greenhouse gas
GLC_{MAX}	Maximum predicted ground level concentration
GLC_{NI}	Maximum predicted ground level concentration at non-industrial receptor
GT	Gas turbine
H1H	High first (1) high, conversely H2H is High second high
H_2O	Water
H_2SO_4	Sulfuric acid mist
H3TD	Hierarchy of Human Health Toxicity Data
HAP	Hazardous Air Pollutant
HEAST	Health Effects Assessment Summary Tables
HHV	Higher heating value
HI	Hazard index
HP	High pressure
HQ	Hazard quotient
HRSG	Heat Recovery Steam Generator
IDL	Instrument detection limit
IRIS	Integrated Risk Information System
K	Kelvin (degrees)
kg	Kilogram
Km	Kilometers
kW	Kilowatt
L	Liter
LAER	Lowest Achievable Emission Rate
lb	Pound
lb/hr	Pounds per hour
lb/MMBtu	Pounds per million British thermal units
LCD	Local climatological data annual summary with comparative data
LP	Low pressure

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m	Meters
m/s	Meters per second
MACT	Maximum Achievable Control Technology
MDL	Method detection limit
MERA	Modeling and effects review applicability
mg	Milligram
Mg	Megagram
MJ	Megajoule
mL	Milliliter
MMBtu/hr	Million British thermal units per hour
MPRM	Meteorological processor for regulatory models
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NACAA	National Association of Clean Air Agencies
NAD83	North American Datum of 1983
NCDC	National Climatic Data Center
NCEA	National Center for Environmental Assessment
NED	National elevation dataset
NH_3	Ammonia
NIOSH	National Institute of Occupational Safety and Health
NNSR	Nonattainment New Source Review
NO_X	Nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
NTIS	National Institute of Standards and Technology
NWS	National Weather Service
O_2	Oxygen
OAQPS	Office of Air Quality Planning and Standards
OEHHA	Office of Environmental Health Hazard Assessment
OLM	Ozone limiting method
ORD	Office of Research and Development
OSHA	U.S. Occupational Safety and Health Administration
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response

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Pb	Lead
PCRAMMET	PC version of the meteorological preprocessor for the old RAM program
PDF	Probability density function
pg	Picogram
PIC	Product of incomplete combustion
PM	Particulate matter
PM_{10}	Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in diameter
PNG	Pipeline natural gas
ppb	Parts per billion
ppm	Parts per million
ppmv	Parts per million by volume
Ppmvd	Parts per million by volume, dry basis
ppt	Parts per trillion
PSD	Prevention of Significant Deterioration
PTE	Potential to emit
PVMRM	Plume Volume Molar Ratio Method
QA	Quality assurance
QAPjP	Quality assurance project plan
QC	Quality control
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
RCRA	Resource Conservation and Recovery Act
RfC	Reference concentration
RfD	Reference dose
RME	Reasonable maximum exposure
RN	Regulated Entity Reference Number (TCEQ)
ROI	Radius of impact
RPF	Relative potency factor
RTDM	Rough terrain diffusion model
s	Second
SAMSON	Solar and Meteorological Surface Observational Network
SAR	South Austin Regional
Scf	Standard cubic feet

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SCR	Selective Catalytic Reduction
SCRAM	Support Center for Regulatory Air Models
SER	Significant Emission Rate
SIA	Significant impact area
SIL	Significant impact level
SIP	State Implementation Plan
SO_2	Sulfur dioxide
STG	Steam Turbine Generator
SVOC	Semivolatile organic compound
TAMIS	Texas Air Monitoring Information System
TARA	Toxicology and risk assessment
TCEQ	Texas Commission on Environmental Quality
TEELs	Temporary emergency exposure limits
TEF	Toxicity equivalent factor
TEQ	Toxicity equivalent quotient
TG	Terrain grid
TIC	Tentatively identified compound
TLV	Threshold limit value
TOC	Total organic carbon
TOE	Total organic emissions
tpy	Tons per year
TTN	Technology transfer network
TWA	Time-weighted average
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile organic compounds

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Section 1
Introduction

NRG Texas Power, LLC (NRG Texas) proposes to construct a Steam Generating Station at an existing chemical plant in the Chocolate Bayou area near Alvin, Brazoria County, Texas. NRG Texas submitted a revised application for a Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) air quality permit to authorize the construction of a new Combined Heat and Power (CHP) Plant to be a support facility for an existing chemical plant in Brazoria County. The NRG Texas CHP plant will be co-located with a chemical manufacturing plant to provide steam and electricity to the chemical plant, which is owned and operated by INEOS USA LLC (INEOS) operating under a Regulated Entity Number (RN) of RN100238708. The location of the INEOS and NRG Texas Chocolate Bayou site is illustrated in Figure 1-1.

The proposed Chocolate Bayou Steam Generating Station (CBSGS) will consist of two General Electric (GE) LM6000 natural gas-fired combustion turbines each exhausting to heat recovery steam generators (HRSG) with natural gas-fired duct burners, and three auxiliary boilers. The three auxiliary boilers will be fired with natural gas and composite fuels, which are comprised of process gas provided by the steam host, INEOS. Fuel burned in the combustion turbines and duct burners would be limited to pipeline natural gas (PNG). Each combustion turbine has a maximum electric power output of approximately 50 megawatts (MW).

Since the NRG Texas CHP Plant will be a support facility for the adjoining INEOS Plant, the proposed project is a major modification of an existing stationary source, and CHP Plant and INEOS Plant will be considered one existing major stationary source for PSD applicability purposes. The combined project will trigger PSD review for nitrogen oxides (NO_X), volatile organic compounds (VOC), carbon monoxide (CO), particulate matter (PM), particulate matter with diameters of 10 microns or less (PM_{10}), particulate matter with diameters of 2.5 microns or less ($PM_{2.5}$), and Greenhouse Gas (GHG) emissions. The combined project will trigger NNSR for VOC and NO_X emissions.

Air emissions from the project are subject to the jurisdiction of both the U.S. Environmental Protection Agency (USEPA) and the Texas Commission on Environmental Quality (TCEQ). This PSD Air Quality Analysis (AQA) Protocol is being submitted in support of this permitting action to address the proposed modeling methodologies that will be used to demonstrate that the air emissions associated with this project will not cause or contribute to a violation of any

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applicable National Ambient Air Quality Standards (NAAQS) or PSD Increments, nor cause any adverse human health or welfare effects, and to provide an assessment of the project's effect on the overall environment.

The modeling methodologies presented in this protocol are consistent with current TCEQ and USEPA guidelines. The results of the air dispersion analyses will be prepared in accordance with the *Guideline on Air Quality Models (Revised)*, the TCEQ *Air Quality Modeling Guidelines (AQMG)*, and the July 2009 TCEQ Modeling Effects and Review Applicability (MERA) guidance package.[1,2,3]

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[1] Code of Federal Regulations, Title 40–Protection of Environment, Part 51, Appendix W, July 1, 2010.

[2] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2, Air Permits Division, Austin, TX, April 2015.

[3] TCEQ, *Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits*, APDG 5874v3, July 2009.

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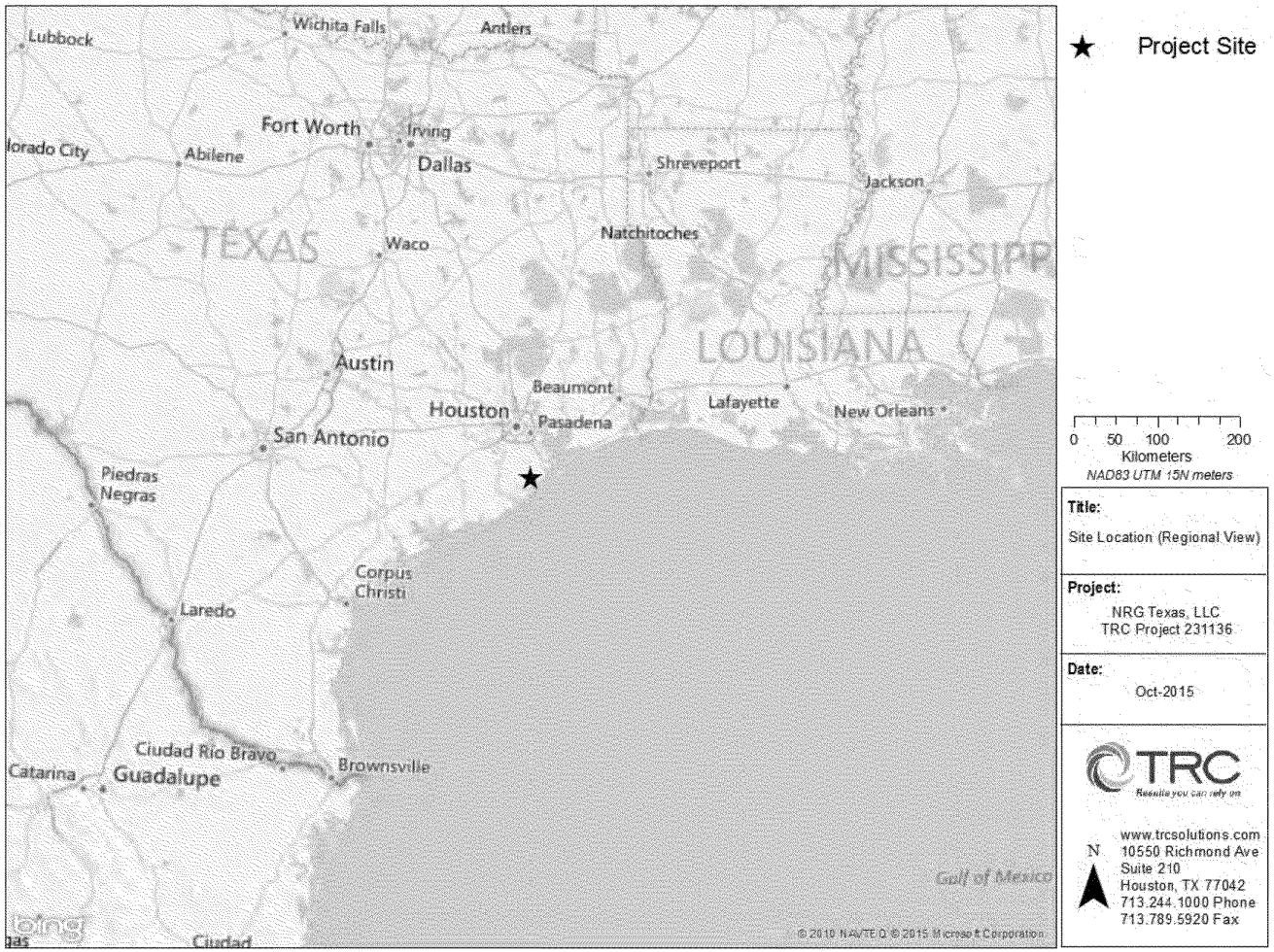
Figure 1-1 Location of the Project Site (Regional View)



Section 2
Project Overview

This PSD AQA Protocol is being submitted in support of the initial permit application dated August 2014 and technical supplement to TCEQ Permit No. 123117 and Nonattainment Permit N204 submitted in May 2015. This section presents a summary of the pollutants to be evaluated and outlines the general dispersion modeling approach and screening techniques used for this analysis.

2.1 Type of Permit Review

In accordance with Title 30 Texas Administrative Code (30 TAC) §116.111(a)(2)(J), an air quality impacts analysis in the form of an atmospheric dispersion modeling study will be prepared in support of the NRG Texas CBSGS permit application. The project triggers PSD permitting thresholds and will therefore consist of the following analyses:

- PSD NAAQS and Increment Analysis;
- PSD Monitoring Analysis; and
- PSD Additional Impacts Analyses.

In addition to the PSD analyses, the following State analyses will be performed:

- State NAAQS Analysis for sulfur dioxide (SO_2);
- State Health Effects Analysis; and
- State Property Line.

For the State analyses, a Toxicology Division (TD) review and State Health Effects Analysis will be performed for the projected increases of ammonia (NH_3), speciated VOCs, and diesel fuel particulates (PM_{10}). Additionally, a State Property Line analysis will be performed for sulfur compounds. A State Disaster Review and Resource Conservation Recovery Act (RCRA) Boiler and Industrial Furnace (BIF) are not applicable. Further, the NRG Texas CBSGS is not located within 300 kilometers (km) of a Class I area; therefore, a Class I analysis is not applicable.

NRG Texas submitted a revised application to authorize the construction of the CBSGS at an existing chemical plant in Brazoria County. The revised application included a PSD significant emission rate evaluation for all PSD pollutants emitted from the new CHP Plant. The complete federal applicability discussion for the permit can be found in the application.

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NRG Texas is located in Brazoria County, which is classified as an "attainment" or "unclassifiable" county for all criteria pollutants except ozone. Brazoria County is designated as a marginal nonattainment area for ozone per the 2008 eight-hour ozone standard, and a severe nonattainment area for ozone per the 1997 eight-hour ozone standard. Attainment classification based on the recently (October 1, 2015) finalized 2015 eight-hour ozone standard of 70 ppb has not been updated as of yet. Thus, the project will be a major modification of an existing stationary source of VOC and NO_X emissions in an ozone nonattainment area and is subject to NNSR for these pollutants. Table 2-1 provides a summary of the proposed project's PSD emission significance.

Table 2-1
PSD Significance Summary

Pollutant	PSD Significant Emission Rates (tons/year)	PSD Emissions Significant (Yes/No)?
Particulate Matter (PM)	25	Yes
Particulate Matter, diameters < 10 microns (PM_{10})	15	Yes
Particulate Matter, diameters < 2.5 microns ($PM_{2.5}$)	10	Yes
Nitrogen Oxides (NO_X)	40	Yes
Carbon Monoxide (CO)	100	Yes
Sulfur Dioxide (SO_2)	40	No
Volatile Organic Compounds (VOC)	40	Yes
Sulfuric Acid Mist (H_2SO_4)	7	No
Greenhouse Gases (GHG)	75,000	Yes

2.2 Class I Area Impact Analyses

There are no current PSD increments for CO applicable to Class I areas and Air Quality Related Values (AQRVs) are not typically evaluated for impacts due to CO emissions. Additionally, the provided preliminary estimates of the daily potential emissions of PM, including PM_{10} and $PM_{2.5}$, and NO_X associated with the project, are less than 1 ton per day, as detailed in Table 2-2.

Table 2-2
Criteria Pollutant Project Daily Potential Emissions

Pollutant	Daily Potential Emission Increases (tons/day)
Particulate Matter (PM)	0.24
Particulate Matter, diameters < 10 microns (PM_{10})	0.24
Particulate Matter, diameters < 2.5 microns ($PM_{2.5}$)	0.24
Nitrogen Oxides (NO_X)	0.30

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Given the distance of over five hundred (500) kilometers to the nearest Class I Area, the increase in emissions of these pollutants would also be considered a presumptive no-adverse impact under the current Federal Land Managers' (FLMs) Air Quality Related Values Work Group (FLAG 2010) Class I area guidance[4], which is based on an emissions (tpy) to distance (km) ratio of less than 10. The nearest Class I area is the Caney Creek Wilderness at a distance of 579 kilometers (360 miles) to the north.

Therefore, the pollutants such as PM, PM_{10}, $PM_{2.5}$, and NO_X for potential PSD increment consumption and impact on AQRVs, such as visibility and deposition of nitrogen, would not be required for the proposed project.

2.3 Constituents to be Evaluated in Class II Analyses

The following pollutants from the proposed project will be evaluated for the PSD analysis: NO_2, PM_{10}, $PM_{2.5}$, and CO. A State NAAQS analysis will be performed for SO_2.

The following pollutants will be evaluated for the State Property Line analysis: SO_2 and sulfuric acid (H_2SO_4). Ammonia (NH_3), diesel fuel, diesel fuel combustion products, and speciated VOC from process gases will be evaluated for the State Health Effects analysis.

Project emission increases will be evaluated on a constituent-by-constituent basis for each emission source in the TCEQ Permit No. 123117 application. A summary of criteria pollutant emission increases per constituent per emission point number (EPN) is provided in Table 2-3. A summary of the non-criteria pollutant emission increases is provided in Table 2-4.

[4] U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service. 2010. *Federal Land Managers' Air Quality Related Values Work Group (FLAG): Phase I Report - Revised (2010)*. Natural Resource Report NPS/NRPC/NRR—2010/232. National Park Service, Denver, Colorado.

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Table 2-3
Criteria Pollutant Project Emission Increases

EPN	PM_{10}		$PM_{2.5}$		SO_2		NO_X (MSS)		CO (MSS)
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr
BLR1	1.95	8.53	1.95	8.53	0.05	0.20	4.17 (10.51)	18.59	15.22
BLR2	1.95	8.53	1.95	8.53	0.05	0.20	4.17 (10.51)	18.59	15.22
BLR3	1.95	8.53	1.95	8.53	0.05	0.20	4.17 (10.51)	18.59	15.22
TURBINE1	6.98	30.58	6.98	30.58	0.07	0.31	5.42 (47.00)	25.80	6.60 (203.60)
TURBINE2	6.98	30.58	6.98	30.58	0.07	0.31	5.42 (47.00)	25.80	6.60 (203.60)
CTWR1	0.16	0.46	0.001	0.002	-	-	-	-	-
CTWR2	0.16	0.46	0.001	0.002	-	-	-	-	-
EDG	0.10	0.01	0.10	0.01	0.04	0.01	2.21	0.11	11.47
DP-HTR	0.03	0.13	0.03	0.13	0.01	0.01	0.42	1.86	0.40
TOTAL	20.26	87.81	19.94	86.89	0.34	1.24	25.98 (128.16)	109.35	70.73 (464.73)

Table 2-4
Non-Criteria Pollutant Allowable Emission Increases

EPN	Ammonia NH_3 CAS 7664-41-7		Sulfuric Acid H_2SO_4 CAS 7664-93-9		Diesel Fuel CAS 68334-30-5		Diesel Fuel Combustion Products No CAS No.		Process Gas VOC Multiple CAS	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
BLR1	1.85	8.10	0.01	004	-	-	-	-	0.54	2.44
BLR2	1.85	8.10	0.01	004	-	-	-	-	0.54	2.44
BLR3	1.85	8.10	0.01	004	-	-	-	-	0.54	2.44
TURBINE1	7.01	30.70	0.01	0.04	-	-	-	-	-	-
TURBINE2	7.01	30.70	0.01	0.04	-	-	-	-	-	-
FUG-NH3	0.01	0.05	-	-	-	-	-	-	-	-
EDG	-	-	-	-	-	-	0.62 (vapor) 0.10 (PM_{10})	0.03 (vapor) 0.01 (PM_{10})	-	-
DTANK	-	-	-	-	2.03	0.02	-	-	-	-
TOTAL	19.58	85.75	0.05	0.20	2.03	0.02	0.62 (vapor) 0.10 (PM_{10})	0.03 (vapor) 0.01 (PM_{10})	1.62	7.32

2.4 Overview of Federal Regulatory Requirements and Standards

Air pollution comes from many different sources: stationary sources such as factories, mobile sources such as cars, and naturally occurring sources such as windblown dust. Air quality can be affected in many ways by the pollution emitted by these sources. These pollution sources also emit a wide variety of pollutants.

The Clean Air Act provides the framework for national, state and local organizations to protect ambient air quality. Ambient air is the atmosphere, external to buildings, to which the general public has access. Under the Clean Air Act, USEPA is responsible for setting standards, known as the NAAQS, for the seven criteria pollutants. USEPA is also responsible for ensuring that the standards are met.

The Clean Air Act established two types of NAAQS: primary and secondary. Primary standards protect against adverse health effects and secondary standards protect against welfare effects, such as damage to animals, crops, vegetation, and buildings. The primary standards for the seven criteria pollutants are defined as the ambient concentration (for each pollutant) required for the protection of human health (with an adequate margin of safety). The primary standards are designed to protect human health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Additionally, secondary standards are designed to protect the environment and public welfare. These standards are based upon the best evidence available from scientific studies conducted over many years.

Under the Clean Air Act and USEPA regulatory actions, state agencies are required to identify and define areas within the state that are in or out of compliance with the established NAAQS. If the concentration of one or more criteria pollutants in an area is found to exceed the threshold levels established by the NAAQS, the area may be classified as a nonattainment area.

Areas with concentrations of criteria pollutants that are below the levels established by the NAAQS are considered either attainment or unclassifiable areas. The NRG Texas is located in a region of Texas that is currently classified as either an attainment or unclassifiable area for all criteria pollutants with the exception of ozone.

The USEPA *Guideline on Air Quality Models* (40 CFR 51, Appendix W,) or GAQM, provides guidance and recommends specific air dispersion models and modeling techniques for use in assessing potential impacts. The techniques used in such AQA are designed to provide conservative (high-biased) results in order to provide a margin of safety in protecting public health and welfare.

The AQA to be performed in accordance with this modeling protocol will consider the impacts from PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, H_2SO_4, NH_3, and speciated VOC and particulate air emissions from the NRG Texas project and other sources, as appropriate, to demonstrate compliance with applicable federal and state air quality standards. Modeled concentrations will be compared to the USEPA established Significant Impact Levels (SILs), NAAQS, PSD Increment consumption levels, and State Property Line standards, shown in Table 2-5. The general approaches for evaluating off-site impacts are discussed in Section 2.5.

Table 2-5
Applicable Federal and State Standards (µg/m³)

Air Constituent	Averaging Time	Significant Impact Level (SIL) (µg/m³)	NAAQS (µg/m³)	PSD Increment Class II Area (µg/m³)	Significant Monitoring Value [1] (µg/m³)	State Property Line Standard µg/m³ (ppm)
PM_{10}	24-hour	5	150	30	10	---
	Annual	1	---	17	---	---
$PM_{2.5}$	24-hour	1.2	35	9	0 [2]	---
	Annual	0.3	12	4	---	---
SO_2 CAS 7446-09-5	30-minute	---	---	---	---	1021 (0.4) [3]
	1-hour	7.8	196	---	---	---
	3-hour	25	1300	512	---	---
	24-hour	5	365 [4]	91	13	---
	Annual	1	80 [4]	20	---	---
NO_2 CAS 10102-44-0	1-hour	7.5	188	---	---	---
	Annual	1	100	25	14	---
CO CAS 630-08-0	1-hour	2,000	40,000	---	---	---
	8-hour	500	10,000	---	575	---
H_2SO_4 CAS 7664-93-9	1-hour	---	---	---	---	50 [3]
	24-hour	---	---	---	---	15 [3]

[1] 40 CFR §52.21(i)(5)(i).
[2] 40 CFR §52.21(i)(5)(i)(c) vacated and remanded.
[3] Title 30 Texas Administrative Code (30 TAC) §112.3(a) for SO_2 and §112.41(a) for H_2SO_4.
[4] EPA revoked both the existing 24-hour and annual SO_2 standards; however, they will remain in effect until one year after the effective date of the 1-hour SO_2 designations.

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The significant impact levels listed in Table 2-5 for 1-hour NO_2 and 1-hour SO_2 are the interim de minimis values for the 1-hour NO_2 and 1-hour SO_2 standards.[5,6]

The non-criteria pollutants listed in Table 2-6 will be evaluated for the State Health Effects analysis. All applicable Chemical Abstract Service (CAS) numbers for constituents with assigned CAS numbers are included in Table 2-6. Diesel fuel combustion products do not have an assigned CAS number. Modeled concentrations will be compared to the most recent state-defined Effects Screening Level (ESL)[7] shown in Table 2-6.

Table 2-6
Non-Criteria Pollutants to be Evaluated

Air Constituent	CAS	Modeling Requirement	ST ESL [1] ($\mu g/m^3$)	LT ESL [1] ($\mu g/m^3$)
Ammonia (NH_3)	7664-41-7	Project Emission Increases	180	92
Diesel fuel	68334-30-5	Project Emission Increases	1000	100
Diesel fuel combustion products - particulate	--	Project Emission Increases	1.5 (PM_{10})	0.15 (PM_{10})
Diesel fuel combustion products - vapors	--	Project Emission Increases	90 (vapor)	9 (vapor)
1-butene	106-98-9	Annual Project Emission Increases	19000	1600
1,3-butadiene	106-99-0	Project Emission Increases	510	9.9
1,2-butadiene	590-19-2	Annual Project Emission Increases	1100	9.9
vinyl acetylene	689-97-4	Project Emission Increases	5000	500
ethylene	74-85-1	Annual Project Emission Increases	1400	34

[1] TCEQ ESL List, September 2015.

2.4.1 $PM_{2.5}$ Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC)

Pursuant to USEPA guidance[8] for $PM_{2.5}$ modeling additional justification is necessary to use the $PM_{2.5}$ SIL values a screening tool to determine whether it is necessary to conduct a cumulative analysis of NAAQS compliance and a cumulative modeling analysis for the $PM_{2.5}$ increments. EPA believes permitting authorities may continue to apply SILs for $PM_{2.5}$ to support a PSD permitting decision, but permitting authorities should take care to ensure that SILs are not used in a manner that is inconsistent with the requirements of Section 165(a)(3) of the Federal Clean Air Act (FCAA). Appendix A of

[5] TCEQ APD, *Interim 1-Hour Nitrogen Dioxide (NO_2) NAAQS Implementation Guidance*, July 22, 2010.

[6] TCEQ APD, *Interim 1-Hour Sulfur Dioxide (SO_2) NAAQS Implementation Guidance*, August 1, 2010.

[7] TCEQ Toxicology Division, ESL List, September 2015.

[8] U.S. EPA OAQPS Memorandum, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

the TCEQ AQMG[9] provides guidance for conducting an AQA when relying on the $PM_{2.5}$ SILs, as well as for meeting the preconstruction monitoring requirements of section 165 of the FCAA.

For use of the SIL in the $PM_{2.5}$ NAAQS analysis, background air quality concentrations must first be examined to determine whether a substantial portion of the NAAQS has been consumed. If the background monitoring data are sufficiently representative of the air quality in existence before the increase in emissions from the proposed source and the difference between the $PM_{2.5}$ NAAQS and the measured $PM_{2.5}$ background concentrations in the area is greater than or equal to the SIL value selected from the vacated 40 CFR Sections 51.166(k)(2) and 52.21(k)(2), then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a source with an impact equal to or below that SIL value will not cause or contribute to a violation of the NAAQS and to forego a cumulative modeling analysis for $PM_{2.5}$ with respect to the NAAQS.

For use of the SIL in the $PM_{2.5}$ increment analysis, background air quality concentrations will be examined to evaluate the difference in ambient background concentrations for the time period between the most recent year and the major source baseline date. Specifically, the difference between the PSD increment and the difference in ambient background concentrations for the time period between the most recent complete year (2014) and the $PM_{2.5}$ major source baseline date [October 20, 2010] will be evaluated. Based on review of this information, a permitting authority may have sufficient reason to conclude that the SILs are reasonable to use when the project emissions lead to predictions that are less than the SILs.

Therefore the background air quality concentrations from a conservative air monitor, which is part of the Texas Air Monitoring Information System (TAMIS) network, will be used to assess the appropriateness of $PM_{2.5}$ SIL values in the NAAQS and PSD increment significant impact analysis. Ambient $PM_{2.5}$ monitoring data used to justify the $PM_{2.5}$ SIL is provided in Appendix D. Justification for the proposed monitor and the monitoring concentrations that will be used are provided in Section 5. Technical justification for the monitor includes a quantitative demonstration that emissions near the monitor are greater than the emissions near the project site.

To satisfy the pre-construction monitoring requirements for $PM_{2.5}$, ambient $PM_{2.5}$ monitoring data will be submitted with the AQA in accordance with the CAA

[9] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2, Air Permits Division, Austin, TX, April 2015.

requirements. In lieu of setting out a $PM_{2.5}$ monitor to collect ambient data, conservative $PM_{2.5}$ ambient data collected from the existing TAMIS monitoring network will be submitted. Specifically, the three-year average (2012-2014) of the 98th percentile of the annual distribution of the 24-hr concentrations, and the three-year average (2012-2014) of the annual mean concentrations will be used to satisfy the $PM_{2.5}$ pre-construction monitoring requirement in the AQA. The monitor selection, justification, and monitoring concentrations that will be used are provided in Section 5 and Appendix D.

2.4.2 Secondary Formation of $PM_{2.5}$

Recent USEPA guidance[10] has suggested the need to examine secondary particulate formation. This guidance clarifies procedures for addressing primary and secondary formed $PM_{2.5}$ in a significance, NAAQS and increment compliance demonstration under PSD. Both primary and secondary impacts of $PM_{2.5}$ will be analyzed based on USEPA guidance.

This protocol proposes to use a qualitative assessment to determine the secondary impact from the NRG Texas project precursor (NO_X and SO_2) emissions. The sulfur compounds emitted by NRG Texas are in the form of SO_2. The nitrogen compounds emitted by NRG Texas are in the form of NO_X. The NRG Texas project would have 1.24 tpy SO_2, 109.35 tpy of NO_X, and 86.92 tpy of direct $PM_{2.5}$ emissions, which is a "Case 3" assessment as identified in USEPA guidance[11].

For Case 3, where the project's direct $PM_{2.5}$ emissions and emissions of at least one precursor are equal to or greater than the respective significant emission rates (SERs), the comparison of the SIL will need to address both primary and secondary $PM_{2.5}$ ambient impacts associated with the proposed project. Thus the ambient impacts due to direct $PM_{2.5}$ emissions will be estimated using the USEPA preferred AERMOD dispersion model, and the assessment of the precursor emission impacts on secondary $PM_{2.5}$ formation will be qualitative in nature using the primary $PM_{2.5}$ impacts, proposed allowable rates of $PM_{2.5}$ and NO_X, and representative background air quality monitoring data.

In the proposed qualitative assessment, the spatial and temporal correlation of the location of maximum direct and secondary $PM_{2.5}$ impacts will be examined. For the NRG Texas preliminary impact determination, the model predicted concentration for direct $PM_{2.5}$ project emissions will be less than the NAAQS de minimis levels (SILs), and

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[10] U.S. EPA OAQPS Memorandum, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

[11] U.S. EPA OAQPS Memorandum, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

the maximum predicted concentration will occur near the fence line. Direct $PM_{2.5}$ impacts generally occur close in (near the fence line) and decrease with downwind distance, whereas secondary $PM_{2.5}$ impacts from the NO_X and SO_2 precursors generally occur farther downwind (well beyond fence line). Therefore, the maximum primary and secondary impacts rarely occur at the same time and location. As a result, secondary formation of $PM_{2.5}$ would not be expected to result in significant impacts for the NRG Texas preliminary NAAQS analysis due the spatial and temporal variability between direct and secondary $PM_{2.5}$ impacts.

The proposed qualitative assessment will also include an examination of the speciated background $PM_{2.5}$ monitoring data to demonstrate that the chemical environment is not conducive to secondary formation. Secondary $PM_{2.5}$ is formed primarily from reaction of SO_2 emissions to form particulate sulfate and from NOx reacting to form particulate nitrate. Specifically, directly emitted sulfur or nitrogen compounds can potentially react with available water and other pollutants in secondary reactions to form particulate ammonium sulfate – $(NH_4)_2SO_4$; or ammonium nitrate – NH_4NO_3. These latter compounds are formed some distance downwind of the specific sources of concern, given reaction times, ambient temperature and other environmental factors.

An analysis of the speciation of $PM_{2.5}$ concentrations from the nearest monitor that has speciated data will be performed to determine if nitrate formation is a significant contributor to the observed total mass of $PM_{2.5}$. Monitoring data will be used to demonstrate that nitrate is not a large contributor to $PM_{2.5}$ concentrations to show that the main increase of emissions (NOx) with this project would not be expected to yield significant levels of secondary $PM_{2.5}$. Justification for the proposed monitor and the monitoring concentrations that will be used will be provided in the final AQA.

A full PSD increment analysis will be performed for the $PM_{2.5}$ 24-hour averaging period, and the AQA will include further discussion to demonstrate how relatively inconsequential the impacts of secondary $PM_{2.5}$ formation would be on the significant receptors within the area of significant impact surrounding the project for the PSD increment analysis.

2.5 General Modeling Approach

The modeling analysis will be conducted in phases to demonstrate compliance with applicable NAAQS, PSD Increment consumption limits, State Health Effects standards, State Property Line regulations, and an additional impacts analysis. A discussion of the general approach that will be used to demonstrate compliance is included below.

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2.5.1 NAAQS Analysis

The first step of the NAAQS analysis will be to conduct a preliminary impact analysis to determine whether the proposed emissions increase from the CBSGS (i.e., project emissions) will have a ◎significant◎ ambient impact. Thus, the first step of this analysis will be to determine whether the project emissions will result in ambient air concentrations that exceed the applicable SILs. Increases in emissions from the proposed project sources (i.e., project emission rates in Table 2-3) will be used in the preliminary NAAQS analysis.

Under state and federal regulations, a source can neither cause nor significantly contribute to a violation of the NAAQS. If the modeled impacts of a source are found to be below the SILs, it is presumed that the source could neither violate nor significantly contribute to a violation of the ambient standard. Therefore, in such a case, no further analyses are required to assess compliance with the standards.

If the impacts are found to equal or exceed the SILs, then cumulative air quality analyses must be performed for those pollutants and averaging periods with impacts over the SILs. The cumulative analyses must consider the impacts associated not only with emissions from the project sources, but also with emissions from other on-property sources and nearby existing sources and background levels of those emissions.

The cumulative modeling demonstration must include maximum emissions from the facilities in the modeling inventory. That is, the NAAQS compliance analyses must be conducted assuming that all facilities in the inventory are operating at their permitted or allowable maximum emission rate. Model predictions must then be presented for those meteorological periods which were modeled to cause the highest, second-highest, or percentile based ambient concentrations depending upon the form of the air quality standard.

Actual emissions from industrial and commercial facilities tend to generally be considerably lower than their maximum emission rates. Since the NAAQS compliance modeling assumes that each facility in the inventory is operating simultaneously at its maximum emission rate and that these maximum emission rates occur at the same time as meteorological conditions which give rise to the poorest dispersion of pollutants, there is considerable conservatism included in NAAQS compliance modeling. The fact that the modeling is conducted in this conservative way tends to artificially increase the model predictions, but also affords an added measure of protection to public health and welfare.

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2.5.2 PSD Increment Analysis

PSD increments are the maximum increases in concentration that are allowed to occur above baseline concentrations for each pollutant for which an increment has been established. PSD increment consumption limits exist for PM_{10} (24-hr and annual), $PM_{2.5}$ (24-hr and annual), SO_2 (3-hr, 24-hr, and annual), and annual NO_2. Compliance with the PSD increment consumption limits must be demonstrated for sources with PSD significant emission rates. As discussed in Section 2.1, PSD applies to the proposed emissions of PM_{10}, $PM_{2.5}$, and NO_2.

As described in Section 2.5.1, a preliminary impact analysis will be conducted for the proposed project emissions increases. If the maximum predicted concentrations are equal to or greater than the applicable SILs, all on-site increment consuming sources and off-site increment consuming sources that had an Area of Impact (AOI) defined in the NAAQS analysis must be included in a full-impact refined modeling analysis. This refined modeling analysis is conducted to estimate the amount of the PSD increment that will be consumed within the AOI. Results of the full-impact refined analysis will be provided only for those receptors with preliminary modeling results equal to, or greater than, the applicable SIL. That is only those receptors within the AOI that are potentially ◎significant◎ from the NRG Texas project will be included in the full-impact refined PSD increment modeling results.

Per TCEQ◎s AQMG, a tiered approach to the PSD Increment modeling demonstration will be performed to limit the amount of research needed to determine actual emission rates. First, all increment consuming sources will be modeled using their allowable emission rates and the predicted concentration will be compared to the appropriate increment. If the increment is not exceeded, the demonstration is complete.

It is expected that the project increases of PM_{10}, NO_2, and annual $PM_{2.5}$ will result in predicted concentrations that are less than the SIL, and therefore a full-impact refined modeling analysis for these pollutants and averaging periods will not be required for increment consuming sources.

The 24-hr $PM_{2.5}$ impacts will be evaluated modeling the individual years to determine if a PSD full increment analysis is required. It is expected that the predicted concentrations associated with the proposed project emissions of $PM_{2.5}$ will result in a significant impact for the daily (24-hour) $PM_{2.5}$ standard for some individual years. Therefore all major sources of $PM_{2.5}$ that have increment consuming emissions (related to the $PM_{2.5}$ major source baseline date [October 20, 2010]), as well as all minor sources that have increment consuming emissions (related to the $PM_{2.5}$ minor source baseline

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date for Brazoria County [December 20, 2011]) will be identified. This information will be obtained by performing a modeling data retrieval for all sources within 50 km of the NRG Texas site from the TCEQ Air Permits Allowable Database (APAD).

In reviewing the information received from TCEQ, inconsistent or incomplete data for any of the sources in the emission inventories may be identified and corrections or additions may be required. To correct or complete the emission inventories, the pre-construction NSR permits, Title V permits, or other permitting documents may be obtained when necessary. Much of the data necessary to fill in data gaps, such as permit documents (i.e., MAERTs) and air dispersion modeling project files may be obtained electronically on the GroupWise Remote Document Server. Other paper files will be located in Central Records at the TCEQ. Any corrections to the data will be accompanied with documentation that can be validated.

2.5.3 Ozone Analysis

The project site is located in Brazoria County, which is part of the Houston-Galveston-Brazoria (HGB) ozone nonattainment area. Therefore, an ozone NAAQS analysis is not required as part of the AQA.

2.5.4 State Health Effects Evaluation

The TCEQ Guidance Document; *Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits* (APDG-5874, July 2009), and the Modeling and Effects Review Applicability (MERA) Flow Chart will be used to determine the scope of the effects review for the State Health Effects evaluation. Specifically, the MERA flow chart will be used to determine the scope of modeling and effects review for project-related emissions of contaminants for which there are no state or federal ambient air quality standards. These contaminants include the following:

- VOC emissions from the combustion of natural gas in the boilers and turbines;
- NH_3 emissions from the boilers, turbines, and piping equipment;
- Speciated VOC process gases in the composite fuel for the boilers;
- Diesel fuel, natural gasoline, and lube oil speciated emissions;
- Diesel fuel combustion products (VOC and PM_{10}); and
- Emissions of hydrogen, methane, ethane, nitrogen, and carbon dioxide gases, which have been classified as simple asphyxiants.

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Natural gas combustion VOC emissions are listed on the TCEQ Toxicology Emissions Screening List (MERA Appendix B) for combustion units fueled only by pipeline-quality natural gas. Likewise, emissions of hydrogen, methane, ethane, nitrogen, and carbon dioxide gases are listed on the Toxicology Emissions Screening List. Therefore no further modeling or State effects review is required for natural gas combustion VOC emissions or simple asphyxiants pursuant to MERA Step 2.

The remaining pollutants will be compared to MERA Step 4C. In this step, short-term emissions (total for a constituent from all EPNs) will be compared to the de minimis levels defined in MERA Step 4C. If the short-term emissions do not exceed the de minimis levels, further analysis is not required. Next, remaining pollutants will be compared to MERA Step 5. For this step, project increases will be modeled using the methodologies described in this protocol, and if the maximum predicted ground level concentration (GLC_{MAX}) due to the project emissions increase is less than 10 percent of the ESL then no further modeling or effects review is required. The purpose of this step is to authorize small emission increases without requiring full modeling and effects review. Note that for compounds with a long-term ESL greater than or equal to 10 percent of the short-term ESL, a separate analysis of the long-term impacts is not required.

It is expected that the speciated constituents evaluated for the State Health Effects analysis will "fall-out" of the MERA evaluation at Steps 4 and 5, and therefore further analysis (i.e., site wide modeling and frequency of occurrence analysis) will not be required.

2.5.5 State Property Line Analysis

A State Property Line analysis (also referred to as a State regulation analysis) will be conducted to demonstrate compliance with State standards for net ground-level concentrations of sulfur compounds[12]. These analyses will be performed for short-term SO_2 and H_2SO_4 emissions.

The first step of the property line analysis will be to conduct a preliminary impact evaluation to determine the predicted concentration of SO_2 and H_2SO_4 from all new and modified sources. Allowable emission rates will be modeled for all new and modified sources that emit the regulated pollutants. If the predicted concentration, at or beyond the property line, is less than two percent of the standard, the demonstration is complete. If not, site wide modeling will be performed.

[12] 30 TAC Chapter 112, *Control of Air Pollution from Sulfur Compounds* (TCEQ, 1997a).

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If site wide modeling is required, the allowable emission rates for all sources on the property that emit the regulated pollutant will be modeled. Model predicted concentrations will be compared to the appropriate state standard. If the concentrations are less than the standard, the demonstration is complete.

The 1-hour modeled predictions will be compared with the 30-minute property line standards, which is a conservative technique since the model's dispersion coefficients were derived based on sampling times of much less than 1 hour but are held constant during a modeled hour.

TCEQ Regulation §112.3(a) sets the net ground level SO_2 concentration limit of 0.4 ppm (1021 μg/m^3) averaged over any 30-minute period. TCEQ Regulation §112.41(a) sets the net ground level H_2SO_4 concentration limit of 15 μg/m^3 averaged over any 24-hour period and 50 μg/m^3 averaged over any one-hour period.

2.5.6 Additional Impacts Analysis

In addition to assessing the ambient air quality impacts expected from a proposed new source, the PSD regulations require an evaluation of other potential impacts on 1) soils and vegetation; 2) growth; and 3) visibility impairment. [13] The depth of the analysis generally depends on existing air quality, the quantity of emissions, and the sensitivity of local soils, vegetation, and visibility in the source's impact area.

Soils and Vegetation

The additional impact analysis will include consideration of potential impacts to soils and vegetation associated with the NRG Texas emissions in accordance with 40 CFR § 52.21(o). This component generally includes:

- a screening analysis to determine if maximum modeled ground-level concentrations of project pollutants could have an impact on plants; and
- a discussion of soils and vegetation that may be affected by proposed project emissions and the potential impacts on such soils and vegetation associated with such emissions.

For most types of soils and vegetation, ambient concentrations of criteria pollutants below the secondary NAAQS will not result in harmful effects because the secondary NAAQS are set to protect public welfare, including animals, plants, soils, and materials. Therefore, for the impact on soils and

[13] 40 CFR Part 52, Prevention of significant deterioration of air quality, §52.21(o), *Additional impact analyses.*

vegetation, the maximum modeled concentrations (for pollutants where the modeled concentrations are above the SIL) will be compared to the Primary and Secondary NAAQS.

Visibility Impairment

The PSD regulations that address additional impact analyses also require the evaluation the potential for visibility impairment (*e.g.*, plume blight) associated with the project emissions in accordance with 40 CFR § 52.21(o). Using procedures from EPA's Workbook for Plume Visual Impact Screening and Analysis, the potential for visibility impairment should be characterized for:

- Class I areas located within 50 km of the proposed NRG Texas-modification; and
- Class II areas identified as potentially sensitive state or federal parks, forests, monuments, or recreation areas.

There are no Federal Class I areas located within 50 km of the project site; the nearest Class I area is the Caney Creek Wilderness, which is located 579 km north of the project site. Therefore the Additional Impacts Analysis will not address any Class I area.

For nearby Class II areas or recreation areas, the AQA will evaluate visibility impacts to sensitive areas (state parks, battlefields, historic sites, or other areas of historic significance on or eligible to be on the National Register of Historic Places) within the area where concentrations exceed the SIL.

EPA has not yet established a quantitative visibility impairment threshold for Class II areas (similar to what exists for Class I areas). If there are any sensitive areas in the SIL area, the air quality analysis will be done using Level 1 VISCREEN analysis, and, if necessary, a Level 2 (as defined by EPA's Workbook for Plume Visual Impact Screening and Analysis) screening analysis for these areas. In addition, for visibility impacts within the AOI, NRG Texas can meet the requirement for the Class II visibility analysis by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111, per TCEQ ADMT guidance.

Growth

The growth component of the additional impact analysis involves a discussion of general commercial, residential, industrial, and other growth associated with

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NRG Texas in accordance with 40 CFR § 52.21(o). This analysis should consider emissions generated by growth that will occur in the area due to the modification. In conducting this review, the focus should be on residential, commercial, and industrial growth that is likely to occur to support the source under review including employment expected during construction and operations.

The NRG Texas CHP Plant will be a support facility for the adjoining INEOS Plant, and NRG Texas does not expect this project to result in any significant growth. Construction of the proposed cogeneration unit would span between 14 and 18 months. Laydown and temporary worker parking areas will be located within the existing facility property boundary. During construction approximately 40 temporary workers would be added.

Once the CBSGS is operational, the facility is expected to employ two to three additional workers. The project will utilize existing plant roads and infrastructure, and no additional roads or transportation infrastructures are proposed for construction. We do not expect the new CBSGS to cause significant growth in the area.

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Section 3
Plot Plan

A plot plan depicting the locations of the NRG Texas modeled sources, buildings, tanks, fence line, and property line is included as Figure A-1 in Appendix A to this protocol. A second plot plan is included as Figure A-2, which shows the proposed location of the CBSGS within the existing chemical plant. Figure 3-2B is also provided in this section, which depicts the entire site and plant fence line.

The location of emission sources, structures, and receptors will be represented in the Universal Transverse Mercator (UTM) coordinate system, Zone 15 North (NAD83), with meters used for distances for the modeling analysis. The USEPA and the TCEQ require that coordinates for permits and air quality dispersion modeling analyses be represented in the UTM system.

3.1 Plant Overview

NRG Texas is seeking authorization to construct a new CHP plant in Brazoria County, Texas to provide electrical power and steam to the existing INEOS Chocolate Bayou chemical plant. The NRG Texas CHP plant will be co-located on property owned by the INEOS chemical plant and will be a support facility to provide steam and electricity to the chemical plant.

The plant design includes two GE LM6000 combustion turbine generators (CTG) with integrated combustion inlet air chillers, two duct burner systems and heat recovery steam generators (HRSGs), oxidation and selective catalytic reduction (SCR) emission control systems, ammonia piping system for control equipment, continuous emission monitoring system (CEMS), three auxiliary boilers, two package cooling towers, one black-start generator and diesel fuel storage tank, natural gas and composite fuels piping and metering, electrical equipment insulated with sulfur hexafluoride (SF_6), and water storage facilities.

The new CHP plant will generate approximately 100 MW of gross electrical power in addition to high pressure steam for use in the INEOS chemical plant. Pipeline natural gas is chosen as the only fuel for the LM6000 combustion turbines and duct burner systems. The three auxiliary boilers will be fired with natural gas and composite fuels; the composite fuels are comprised of process gas (Butadiene Extraction Unit (BEU) waste gas and olefins tail gas) provided by the INEOS chemical plant. The CTGs, HRSGs, and auxiliary boilers could operate up to 8,760 hours per year.

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3.2 Local Terrain

The NRG Texas site is located in southeast Texas, along the Gulf Coast. The chemical facility that the project supports is located at the Chocolate Bayou, about five miles upstream of Chocolate Bay. See Figure 3-1.

The INEOS property is south of Houston, Texas at the intersection of Route 2004 and 2917. The INEOS fence line contains a short stretch of rail lines and INEOS owns property on north and south lots adjacent to Route 2004. The immediate area is dominated by farm and ranchland. See Figures 3-1 through 3-3B.

The terrain of the region is relatively simple, with gradual sloping southeast toward the Gulf Coast. No significant terrain features lie within the immediate area and elevations within the property boundaries vary from just under 1 meter to approximately 6 meters. Figures 3-3 and 3-3B provides a topographic illustration of the local terrain.

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Figure 3-1 Location of Project Site (Local View)

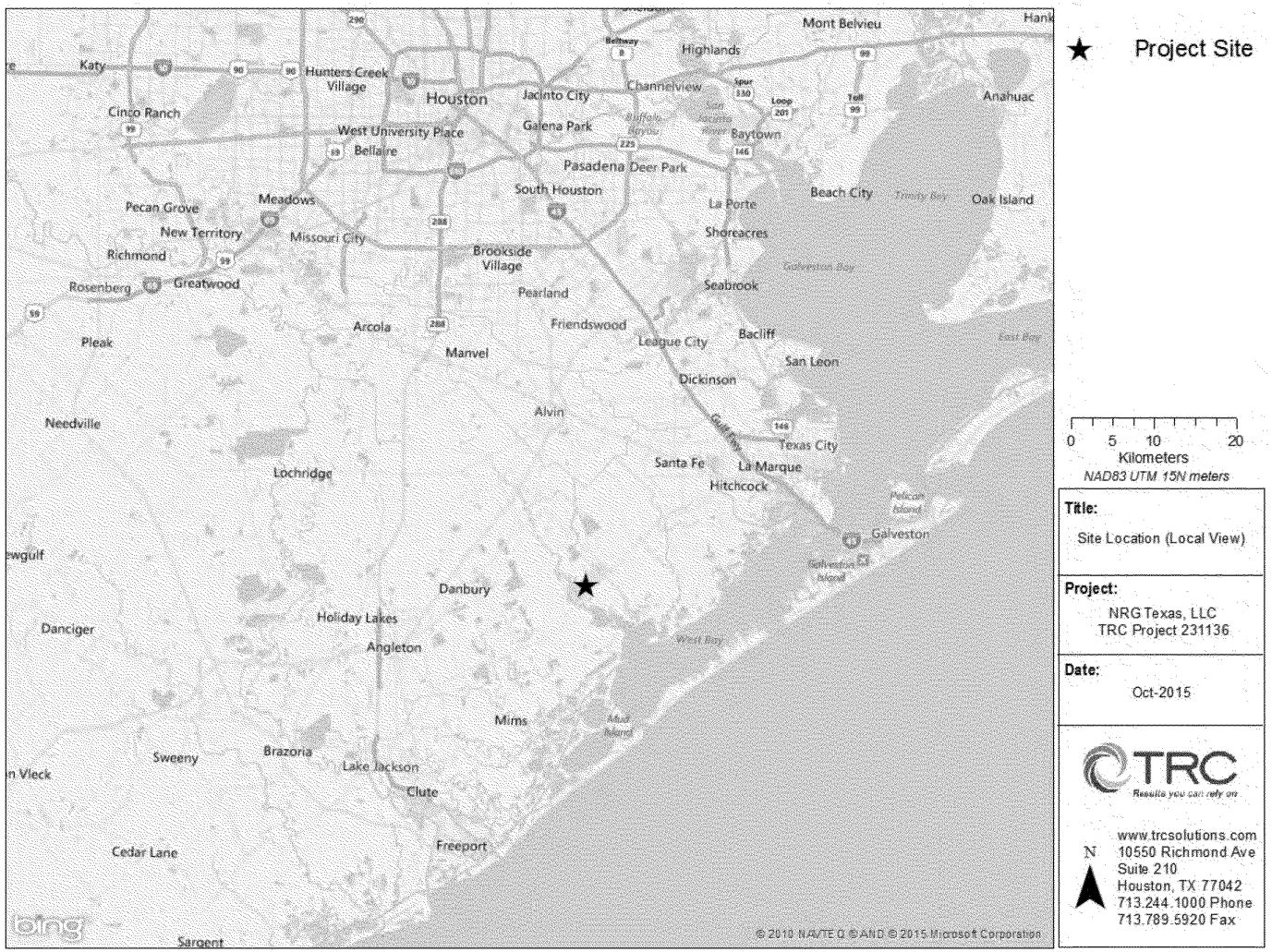

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Figure 3-2 Aerial Photo of the Project Site

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Figure 3-2B Aerial Photo of the Project Site Fence line and Property Line

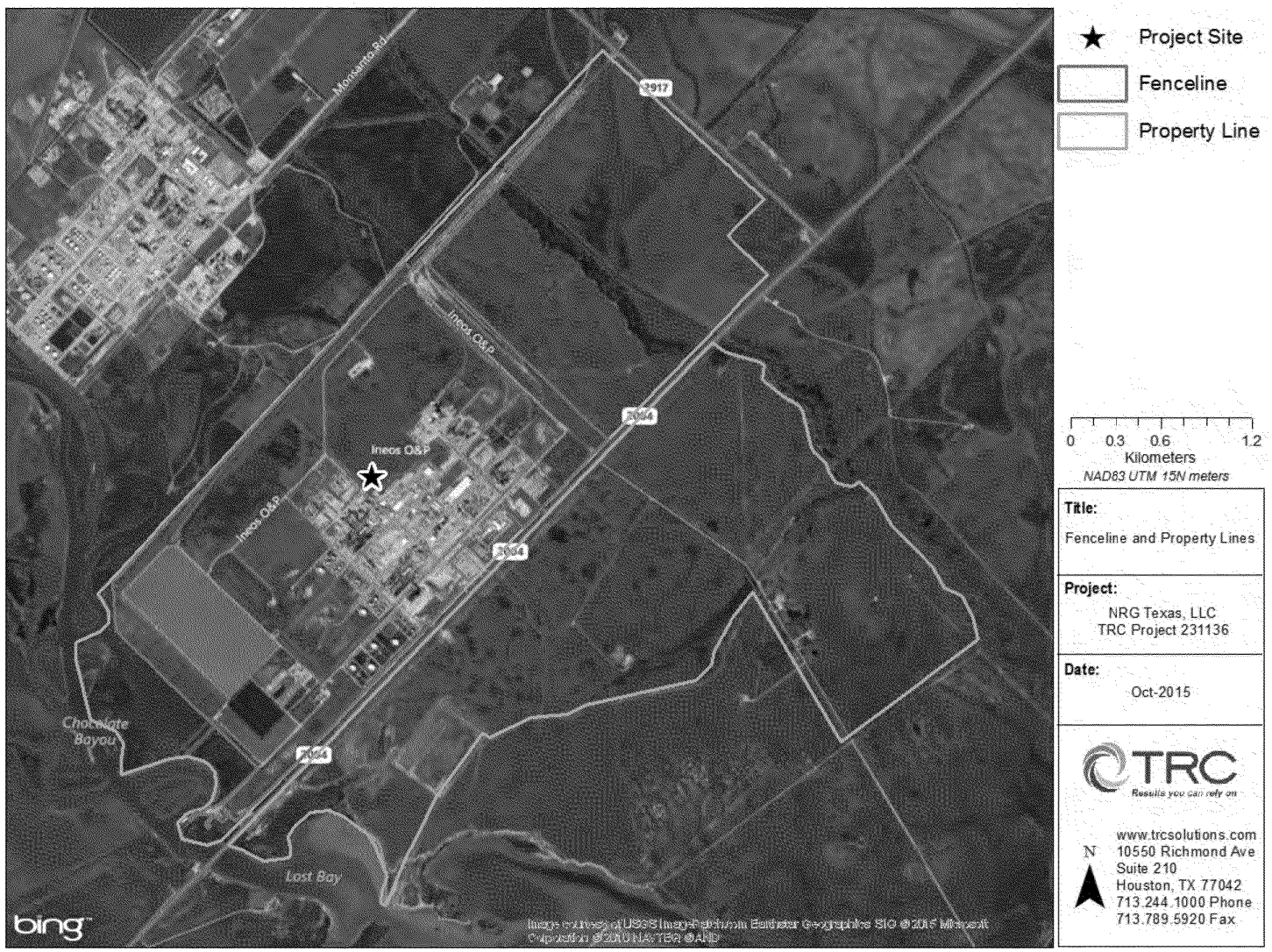

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Figure 3-2C Aerial Photo of the Project Site and Supported Facility

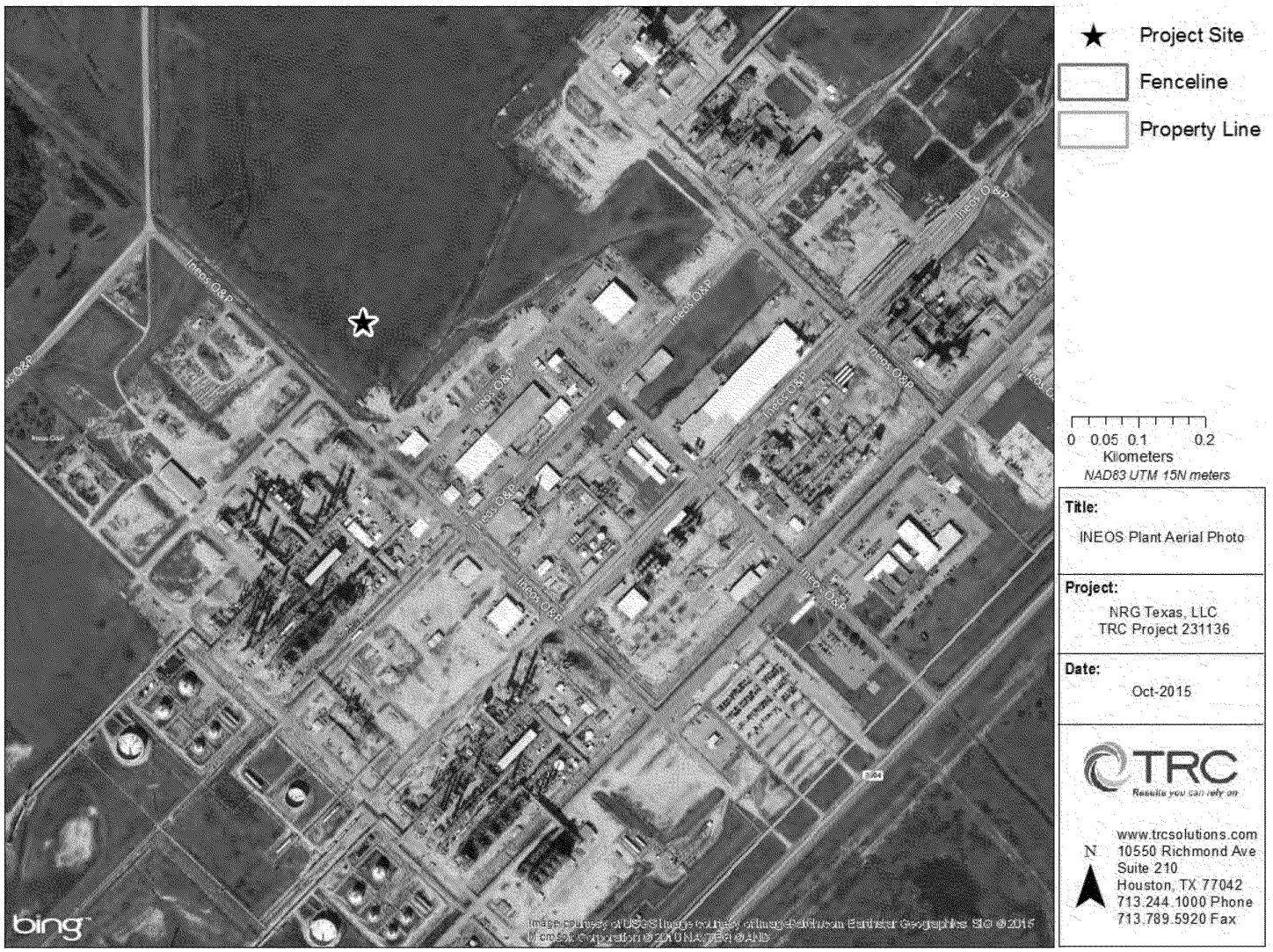

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Figure 3-3 Topographic Map (Local View)

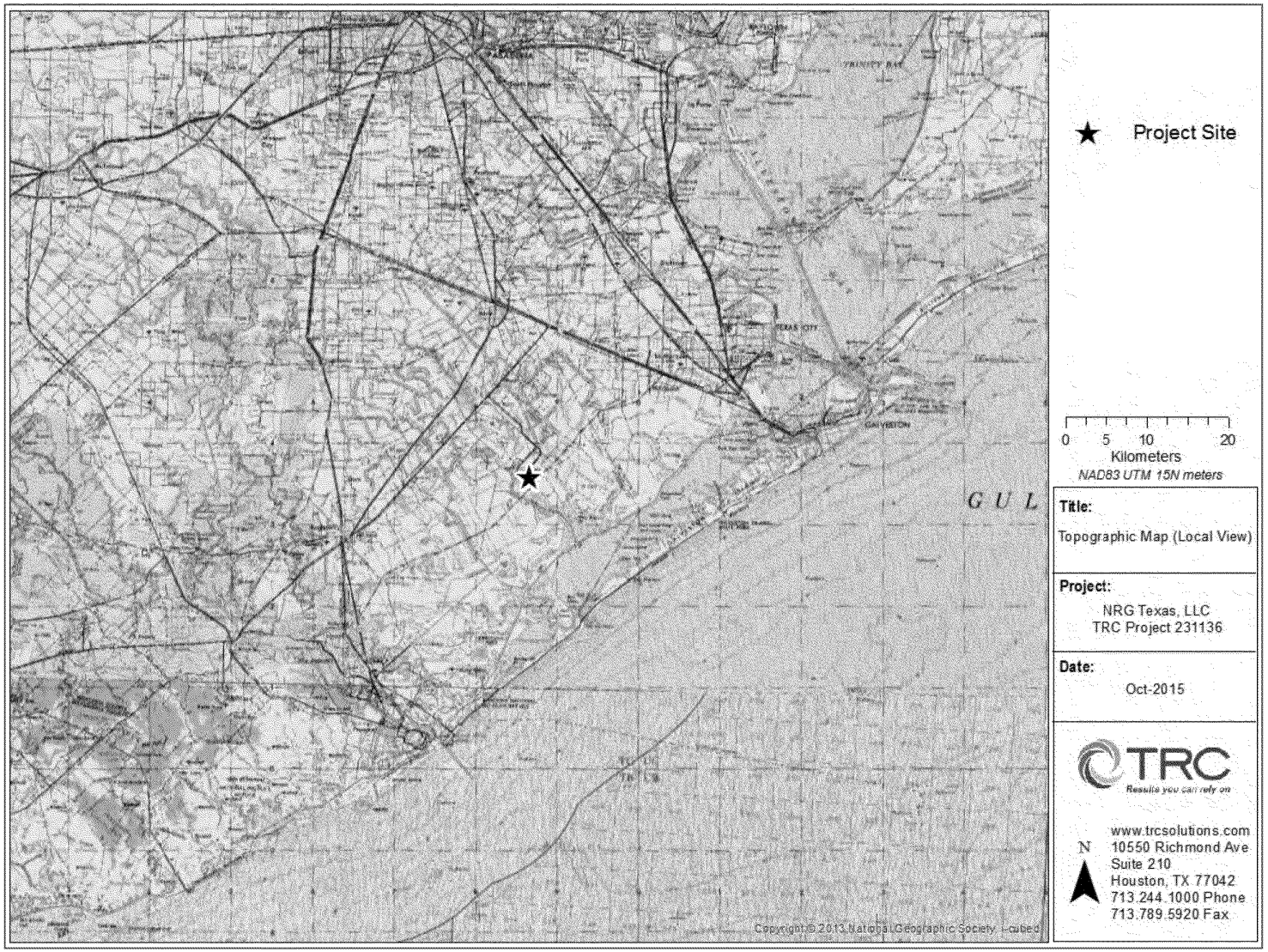

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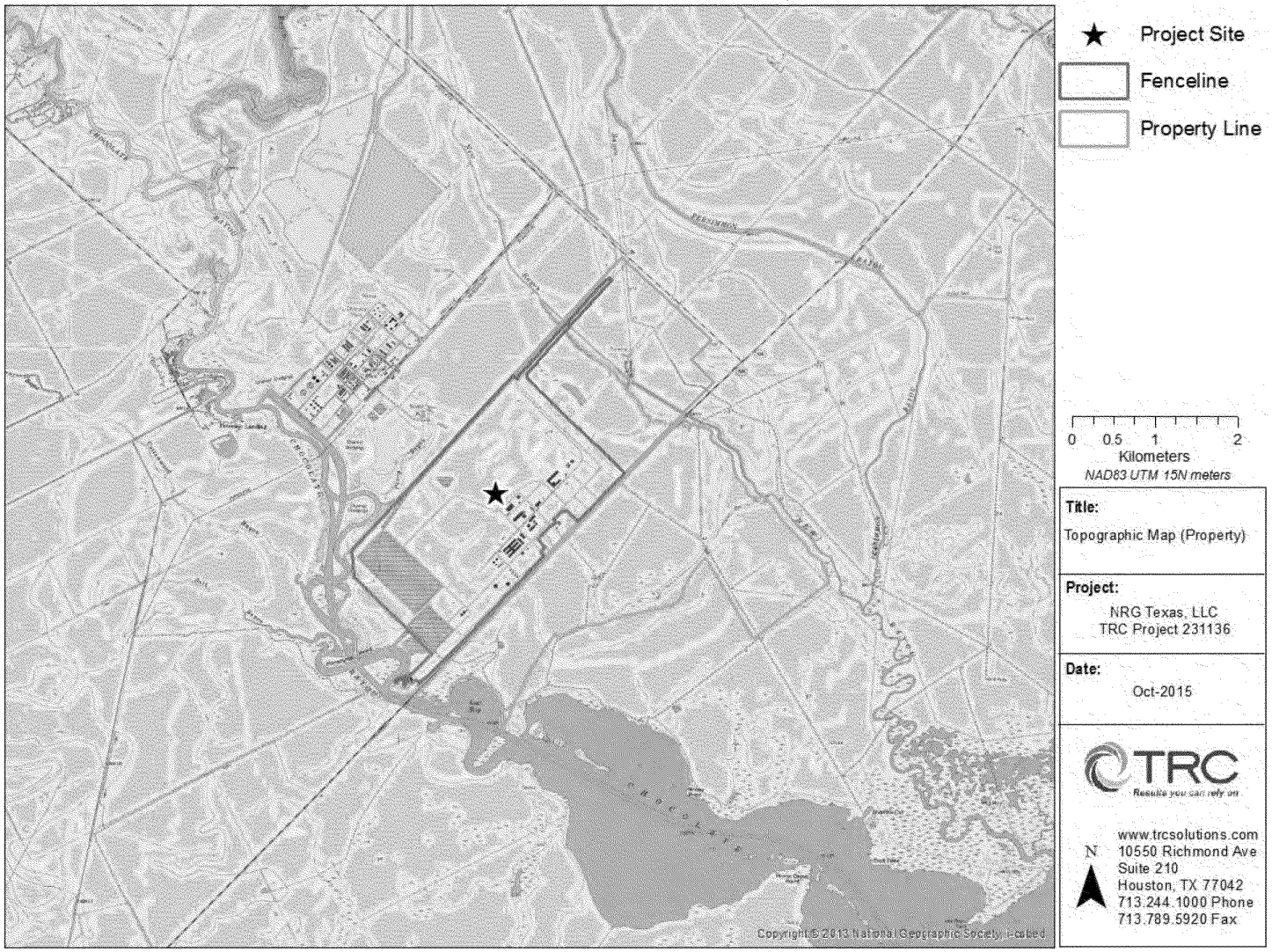
Figure 3-3B Topographic Map (Property View)



Section 4
Area Map

Appendix B includes an area map illustrating the surrounding area and includes the site orientation, scale, and project boundaries. The INEOS property and fence line boundaries encompass the NRG Texas project. A 3,000-foot radius and a one-mile radius are indicated on the map. The area map depicts both the property line and fence line with respect to the surrounding topography and predominant geographic features (such as highways, roads, streams, railroads, etc.). There are no schools located within a 3,000-foot radius of the NRG Texas.

There are no PSD Class I areas located within 500 kilometers (310 miles) of the NRG Texas site. The nearest Class I areas are the Breton National Wildlife Refuge at a distance of 582 kilometers (362 miles) in southeast Louisiana, the Big Bend National Park at a distance of approximately 746 kilometers (464 miles) in west Texas, and the Caney Creek Wilderness at a distance of 579 kilometers (360 miles) in southwestern Oklahoma. Therefore, a Class I analysis is not applicable.

The project is located in Brazoria County, which is classified as ◎attainment◎ or ◎unclassifiable◎ for all pollutants with the exception of ozone, which is currently classified as a severe nonattainment area for ozone per the 1997 eight-hour ozone standard.

Figure 4-1 shows the ozone non-attainment area based off the 2008 standard (recently finalized 2015 ozone standards have not been integrated into attainment classifications yet). For pollutants other than ozone, there are no nonattainment areas located within 50 kilometers of the facilities.

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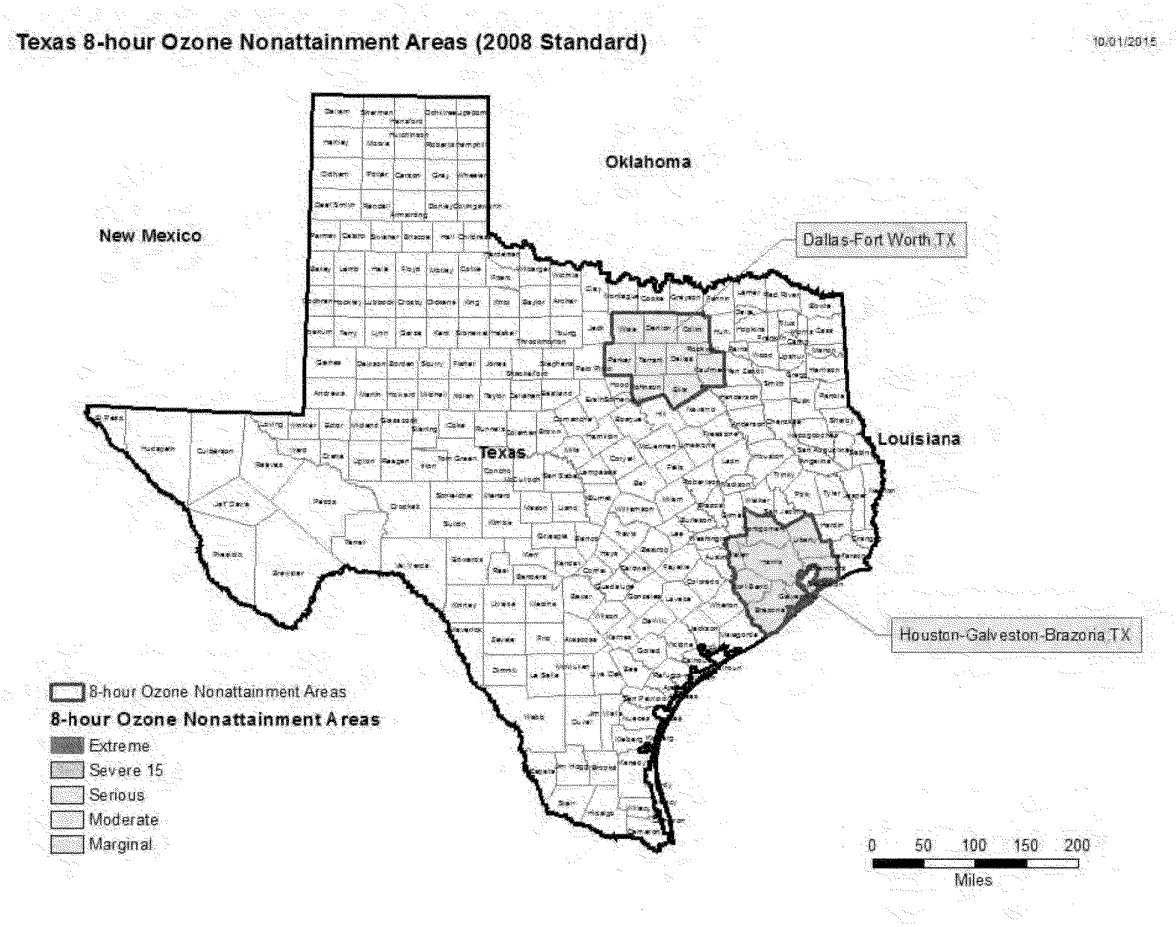
Figure 4-1 Texas 8-hour Ozone Nonattainment Areas (2008 Standard)



Source: US EPA Green Book - http://www3.epa.gov/airquality/greenbook/tx8_2008.html

Section 5
Air Quality Monitoring Data

Background concentration data may be required for any criteria pollutant emitted in significant amounts by the proposed modification. The NAAQS preliminary impact analysis (SIL analysis) will be conducted first before determining if representative ambient air quality monitoring data is necessary. It is expected that the project increases of criteria pollutants will result in predicted concentrations that are less than the NAAQS SILs for all pollutants and averaging periods. As a result, monitoring data will not be required to assess impacts from NO_2, PM_{10}, SO_2, CO, and other non-criteria pollutant emissions from this project, but will be used in support of the $PM_{2.5}$ impacts analysis.

Conservative $PM_{2.5}$ ambient air quality monitoring data will be used to justify use of the SIL in the 24-hour and annual $PM_{2.5}$ NAAQS analysis, and to satisfy the pre-construction monitoring requirements for $PM_{2.5}$ since the Significant Monitoring Concentration (SMC) for $PM_{2.5}$ has been vacated. In addition, speciated $PM_{2.5}$ ambient air quality monitoring data will be used in support of the qualitative assessment to address the secondary formation of $PM_{2.5}$.

This section details the proposed $PM_{2.5}$ ambient air quality monitoring data to be used in the AQA. Ambient air quality monitoring data will be obtained from the TCEQ TAMIS and USEPA AirData websites.

5.1 $PM_{2.5}$ Air Quality Monitoring Data

Background concentrations from the Baytown A148 monitor (EPA Site Number: 48-201-0058) will be assessed to establish the existing ambient air quality for the area, and to determine whether a substantial portion of the $PM_{2.5}$ NAAQS has already been consumed. Site-specific ambient air monitoring data are not available for this project and therefore monitoring data from the existing TAMIS network of regional monitors is proposed.

The Baytown monitor is located approximately 60-km northeast of the Chocolate Bayou site in Baytown, Harris County. A monitor in Harris County, which is adjacent to Brazoria County, is proposed for this analysis because there are no continuous $PM_{2.5}$ monitors in Brazoria County. Monitor value summary reports of the conservative $PM_{2.5}$ air quality monitoring data are included in Appendix D, and the applicable monitored design values are identified in Table 5-1.

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Table 5-1
$PM_{2.5}$ Background Air Quality Monitor Summary – 2012 - 2014 Data

Pollutant (Sampler Type)	Monitor	Year	$PM_{2.5}$ 24-Hour 98th Percentile (µg/m³)	$PM_{2.5}$ Annual Average (µg/m³)	$PM_{2.5}$ 24-Hour 98th Percentile 3-Yr Average (µg/m³)	$PM_{2.5}$ 3-Yr Annual Average (µg/m³)	NAAQS Primary Standard (µg/m³)
$PM_{2.5}$ (FRM)[1]	Baytown CAMS 148 EPA Site: 48-201-0058	2014	24	10.3	**22**	**10.2**	35 (24-hr) / 12 (Annual)
		2013	21	9.6			
		2012	22	10.6			

[1] Federal Reference Method (FRM).

Table 5-1 provides the monitor concentrations obtained from EPA AIRS monitor 48-201-0058 located at 7210 1/2 Bayway Drive, Baytown, Harris County, Texas. The daily (24-hour) $PM_{2.5}$ design value (22 µg/m³) is based on the three-year average of the 98th percentile 24-hour average $PM_{2.5}$ concentrations from the most recent three years of monitoring data. The annual $PM_{2.5}$ background concentration (10.2 µg/m³) is based on the most recent three-year average of the annual monitored concentrations that encompasses three consecutive calendar years of complete data. Data from this monitor meets the Appendix N to 40 CFR Part 50 completeness criteria. This monitor is owned by the TCEQ and data from this monitor meets EPA quality assurance criteria for regulatory purposes.

As shown in Table 5-1, since the difference between the $PM_{2.5}$ NAAQS and the measured $PM_{2.5}$ background (i.e., monitor concentrations) in the area is greater than EPA's $PM_{2.5}$ SIL value for 24-hour (13 □g/m³ > SIL 1.2 □g/m³) and annual (1.8 □g/m³ > SIL 0.3 □g/m³) averaging periods, it should be sufficient to conclude that a source with a $PM_{2.5}$ impact below that SIL value will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and to forego a more comprehensive cumulative modeling analysis for $PM_{2.5}$.

Use of the Baytown monitor is conservative because it is situated near the Baytown industrial district and Houston Ship Channel with multiple large industrial complexes (i.e., ExxonMobil Baytown refinery) located nearby. Emissions near the Baytown monitor are greater than the emissions near the project site. Specifically, an analysis of the area surrounding the Chocolate Bayou site relative to the monitor site with respect to nearby sources of $PM_{2.5}$ emissions was performed. Per TCEQ guidance, reported 2013 $PM_{2.5}$ emissions for all facilities within a 10-km radius of both the monitor and the Chocolate Bayou site were summed for comparison. According to the analysis, 2,339 tpy of $PM_{2.5}$ was released to the atmosphere within a 10-km radius of the monitor, whereas emissions within a 10-km radius of project site totaled 182 tpy of $PM_{2.5}$. The list of sites (RNs) and the 2013 reported emissions were provided by the TCEQ Air

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Dispersion Modeling Team (ADMT) and are included as justification for selecting the Baytown monitor in Tables D-1 and D-2 in Appendix D.

As the $PM_{2.5}$ emissions from the region surrounding the Baytown monitor are greater than the region surrounding the Chocolate Bayou site, this monitor should provide a conservative measurement of background $PM_{2.5}$ concentrations. Note that RNs without reported emissions in the database were not required to file an Emissions Inventory (EI). Per TCEQ guidance, these sources are not considered to have a significant impact on the monitor observed concentrations and therefore are not included as part of the analysis.

Further, the use of this monitor is conservative because Harris County has a greater number of both industrial and mobile $PM_{2.5}$ emission sources, resulting in greater $PM_{2.5}$ emissions from 2011 (21,987 tons) than Brazoria County (10,158 tons)[14]. In addition, Harris County has a greater population than Brazoria County (Harris County: 4,093,011 in 2010 and Brazoria County: 313,127 in 2010)[15].

5.2 Justification of $PM_{2.5}$ SIL for PSD Increment

Background concentrations from the Baytown monitor (EPA Site Number: 48-201-0058) will be examined to evaluate the difference in ambient background concentrations for the time period between the most recent year and the major source baseline date. Specifically, the difference between the PSD increment and the difference in ambient background concentrations for the time period between the most recent complete year (2014) and the $PM_{2.5}$ major source baseline date [October 20, 2010] will be evaluated. Monitor value summary reports of the conservative $PM_{2.5}$ air quality monitoring data are included in Appendix D, and the applicable monitored concentrations for 2010 and 2014 are identified in Table 5-2.

Table 5-2
$PM_{2.5}$ Background Air Quality Monitor Summary for PSD Increment

Pollutant (Sampler Type)	Monitor	Year	$PM_{2.5}$ 24-Hour H2H (µg/m³)	$PM_{2.5}$ Annual Average (µg/m³)	$PM_{2.5}$ 24-Hour H2H DELTA (µg/m³)	$PM_{2.5}$ Annual DELTA (µg/m³)	PSD Increment Class II Area (µg/m3)
$PM_{2.5}$ (FRM)[1]	Baytown CAMS 148	2014	23.6	10.3	**2.9**	**-0.5**	9 (24-hr) / 4 (Annual)
		2010	20.7	10.8			

[1] Federal Reference Method (FRM).

[14] 2011 National Emissions Inventory (NEI) Data, U.S. EPA Clearinghouse for Inventories and Emissions Factors.
[15] 2010 Census, U.S. Census Bureau.

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Using the ambient air monitoring data from the Baytown monitor shown in Table 5-2, the difference between the 24-hr high, second high (H2H) and annual monitored concentrations for the major source baseline date (2010) and the most recent complete year (2014) were determined and compared to the PSD increment as follows:

- The difference between the 24-hour $PM_{2.5}$ PSD increment (9 □g/m^3) and the difference in measured background concentrations (2.9 □g/m^3) is 6.1 □g/m^3, which is greater than the SIL (1.2 □g/m^3).

- The difference between the annual $PM_{2.5}$ PSD increment (4 □g/m^3) and the difference in measured background concentrations (-0.5 □g/m^3) is 3.5 □g/m^3, which is greater than the SIL (0.3 □g/m^3). The difference in the annual monitored concentrations from 2010 to 2014 is a negative value, which represents a decrease in monitored concentrations and an improvement in air quality.

Therefore it should be sufficient to conclude that a source with a $PM_{2.5}$ impact below that SIL value will not cause or contribute to a violation of the $PM_{2.5}$ increment and to forego a more comprehensive cumulative increment modeling analysis for $PM_{2.5}$. Based on review of this information, a permitting authority may have sufficient reason to conclude that the SILs are reasonable to use when the project emissions lead to predictions that are less than the SILs.

5.3 PSD Ambient Monitoring Requirement for $PM_{2.5}$

As discussed in Section 5.1, a conservative $PM_{2.5}$ monitor is located in Harris County, which offers conservative estimates for the background concentrations of $PM_{2.5}$ for the proposed project because emissions near the monitor are greater than the emissions near the project site. The monitoring data in Table 5-1, which provides a three-year average (2012-2014) of the 98th percentile of the annual distribution of the 24-hr concentrations and a three-year average (2012-2014) of the annual mean concentrations, shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the EPA's $PM_{2.5}$ SIL value for 24-hour and annual averaging periods. Therefore this monitoring data will be submitted with the AQA to satisfy the pre-construction monitoring data requirement.

5.4 Speciated $PM_{2.5}$ Monitoring Data

An analysis of the speciation of $PM_{2.5}$ concentrations from the nearest monitor that has speciated data will be performed to determine if nitrate formation is a significant contributor to the observed total mass of $PM_{2.5}$ in support of the qualitative assessment of secondary $PM_{2.5}$ formation. The analysis will assess the nitrate, sulfate, and elemental and organic carbon fractions from the air quality monitoring data.

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The Baytown monitor proposed for justifying the use of the $PM_{2.5}$ SILs and to satisfy the $PM_{2.5}$ pre-construction monitoring data requirement does not provide speciated $PM_{2.5}$ ambient air quality data. Therefore speciated air quality concentrations will be obtained from the Houston Deer Park #2 monitor (EPA Site: 48-201-1039), which is located approximately 50-km northeast of the Chocolate Bayou site in Harris County.

Use of the Houston Deer Park #2 monitor is conservative because it is situated near the Houston Ship Channel industrial complex, and emissions near the monitor are greater than the emissions near the project site. Specifically, an analysis of the area surrounding the NRG Texas site relative to the monitor site with respect to nearby sources of $PM_{2.5}$ emissions was performed. Per TCEQ guidance, reported 2013 $PM_{2.5}$ emissions for all facilities within a 10-km radius of both the monitor and the Chocolate Bayou site were summed for comparison. According to the analysis, 1,449 tpy of $PM_{2.5}$ was released to the atmosphere within a 10-km radius of the monitor, whereas emissions within a 10-km radius of the Chocolate Bayou site totaled 182 tpy of $PM_{2.5}$. The list of sites (RNs) were provided by the TCEQ and are included as justification for selecting the Houston Deer Park #2 monitor in Tables D-1 and D-3 in Appendix D.

As the speciated $PM_{2.5}$ emissions from the region surrounding the Houston Deer Park #2 monitor are greater than the region surrounding the project site, this monitor should provide a conservative measurement of speciated background $PM_{2.5}$ concentrations. The speciated air quality monitoring data, and analysis of the speciation of $PM_{2.5}$ concentrations will be submitted electronically with the final AQA.

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Section 6
Modeling Emissions Inventory

The following sections discuss the methodology used to represent the NRG Texas on-site emission sources under review and the methodology used for obtaining the nearby off-property industrial emission sources that will be included in the AQA. Modeled ground-level concentrations of all pollutants of concern will be evaluated at receptors located beyond the NRG Texas fence line.

The proposed emissions, operating parameters and design parameters for the NRG Texas project are defined in the air quality permit application. Development of the modeling emission inventory will be based upon guidance provided in Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*, Section 8.1.

6.1 On-Property Sources to be Permitted

The TCEQ Table 1(a) for the NRG Texas project is included as Appendix C. The TCEQ Table 1(a) includes all the proposed sources authorized by Permit 123117 and their emission point discharge parameters (in English units). Appendix E contains tables summarizing the NRG Texas stack parameters modeled in this analysis (in English and Metric units). Appendix F contains tables summarizing the short-term and annual criteria pollutant emission rates for the project-related sources.

The power generating equipment, as well as ancillary equipment will be sources of VOC, NO_X, CO, SO_2, PM, PM_{10}, $PM_{2.5}$, H_2SO_4, and NH_3 emissions at the site. The project sources are listed below:

- Two 50 MW natural gas-fired combustion turbines equipped with heat recovery steam generators (HRSGs) (EPNs TURBINE1 and TURBINE2); *Point Sources*
- Three auxiliary boilers (EPNs BLR1, BLR2, and BLR3); *Point Sources*
- Two package cooling towers (EPN CTWR1 and CTWR2); *Point Sources*
- Natural gas piping and metering (EPN FUG-FUEL); *Volume Source*
- Ammonia piping system (EPN FUG-NH3); *Volume Source*
- Fuel gas dew point heater (EPN DP-HTR); *Point Source*
- Emergency diesel generator engine (EPN EDG); *Point Source*
- Diesel fuel storage tank (EPN DTANK); *Pseudo-Point Source*

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- Turbine lube oil vents (EPN LUBE-VENT); *Pseudo-Point Sources* and
- Lube oil tanks (EPN LUBE-TANKS) *Pseudo-Point Sources*

Section 6.4 provides stack parameter justification and describes the methodology that will be used to characterize the source parameters for the sources under consideration.

6.2 Other On-Property Sources

It is expected that the NRG Texas project increases of criteria pollutants will result in predicted concentrations that are less than the NAAQS SILs for all pollutants and averaging periods. Likewise, the NRG Texas project increases of non-criteria pollutants will result de minimis impacts and will ◎fall-out◎ of the MERA review prior to the site wide modeling requirement. As a result, no other on-property sources will be included in the NAAQS analysis, State health effects analysis, and State property line analysis.

For the PSD increment analysis, it is expected that the predicted concentrations associated with the proposed project emissions of $PM_{2.5}$ will result in a significant impact for the daily (24-hour) $PM_{2.5}$ standard for some individual years, requiring a cumulative increment analysis. During the course of the PSD increment consumption analysis, all major sources external to the project that have increment consuming emissions, as well as all minor sources that have increment consuming emissions will be identified and included in the analysis.

6.3 Modeling Analyses

A tiered modeling approach is proposed to demonstrate compliance with the applicable pollutant ambient air quality standards. Single-source, or the NRG Texas-only modeling, will first be performed to determine whether the modeled pollutant emissions due to the project will have predicted impacts by themselves above the PSD Class II SILs shown in Table 2-5. If the maximum modeled concentrations for each averaging period are below their respective SIL, no further modeling is required.

Otherwise, multi-source modeling will be required to include other nearby sources of pollutants that may have significant contributions to modeled impacts. The analyses to be performed are described below.

6.3.1 Single-Source Analyses

Single-source or NRG Texas-only emission modeling for the proposed project will be conducted to identify the pollutant predicted concentrations for comparison to the modeling SILs. The analyses will be run for five years of meteorological data as detailed in Section 12.

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For each pollutant averaging period, and for each operating scenario, the appropriate impact will be determined for comparison to the modeling SIL. A description of the modeling scenarios, including operating loads, planned MSS activities, and how the worst-case operating scenario will be determined is included in Section 6.5. All scenarios for which the predicted pollutant impacts for the applicable averaging periods are determined to be below the modeling SIL will be dropped from further consideration.

If a modeled significant impact is predicted, further analyses may be required. The information derived from the single-source modeling will be evaluated to determine the worst-case operating scenario resulting in the maximum impact. The selected worst-case scenario will be used for further multi-source modeling analyses.

The modeling results for each operating scenario with predicted maximum impacts greater than a respective modeling SIL will be evaluated to determine a radius of impact (ROI). The furthest distance from the source to which a modeling significant impact is predicted defines a ROI. The longest ROI obtained for the operating scenarios and averaging periods will be used to define the overall maximum modeling significant impact area (SIA). The maximum SIA is defined as the circular area enclosed by the largest ROI, and the range within which other sources will need to be considered in the modeling. Other sources within the SIA and in a "screening area" that extends up to 50 kilometers beyond the SIA may be considered for the Cumulative Source Inventory, per the following section.

6.3.2 Multi-Source Analyses

The information derived in the single source facility modeling will be used, as necessary, to perform the multi-source modeling to demonstrate compliance with the NAAQS. The multi-source modeling will include the proposed source emissions of the NRG Texas project, as discussed above, as well as other nearby sources determined to contribute to ambient concentrations within the modeling SIA and screening area up to 50 kilometers. Results of the cumulative impacts from the multi-source analyses will only be provided at those receptors with preliminary modeling results equal to, or greater than, the applicable SIL. That is only those receptors within the AOI that are potentially "significant" from the NRG Texas project will be included in the full-impact refined multi-source modeling results.

In the event that multi-source modeling analyses are required, a current source list with the associated location coordinates, stack parameters and maximum emission rates will be compiled. This inventory of sources may be included in the multi-source analyses.

To demonstrate compliance with the NAAQS for each averaging period, an appropriate background concentration will need to be added to the total modeled impact.

6.3.3 Cumulative Source Inventory

If any predicted impact from the single source analyses described in Section 6.3.1 of this document exceeds a pollutant SIL, TRC will develop a cumulative source inventory in coordination with TCEQ. The off-property source inventory will be determined by performing a retrieval from the TCEQ APAD and cross-referencing the retrieval with the a spreadsheet that contains the regulated entity numbers (RNs) of sites that are within 10 km of the project site to help verify that off-property sources are addressed.

The current inventories of maximum allowable emission rates for industrial sources within the ROI will be obtained from the TCEQ APAD for use in the PSD cumulative impact assessment. The APAD retrievals will be requested from the Information Resources (IR) Division of the TCEQ to obtain a current list of off-property inventory sources. TRC will work closely with TCEQ staff to develop the final inventory that will be used in the final NAAQS compliance demonstration.

In reviewing the information received from TCEQ, inconsistent or incomplete data for any of the sources in the emission inventories may be identified and corrections or additions may be required. To correct or complete the emission inventories, the pre-construction NSR permits, Title V permits, or other permitting documents may be obtained when necessary. Much of the data necessary to fill in data gaps, such as permit documents (i.e., MAERTs) and air dispersion modeling project files may be obtained electronically on the GroupWise Remote Document Server. Any corrections to the data will be accompanied with documentation that can be validated.

6.4 Stack Parameter Justification

The modeling will be conducted utilizing the conservative modeling parameters described in this section. The use of these parameters is expected to result in conservative off-property concentration estimates. Summary tables of the modeled stack discharge parameters are provided in Appendix E.

6.4.1 Point Source Parameters

Emission sources with traditional stacks such as the NRG Texas combustion turbines, boilers, dew point heater, and engine generator stack will be modeled as point sources using actual emission point stack discharge parameters. The cooling tower fans will be modeled as point sources using actual stack discharge parameters and ambient (0

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Kelvin) discharge temperature. These point sources discharge emissions vertically. The actual stack heights will be used in the modeling analysis for these sources. Each modeled stack meets the Good Engineering Practice (GEP) stack height requirements.

6.4.2 Pseudo-Point Source Parameters

Sources characterized as pseudo-point sources are gas turbine oil vents and storage tanks with equipment openings that do not release to the atmosphere through a standard stack. Emissions from these sources may discharge horizontally or be vertically obscured (capped). These exhausts will be conservatively modeled using default pseudo-point source discharge parameters. These sources were modeled following guidance contained in the AERMOD Implementation Guide for determining the default parameters:

- Exit velocity = 0.001 meter per second (m/s);
- Actual exit temperature, or ambient temperature for storage tanks (0 Kelvin);
- Actual stack diameter; and
- Actual release height.

The exit velocity is set to a nominally low value (0.001 m/s) in order to simulate a release with little or no plume rise, which is expected to provide a conservative estimate of impacts. The actual release height and diameter of the equipment openings will be used in the analysis.

6.4.3 Volume Source Parameters

Fugitive emissions from the fuel and ammonia piping systems for the turbines and boilers at the project site will be modeled as volume sources. The equipment piping fugitive emissions will be modeled with horizontal boundaries that encompass the equipment, and a release height equal to the average height of any potential fugitive release. For each volume source, the height, width, and depth of the release will be defined, and then these limiting dimensions will be used to calculate the initial horizontal and vertical dispersion dimensions as detailed in Table 6-1.

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Table 6-1
Volume Source Stack Parameters

EPN	Modeling ID	Description	Volume Height (ft)	Equivalent Volume Width (ft)	Release Height (ft)	Initial Horizontal Dimension (ft)	Initial Vertical Dimension (ft)
FUGFUEL	FUGFUEL	Fuel System Piping Fugitives	6.0	322.5	3.0	75.0	2.79
FUGNH3	FUGNH3B	Ammonia System Piping Fugitives - Turbines	6.0	142.8	3.0	33.2	2.79
	FUGNH3B	Ammonia System Piping Fugitives - Boilers	6.0	161.2	3.0	37.5	2.79

An example calculation for the fuel system equipment piping fugitives (EPN FUGFUEL) is detailed below. The equipment piping area encompasses a 400′ long × 260′ wide space (volume length and width), and the equipment piping height is 6′ above ground (volume height). The horizontal and vertical dimensions of the fugitive emission source, σ_{y0} and σ_{z0} respectively, were calculated from an equivalent square using the length and width of the equipment piping area and the height of the equipment. Per Appendix K of the TCEQ AQMG[16], the width of the source is divided by 4.3 to determine the horizontal dimension of the volume source, and the height of the source is divided by 2.15. Emissions could come from multiple locations throughout the entire piping structure and therefore the height of release is the center of the volume source above the ground.

$$Area = (400\,ft)\,x\,(260\,ft) = 104{,}000\ ft^2$$
$$Equivalent\ Square\ \ Side = (104{,}000)^{1/2} = 322.5\ ft$$
$$\sigma_{y0} = (3225\,ft) \div (4.3)$$
$$\sigma_{y0} = 75.0\,ft$$
$$\sigma_{z0} = (6\,ft) \div (2.15)$$
$$\sigma_{z0} = 2.79\,ft$$

Documentation for each source volume characterization and complete technical justification will be included in the AQA.

[16] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2, Air Permits Division, Austin, TX, April 2015.

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6.5 Determination of Worst-Case Operating Scenarios

This section details how the worst-case operating scenarios will be determined for the AQA.

6.5.1 Operating Load Levels

The proposed turbine and boiler units will be capable of operating continuously at full load and may also operate part of the time at reduced loads. NRG Texas expects to operate the proposed CHP plant with each boiler and turbine unit capable of operating continuously at full load. NRG Texas also expects to operate the turbines and/or boilers part of the time at reduced loads.

The short-term emission rates included on the TCEQ Table 1(a) correspond to the maximum short-term emission rates across all operating loads. The emission calculations included in the permit application include short-term emission rates and stack exhaust parameters at various load rates and ambient air temperatures. The stack exit velocities are tied directly to the turbine and boilers emission rates, and the highest exit velocities and maximum allowable emission rates occur at 100 percent load.

To ensure that the most conservative (worst-case) off-property concentrations are determined, four load levels will be examined and each modeled separately to determine the worst-case operating scenario for the proposed turbine and boiler operations. Each of the proposed turbines and boilers will be modeled at four load levels as listed below:

Turbine Load Levels

- 100% Load @ the highest emissions associated with the two turbines operating at 100% load with duct firing (turbine and duct burner combined) and the corresponding stack exit velocities and exhaust temperatures associated with this operating level. The proposed maximum allowable emission rates (short-term and annual) occur at 100 percent load with duct firing.
- 75% Load @ the highest emissions associated with the two turbines operating at 75% load, which occurs during worst-case winter conditions (low ambient temperatures) and the corresponding stack exit velocities and exhaust temperatures associated with this load level.
- 50% Load @ the highest emissions associated with the two turbines operating at 50% load, which occurs during worst-case winter conditions (low ambient temperatures) and the corresponding stack exit velocities and exhaust temperatures associated with this load level.

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- 50% Load Summer (lowest exit velocity scenario) ◎ the emissions associated with the two turbines operating at 50% load during summer conditions (high ambient temperatures) and the corresponding stack exit velocities and exhaust temperatures associated with this load level. This scenario has the lowest exit velocities.

Boiler Load Levels

- 100% Load ◎ the highest emissions associated with the three boilers operating at 100% load and the corresponding stack exit velocities and exhaust temperatures associated with this load level. The proposed maximum allowable emission rates (short-term and annual) occur at 100 percent load.
- 75% Load ◎ the highest emissions associated with the three boilers operating at 75% load and the corresponding stack exit velocities and exhaust temperatures associated with this load level.
- 50% Load ◎ the highest emissions associated with the three boilers operating at 50% load and the corresponding stack exit velocities and exhaust temperatures associated with this load level.
- 25% Load (lowest exit velocity scenario) ◎ the highest emissions associated with the three boilers operating at 25% load and the corresponding stack exit velocities and exhaust temperatures associated with this load level. This scenario has the lowest exit velocities.

6.5.2 Maintenance, Startup and Shutdown Scenarios

Startup and shutdown operations for the turbine and boiler emission sources will be limited to less than 100 hours per year and will be considered intermittent for the NO_2 impacts evaluation as detailed in Section 6.7. The 1-hr and 8-hr CO NAAQS evaluation will use the maximum MSS hourly emission rates for the combustion turbines. There are no other MSS rates to be evaluated in this AQA.

6.5.3 Emergency Equipment Emissions

Emissions associated with emergency readiness testing of an emergency diesel generator will be included in the NAAQS preliminary impact determination. The testing of this engine will be conservatively modeled during the worst-case operating scenario. The testing of the emergency diesel generator is limited to 100 hours per year. The emergency diesel generator will be modeled using the scaling factors detailed in Section

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6.6 and as an intermittent facility for the 1-hour NO_2 evaluation as discussed in Section 6.7.

6.5.4 Worst-Case Operating Scenario

In summary, the worst-case operating scenario will consider:

- Multiple operating load scenarios for both turbine and boiler associated emissions;
- MSS emissions as detailed in Section 6.5.2;
- Emissions associated with testing of an emergency diesel generator;
- All other emission sources that operate simultaneously during turbine and boiler operation (i.e., cooling towers, dew point heater, and fugitive sources).

6.6 Scaling Factors

The following scaling factors will be used in this AQA:

- The Tier 2 Ambient Ratio Method (ARM) will be used in this analysis for estimating the conversion of NO_X to ambient NO_2 concentrations. The USEPA has established a national default ARM value (NO_X-to-NO_2 ratio) of 0.80 for the 1-hour averaging period suggested by USEPA's March 1, 2011, guidance document. The national default ARM value of 0.75 is still applicable to annual NO_2 NAAQS analyses.
- The daily, or 24-hour, emission rate will be modeled for the $PM_{2.5}$ 24-hour NAAQS and PSD increment modeling evaluation for the boiler and turbine emission sources based on the equipment manufacturer expected daily $PM_{2.5}$ emission rates.
- The daily, or 24-hour, emission rate will be modeled for the PM_{10}/$PM_{2.5}$ 24-hour NAAQS and PSD increment modeling evaluation for the emergency diesel engine based on operating the emergency equipment one-hour per day for testing and maintenance. In addition, the emergency diesel engine is not operated for testing and maintenance between the hours of 6:00 am to noon per 30 TAC Chapter 117 regulations, making the daily emission rates based on 18 hours per day. An emission rate scalar will be used in the AERMOD input files to zero the emissions from the emergency generator during the hours of 6:00 am to noon.
- The emergency diesel engine is not operated more than 100 hours per year for non-emergency testing and maintenance. Therefore the emergency diesel engine will be considered an intermittent facility for the 1-hour NO_2 NAAQS modeling since this source operates less than 100 hours per year.
- The startup and shutdown operations (MSS activities) for the boilers and turbines will be limited to less than 100 hours per year. Therefore the boilers and turbines startup and

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shutdown emissions will be considered intermittent for the short-term (1-hour) NO_2 NAAQS modeling since these MSS activities occur less than 100 hours per year.

Further discussion of intermittent facilities is includes in the following section.

6.7 Modeling Procedures for the NO_2 NAAQS Demonstration

The air quality modeling analysis for the 1-hour NO_2 NAAQS will be performed consistent with the guidance and procedures established in the March 1, 2011 guidance memorandum from Tyler Fox (USEPA OAQPS) titled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 NAAQS" (Memorandum)[17]. Based upon the discussion in the memorandum regarding the treatment of intermittent sources it is proposed that only equipment or operating scenarios that "are continuous or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations" will be included in the 1-hour NO_2 modeling analysis.

It is noted that USEPA's guidance in Table 8-2 of Appendix W involves a degree of conservatism in the modeling assumptions for demonstrating compliance with the NAAQS by recommending the use of maximum allowable emissions. However, the intermittent nature of the actual emissions associated with the boiler and turbine startup operations in many cases, when coupled with the probabilistic form of the standard, could result in modeled impacts being significantly higher than actual impacts would realistically be expected to be for these emission scenarios. The probability of a particular boiler and turbine startup actually coinciding with the worst-case meteorological conditions is relatively low and assuming continuous emissions would significantly overestimate actual impacts for these sources.

For this type of intermittent operation, the TCEQ ADMT recommends combining the annualized MSS NOx emissions with the allowable "routine" NOx emissions to account for the intermittent emissions in the modeling as follows:

- For the boilers, the annualized MSS NOx emission rate of 0.12 lb/hr (10.51 lb/hr x 100/8760) will be combined with the maximum allowable routine NOx emission rate of 4.17 lb/hr to account for the intermittent emissions in the modeling [4.17 lb/hr + 0.12 lb/hr = 4.29 lb/hr].
- For turbines, the annualized MSS NOx emission rate of 0.53 lb/hr (47.0 lb/hr x 100/8760) will be combined with the maximum allowable routine NOx emission rate of 5.42 lb/hr to account for the intermittent emissions in the modeling [5.42 lb/hr + 0.53 lb/hr = 5.95 lb/hr].

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[17] U.S. EPA OAQPS Memorandum, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 NAAQS*, March 1, 2011.

The emergency diesel engine is used exclusively in emergency situations, and is not operated more than 100 hours per year for non-emergency testing and maintenance. Therefore the emergency diesel engine will be considered an intermittent facility for the short-term (1-hour) NO_2 NAAQS modeling. The annualized NO_X emission rate [2.21 lbs/hr x 100/8760 = 0.025 lbs/hr] will be modeled for the short-term NO_2 NAAQS modeling analysis.

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Section 7
Models Proposed and Modeling Techniques

This section describes the procedures that are proposed for conducting the Class II air quality modeling analyses, including the model to be employed, the model input options, and the supporting data.

The purpose of the air quality impact analyses is to assess the model-predicted ground level air quality concentrations at Class II areas within 50 km of the site and compare the predicted impacts with applicable state and federal ambient air quality standards and significance level guideline concentrations. This discussion is provided for reference and completeness relative to the NRG Texas project.

The air dispersion modeling compliance demonstration will be performed in accordance with the requirements discussed in the USEPA Guideline on Air Quality Models (40 CFR 51 Appendix W), current USEPA methodology such as the AERMOD Implementation Guide, and guidance from TCEQ staff.

The Guideline on Air Quality Models states that AERMOD is a preferred air quality model for near-field applications (within 50 km) in areas with both simple and complex terrain. In accordance with the Guideline on Air Quality Models, and discussions with the TCEQ permitting staff, TRC proposes to use AERMOD model version 15181 and the associated preprocessors (AERMAP) necessary for the compliance demonstration[18].

7.1 AERMOD Model Options

TRC proposes to apply the AERMOD model in its ◎regulatory default◎ mode as described in this section:

- Regulatory default option will be enabled.
- Elevated terrain will be used for the modeling the area around the facility. The terrain data preprocessor (AERMAP, version 11103) will be used to calculate elevations for all sources, buildings, tanks, and receptors.
- The regulatory default options include stack heights adjusted for stack-tip downwash, buoyancy-induced dispersion, and final plume rise.

[18] EPA, Office of Air Quality Planning and Standards, *Federal Register* Vol. 70 / No. 216, pp. 68,218-68,261, 40 CFR 51, Appendix W, *Revision to Guideline on Air Quality Models*, November 9, 2005.

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- Ground-level concentrations occurring during ◎calm◎ wind conditions will be calculated by the model using the calm processing feature.
- Modeling receptors will be placed to a distance that clearly identifies the area of impact.
- The profile base elevation parameter will be set to the Lake Charles Regional Airport (LCH) meteorological station base elevation of 5 meters (16.4 feet).

7.2 PSD NAAQS and PSD Increment Consumption Analyses

A preliminary impact determination will be conducted to commence the PSD NAAQS and PSD increment consumption analyses to predict whether proposed emissions from the project could make a significant impact on existing air quality. Preliminary modeling will be conducted for proposed emissions of PM_{10}, $PM_{2.5}$, SO_2, NO_2, and CO to determine whether a refined modeling analysis is required for each pollutant and averaging period. If the predicted concentration of a criteria pollutant is equal to, or exceeds, the applicable SIL, PSD regulations require a full-impact refined analysis (refined analysis) be performed for that pollutant.

The refined analysis includes the estimated contributions from existing non-project sources, off-property retrieval sources, and background concentration estimates. For those pollutants and averaging periods where the preliminary modeling results indicate concentrations greater than the SIL, the preliminary modeling results would also be used to define the AOI within which the refined modeling analysis must be carried out. Results of the full-impact refined analysis will be provided only for those receptors with preliminary modeling results equal to, or greater than, the applicable SIL. That is only those receptors within the AOI that are potentially ◎significant◎ from the NRG Texas project will be included in the full-impact refined analysis modeling results.

AERMOD will be used to predict concentrations at and beyond the fence line over the significant receptors within the AOI from all retrieved sources and sources to be permitted. Background concentrations as determined in Section 5 of this protocol will be added to the full-impact refined modeling results. The predicted concentration plus background concentration for each pollutant will be compared to the appropriate NAAQS and PSD increment.

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Section 8
Selection of Dispersion Options

Meteorological data was developed for this AQA according to the TCEQ-approved meteorological data processing protocol. This protocol included steps taken to describe surface characteristics of the site and incorporate high temporal frequency observations to create a robust and updated meteorological data set.

The surface characteristics used in the AERMET stage 3 processing were calculated using USEPA's AERSURFACE. AERSURFACE was run with the center coordinates of the study radius corresponding to the center of the project's proposed sources. Surface characteristics (surface roughness, albedo, and Bowen Ratio) were evaluated at the project site following TCEQ guidance. These inputs were generated using AERSURFACE (version 13016) which utilized the 1992 National Land Cover Dataset (NLDC92)[19]. A copy of the Meteorological Data Processing Protocol is included as Appendix G.

[19] NLCD92 state-scale archive. http://www.mrlc.gov/nlcd92_data.php

Section 9
Building Wake Effects (Downwash)

The emission sources considered in this analysis were evaluated in terms of their proximity to nearby buildings and structures. The purpose of this evaluation is to determine if stack discharges might become caught in the turbulent wakes of these structures. Building downwash effects were included in the modeling based on guidance provided in the *User's Guide to the Building Profile Input Program* (USEPA, October 1993). The USEPA currently requires that all building downwash be determined using the USEPA Building Profile Input Program (BPIP-Prime) subroutine (version 04274).

9.1 Good Engineering Practice (GEP) Stack Height Analyses

USEPA provides specific guidance for determining the Good Engineering Practice (GEP) stack height and for determining whether building downwash will occur in the *Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations* (USEPA-450/4-80-023R). GEP is defined as "the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes that may be created by the source itself, nearby structures, or nearby terrain "obstacles".

The GEP definition is based on the observed phenomenon of atmospheric flow in the immediate vicinity of a structure. It identifies the minimum stack height at which significant adverse aerodynamics (downwash) are avoided. The USEPA GEP stack height regulations specify the GEP stack height calculation based on the following equation:

$$H_{GEP} = H_B + 1.5L$$

where:

H_B = the height of adjacent or nearby structures, and

L = the lesser dimension (height or projected width) of the adjacent or nearby structures.

The direction-specific downwash parameters will be determined using the USEPA-approved *Building Profile Input Program for PRIME (BPIPPRM, Version 04274)*. The major structures of the CBSGS will be included in the BPIPPRM run to ensure that the GEP analysis is complete.

Figures 9-1 illustrates all project structures that will be included in the BPIP analysis for the NAAQS preliminary impact determination. During any required PSD increment consumption analysis modeling, additional pre-existing structures within the Chocolate Bayou plant will be included during the PSD increment consumption analysis modeling (see Figure 9-2). The buildings selected for the BPIP analysis are consistent with prior modeling analyses approved by TCEQ, with the addition of new structures associated with the project.

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Figure 9-1 Aerial View and Illustration of BPIP Structures (NAAQS SIL Analysis)

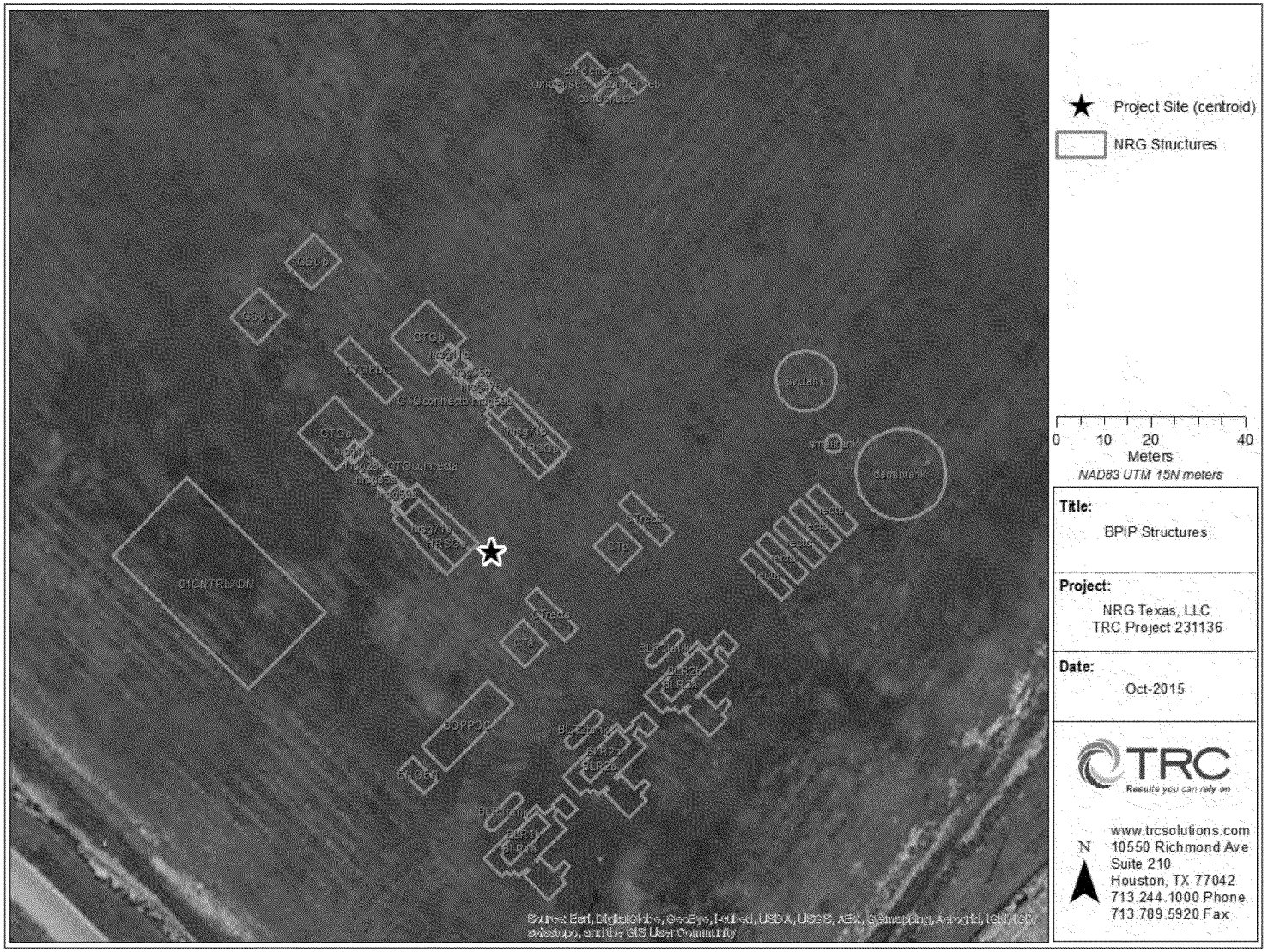

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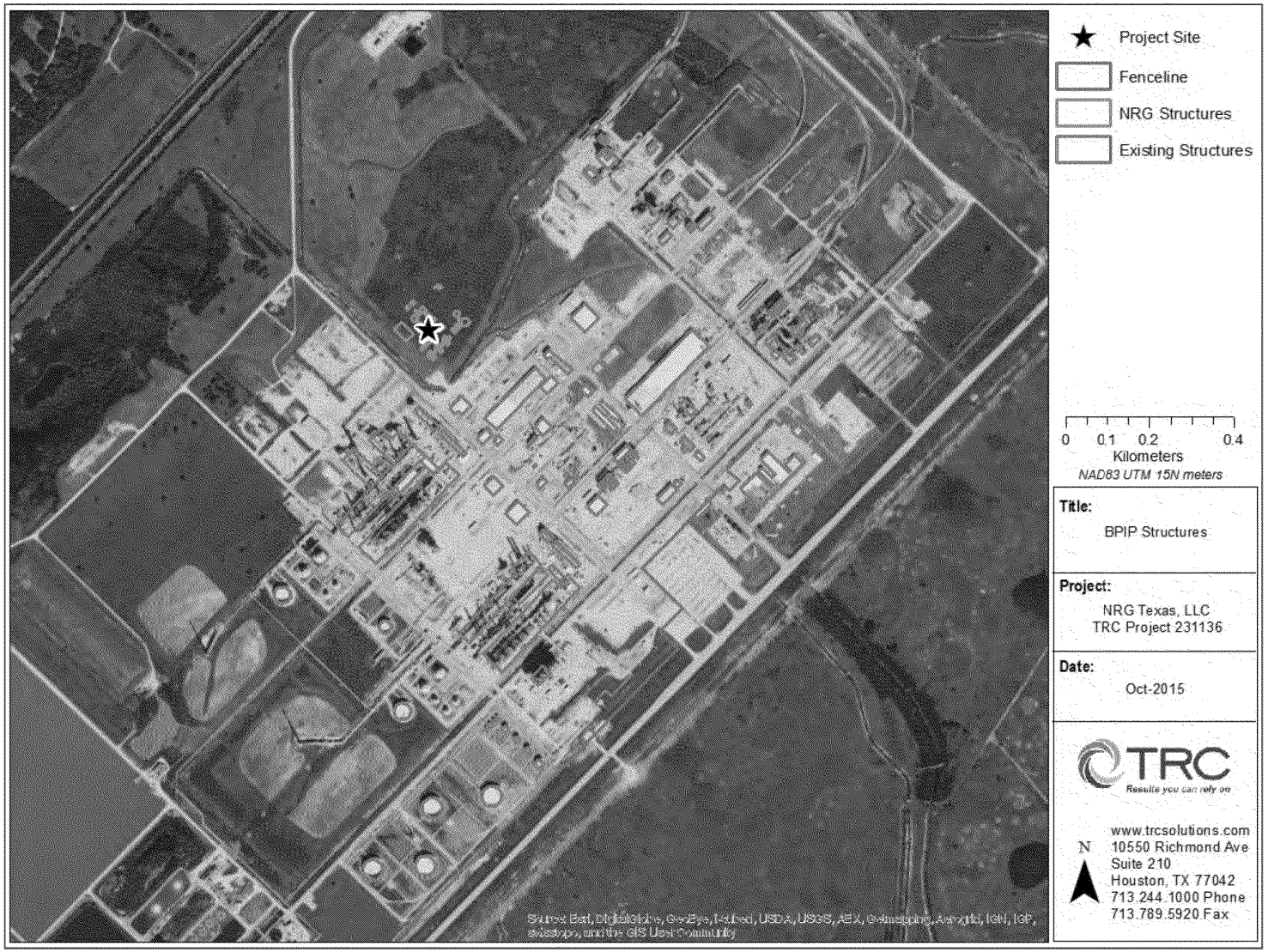
Figure 9-2 Aerial View and Illustration of BPIP Structures (PSD Increment Analysis)



Section 10
Terrain

The change in elevation around the NRG Texas site will be processed by the AERMAP terrain preprocessing program (USEPA, 1998c) before input to the AERMOD model. U.S.G.S. National Elevation Dataset (NED) data will be used to automate the task of assigning terrain elevations to sources, receptors, buildings, tanks, and the surrounding terrain. The NED is a seamless dataset with the best available raster elevation data of the conterminous United States.

NED data will be obtained for the area the covers all of the sources and receptors, including the TCEQ-supplied APAD emission sources located within the ROI. NED data at resolutions of 1 arc-second (30 meters) will be used in the impacts analysis to calculate terrain elevations. Elevations of hill heights for all sources, buildings, tanks and receptors were calculated through linear interpolation using AERMAP.

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Section 11
Receptor Grid

TCEQ modeling guidance regarding receptor grid spacing will be utilized in the AQA. Modeling receptors will be placed to a distance that clearly identifies the maximum predicted impacts. The receptor grid used in the AQA will capture the appropriate maximum ground level concentration, and any exceedances; for all pollutants, operating scenarios, and review types.

The AERMOD dispersion model will be used to calculate potential impacts from emissions associated with the proposed plant changes at specific ambient air receptors in a grid designed to cover the entire modeling domain of interest.

The receptor grid will be prepared using AERMAP (version 11103), the receptor and terrain pre-processor for AERMOD. Each receptor's terrain height, and the variable HCRIT, will be extracted using AERMAP. Terrain elevations will be calculated for all receptors using U.S.G.S. NED data, which will be processed by the AERMAP terrain preprocessing program before input to the AERMOD model. North American Datum of 1983 will be used for the receptor UTM coordinates.

The terrain in the area of the NRG Texas is relatively flat with a general slight slope downward toward the Chocolate Bayou and Gulf Coast. Figures 3-1 through 3-3B illustrate the terrain near the plant site.

The full receptor grid consists of a total of 22,631 discrete points consisting of multiple nested grids with varying horizontal spacing, centered on the property of the plant site. The receptor grid consists of fence line receptors with 25 meter spacing, and a Cartesian grid with 25 meter spacing extending out to a distance of approximately 300 meters in each direction from the fence line. The grid then extends out to a distance of one kilometers in each direction from the project, with a spacing of 100 meters in both the X and Y directions. From a distance of 1 to 5 kilometers, the grid consists of 500-meter spaced receptors. Beyond 5 kilometers, the receptors are placed at a one kilometer spacing out to the edges of the grid at a distance of 50 kilometers.

A block of 25 meter receptors within the fence line will be included as these receptors cover an area used by the Lyondell facility.

Figures 11-1 through 11-4 show plots of the resulting proposed receptor grids for the modeling domain.

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Figure 11-1 High Density Receptor Grid

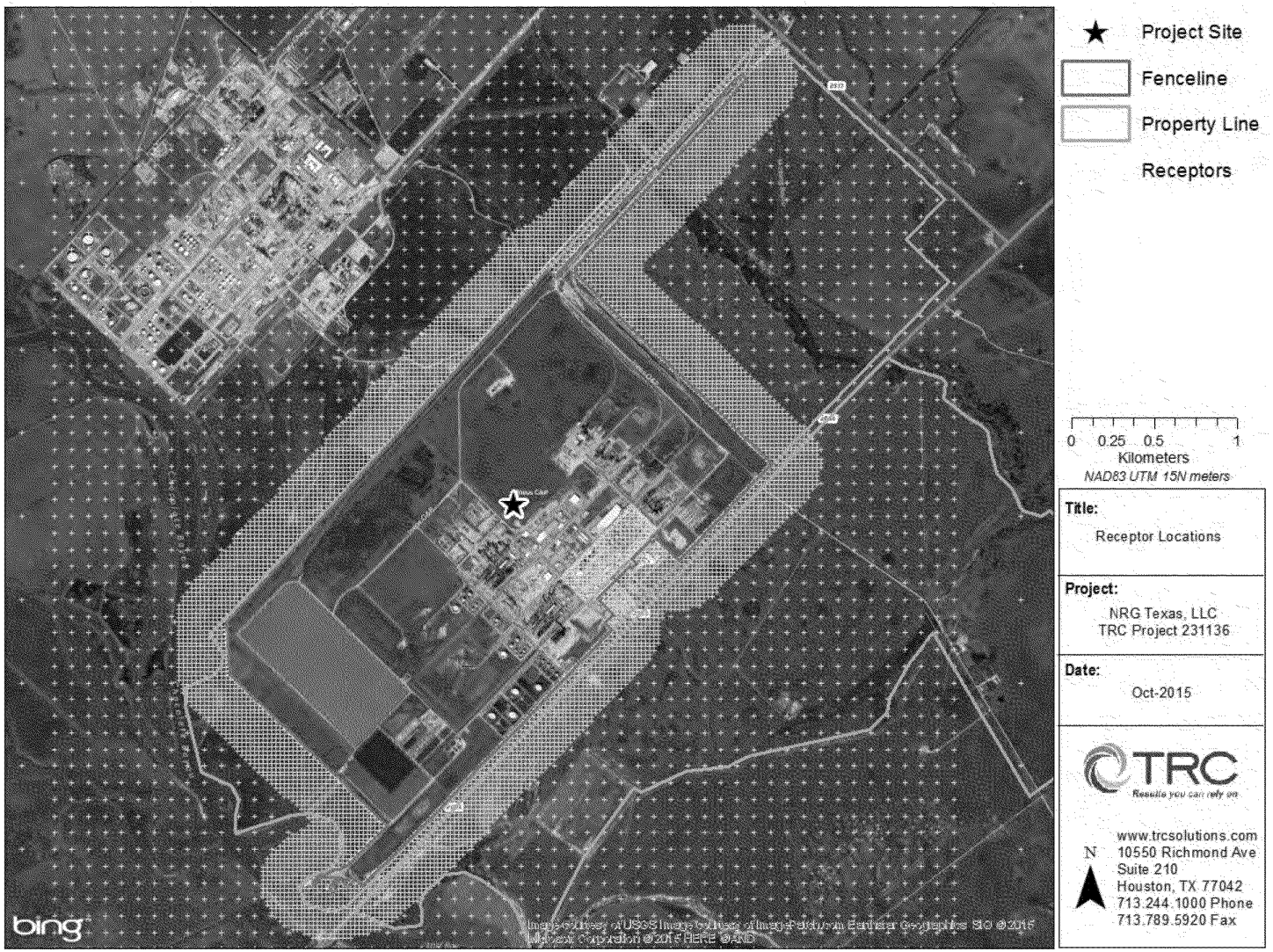

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Figure 11-2 Stepped Receptor Grid 1

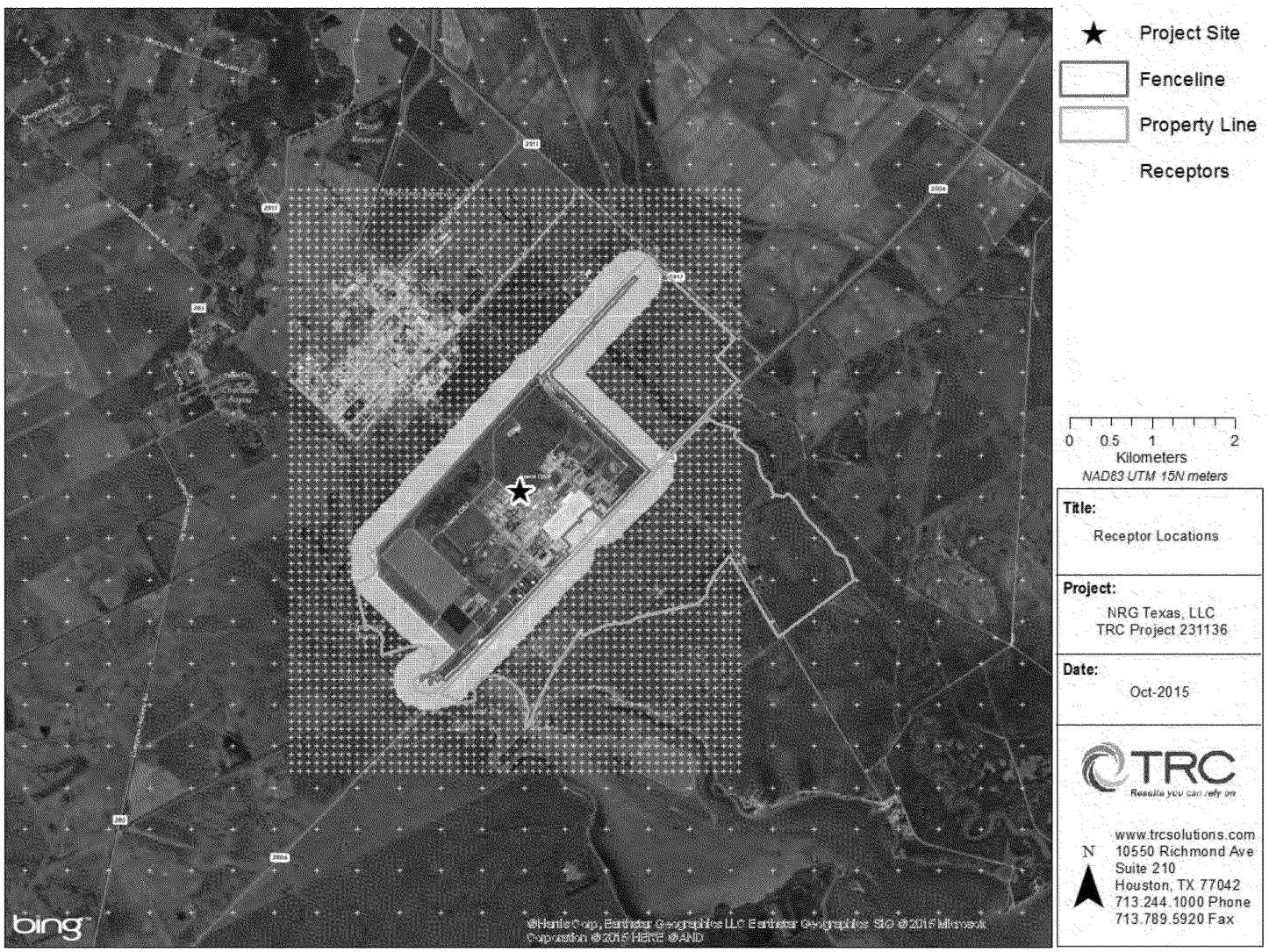

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Figure 11-3 Stepped Receptor Grid 2

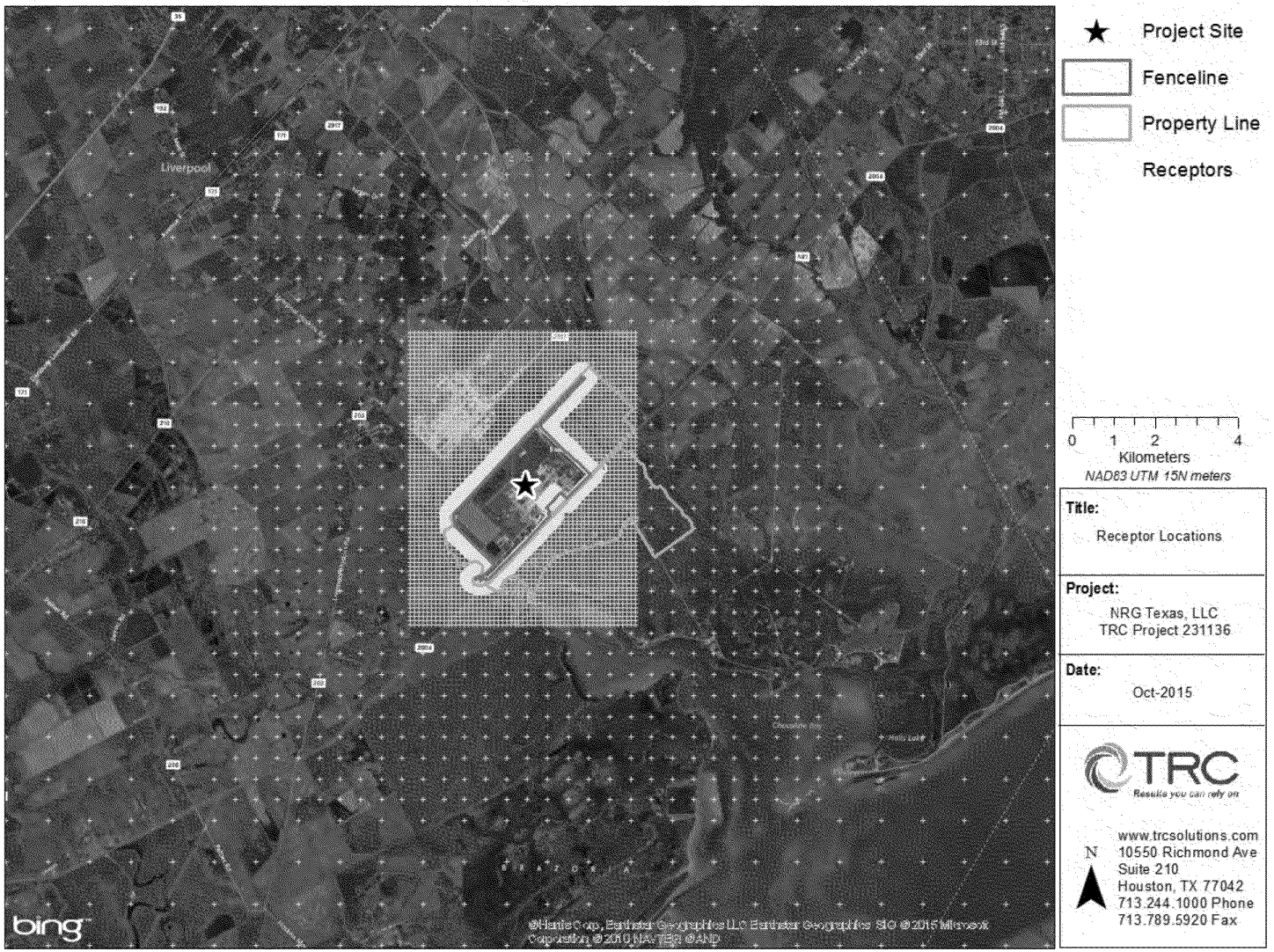

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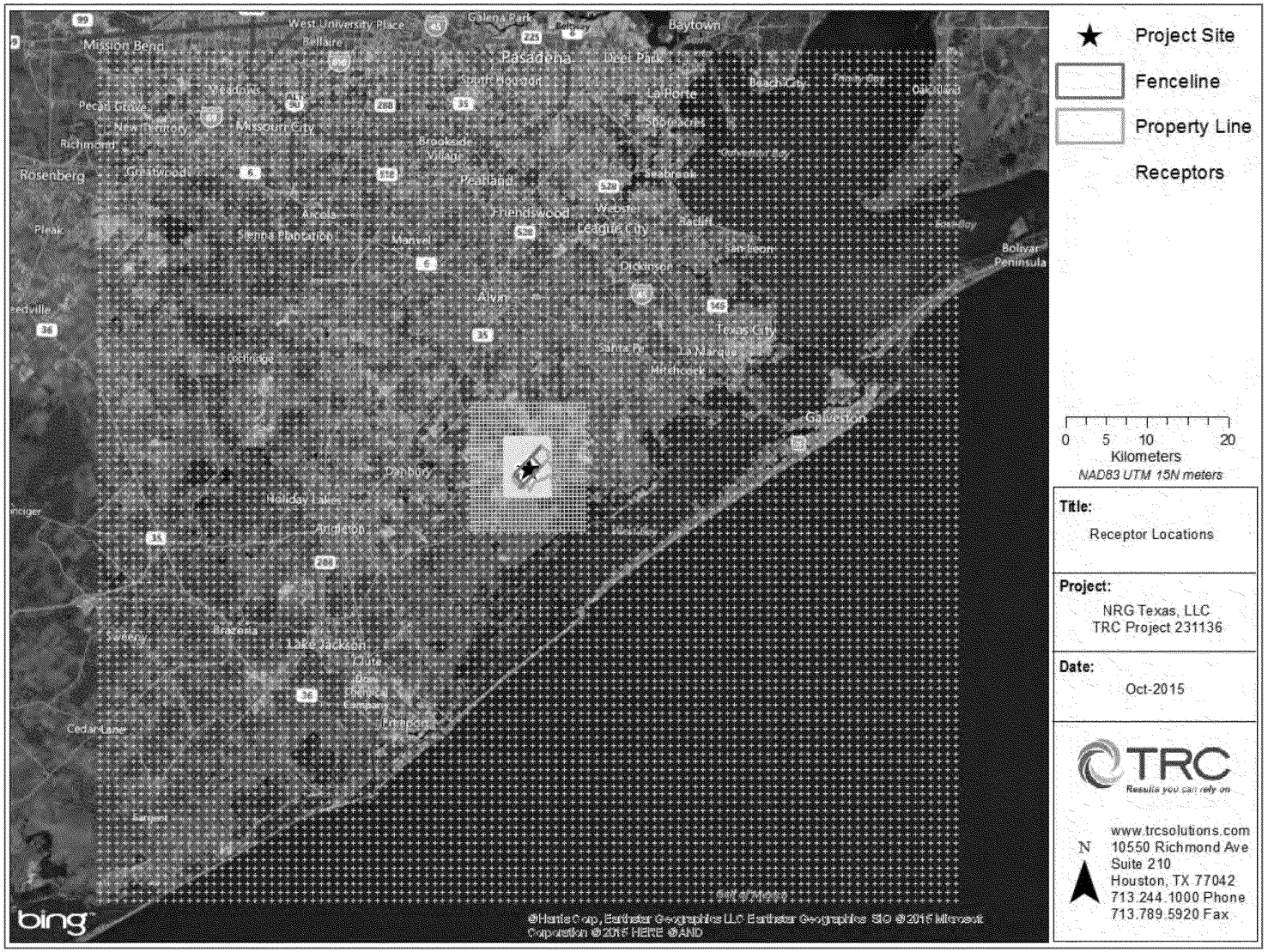
Figure 11-4 Stepped Receptor Grid 3



Section 12
Meteorological Data

NRG Texas submitted to and had approved by TCEQ ADMT a meteorological data processing protocol describing in detail the steps taken to produce a five-year (2010-2014) meteorological data set to be used in the AQA. That protocol and accompanying communication with TCEQ is attached as Appendix G.

The AERMOD model requires several hourly meteorological parameters, including wind speed, wind direction, temperature and parameterizations of atmospheric stability to calculate pollutant dispersion and resulting concentrations at each model receptor. Current modeling Guidance (40 CFR 51 Appendix W) requires the use of a minimum of one year of on-site meteorological data, or five years of sequential hourly data from a representative off-site station, to demonstrate compliance with the applicable ambient air quality standards. The meteorological database used for modeling must include a concurrent period of upper air and surface observation data.

The meteorological data record is comprised of 42,970 hours of valid data that represent more than 98 percent of the annual hours and meets and exceeds the data completeness requirement for modeling data as was noted in the meteorological data processing protocol approved by TCEQ ADMT.

The frequency distribution of the data indicates relatively moderate wind speeds, with 68 percent of all hours recording speeds between 2.1 and 8.8 meters per second (m/s), and 4.9 percent of the hours are reported as calm.

The average wind speed for the period of record is 3.68 m/s. The wind direction data show a predominant wind from the south to southeast sector. A secondary prevalent sector is indicated to be from the northern sector. The wind rose is indicative of thermal land-sea breezes of the area due to proximity to the Gulf of Mexico. Please refer to Figures 12-1 and Figure 12-2.

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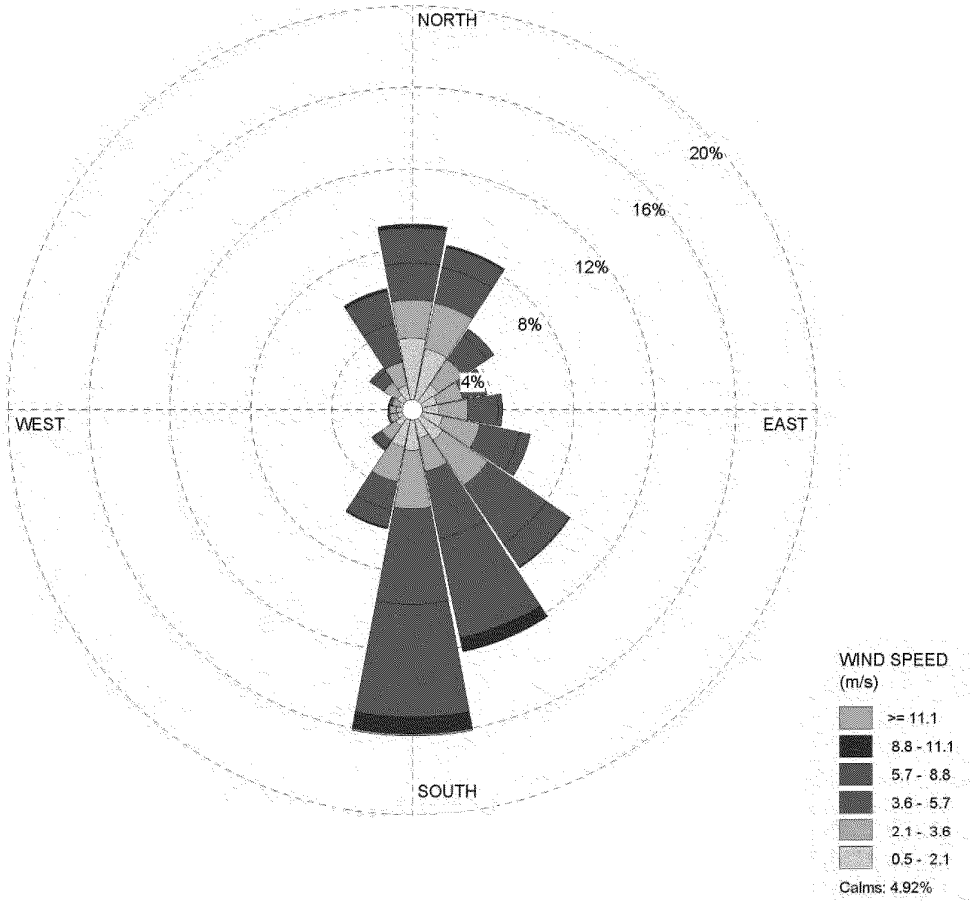
Figure 12-1 Meteorological Data Wind Rose

WIND ROSE PLOT:
NRG TEXAS Combined Heat and Power Project
Texas Gulf Coast Regional Airport / Brazoria County Airport (LBX)

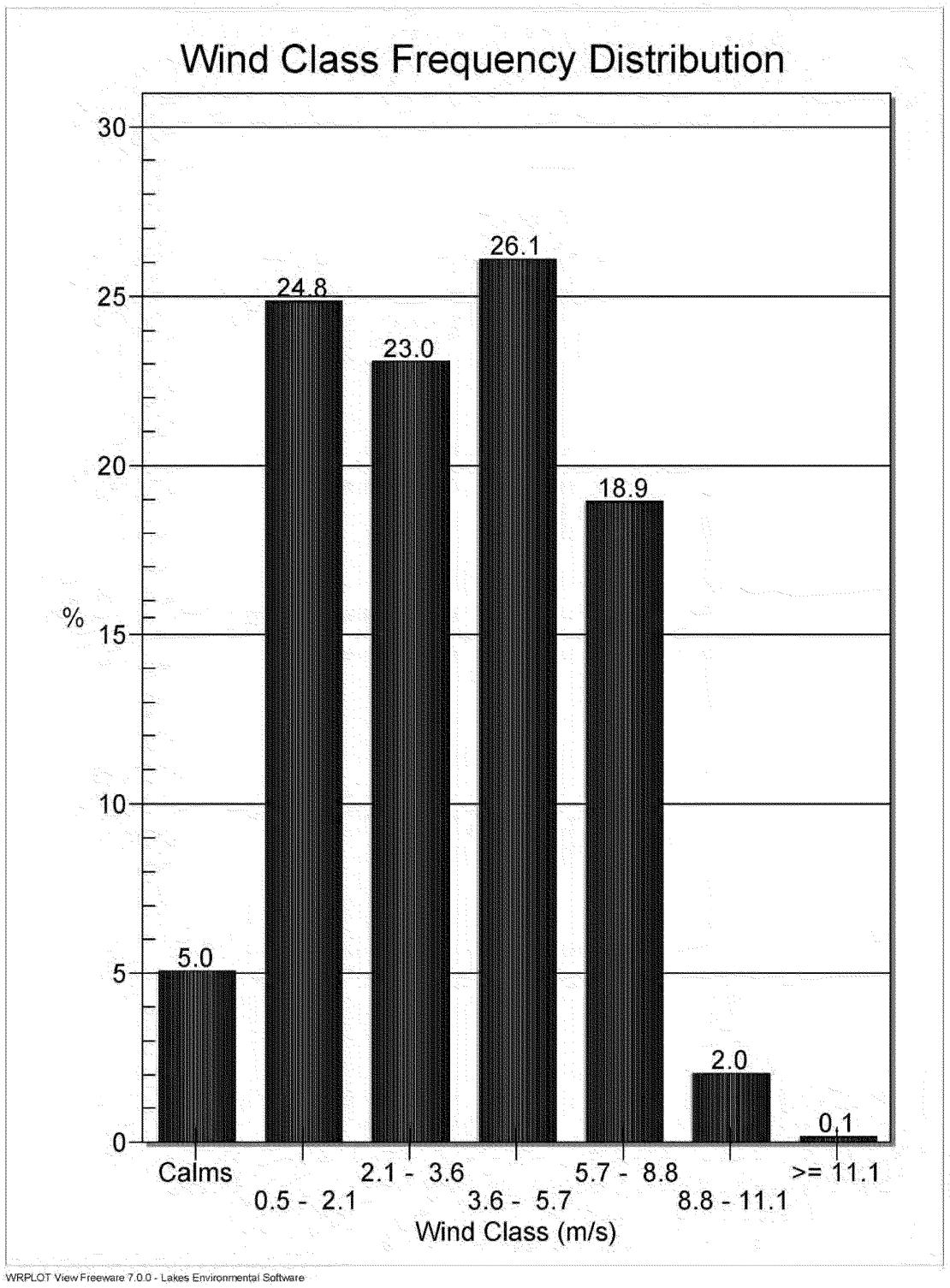


COMMENTS:		COMPANY NAME: **TRC Environmental Corporation**	
		MODELER: **Matthew S Jones**	TRC Results you can rely on
	CALM WINDS: **4.92%**	TOTAL COUNT: **42970 hrs.**	
	AVG. WIND SPEED: **3.68 m/s**	DATE: **10/14/2015**	PROJECT NO.: **231136**

WRPLOT View - Lakes Environmental Software

ED_001261_00098075

Figure 12-2 Meteorological Data Wind Frequency Distribution Chart



WRPLOT View Freeware 7.0.0 - Lakes Environmental Software

Section 13
Modeling Results

Upon review and final approval of this modeling protocol by TCEQ, TRC will commence the modeling analyses in accordance with the agreed upon protocol.

The modeling results for pollutants evaluated will be compared to applicable NAAQS, PSD increments, State Property Line standards, and ESLs. For the Health Effects analyses, the predicted the high, first high (H1H) concentration will be reported for the 1-hr and annual averaging times. Frequency of occurrence of predicted concentrations above ESL levels will be presented for industrial and nonindustrial areas and at the location of the nearest nonindustrial receptor.

For the NAAQS significance analyses, in general, the predicted H1H concentration for each pollutant will be reported. The results of the modeling for 24-hr and annual $PM_{2.5}$, 1-hr NO_2, and 1-hr SO_2 analyses will be presented as the highest five-year average of the maximum modeled concentrations predicted each year at each receptor, consistent with USEPA guidance.

For the full NAAQS analyses, the following methodology will be used in reporting the results for each criteria pollutant:

- For 24-hr PM_{10}, the maximum predicted high, sixth high (H6H) predicted concentration from all receptors for the 24-hr averaging time will be reported when using five years of meteorological data.
- For 24-hr $PM_{2.5}$, the highest H8H, or 98th percentile impact, predicted concentrations from all receptors for the 24-hr averaging time will be reported when using five years of meteorological data. For the annual $PM_{2.5}$, the highest five-year average of the modeled annual average predicted concentrations from all receptors will be reported when using five years of meteorological data. Model predicted impacts for $PM_{2.5}$ will be increased by a factor of 1.017 to account for the secondary formation of $PM_{2.5}$ as detailed in Section 2.4.2.
- For 1-hr SO_2, the maximum five-year average of the 99th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, fourth high (H4H) predicted concentration) determined for each receptor will be reported when using five years of meteorological data. For 3-hr and 24-hr SO_2, the maximum H1H predicted concentration from all receptors for the 3-hr and 24-hr averaging times will be reported when using one year of meteorological data. For annual SO_2, the maximum predicted concentration from all receptors across one year of meteorological data will be reported.

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- For the 1-hr NO_2, the maximum five-year average of the 98th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, eighth high (H8H) predicted concentration) determined for each receptor will be reported when using five years of meteorological data. For annual NO_2, the maximum predicted concentration from all receptors across one year of meteorological data will be reported.
- For 1-hr and 8-hr CO, the maximum H2H predicted concentration from all receptors for the 1-hr and 8-hr averaging times will be reported when using five years of meteorological data.

The modeling analyses will be summarized in a written modeling report that will be submitted as expeditiously as possible thereafter. The modeling report will summarize the final modeling input parameters used, the methods employed and the compliance status relative to the significance levels and the NAAQS.

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Section 14
Digital Information

All generated modeling and downwash input and output files and ancillary data files will be submitted electronically via USB flash drive. The meteorological data, AERSURFACE files, elevation data, downwash structure BPIP data, and AERMAP files utilized in the AQA will be included as part of the electronic files submission with the final report. Electronic copies of the modeling protocol, plot plans, and maps will be included on the USB flash drive.

ED_001261_00098075

Section 15
References

40 CFR Part 51, Appendix W: Revision to the Guideline on Air Quality Models (GAQM): Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005

Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations (EPA-450/4-80-023R).

Meteorological Monitoring Guidance for Regulatory Modeling Applications, (EPA-454/R-99-005), February 2000.

AERSURFACE Users Guide (EPA-454/B-08-001), January 2008, (Revised 01/16/2013).

AERMINUTE Users Instructions DRAFT, November 2011.

Users Guide for the AERMOD Meteorological Preprocessor (AERMET), (EPA-454/B-03-002), November 2004, (Revised December 2012) with Addendum.

Users Guide for the AERMOD Terrain Preprocessor (AERMAP), (EPA-454/B-03-003) October 2004, (Revised March 2011) with Addendum.

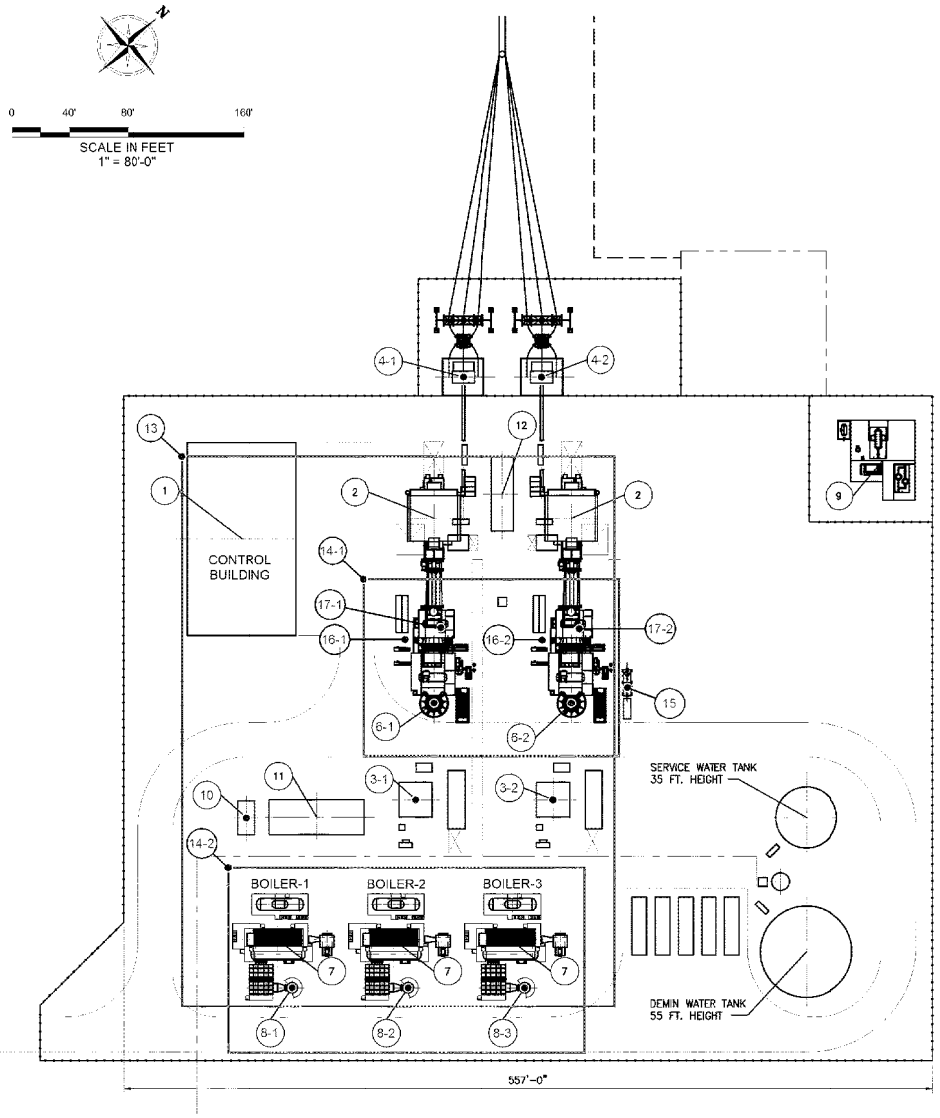
Users Guide for the AMS/EPA Regulatory Model AERMOD, (EPA-454/B-03-001), September 2004, (Revised December 2012) with Addendum.

AERMOD Implementation Guide, Last Revised: March 19, 2009; AERMOD Implementation Workgroup.

FLAG, 2010. U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service. 2010. Federal Land Manager' Air Quality Related Values Workgroup (FLAG). Phase I Report-revised 2010. Natural Resource Report NPS/NRPC/NRR-2010/232. National Park Service, Denver, Colorado.

U.S. Environmental Protection Agency (EPA), 1998: Interagency Workgroup on Air Quality Modeling (IWAQM), Phase 2 Report: Summary Report and Recommendation for Modeling Long Range Transport and Impacts on Regional Visibility. EPA-454/R-98-019.

Appendix A
Plot Plan



Plot Plan ID	EPN	Source Description	Easting (X) (m)	Northing (Y) (m)
8-1	BLR1	Auxiliary Boiler 1 Stack	286,464	3,236,008
8-2	BLR2	Auxiliary Boiler 2 Stack	286,481	3,236,026
8-3	BLR3	Auxiliary Boiler 3 Stack	286,498	3,236,043
6-1	TURBINE1	Gas Turbine 1 HRSG Stack	286,442	3,236,071
6-2	TURBINE2	Gas Turbine 2 HRSG Stack	286,462	3,236,092
3-1	CTWR1	Chiller Cooling Tower - Cell 1a	286,455	3,236,053
		Chiller Cooling Tower - Cell 1b	286,473	3,236,076
3-2	CTWR2	Chiller Cooling Tower - Cell 2a	286,475	3,236,074
		Chiller Cooling Tower - Cell 2b	286,452	3,236,056
4-1	FUG-SF6	Circuit Breaker Leak Fugitives	286,397	3,236,125
4-2	FUG-SF6	Circuit Breaker Leak Fugitives	286,409	3,236,136
9	DP-HTR	Fuel Gas Dew Point Heater	286,470	3,236,174
10	EDG	Emergency Diesel Generator Stack	286,430	3,236,024
13	FUG-FUEL	Fuel System Fugitives	286,447	3,236,063
14-1	FUG-NH3	Ammonia System Fugitives	286,444	3,236,087
14-2	FUG-NH3	Ammonia System Fugitives	286,477	3,236,028
15	DTANK	Diesel Storage Tank	286,465	3,236,098
16-1	LUBE-TANKS	Turbine Lube Oil Tank 1	286,425	3,236,082
16-2	LUBE-TANKS	Turbine Lube Oil Tank 2	286,446	3,236,102
17-1	LUBE-VENT	Turbine Oil Vent 1	286,421	3,236,099
17-2	LUBE-VENT	Turbine Oil Vent 2	286,434	3,236,112

Plot Plan ID	Structure/Equipment
1	Control Building
2	Gas Turbine Generators (GTGs)
4	GSU Transformers
7	Auxiliary Boilers
11	BOP Power Distribution Center
12	GTG Power Distribution Center

LEGEND

● PROPOSED EMISSION POINT NUMBER (EPN)

▭ VOLUME SOURCE FUGITIVES

PROJECT
NRG TEXAS POWER, LLC
Chocolate Bayou Steam Generating Station
Brazoria County, Texas

SHEET TITLE
FACILITY PLOT PLAN
Permit 123117 and Nonattainment Permit N204

DRAWN BY:	O.F.	DATE:	OCTOBER 2015
APPROVED BY:	E.S.	PROJ. No:	231136.0000.0000

TRC
10550 RICHMOND AVENUE
SUITE 210
HOUSTON, TEXAS 77042
713-244-1000

FIGURE
A-1

HOU L:\NRG Texas Power LLC\Chocolate Bayou Station\ Fig A-1 - NRG-ChocolateBayou - Facility Plot Plan.dwg 10/23/15

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FIGURE A-2: AERIAL PLOT PLAN
NRG TEXAS POWER, LLC – CHOCOLATE BAYOU STEAM GENERATING STATION

Fenceline

Property Line

Lyondell Property Line

NRG TEXAS Project Outline

0 0.075 0.15 0.3
Kilometers
NAD83 UTM 15N meters

Title:
Facility Plot Plan Aerial

Project:
NRG Texas, LLC
TRC Project 231136

Date:
Oct-2015

TRC
Results you can rely on

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10550 Richmond Ave
Suite 210
Houston, TX 77042
713.244.1000 Phone
713.789.5920 Fax

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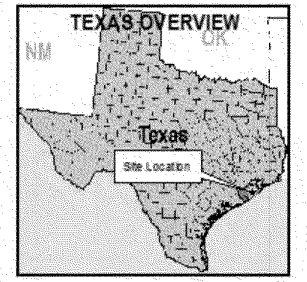
Appendix B
Area Map

FIGURE B-1: AREA MAP
NRG TEXAS POWER, LLC – CHOCOLATE BAYOU STEAM GENERATING STATION

Property Line Distance Buffers
Property Line
Fenceline
Lyondell Property Line
NRG TEXAS Project Outline



0 0.45 0.9 1.8
Kilometers
NAD83 UTM 15N meters

Title:
Facility Plot Plan Aerial

Project:
NRG Texas, LLC
TRC Project 231136

Date:
Oct-2015

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Appendix C
TCEQ Table 1(a)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: October 2015	Permit No.: 123117 - Nonattainment N102	Regulated Entity No.: RN100238708
Area Name: Chocolate Bayou Steam Generating Station		Customer Reference No.: CN603207218

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					
1. Emission Point			2. Component or Air Contaminant	3. Air Contaminant Emission Rate	
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)
BLR1	BLR1	Auxillary Boiler 1 (Natural Gas/Composite Fuel)	NO_X	4.17	18.59
			NO_X (MSS)	10.51	
			CO	15.22	66.65
			VOC	0.54	2.44
			VOC (MSS)	2.02	
			$PM/PM_{10}/PM_{2.5}$	1.95	8.53
			SO_2	0.05	0.20
			H_2SO_4	0.01	0.04
			NH_3	1.85	8.10
			GHG	-	263,782
			CO_2e	-	264,791
BLR2	BLR2	Auxillary Boiler 2 (Natural Gas/Composite Fuel)	NO_X	4.17	18.59
			NO_X (MSS)	10.51	
			CO	15.22	66.65
			VOC	0.54	2.44
			VOC (MSS)	2.02	
			$PM/PM_{10}/PM_{2.5}$	1.95	8.53
			SO_2	0.05	0.20
			H_2SO_4	0.01	0.04
			NH_3	1.85	8.10
			GHG	-	263,782
			CO_2e	-	264,791
BLR3	BLR3	Auxillary Boiler 3 (Natural Gas/Composite Fuel)	NO_X	4.17	18.59
			NO_X (MSS)	10.51	
			CO	15.22	66.65
			VOC	0.54	2.44
			VOC (MSS)	2.02	
			$PM/PM_{10}/PM_{2.5}$	1.95	8.53
			SO_2	0.05	0.20
			H_2SO_4	0.01	0.04
			NH_3	1.85	8.10
			GHG	-	263,782
			CO_2e	-	264,791

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: October 2015	Permit No.: 123117 - Nonattainment N102	Regulated Entity No.: RN100238708
Area Name: Chocolate Bayou Steam Generating Station		Customer Reference No.: CN603207218

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					
1. Emission Point			2. Component or Air Contaminant	3. Air Contaminant Emission Rate	
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)
TURBINE1	TURBINE1	Gas Turbine w/ Duct Firing (GE LM 6000)	NO_X	5.42	25.80
			NO_X (MSS)	47.00	-
			CO	6.60	38.78
			CO (MSS)	203.60	-
			VOC	0.68	3.70
			VOC (MSS)	15.00	-
			$PM/PM_{10}/PM_{2.5}$	6.98	30.58
			SO_2	0.07	0.31
			H_2SO_4	0.01	0.04
			NH_3	7.01	30.70
			GHG	-	384,141
			CO_2e	-	384,530
TURBINE2	TURBINE2	Gas Turbine w/ Duct Firing (GE LM 6000)	NO_X	5.42	25.80
			NO_X (MSS)	47.00	-
			CO	6.60	38.78
			CO (MSS)	203.60	-
			VOC	0.68	3.70
			VOC (MSS)	15.00	-
			$PM/PM_{10}/PM_{2.5}$	6.98	30.58
			SO_2	0.07	0.31
			H_2SO_4	0.01	0.04
			NH_3	7.01	30.70
			GHG	-	384,141
			CO_2e	-	384,530
FUG-FUEL	FUG-FUEL	Fuel System Fugitives	VOC	0.10	0.43
			GHG	-	20.26
			CO_2e	-	498.30
FUG-NH3	FUG-NH3	Ammonia System Fugitives	NH_3	0.01	0.05
FUG-SF6	FUG-SF6	Electrical Circuit Breaker Insulation Leak Fugitives	GHG	-	0.004
			CO_2e	-	102.14

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: October 2015	Permit No.: 123117 - Nonattainment N102	Regulated Entity No.: RN100238708
Area Name: Chocolate Bayou Steam Generating Station		Customer Reference No.: CN603207218

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					
1. Emission Point			2. Component or Air Contaminant	3. Air Contaminant Emission Rate	
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)
CTWR1	CTWR1	Cooling Tower 1	PM	0.25	0.72
			PM_{10}	0.16	0.46
			$PM_{2.5}$	0.001	0.002
CTWR2	CTWR2	Cooling Tower 2	PM	0.25	0.72
			PM_{10}	0.16	0.46
			$PM_{2.5}$	0.001	0.002
EDG	EDG	Emergency Diesel Generator	NO_X	2.21	0.11
			CO	11.47	0.57
			VOC	0.62	0.03
			$PM/PM_{10}/PM_{2.5}$	0.10	0.01
			SO_2	0.04	0.01
			GHG	-	168.77
			CO_2e	-	169.34
DP-HTR	DP-HTR	Fuel Gas Dew Point Heater	NO_X	0.42	1.86
			CO	0.40	1.77
			VOC	0.20	0.88
			$PM/PM_{10}/PM_{2.5}$	0.03	0.13
			SO_2	0.01	0.01
			GHG	-	2,048
			CO_2e	-	2,050
DTANK	DTANK	Diesel Storage Tank	VOC	2.03	0.02
LUBE-TANKS	LUBE-TANKS	Turbine Lube Oil Tanks	VOC	0.02	0.01
LUBE-VENT	LUBE-VENT	Turbine Oil Vents	VOC	0.04	0.16

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

ED_001261_00098075

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: October 2015	Permit No.: 123117 - Nonattainment N102	Regulated Entity No.: RN100238708
Area Name: Chocolate Bayou Steam Generating Station		Customer Reference No.: CN603207218

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS							
1. Emission Point			4. UTM Coordinates of Emission Point			Source							
						5. Building Height	6. Height AGL	7. Stack Exit Data			8. Fugitives		
EPN (A)	FIN (B)	NAME (C)	Zone	East (Meters)	North (Meters)	(ft)	(ft)	Diameter (ft) (A)	Velocity (fps) (B)	Temp (°F) (C)	Length (ft) (A)	Width (ft) (B)	Axis Degrees (C)
BLR1	BLR1	Auxillary Boiler 1 (Natural Gas/Composite Fuel)	15	286,464	3,236,008	---	196.0	6.56	59.1	320	---	---	---
BLR2	BLR2	Auxillary Boiler 2 (Natural Gas/Composite Fuel)	15	286,481	3,236,026	---	196.0	6.56	59.1	320	---	---	---
BLR3	BLR3	Auxillary Boiler 3 (Natural Gas/Composite Fuel)	15	286,498	3,236,043	---	196.0	6.56	59.1	320	---	---	---
TURBINE1	TURBINE1	Gas Turbine w/ Duct Firing (GE LM 6000)	15	286,442	3,236,071	---	196.0	10.12	73.3	241	---	---	---
TURBINE2	TURBINE2	Gas Turbine w/ Duct Firing (GE LM 6000)	15	286,462	3,236,092	---	196.0	10.12	73.3	241	---	---	---
FUG-FUEL	FUG-FUEL	Fuel System Fugitives	15	286,447	3,236,063	---	---	---	---	---	400	260	45
FUG-NH3	FUG-NH3	Ammonia System Fugitives	15	286,444	3,236,087	---	---	---	---	---	260	170	45
FUG-SF6	FUG-SF6	Electrical Circuit Breaker Insulation Leak Fugitives	15	286,397	3,236,125	---	---	---	---	---	100	100	45
CTWR1	CTWR1	Cooling Tower 1	15	286,455	3,236,053	---	20.0	11.0	40.7	Ambient	---	---	---
CTWR2	CTWR2	Cooling Tower 2	15	286,475	3,236,074	---	20.0	11.0	40.7	Ambient	---	---	---
EDG	EDG	Emergency Diesel Generator	15	286,430	3,236,024	---	10.0	0.50	242.8	1000	---	---	---
DP-HTR	DP-HTR	Fuel Gas Dew Point Heater	15	286,470	3,236,174	---	20.0	1.17	25.0	800	---	---	---
DTANK	DTANK	Diesel Storage Tank	15	286,465	3,236,098	---	4.0	0.50	0.0033[1]	Ambient	---	---	---
LUBE-TANKS	LUBE-TANKS	Turbine Lube Oil Tanks	15	286,425	3,236,082	---	4.0	0.50	0.0033[1]	Ambient	---	---	---
LUBE-VENT	LUBE-VENT	Turbine Oil Vents	15	286,421	3,236,099	---	5.0	0.75	0.0033[1]	100	---	---	---

EPN = Emission Point Number
FIN = Facility Identification Number
[1] Stack paramenters to represent horizontal vent.

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

Appendix D
Air Quality Monitoring Data

ED_001261_00098075

Appendix D - Background Monitor Justification

Table D-1: Sources within 10-km of NRG Texas Power LLC (Project Site)				
Facility RN	**Company**	**Site**	**County**	**2013 $PM_{2.5}$ (tpy)**
RN100237668	EQUISTAR CHEMICALS LP	CHOCOLATE BAYOU POLYMERS	BRAZORIA	29.993
RN106492325	HUNTSMAN PETROCHEMICAL CORPORATION	LAB CHOCOLATE BAYOU PLANT	BRAZORIA	2.5428
RN107702789	*Not in Database*	*Not in Database*	*Not in Database*	*Not in Database*
RN105233662	*Not in Database*	*Not in Database*	*Not in Database*	*Not in Database*
RN106398795	MHBA CB LLLP	MHBA CHOCOLATE BAYOU PLANT	BRAZORIA	0.0821
RN106592579	*Not in Database*	*Not in Database*	*Not in Database*	*Not in Database*
RN100238708	INEOS USA LLC	CHOCOLATE BAYOU PLANT	BRAZORIA	117.1235
RN103057568	SOLUTIA INC	CHOCOLATE BAYOU PLANT	BRAZORIA	0
RN100238682	ASCEND PERFORMANCE MATERIALS LLC	ASCEND PERFORMANCE MATERIALS CHOCOLATE BAYOU PLANT	BRAZORIA	32.1325
RN106120025	*Not in Database*	*Not in Database*	*Not in Database*	*Not in Database*
RN100210574	ASCEND PERFORMANCE MATERIALS INC	CHOCOLATE BAYOU CHEMICAL	BRAZORIA	0
SUM OF REPORTED SOURCES				**182**

Appendix D - Background Monitor Justification: $PM_{2.5}$ Monitor

Table D-2: Sources within 10-km of Baytown Monitor - EPA Site ID: 48-201-0058

Facility RN	Company	Site	County	2013 $PM_{2.5}$ (tpy)
RN100214832	ADVANCED AROMATICS LLC	ADVANCED AROMATICS	HARRIS	1.0928
RN100867498	Not in Database	Not in Database	Not in Database	Not in Database
RN102184173	CLEAN HARBORS DEER PARK LLC	CLEAN HARBORS DEER PARK	HARRIS	12.5697
RN102079662	GREIF PACKAGING LLC	HOUSTON SPECIALTY PLANT	HARRIS	0.48
RN100224450	LYONDELLBASELL ACETYLS LLC	LYONDELLBASELL ACETYLS	HARRIS	66.1092
RN100224674	OXY VINYLS LP	GEON OXY VINYL LAPORTE PLANT	HARRIS	22.6495
RN100218429	CHANNEL SHIPYARD CO INC	HIGHLANDS FACILITY	HARRIS	0.0423
RN105391338	Not in Database	Not in Database	Not in Database	Not in Database
RN100225879	OXY VINYLS LP	DEER PARK PVC CAUSTIC PLANT	HARRIS	21.0895
RN105094478	Not in Database	Not in Database	Not in Database	Not in Database
RN105571053	Not in Database	Not in Database	Not in Database	Not in Database
RN105275143	Not in Database	Not in Database	Not in Database	Not in Database
RN101078210	TECHCOTE INDUSTRIAL COATINGS	ABRASIVE BLAST UNIT	HARRIS	0
RN102183647	Not in Database	Not in Database	Not in Database	Not in Database
RN102325974	LCY ELASTOMERS LP	THERMO ELASTOMER PLANT	HARRIS	3.3029
RN105696660	Not in Database	Not in Database	Not in Database	Not in Database
RN100876051	Not in Database	Not in Database	Not in Database	Not in Database
RN102331212	Not in Database	Not in Database	Not in Database	Not in Database
RN105052500	Not in Database	Not in Database	Not in Database	Not in Database
RN102574936	T REX ENGINEERING &	T REX ENGINERRING &	HARRIS	0.1931
RN100582352	Not in Database	Not in Database	Not in Database	Not in Database
RN100558600	Not in Database	Not in Database	Not in Database	Not in Database
RN102074739	Not in Database	Not in Database	Not in Database	Not in Database
RN102893401	Not in Database	Not in Database	Not in Database	Not in Database
RN100667633	Not in Database	Not in Database	Not in Database	Not in Database
RN106168180	Not in Database	Not in Database	Not in Database	Not in Database
RN104712021	Not in Database	Not in Database	Not in Database	Not in Database
RN100214477	SOLAR TURBINES INCORPORATED	CHANNELVIEW FACILITY	HARRIS	0.0543
RN100683952	Not in Database	Not in Database	Not in Database	Not in Database
RN103726568	Not in Database	Not in Database	Not in Database	Not in Database
RN105449847	Not in Database	Not in Database	Not in Database	Not in Database
RN103038766	Not in Database	Not in Database	Not in Database	Not in Database
RN100219070	GEO SPECIALTY CHEMICALS INC	GEO SPECIALTY CHEMICAL DEER	HARRIS	1.0851
RN102537289	INEOS USA LLC	POLYPROPYLENE PLANT	HARRIS	0.3309
RN100216704	SOLVAY CHEMICALS INC	SOLVAY INTEROX	HARRIS	0
RN102888328	BRASKEM AMERICA INC	LA PORTE PLANT	HARRIS	5.0234
RN104244942	INVISTA S A R L	LA PORTE PLANT	HARRIS	0.0153
RN100225085	EI DUPONT DE NEMOURS & CO	LA PORTE PLANT	HARRIS	7.0836
RN102800315	TPC GROUP LLC	BAYTOWN TERMINAL	HARRIS	1.5515
RN100217959	GE PACKAGED POWER INC	GE AERO ENERGY HOUSTON	HARRIS	0.74
RN100616721	Not in Database	Not in Database	Not in Database	Not in Database
RN105659239	Not in Database	Not in Database	Not in Database	Not in Database
RN102212925	EXXONMOBIL CHEMICAL COMPANY	BAYTOWN OLEFINS PLANT	HARRIS	194.8277
RN100211317	ECO SERVICES OPERATIONS LLC	BAYTOWN PLANT	HARRIS	18.1019
RN100542281	EQUISTAR CHEMICALS LP	CHANNELVIEW COMPLEX	HARRIS	180.8477
RN100223205	ROHM AND HAAS TEXAS	DEER PARK PLANT	HARRIS	84.2457
RN100210319	EQUISTAR CHEMICALS LP	LA PORTE COMPLEX	HARRIS	45.2453
RN106071046	Not in Database	Not in Database	Not in Database	Not in Database
RN100222215	AIR PRODUCTS LLC	AIR PRODUCTS BAYTOWN II PLANT	HARRIS	17.47
RN100248749	SOUTHWEST SHIPYARD LP	BARGE CLEANING AND REPAIR	HARRIS	1.1599
RN100223007	VLS RECOVERY SERVICES LLC	VOPAK DEER PARK FACILITY	HARRIS	0
RN100542489	Not in Database	Not in Database	Not in Database	Not in Database
RN100223445	HFOTCO LLC	HOUSTON FUEL OIL TERMINAL	HARRIS	2.6782
RN102574803	EXXONMOBIL CHEMICAL COMPANY	BAYTOWN CHEMICAL PLANT	HARRIS	259.0697

Appendix D - Background Monitor Justification: $PM_{2.5}$ Monitor

Table D-2: Sources within 10-km of Baytown Monitor - EPA Site ID: 48-201-0058				
Facility RN	**Company**	**Site**	**County**	**2013 $PM_{2.5}$ (tpy)**
RN101383859	Not in Database	Not in Database	Not in Database	Not in Database
RN100219237	JOHANN HALTERMANN LTD	JACINTOPORT PLANT	HARRIS	3.843
RN105537880	Not in Database	Not in Database	Not in Database	Not in Database
RN102177391	AKZO NOBEL CHEMICALS INC	BATTLEGROUND SITE	HARRIS	0
RN103886057	Not in Database	Not in Database	Not in Database	Not in Database
RN100825389	NRG TEXAS POWER LLC	SR BERTRON STATION	HARRIS	7.3908
RN100211879	SHELL CHEMICAL LP	DEER PARK PLANT	HARRIS	268.2153
RN100885151	Not in Database	Not in Database	Not in Database	Not in Database
RN107305922	Not in Database	Not in Database	Not in Database	Not in Database
RN102525573	Not in Database	Not in Database	Not in Database	Not in Database
RN102204211	KIRBY INLAND MARINE LP	BARGE CLEANING FACILITY	HARRIS	0.0103
RN100210483	PELICAN REFINING LLC	CHANNELVIEW ASPHALT FACILITY	HARRIS	0.4672
RN100210863	ALTURA COGEN LLC	ALTURA COGEN	HARRIS	65.4188
RN102993078	Not in Database	Not in Database	Not in Database	Not in Database
RN100542901	NRG TEXAS POWER LLC	SAN JACINTO STEAM ELECTRIC	HARRIS	77.4698
RN103060778	Not in Database	Not in Database	Not in Database	Not in Database
RN106057516	Not in Database	Not in Database	Not in Database	Not in Database
RN104267133	Not in Database	Not in Database	Not in Database	Not in Database
RN100225093	VOPAK TERMINAL DEER PARK INC	DEER PARK TERMINAL	HARRIS	0.7213
RN103779591	Not in Database	Not in Database	Not in Database	Not in Database
RN100217363	OXYVINYLS LP	BATTLEGROUND SITE	HARRIS	45.0342
RN100897362	Not in Database	Not in Database	Not in Database	Not in Database
RN100229905	INEOS USA LLC	POLYETHYLENE PLANT	HARRIS	13.3268
RN102041282	AIR PRODUCTS LLC	LA PORTE FACILITY	HARRIS	41.5922
RN102997475	Not in Database	Not in Database	Not in Database	Not in Database
RN100633650	LYONDELL CHEMICAL COMPANY	CHANNELVIEW PLANT	HARRIS	54.0637
RN102562063	STOLT NIELSEN USA INC	STOLTBARGE SERVICES TANK	HARRIS	0.2124
RN102830866	LA PORTE METHANOL COMPANY LP	LA PORTE METHANOL	HARRIS	0.0016
RN105127476	Not in Database	Not in Database	Not in Database	Not in Database
RN100219591	ENTERPRISE REFINED PRODUCTS	BAYTOWN TERMINAL	HARRIS	0.0288
RN102414232	DOW CHEMICAL COMPANY	LA PORTE PLANT	HARRIS	3.9541
RN106879075	Not in Database	Not in Database	Not in Database	Not in Database
RN102056777	Not in Database	Not in Database	Not in Database	Not in Database
RN102579307	EXXONMOBIL REFINING & SUPPLY	BAYTOWN REFINERY	HARRIS	761.0446
RN101049518	NOLTEX LLC	NOLTEX LA PORTE EVOH PLANT	HARRIS	0.0465
RN100217926	PRECOAT METALS DIV OF SEQUA	PRECOAT METALS HOUSTON	HARRIS	0.3284
RN102213386	Not in Database	Not in Database	Not in Database	Not in Database
RN100209568	TEXAS MOLECULAR LP	BATTLEGROUND RD FACILITY	HARRIS	0.4376
RN100210806	INTERCONTINENTAL TERMINALS CO	DEER PARK TERMINAL	HARRIS	0.0834
RN100212109	TOTAL PETROCHEMICALS &	LA PORTE PLANT	HARRIS	43.1403
RN100210665	ENTERPRISE PRODUCTS	MORGANS POINT COMPLEX	HARRIS	0.0129
RN100217207	LINDE GAS NORTH AMERICA LLC	LINDE GAS LA PORTE SYNGAS	HARRIS	4.4566
RN102142221	INEOS USA LLC	LAPORTE PAO FACILITY	HARRIS	0.1473
SUM OF REPORTED SOURCES				**2,339**

Appendix D - Background Monitor Justification: Speciated $PM_{2.5}$ Monitor

Table D-3: Sources within 10-km of Houston Deer Park #2 Monitor - EPA Site ID: 48-201-1039

Facility RN	Company	Site	County	2013 $PM_{2.5}$ (tpy)
RN100209568	TEXAS MOLECULAR LP	BATTLEGROUND RD FACILITY	HARRIS	0.4376
RN100210319	EQUISTAR CHEMICALS LP	LA PORTE COMPLEX	HARRIS	45.2453
RN100210475	STOLTHAVEN HOUSTON INC	BULK LIQUIDS STORAGE &	HARRIS	0.8564
RN100210806	INTERCONTINENTAL TERMINALS CO	DEER PARK TERMINAL	HARRIS	0.0834
RN100211523	ALBEMARLE CORPORATION	BAYPORT PLANT	HARRIS	57.5417
RN100211598	CUSTOM BLAST SERVICES INC	CUSTOM BLAST SERVICES	HARRIS	0.3374
RN100211879	SHELL CHEMICAL LP	DEER PARK PLANT	HARRIS	268.2153
RN100212109	TOTAL PETROCHEMICALS &	LA PORTE PLANT	HARRIS	43.1403
RN100213958	AXIALL LLC	PASADENA PLANT	HARRIS	5.6594
RN100216704	SOLVAY CHEMICALS INC	SOLVAY INTEROX	HARRIS	0
RN100216761	EQUISTAR CHEMICALS LP	BAYPORT POLYMERS	HARRIS	0.6962
RN100217207	LINDE GAS NORTH AMERICA LLC	LINDE GAS LA PORTE SYNGAS	HARRIS	4.4566
RN100217363	OXYVINYLS LP	BATTLEGROUND SITE	HARRIS	45.0342
RN100217926	PRECOAT METALS DIV OF SEQUA	PRECOAT METALS HOUSTON	HARRIS	0.3284
RN100217959	GE PACKAGED POWER INC	GE AERO ENERGY HOUSTON	HARRIS	0.74
RN100218247	ALBEMARLE CORPORATION	ALBEMARLE CORP	HARRIS	0.0219
RN100218841	KANEKA NORTH AMERICA LLC	KANEKA PASADENA SITE	HARRIS	44.8199
RN100219070	GEO SPECIALTY CHEMICALS INC	GEO SPECIALTY CHEMICAL DEER	HARRIS	1.0851
RN100219096	GULF BAYPORT CHEMICALS LP	GULF BAYPORT CHEMICALS	HARRIS	0.72
RN100219237	JOHANN HALTERMANN LTD	JACINTOPORT PLANT	HARRIS	3.843
RN100221324	AIR PRODUCTS LLC	DITNTROTOLUENE PLANT PASADENA	HARRIS	19.8644
RN100221589	LUBRIZOL CORPORATION	DEER PARK PLANT	HARRIS	24.451
RN100222033	DEER PARK ENERGY CENTER LP	DEER PARK ENERGY CENTER	HARRIS	38.01
RN100222041	PASADENA COGENERATION LP	PASADENA COGENERATION	HARRIS	46.52
RN100223007	VLS RECOVERY SERVICES LLC	VOPAK DEER PARK FACILITY	HARRIS	0
RN100223205	ROHM AND HAAS TEXAS	DEER PARK PLANT	HARRIS	84.2457
RN100223445	HFOTCO LLC	HOUSTON FUEL OIL TERMINAL	HARRIS	2.6782
RN100223536	BAKER PETROLITE CORP	BAYPORT PLANT	HARRIS	1.0687
RN100224450	LYONDELLBASELL ACETYLS LLC	LYONDELLBASELL ACETYLS	HARRIS	66.1092
RN100224674	OXY VINYLS LP	GEON OXY VINYL LAPORTE PLANT	HARRIS	22.6495
RN100224740	OILTANKING HOUSTON LP	OILTANKING HOUSTON TERMINAL	HARRIS	0.2124
RN100224815	KM LIQUIDS TERMINALS LLC	PASADENA TERMINAL	HARRIS	0.0658
RN100225085	EI DUPONT DE NEMOURS & CO	LA PORTE PLANT	HARRIS	7.0836
RN100225093	VOPAK TERMINAL DEER PARK INC	DEER PARK TERMINAL	HARRIS	0.7213
RN100225689	BASF CORPORATION	PASADENA PLANT	HARRIS	5.3669
RN100225879	OXY VINYLS LP	DEER PARK PVC CAUSTIC PLANT	HARRIS	21.0895
RN100225986	KM LIQUIDS TERMINALS LLC	JEFFERSON ST TRUCK RACK	HARRIS	0.0186
RN100227016	CELANESE LTD	CLEAR LAKE PLANT	HARRIS	28.2007
RN100229905	INEOS USA LLC	POLYETHYLENE PLANT	HARRIS	13.3268
RN100239672	CLEAR LAKE COGENERATION LP	CLEAR LAKE COGENERATION	HARRIS	9.82
RN100524008	Not in Database	Not in Database	Not in Database	Not in Database
RN100542612	SHELL PIPELINE CO LP	WEST CLEAR LAKE STORAGE	HARRIS	0.3135
RN100542901	NRG TEXAS POWER LLC	SAN JACINTO STEAM ELECTRIC	HARRIS	77.4698
RN100558600	Not in Database	Not in Database	Not in Database	Not in Database
RN100582352	Not in Database	Not in Database	Not in Database	Not in Database
RN100661453	Not in Database	Not in Database	Not in Database	Not in Database
RN100661644	Not in Database	Not in Database	Not in Database	Not in Database
RN100667484	Not in Database	Not in Database	Not in Database	Not in Database
RN100667633	Not in Database	Not in Database	Not in Database	Not in Database
RN100681121	Not in Database	Not in Database	Not in Database	Not in Database
RN100706803	OXY VINYLS L P	DEER PARK VCM PLANT	HARRIS	7.1657
RN100716661	PASADENA REFINING SYSTEM INC	PASADENA REFINING SYSTEM	HARRIS	129.9203
RN100825389	NRG TEXAS POWER LLC	SR BERTRON STATION	HARRIS	7.3908
RN100876051	Not in Database	Not in Database	Not in Database	Not in Database

Appendix D - Background Monitor Justification: Speciated $PM_{2.5}$ Monitor

Table D-3: Sources within 10-km of Houston Deer Park #2 Monitor - EPA Site ID: 48-201-1039				
Facility RN	Company	Site	County	2013 $PM_{2.5}$ (tpy)
RN100914217	Not in Database	Not in Database	Not in Database	Not in Database
RN100924042	Not in Database	Not in Database	Not in Database	Not in Database
RN100927367	Not in Database	Not in Database	Not in Database	Not in Database
RN101049518	NOLTEX LLC	NOLTEX LA PORTE EVOH PLANT	HARRIS	0.0465
RN101058410	LUBRIZOL CORPORATION	BAYPORT PLANT	HARRIS	8.4484
RN101062099	MEMC PASADENA INC	POLYSILICON FACILITY	HARRIS	0.4914
RN101062610	PHILLIPS 66 PIPELINE LLC	PASADENA TERMINAL	HARRIS	0
RN101078210	TECHCOTE INDUSTRIAL COATINGS	ABRASIVE BLAST UNIT	HARRIS	0
RN101085256	Not in Database	Not in Database	Not in Database	Not in Database
RN101089001	Not in Database	Not in Database	Not in Database	Not in Database
RN101211498	HALDOR TOPSOE INC	HALDOR TOPSOE	HARRIS	34.0567
RN101383859	Not in Database	Not in Database	Not in Database	Not in Database
RN101613230	ETHYL CORPORATION	LUBE ADDITIVES PLANT	HARRIS	0.235
RN101621944	RENTECH NITROGEN PASADENA LLC	AGRIFOS FERTILIZER PASADENA	HARRIS	14.1121
RN101830891	Not in Database	Not in Database	Not in Database	Not in Database
RN101851517	MARATHON PIPE LINE LLC	MARATHON ASHLAND PIPELINE	HARRIS	0
RN101890499	Not in Database	Not in Database	Not in Database	Not in Database
RN101976850	Not in Database	Not in Database	Not in Database	Not in Database
RN101982197	Not in Database	Not in Database	Not in Database	Not in Database
RN102018322	CHEVRON PHILLIPS CHEMICAL CO	HOUSTON CHEMICAL COMPLEX	HARRIS	48.2345
RN102033487	Not in Database	Not in Database	Not in Database	Not in Database
RN102041282	AIR PRODUCTS LLC	LA PORTE FACILITY	HARRIS	41.5922
RN102056777	Not in Database	Not in Database	Not in Database	Not in Database
RN102060126	Not in Database	Not in Database	Not in Database	Not in Database
RN102079662	GREIF PACKAGING LLC	HOUSTON SPECIALTY PLANT	HARRIS	0.48
RN102142221	INEOS USA LLC	LAPORTE PAO FACILITY	HARRIS	0.1473
RN102162625	Not in Database	Not in Database	Not in Database	Not in Database
RN102177391	AKZO NOBEL CHEMICALS INC	BATTLEGROUND SITE	HARRIS	0
RN102183647	Not in Database	Not in Database	Not in Database	Not in Database
RN102184173	CLEAN HARBORS DEER PARK LLC	CLEAN HARBORS DEER PARK	HARRIS	12.5697
RN102206158	Not in Database	Not in Database	Not in Database	Not in Database
RN102213386	Not in Database	Not in Database	Not in Database	Not in Database
RN102309929	Not in Database	Not in Database	Not in Database	Not in Database
RN102331212	Not in Database	Not in Database	Not in Database	Not in Database
RN102335395	NATIONAL AERONAUTICS & SPACE	NASA ELLINGTON FIELD	HARRIS	0.2302
RN102368305	Not in Database	Not in Database	Not in Database	Not in Database
RN102414232	DOW CHEMICAL COMPANY	LA PORTE PLANT	HARRIS	3.9541
RN102518065	OXY VINYLS LP	PASADENA PVC PLANT	HARRIS	33.2187
RN102521820	Not in Database	Not in Database	Not in Database	Not in Database
RN102523107	LYONDELL CHEMICAL COMPANY	LYONDELL CHEMICAL COMPANY	HARRIS	5.6709
RN102525573	Not in Database	Not in Database	Not in Database	Not in Database
RN102525987	SHELL PIPELINE CO LP	COLEX TERMINAL PASADENA	HARRIS	0
RN102528197	ENTERPRISE PRODUCTS	PASADENA PLANT	HARRIS	0.677
RN102531837	Not in Database	Not in Database	Not in Database	Not in Database
RN102537289	INEOS USA LLC	POLYPROPYLENE PLANT	HARRIS	0.3309
RN102580834	ENTERPRISE PRODUCTS	EPOLP HOUSTON SHIP CHANNEL	HARRIS	0.023
RN102590775	MOMENTIVE SPECIALTY CHEMICALS	MOMENTIVE SPECIALTY CHEMICALS	HARRIS	0
RN102608932	GOODYEAR TIRE & RUBBER	BAYPORT CHEMICAL PLANT	HARRIS	4.2894
RN102614484	Not in Database	Not in Database	Not in Database	Not in Database
RN102662731	Not in Database	Not in Database	Not in Database	Not in Database
RN102662970	Not in Database	Not in Database	Not in Database	Not in Database
RN102684974	Not in Database	Not in Database	Not in Database	Not in Database
RN102694510	Not in Database	Not in Database	Not in Database	Not in Database
RN102765260	Not in Database	Not in Database	Not in Database	Not in Database

Appendix D - Background Monitor Justification: Speciated $PM_{2.5}$ Monitor

Table D-3: Sources within 10-km of Houston Deer Park #2 Monitor - EPA Site ID: 48-201-1039

Facility RN	Company	Site	County	2013 $PM_{2.5}$ (tpy)
RN102776002	ROHM & HAAS CHEMICALS LLC	BAYPORT PLANT	HARRIS	4.9646
RN102830866	LA PORTE METHANOL COMPANY LP	LA PORTE METHANOL	HARRIS	0.0016
RN102860194	Not in Database	Not in Database	Not in Database	Not in Database
RN102888328	BRASKEM AMERICA INC	LA PORTE PLANT	HARRIS	5.0234
RN102897212	Not in Database	Not in Database	Not in Database	Not in Database
RN102926920	EQUISTAR CHEMICALS LP	BAYPORT UNDERWOOD PLANT	HARRIS	0.7395
RN102993078	Not in Database	Not in Database	Not in Database	Not in Database
RN103012183	SEKISUI SPECIALTY CHEMICALS	PASADENA PLANT	HARRIS	0
RN103060778	Not in Database	Not in Database	Not in Database	Not in Database
RN103080487	LINDE GAS NORTH AMERICA LLC	LINDE CLEAR LAKE PLANT	HARRIS	2.105
RN103219085	Not in Database	Not in Database	Not in Database	Not in Database
RN103886057	Not in Database	Not in Database	Not in Database	Not in Database
RN103939427	Not in Database	Not in Database	Not in Database	Not in Database
RN104104658	Not in Database	Not in Database	Not in Database	Not in Database
RN104150123	ARKEMA INC	CLEAR LAKE OPERATIONS	HARRIS	79.3212
RN104253877	Not in Database	Not in Database	Not in Database	Not in Database
RN104262704	AKZO NOBEL POLYMER CHEMICALS	AKZO NOBEL POLYMER CHEMICALS	HARRIS	0.495
RN104416896	Not in Database	Not in Database	Not in Database	Not in Database
RN104785464	Not in Database	Not in Database	Not in Database	Not in Database
RN104881586	Not in Database	Not in Database	Not in Database	Not in Database
RN105007371	Not in Database	Not in Database	Not in Database	Not in Database
RN105127476	Not in Database	Not in Database	Not in Database	Not in Database
RN105147433	AIR LIQUIDE LARGE INDUSTRIES US	LA PORTE SMR	HARRIS	10.672
RN105286884	Not in Database	Not in Database	Not in Database	Not in Database
RN105391338	Not in Database	Not in Database	Not in Database	Not in Database
RN105475610	AIRGAS CARBONIC INC	AIRGAS CARBONIC DEER PARK	HARRIS	0
RN105499420	CLARIANT CORPORATION	CLARIANT CLEAR LAKE PLANT	HARRIS	0
RN105571053	Not in Database	Not in Database	Not in Database	Not in Database
RN105659239	Not in Database	Not in Database	Not in Database	Not in Database
RN105696660	Not in Database	Not in Database	Not in Database	Not in Database
RN105898159	Not in Database	Not in Database	Not in Database	Not in Database
RN105931000	Not in Database	Not in Database	Not in Database	Not in Database
RN106057516	Not in Database	Not in Database	Not in Database	Not in Database
RN106070816	Not in Database	Not in Database	Not in Database	Not in Database
RN106071046	Not in Database	Not in Database	Not in Database	Not in Database
RN106119175	Not in Database	Not in Database	Not in Database	Not in Database
RN106128457	OILTANKING HOUSTON LP	OILTANKING APPELT TERMINAL	HARRIS	0
RN106155849	Not in Database	Not in Database	Not in Database	Not in Database
RN106256951	Not in Database	Not in Database	Not in Database	Not in Database
RN106341803	Not in Database	Not in Database	Not in Database	Not in Database
RN106563935	Not in Database	Not in Database	Not in Database	Not in Database
RN106969033	Not in Database	Not in Database	Not in Database	Not in Database
SUM OF REPORTED SOURCES				**1,449**

ED_001261_00098075

Monitor Values Report

Geographic Area: Harris County, TX
Pollutant: PM2.5
Year: 2010
Exceptional Events: Excluded (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
58	27.9	22.9	19.8	18.7	23	11.9	None	5	482010024	4510 1/2 Aldine Mail Rd	Houston	Harris	TX	06
59	27.6	20.7	19	17.9	21	10.8	None	1	482010058	7210 1/2 Bayway Drive	Baytown	Harris	TX	06
337	32.2	27.4	24.2	24.2	23	12.2	Excluded	1	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
54	26	21.2	20.7	18.5	21	11.9*	None	2	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: October 27, 2015

ED_001261_00098075

Monitor Values Report

Geographic Area: Harris County, TX
Pollutant: PM2.5
Year: 2012
Exceptional Events: Excluded (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
61	26.4	26.2	21.7	20.6	26	11.2	None	5	482010024	4510 1/2 Aldine Mail Rd	Houston	Harris	TX	06
114	28.6	23.4	22.2	18.7	22	10.6	None	1	482010058	7210 1/2 Bayway Drive	Baytown	Harris	TX	06
354	27.6	25.6	25.1	24.5	23	11.7	Excluded	1	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
50	30.8	25.1	25.1	23.3	31	12.7	None	2	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
311	32.9	28.9	27.2	23.5	22	10.0*	None	4	482011039	4514 1/2 Durant St	Deer Park	Harris	TX	06

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: October 27, 2015

ED_001261_00098075

Monitor Values Report

Geographic Area: Harris County, TX
Pollutant: PM2.5
Year: 2013
Exceptional Events: Excluded (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
59	31.1	22.1	21.9	21.8	22	10.7	None	5	482010024	4510 1/2 Aldine Mail Rd	Houston	Harris	TX	06
120	31.9	22.2	20.5	19.5	21	9.6	None	1	482010058	7210 1/2 Bayway Drive	Baytown	Harris	TX	06
351	26.5	23.6	23.3	22.9	22	11.2	Excluded	1	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
51	23.8	22.3	22	20.1	22	11.8	Excluded	2	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
264	28.5	28.1	22.4	21.4	21	9.4*	None	4	482011039	4514 1/2 Durant St	Deer Park	Harris	TX	06
39	16.2	15.8	14.7	14.4	16	9.0*	None	8	482011039	4514 1/2 Durant St	Deer Park	Harris	TX	06

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: October 27, 2015

ED_001261_00098075

Monitor Values Report

Geographic Area: Harris County, TX
Pollutant: PM2.5
Year: 2014
Exceptional Events: Excluded (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
63	29.3	22.6	20.8	20.6	23	11	None	5	482010024	4510 1/2 Aldine Mail Rd	Houston	Harris	TX	06
73	32.4	23.6	20.1	19.3	24	10.3	None	1	482010058	7210 1/2 Bayway Drive	Baytown	Harris	TX	06
326	28	24.4	23.1	22.2	22	11.3*	Excluded	1	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
57	20.6	18	17.9	17	18	11.5	Excluded	2	482011035	9525 1/2 Clinton Dr	Houston	Harris	TX	06
341	43	30	26.6	26	25	9.8	None	4	482011039	4514 1/2 Durant St	Deer Park	Harris	TX	06
120	32.9	21	20.2	19.1	20	9.1	None	8	482011039	4514 1/2 Durant St	Deer Park	Harris	TX	06

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: October 27, 2015

Appendix E
Modeled Stack Parameters

PSD Air Quality Analysis
TCEQ Permit No. 123117

TABLE E-1: POINT SOURCE STACK PARAMETERS FOR NRG TEXAS EMISSION SOURCES (ENGLISH UNITS)

EPN	Modeling Source ID	Description	UTM Location (m)		Base Elevation	Stack Height	Temp	Exit Velocity	Stack Diameter
			Easting	Northing	(ft)	(ft)	(ºF)	(ft/sec)	(ft)
BLR1	BLR1	Auxiliary Boiler 1 (Natural Gas/Composite Fuel)	286,464	3,236,008	12.63	196.0	320	59.1	6.6
BLR2	BLR2	Auxiliary Boiler 2 (Natural Gas/Composite Fuel)	286,481	3,236,026	12.70	196.0	320	59.1	6.6
BLR3	BLR3	Auxiliary Boiler 3 (Natural Gas/Composite Fuel)	286,498	3,236,043	12.76	196.0	320	59.1	6.6
TURBINE1	TURBINE1	Gas Turbine 1 w/ Duct Firing (GE LM 6000)	286,442	3,236,071	12.89	196.0	241	73.3	10.1
TURBINE2	TURBINE2	Gas Turbine 2 w/ Duct Firing (GE LM 6000)	286,462	3,236,092	12.99	196.0	241	73.3	10.1
CTWR1	CTWR1A	Cooling Tower - Cell 1a	286,455	3,236,053	12.80	20.0	-460	40.7	11.0
	CTWR1B	Cooling Tower - Cell 1b	286,473	3,236,076	12.89	20.0	-460	40.7	11.0
CTWR2	CTWR2A	Cooling Tower - Cell 2a	286,475	3,236,074	12.86	20.0	-460	40.7	11.0
	CTWR2B	Cooling Tower - Cell 2b	286,452	3,236,056	12.83	20.0	-460	40.7	11.0
EDG	EDG	Emergency Diesel Generator	286,430	3,236,024	12.66	10.0	1000	242.8	0.50
DTANK	DTANK	Diesel Storage Tank	286,465	3,236,098	12.99	4.0	-460	0.003	0.50
DPHTR	DPHTR	Fuel DewPoint Heater	286,470	3,236,174	13.35	20.0	800	25.0	1.17
LUBETANK	LUBETANK1	CT 1 Lube Oil Tank	286,425	3,236,082	13.02	4.0	-460	0.003	0.50
	LUBETANK2	CT 2 Lube Oil Tank	286,446	3,236,102	13.02	4.0	-460	0.003	0.50
LUBEVENT	LUBEVENT1	Turbine 1 Oil Vents	286,421	3,236,099	13.02	5.0	100	0.003	0.75
	LUBEVENT2	Turbine 2 Oil Vents	286,434	3,236,112	13.02	5.0	100	0.003	0.75

TABLE E-2: VOLUME SOURCE STACK PARAMETERS FOR NRG TEXAS EMISSION SOURCES (ENGLISH UNITS)

EPN	Modeling Source ID	Description	UTM Location (m)		Elevation	Release Height	Init. Horizontal Dimension	Initial Vert. Dimension
			Easting	Northing	(ft)	(ft)	(ft)	(ft)
FUGFUEL	FUGFUEL	Fuel System Piping Fugitives	286,447	3,236,063	12.96	3.0	75.00	2.79
FUGNH3	FUGNH3A	Ammonia System Piping Fugitives - Turbines	286,444	3,236,087	13.06	3.0	33.20	2.79
	FUGNH3B	Ammonia System Piping Fugitives - Boilers	286,477	3,236,028	13.06	3.0	37.50	2.79

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TABLE E-3: POINT SOURCE STACK PARAMETERS FOR NRG TEXAS EMISSION SOURCES (METRIC UNITS)

EPN	Modeling Source ID	Description	UTM Location (m)		Base Elevation	Stack Height	Temp	Exit Velocity	Stack Diameter
			Easting	Northing	(m)	(m)	(K)	(m/s)	(m)
BLR1	BLR1	Auxiliary Boiler 1 (Natural Gas/Composite Fuel)	286,464	3,236,008	3.85	59.7	433	18.0	2.0
BLR2	BLR2	Auxiliary Boiler 2 (Natural Gas/Composite Fuel)	286,481	3,236,026	3.87	59.7	433	18.0	2.0
BLR3	BLR3	Auxiliary Boiler 3 (Natural Gas/Composite Fuel)	286,498	3,236,043	3.89	59.7	433	18.0	2.0
TURBINE1	TURBINE1	Gas Turbine 1 w/ Duct Firing (GE LM 6000)	286,442	3,236,071	3.93	59.7	389	22.3	3.1
TURBINE2	TURBINE2	Gas Turbine 2 w/ Duct Firing (GE LM 6000)	286,462	3,236,092	3.96	59.7	389	22.3	3.1
CTWR1	CTWR1A	Cooling Tower - Cell 1a	286,455	3,236,053	3.90	6.10	0	12.4	3.4
	CTWR1B	Cooling Tower - Cell 1b	286,473	3,236,076	3.93	6.10	0	12.4	3.4
CTWR2	CTWR2A	Cooling Tower - Cell 2a	286,475	3,236,074	3.92	6.10	0	12.4	3.4
	CTWR2B	Cooling Tower - Cell 2b	286,452	3,236,056	3.91	6.10	0	12.4	3.4
EDG	EDG	Emergency Diesel Generator	286,430	3,236,024	3.86	3.05	811	74.0	0.15
DTANK	DTANK	Diesel Storage Tank	286,465	3,236,098	3.96	1.22	0	0.001	0.15
DPHTR	DPHTR	Fuel DewPoint Heater	286,470	3,236,174	4.07	6.10	700	7.6	0.36
LUBETANK	LUBETANK1	CT 1 Lube Oil Tank	286,425	3,236,082	3.97	1.22	0	0.001	0.15
	LUBETANK2	CT 2 Lube Oil Tank	286,446	3,236,102	3.97	1.22	0	0.001	0.15
LUBEVENT	LUBEVENT1	Turbine 1 Oil Vents	286,421	3,236,099	3.97	1.52	311	0.001	0.23
	LUBEVENT2	Turbine 2 Oil Vents	286,434	3,236,112	3.97	1.52	311	0.001	0.23

TABLE E-4: VOLUME SOURCE STACK PARAMETERS FOR NRG TEXAS EMISSION SOURCES (METRIC UNITS)

EPN	Modeling Source ID	Description	UTM Location (m)		Elevation	Release Height	Init. Horizontal Dimension	Initial Vert. Dimension
			Easting	Northing	(m)	(m)	(m)	(m)
FUGFUEL	FUGFUEL	Fuel System Piping Fugitives	286,447	3,236,063	3.95	0.91	22.86	0.85
FUGNH3	FUGNH3A	Ammonia System Piping Fugitives - Turbines	286,444	3,236,087	3.98	0.91	10.12	0.85
	FUGNH3B	Ammonia System Piping Fugitives - Boilers	286,477	3,236,028	3.98	0.91	11.43	0.85

Appendix F
Modeled Emission Rates

ED_001261_00098075

TABLE F-1: CRITERIA POLLUTANT MODELED EMISSION RATES FOR PSD AND STATE NAAQS PRELIMINARY IMPACT (SIL) ANALYSIS

EPN	Modeling Source ID	Description	NO_X[1]		CO[2]	PM_{10}		$PM_{2.5}$[3]		SO_2[4]
			1-hour	Annual	1-hour	24-hour	Annual	24-hour	Annual	1-hour
			(lb/hr)	(tpy)	(lb/hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)
BLR1	BLR1	Auxiliary Boiler 1 (Natural Gas/Composite Fuel)	4.29	18.59	15.22	1.95	8.53	1.73	8.53	0.05
BLR2	BLR2	Auxiliary Boiler 2 (Natural Gas/Composite Fuel)	4.29	18.59	15.22	1.95	8.53	1.73	8.53	0.05
BLR3	BLR3	Auxiliary Boiler 3 (Natural Gas/Composite Fuel)	4.29	18.59	15.22	1.95	8.53	1.73	8.53	0.05
TURBINE1	TURBINE1	Gas Turbine 1 w/ Duct Firing (GE LM 6000)	5.95	25.80	203.60	6.98	30.58	5.90	30.58	0.07
TURBINE2	TURBINE2	Gas Turbine 2 w/ Duct Firing (GE LM 6000)	5.95	25.80	203.60	6.98	30.58	5.90	30.58	0.07
CTWR1[5]	CTWR1A	Cooling Tower 1a	0	0	0	0.08	0.23	0.0003	0.001	0
	CTWR1B	Cooling Tower 1b	0	0	0	0.08	0.23	0.0003	0.001	0
CTWR2[5]	CTWR2A	Cooling Tower 2a	0	0	0	0.08	0.23	0.0003	0.001	0
	CTWR2B	Cooling Tower 2b	0	0	0	0.08	0.23	0.0003	0.001	0
EDG[6]	EDG	Emergency Diesel Generator	0.03	0.11	11.47	0.005	0.01	0.005	0.01	0.04
DPHTR	DPHTR	Fuel DewPoint Heater	0.42	1.86	0.40	0.03	0.13	0.03	0.13	0.01

[1] For the boilers short-term NOx modeling, the annualized MSS NOx emission rate of 0.12 lb/hr (10.51 lb/hr x 100/8760) will be combined with the max allowable NOx emissions of 4.17 lb/hr to account for the intermittent emissions in the modeling [4.17 lb/hr + 0.12 lb/hr = 4.29 lb/hr]. For the gas turbines short-term NOx modeling, the annualized MSS NOx emission rate of 0.53 lb/hr (47.0 lb/hr x 100/8760) will be combined with the max allowable NOx emissions of 5.42 lb/hr to account for the intermittent emissions in the modeling [5.42 lb/hr + 0.53 lb/hr = 5.95 lb/hr].

[2] The CO one-hour emission rate will be modeled for both 1- and 8-hour averaging periods.

[3] 24-hour, or daily, $PM_{2.5}$ emission rates will be modeled for the $PM_{2.5}$ 24-hour preliminary impact determination based on the manufacturer expected daily emission rates for the boiler and turbine sources.

[4] The SO_2 one-hour emission rate modeled for 1-, 3-, 24-hour, and annual averaging periods.

[5] The cooling tower PM_{10} and $PM_{2.5}$ emission rates will be divided by two to represent each two-cell cooling tower.

[6] The emergency diesel generator will be an intermittent facility for short-term (1-hr) NOx emissions because this source only operates 100 hours/year for non-emergency testing [2.21 lbs/hr x 100/8760 = 0.025 lbs/hr]. 24-hour, or daily, PM_{10} and $PM_{2.5}$ emission rates will be modeled for the PM_{10} and $PM_{2.5}$ 24-hour preliminary impact determination based on operating the emergency equipment 1-hour per day (for non-emergency testing) out of 18 hours per day [0.10 lbs/hr x 1/18 = 0.005 lbs/hr]. The generator is not tested between the hours of 6:00 am to 12-noon per 30 TAC Chapter 117 regulations, making the daily emission rates based on 18 hours per day.

Appendix G
Meteorological Data Processing Protocol

TRC
Results you can rely on

10550 Richmond Ave.
Suite 210
Houston, TX 77042

713.244.1000 PHONE
713.789.5920 FAX

www.trcsolutions.com

October 6, 2015

Mr. Matthew Kovar
Air Dispersion Modeling Team (ADMT)
Texas Commission on Environmental Quality (TCEQ)
12100 Park 35 Circle, MC-163
Austin, Texas 78753

Subject: Meteorological Data Processing for AQA
Permit Nos. 123117, N204, and PSD-TX-1460
NRG Texas Power LLC
Chocolate Bayou Steam Generating Station
Brazoria County, Texas
Regulated Entity Number: RN100238708
Customer Number: CN603207218

Dear Mr. Kovar:

On behalf of NRG Texas Power LLC (NRG Texas), TRC Environmental Corporation (TRC) respectfully submits the enclosed memorandum and electronic files used for processing meteorological data. The memorandum and electronic files have been revised in response to the TCEQ ADMT protocol comments received on September 17, 2015, and subsequent email communications from TCEQ. NRG Texas is seeking approval for use of the meteorological data to calculate AERMOD impacts in an Air Quality Analysis (AQA) in support of the subject permit application for construction of a Steam Generating Station.

We appreciate your review of the electronic files and protocol detailing the procedures and methodology used for processing the meteorological data, and technical justification and supporting documentation for the model selections. If you have any questions or require additional information, please feel free to contact me at (713) 244-1039.

Sincerely,

TRC Environmental Corporation

Elizabeth Stanko
Air Quality Specialist

cc: Mr. Randy Hamilton, PE, TCEQ, Air Permits Division, Austin, TX
Mr. Craig Eckberg, Director, Environmental, NRG Texas Power LLC, Houston, TX
Mr. Bruce Broberg, PE, TRC Environmental Corporation, Houston, TX

P:\NRG ENERGY\231136.0000_BRAZORIA INEOS PROJECT\MODELING\MET DATA SUBMITTAL V2\COVER LETTER.DOCX

TRC Environmental Corporation
10550 Richmond Avenue, Suite 210
Houston, TX 77042

Main 713.244.1000
Fax 713.789.5920

Meteorological Data Processing Memorandum

To:	Mr. Matthew Kovar, TCEQ, Air Dispersion Modeling Team
From:	NRG Texas Power LLC
Subject:	Meteorological Data Processing for use in Air Quality Analysis (AQA)
Project:	Chocolate Bayou Steam Generating Station, Brazoria County
Permit No.:	NSR 123117, N204, PSD-TX-1460
Date:	October 6, 2015

1.0 Overview

NRG Texas Power LLC (NRG Texas) is seeking approval for the use of updated meteorological data to calculate AERMOD impacts for use in an Air Quality Analysis (AQA) for the subject project. The AQA will be performed in support of a permit application for construction of a Steam Generating Station at an existing chemical plant in the Chocolate Bayou area near Alvin, Brazoria County, Texas. This memorandum, along with attached electronic files, document the data collection and subsequent data processing in order to create AERMET output files.

2.0 Meteorological Guidance and Data Selection

For any modeling analysis conducted using AERMOD, a minimum of two meteorological datasets are required: 1) hourly surface data and 2) daily upper air sounding data. In accordance with the *Guideline on Air Quality Models*,[1] the meteorological data used in a modeling analysis should be selected based on its spatial and climatological representativeness of the facility site and its ability to accurately characterize the transport and dispersion conditions in the area of concern. The spatial and climatological representativeness of the meteorological data are dependent on four factors:

1. The proximity of the meteorological monitoring site to the area under consideration;
2. The complexity of the terrain;
3. The exposure of the meteorological monitoring site; and

[1] Code of Federal Regulations, Title 40–Protection of Environment, Part 51, Appendix W, November 9, 2005. http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

4. The period of time during which data were collected.

The facility site of interest here is the Chocolate Bayou Steam Generating Station, which will be a support facility for an existing chemical plant in Brazoria County. The NRG Texas facility will be co-located with a chemical manufacturing plant, which is owned and operated by INEOS USA LLC (INEOS) operating under a Regulated Entity Number (RN) of RN100238708.

TCEQ offers AERMET files for this region based on Texas Gulf Coast Regional Airport (LBX) surface data and Lake Charles Regional Airport (LCH) upper air data[2]. The TCEQ prepared meteorological data sets for Brazoria County are based on years 2008 through 2012. Given the availability of more recent (2013 and 2014) meteorological data at those airport locations, reprocessing of the meteorological data is required to incorporate it into new AERMET output files, which will be more representative of the meteorological conditions at the facility.

Further, reprocessing of the meteorological data was performed using the most recent version of AERMET (15181) released in July 2015, while the TCEQ prepared meteorological data set was processed using AERMET version 12345. Since version 12345, AERMET has been updated three times (the most recent being to version 15181), incorporating multiple bug fixes and enhancements.

3.0 AERMET Stage 1

The latest version of AERMET (15181) was used to process the meteorological data. The first step in processing AERMET data is Stage 1, which reads in onsite, surface, and upper air data sets. Since there is no onsite data available for this project, the acquisition and processing of available surface and upper air data is discussed below.

3.1 Surface Met Data

Surface meteorological data was obtained in Integrated Surface Hourly Data (ISHD) format from the National Climatic Data Center (NCDC)[3] for Texas Gulf Coast Regional Airport (call sign LBX, formerly known as "Brazoria County Airport"), located approximately 18 miles to the southwest of the NRG Texas facility. Since ISHD data is provided in UTC, a time zone adjustment factor of 6 was applied in AERMET to shift the data to Central Standard Time. Otherwise, the data was used as-provided by NCDC (e.g., no data substitutions). The data capture rates were well above 90 percent for all variables and years, as shown in Table 1.

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[2] Meteorological Data for Refined Screening with AERMOD. http://www.tceq.state.tx.us/permitting/air/modeling/aermod-datasets.html

[3] ISHD FTP archive. ftp://ftp.ncdc.noaa.gov/pub/data/noaa/

Table 1. Surface Data Capture

Year	WSPD	WDIR	T	All Variables
2010	94.4%	94.2%	94.3%	92.5%
2011	99.9%	99.8%	99.6%	97.7%
2012	100.0%	99.9%	99.7%	99.3%
2013	99.4%	97.9%	99.6%	97.7%
2014	98.4%	98.4%	98.5%	98.1%

3.2 Upper Air Met Data

Upper air meteorological data was obtained in "Original FSL (ASCII text)" rawinsonde data format from the NOAA/ESRL Radiosonde Database[4] for Lake Charles Regional Airport (call sign LCH), located approximately 215 miles to the northeast of the NRG Texas facility in Louisiana. A time zone adjustment factor of 6 was applied in AERMET to shift the data from UTC to Central Standard Time. The data was used as-provided from NOAA/ESRL. As shown in Table 2, the morning soundings (collected at 11:00, 12:00, or 13:00 UTC) significantly exceed a 90 percent data capture rate.

Table 2. Upper Air Data Capture

Year	Missing Soundings	Capture Rate
2010	5	98.63%
2011	1	99.73%
2012	1	99.73%
2013	1	99.73%
2014	1	99.73%

4.0 AERMET Stage 2

AERMET Stage 2 merges the supplied hourly meteorological data into a single file. Automated Surface Observing Systems (ASOS) 1-minute data were obtained in "64050" format from the NCDC for LBX. This data was then processed with the hourly ISHD LBX data using the AERMINUTE (version 14337) and used in the Stage 2 processing of AERMET where a threshold value of 0.5 m/s was applied (THRESH_1MIN = 0.5). Multiple months of 64050 formatted 1-minute data were unavailable from NCDC for LBX during year 2013, while all other years had 12 months of available data. However, as can be seen in Table 1, surface data capture rates for year 2013 were over 97 percent for all variables, even with the unavailable 1-minute data.

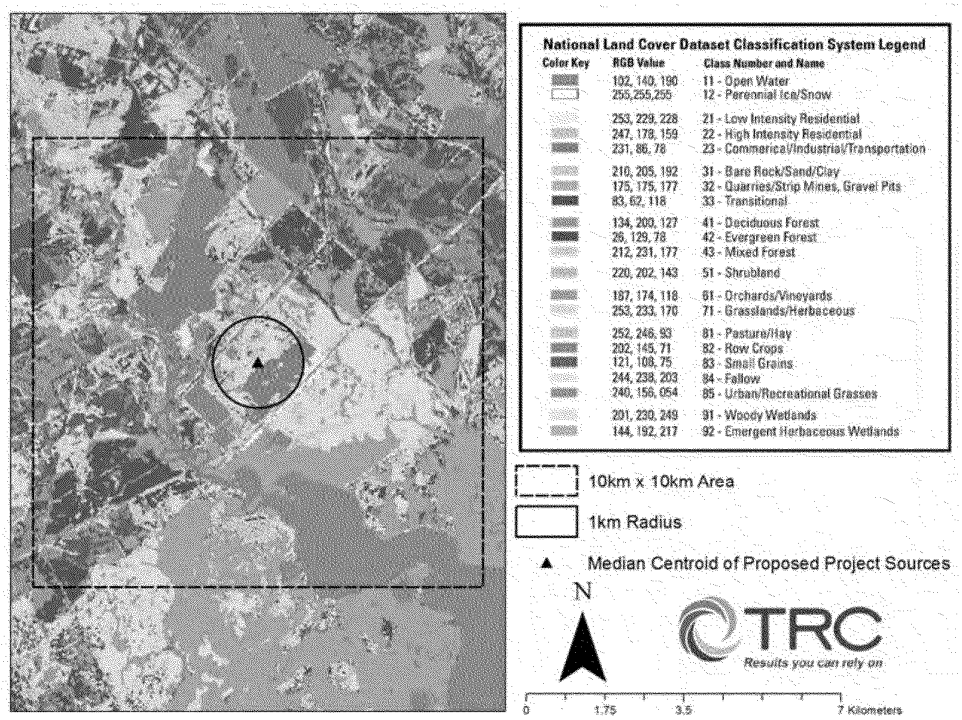
[4] NOAA/ESRL Radiosonde Database. http://www.esrl.noaa.gov/raobs/

5.0 AERMET Stage 3

AERMET Stage 3 creates the final meteorological output files for use in AERMOD. It combines the meteorological data from Stage 2 with estimates of boundary layer parameters. This stage of AERMET processing is consistent with TCEQ guidance. The surface characteristics were evaluated at the project site as the dispersion of the project source emissions will be influenced by the surface characteristics at the site.

The surface characteristics used in the AERMET stage 3 processing were calculated using AERSURFACE. AERSURFACE was run with the center coordinates of the study radius corresponding to the center of the project's proposed sources. Surface characteristics (surface roughness, albedo, and Bowen Ratio) were evaluated at the project site following TCEQ guidance. These inputs were generated using AERSURFACE (version 13016) which utilized the 1992 National Land Cover Dataset (NLDC92)[5], as presented in Figure 1.

Figure 1. 1992 NLCD Surrounding the Surface Station (LBX)



[5] NLCD92 state-scale archive. http://edcftp.cr.usgs.gov/pub/data/landcover/states/

Surface roughness for the project site was determined per TCEQ guidance using a single 360-degree sector for a 1 km radius circle around the project site. The Bowen ratio and albedo were determined per guidance based on the average characteristics over a 10 by 10 km square centered on the project site. The surface parameters were determined on an annual basis per TCEQ guidance.

An analysis of precipitation data was conducted to determine the surface moisture condition used in the AERSURFACE analysis in accordance with EPA guidance[6]. The surface moisture analysis was conducted using precipitation data from the Angleton, Texas station using the most recent 30 years of precipitation data. Each year was characterized as either a dry, average, or wet year based on a thirty year period (1985 to 2014) of climatological data from the Angleton 2 W, TX station (Coop ID: 410257) from NCDC[7].

Years that showed measured precipitation greater than the 70th percentile of the 30-year data-set (i.e., "upper 30th percentile") were described as "wet" years. Those years that recorded measured precipitation less than the 30th percentile of the data-set were described as "dry" years (i.e., "lower 30th percentile"). "Average" years were those years that had measured precipitation greater than the 30th percentile, but less than the 70th percentile (i.e., "middle 40th percentile"), inclusive. The precipitation data that were utilized in that characterization are summarized in Table 3.

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[6] AERSURFACE User's Guide.
http://www3.epa.gov/ttn/scram/7thconf/aermod/aersurface_userguide.pdf

[7] "Annual Summaries".
http://gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=cdo&theme=annual&layers=1&node=gis

Table 3. Precipitation Data (Angleton, TX) Used in Moisture Determination for Surface Parameters

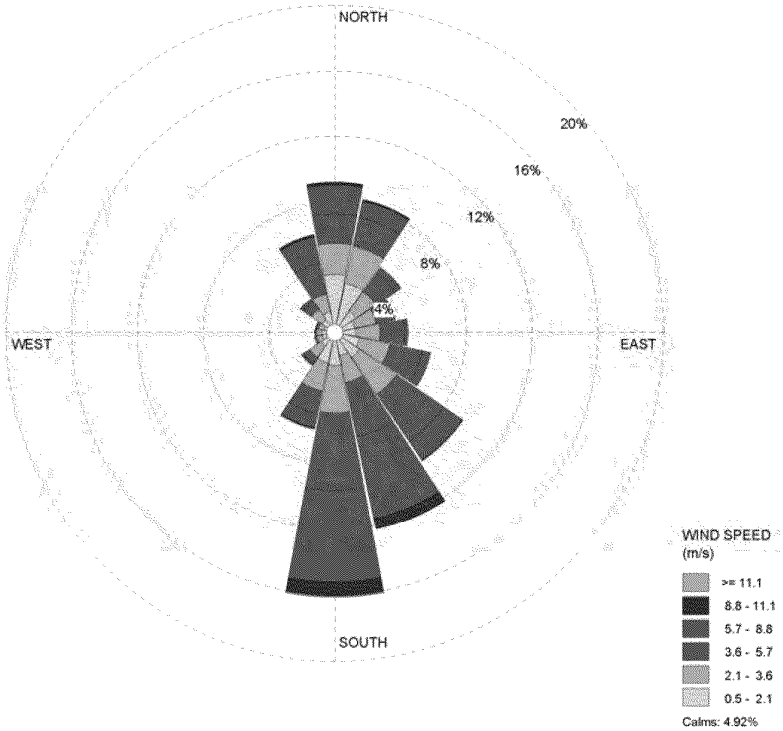
YEAR	Annual Total (0.01 inches)	RANK (1=driest, 30=wettest)	Category
2014[1]	248	1	dry[2]
2013[1]	1746	2	
2011	2740	3	
1999	2782	4	
2005	3673	5	
2009	4066	6	
2000	4279	7	
2003	4332	8	
1988	4540	9	
2012	4836	10	average
2008	4878	11	
2010	5056	12	
1996	5118	13	
1989	5268	14	
1994	5270	15	
2004	5439	16	
1985	5516	17	
1987	5578	18	
1998	5594	19	
1990	5683	20	
1992	5829	21	
2001	5866	22	wet[3]
2007	5960	23	
1997	6226	24	
1986	6278	25	
2006	6315	26	
1993	6664	27	
1995	6685	28	
1991	7779	29	
2002	8409	30	

[1] Incomplete records. However, comparing with Houston William Hobby Airport (KHOU, station USW00012918) data collected from NCDC (http://www.ncdc.noaa.gov/cag/), which had 2013 and 2014 as "dry" years, we will assume a "dry" moisture category for 2013 and 2014.
[2] Annual total less than 30th percentile of 30-year data-set (4747.20), exclusive.
[3] Annual total greater than 70th percentile of 30-year data-set (5840.10), exclusive.

6.0 Review of Output

The resulting AERMET output files (SFC surface file and PFL profile file) were reviewed to verify correct time zones, and correct usage of missing data flags. A wind rose of the final data set is shown in Figure 3. A predominance of winds from the south, southeast, and north is consistent with sea- and land-breezes in the coastal zone of the measurement site associated with the Gulf.

Figure 3. Wind Rose for AERMET Output (Jan 1, 2010 to Dec 31, 2014)



7.0 Digital Information

The meteorological data and AERMET input/output files are included in the attached electronic files.

October 8, 2015

Subject: Meteorological Data Processing for AQA

On September 17, 2015, the Air Dispersion Modeling Team (ADMT) sent comments to the applicant regarding the meteorological data processing protocol for NRG Texas Power LLC located in Brazoria County, Texas, dated September 2015. The applicant submitted a revised protocol in response to the ADMT comments on October 7, 2015. My comment related to the revised protocol is provided below.

6.0 Review of Output – Be sure to remove the 2015 meteorological data from the NRG_2014.SFC and NRG_2014.PFL output files prior to running AERMOD.

If you have any questions, please contact Matthew Kovar at 512-239-0180, by fax at 512-239-1330, or by email at Matthew.Kovar@tceq.texas.gov.

December 21, 2015

Subject: NRG Texas Power LLC AQA Modeling Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) protocol for NRG Texas Power LLC located in Brazoria County, Texas, dated October 2015. The comments in sections 6.5.1, 6.7, 11.0, and 13.0 should be addressed in a revised protocol.

1.0 Introduction - The protocol notes that the NRG Texas CHP Plant will be a support facility for the adjoining INEOS Plant, and the CHP Plant and the INEOS Plant will be considered one existing major stationary source for PSD applicability purposes. Be sure to coordinate with the permit reviewer on any INEOS sources that should be evaluated as part of the project.

2.2 Class I Area Impact Analyses - The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 kilometers of a Class I area. The applicant may contact the applicable Federal Land Manager to discuss any potential Class I analyses for air quality related values.

2.4.1 $PM_{2.5}$ Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC) - The protocol notes that a $PM_{2.5}$ background concentration will be used to justify the use of the $PM_{2.5}$ SILs in the Increment analysis. Please refer to the comments below in section 5.2.

2.5.1 NAAQS Analysis - Be sure to coordinate with the permit reviewer on the project emission rates prior to conducting the modeling analysis.

2.5.2 PSD Increment Analysis - The protocol notes that the TCEQ Air Permits Allowable Database (APAD) will be used to develop the emissions inventory for the $PM_{2.5}$ Increment analysis. Please note that applicants are not limited to using only APAD as a data source. If the applicant is aware of data not contained in APAD, such as recently issued permitted facilities, the data should be included as applicable.

5.0 Air Quality Monitoring Data - The protocol notes that the predicted concentrations for all criteria pollutants are expected to be below the respective SILs for the NAAQS analysis. If the model predictions are greater than or equal to the applicable SILs, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that includes a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

5.2 Justification of $PM_{2.5}$ SIL for PSD Increment - The proposed monitor may not be appropriate given the distance from the project site; the monitor used in the justification should account for increment consuming sources in the vicinity of the project site. If justification for the $PM_{2.5}$ SILs is not provided for the Increment analysis, the applicant will need to search and identify all major sources of $PM_{2.5}$ that have increment consuming emissions (related to the $PM_{2.5}$ major source baseline date [October 20, 2010]), as well as minor sources that have increment consuming emissions (related to the minor source baseline date for Brazoria County [December 20, 2011]). Be sure to document how this information was obtained in the AQA.

In addition, the justification for the use of the SILs is not appropriate for limiting the PSD Increment analysis to the significant receptors. The PSD Increment analysis could be limited to the significant receptors provided that the magnitude and location of the increment affecting emissions are evaluated relative to the proposed project. If nearby increment affecting emissions are small and distant relative to the project site, then a case could be made for limiting the analysis to the significant receptors.

6.3.3 Cumulative Source Inventory - The protocol notes that a retrieval from APAD will be obtained for NAAQS pollutants that exceed the applicable SIL. In addition, the protocol notes that a search radius of ten kilometers will be used to focus additional review of APAD data for developing the off-property inventory. Please provide additional justification to support the proposed approach. For example, a map that depicts the location of off-property sources, along with the magnitude of emissions.

As stated in section 2.5.2, applicants are not limited to using only APAD as a data source. If the applicant is aware of data not contained in APAD, such as recently issued permitted facilities, the data should be included as applicable.

6.5.1 Operating Load Levels - The protocol lists several operating load levels for the turbines and boilers. Ensure that the load levels and the determination of the worst-case scenario are properly documented in the AQA.

In addition, the protocol does not sufficiently document how the turbines and boilers will operate simultaneously with the various load levels. Submit a revised protocol that documents the specific operating scenarios that will be evaluated in the AQA.

6.6 Scaling Factors - The protocol notes that 24-hr emission rates will be modeled for the 24-hr $PM_{2.5}$ NAAQS and Increment analyses. Be sure to fully document how the 24-hr emission rates are calculated in the AQA.

6.7 Modeling Procedures for the NO_2 NAAQS Demonstration - The protocol notes that planned MSS operations of the boilers and turbines can be classified as intermittent sources. Although information in support of classifying the planned MSS operations as intermittent sources was provided in the protocol, the protocol failed to show that the operations would not contribute significantly to the modeled design value of the annual distribution of daily maximum 1-hr concentrations based on the uncertainty of the total number of hours of planned MSS operations. The protocol did not clarify if the 100 hours applied to all boilers and turbines

combined, or on an individual basis. Additional information should be provided in a revised protocol on the planned MSS operations with respect to the frequency and duration of the operations for each boiler and turbine. In addition, the protocol should discuss if the planned MSS operations can occur simultaneously for multiple boilers and turbines.

In addition, please provide information on the frequency and duration of testing and maintenance operations for the emergency diesel engine. Please note that the project is located within the Houston-Galveston-Brazoria ozone nonattainment area. Title 30 Texas Administrative Code (30 TAC) Chapter 117 includes operational restrictions for diesel engines in the ozone nonattainment areas. The operation of diesel engines for testing or maintenance purposes cannot occur between the hours of 6 am and 12 pm. The total hours per year available for testing or maintenance would be 6570 hours (18 hours per day multiplied by 365 days per year). The modeled hourly emission rate for the diesel engine would be equal to the maximum hourly emission rate multiplied by 100/6570.

7.1 AERMOD Model Options - The protocol notes that the profile base elevation for the meteorological data will be set to the Lake Charles Regional Airport base elevation (upper air station). Please note that the profile base elevation should be set to the surface station base elevation (Texas Gulf Coast Regional Airport).

7.2 PSD NAAQS and PSD Increment Consumption Analyses - The protocol notes that the predicted concentrations plus background concentrations for each pollutant will be compared to the appropriate NAAQS and PSD Increment. Please note that the PSD Increment analysis does not include the use of background concentrations.

9.1 Good Engineering Practice (GEP) Stack Height Analysis - Figure 9-2 of the protocol indicates that process areas and the associated piping components will be included as downwash structures. These areas will not present a significant obstruction to wind flow and should not be considered downwash structures.

11.0 Receptor Grid – The protocol notes that the receptor grid is placed along the fence line of the property of INEOS USA, LLC. The protocol did not provide adequate technical justification for the proposed fence line. Please provide additional information in a revised protocol.

13.0 Modeling Results - The protocol notes that the model predicted impacts for $PM_{2.5}$ will be increased by a factor of 1.017 to account for the secondary formation of $PM_{2.5}$ as detailed in section 2.4.2. However, section 2.4.2 does not provide any discussion on how this factor was determined. Please discuss in a revised protocol how this factor was developed and justify the appropriateness of using the factor in the modeling analysis.

The protocol notes that five years of meteorological data will be used for the 1-hr SO_2 analysis, and one year of meteorological data will be used for the 3-hr, 24-hr, and annual SO_2 analyses. Please note that the meteorological data used should be consistent for all averaging times.

In addition, the protocol notes five years of meteorological data will be used for the 1-hr NO_2 analysis, and one year of meteorological data will be used for annual NO_2 analysis. Based on the

source of meteorological data, five years of meteorological data must be used for PSD analyses.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Matthew Kovar at 512-239-0180, by fax at 512-239-1330, or by email at Matthew.Kovar@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Justin Cherry[justin.cherry@tceq.texas.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Tue 12/29/2015 3:40:55 PM
Subject: Modeling protocol - PSDTX1472 SUNOCO PARTNERS MARKETING & TERMINALS LP
Modeling Protocol - PSDTX1472 Sunoco Partners Marketing & Terminals LP.docx
SPMT-Model-Protocol-120915.pdf

Ashley,

Attached are the modeling protocol submitted by SUNOCO PARTNERS MARKETING & TERMINALS LP, permit No. PSDTX1472, and TCEQ comments on the modeling protocol.

Please send confirmation that you received this e-mail.

Best Regards,

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

December 29, 2015

Subject: Sunoco Partners Marketing & Terminals LP Air Dispersion Modeling Protocol

We have reviewed the Prevention of Significant Deterioration (PSD) Air Dispersion Modeling Protocol for Sunoco Partners Marketing & Terminals LP located in Nederland, Jefferson County, Texas, dated December 2015, and our comments are provided below.

I. Introduction

3. **Applicable Regulations and Requirements –** Be sure to use the most recent effects screening level (ESL) list from the Toxicology Division (September 2015). If a contaminant is not on the ESL list, be sure to provide verification from the Toxicology Division for the ESL used.

II. Project Description

1. **Project Overview** – The purpose of any air quality analysis (AQA) for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.
3. **Emissions Inventory and Emissions-Related Parameters for the Proposed Source or Modification** – Be sure to provide a copy of the Table 1(a) that was submitted with the permit application with the AQA. In addition, be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA.
    a. Criteria Pollutants – The protocol notes that Table 2 of the protocol provides the proposed sources for assessing <u>the site-wide emissions</u> of criteria pollutants. When conducting the NAAQS Significance analyses, consider all new and increased emissions from the site related to the project. For pollutants that exceed the associated de minimis levels, conduct a NAAQS analysis that considers all allowable emissions at the site, including emissions associated with all planned Maintenance, Start up, and Shutdown (MSS) activities, and emissions from off-property sources and activities.

b. Non-Criteria (Speciated) Pollutants – Be sure to provide all supporting documentation used to justify the area source characterization and all assumptions and calculations used to determine the size, height of release, dimensions, and rotation angle of area sources. Below are some items to consider when determining the appropriateness of the area source characterization and the associated source parameters:

i. What activity will be represented in the modeling analysis?

ii. What is the horizontal and vertical scale of the emissions associated with this activity?

iii. Does the activity occur at multiple locations throughout the site?

- If yes, do the activities operate within certain areas of the site?
- Are the activities adjacent to each other?
- Do the activities operate simultaneously?

4. **Good Engineering Practice (GEP) Stack Height Analysis** – Table 5 of the protocol lists several ships and barges as downwash structures. Ships and barges should not be included as downwash structures unless sufficient technical justification can be provided.

III. Project Site Description

1. **Facility Layout: Location of Sources, Buildings, and Property/Fence Line** – Provide a plot plan with the AQA (electronic format preferred) that depicts the entire site. The plot plan should include the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any buildings or structures represented in the AQA. Please be sure to clearly label all of these features on the plot plan.
2. **Terrain Description** – The selection of flat terrain is reasonable.

IV. Air Quality Modeling Methodology

1. **Model Selection** – Using ISC-PRIME (version 04272) for the modeling demonstration is reasonable and consistent with previous modeling demonstrations.
2. **Model Setup and Application**

a. Land Use Analysis

i. Selection of Dispersion Coefficients – Utilizing rural dispersion coefficients is reasonable.

b. Building Downwash – Provide all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

Ensure that all GEP heights used in BPIP PRIME are justified according to Guideline for Determination of Good Engineering Practice Stack Height:

http://www.epa.gov/scram001/guidance/guide/gep.pdf

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

As mentioned above in Section II item 4, Table 5 lists several ships and barges as downwash structures. Ships and barges should not be included as downwash structures unless sufficient technical justification can be provided.

c. Treatment of Chemical Transformation (e.g., NO to NO_2, parameterizations) – Using Tier 2 to evaluate NO_2 is appropriate. Please note that the Tier 2 default value for the annual averaging period of NO_2 is 0.75.

d. Averaging Periods – The protocol notes based on previous modeling that all of the maximum predicted concentrations are less than the applicable significant impact levels (SILs), except for 1-hr and 24-hr SO_2. If the preliminary results change and the model predictions of any pollutant are greater than or equal to an applicable de minimis level, then a full Minor New Source Review NAAQS analysis will need to be conducted that includes the evaluation of all on-property and off-property sources. If evaluating off-property sources with a representative background monitor, be sure to provide complete documentation and technical justification for the selection of the monitor prior to submitting the AQA.

The protocol notes that the data substitution procedures were used to validate the $PM_{2.5}$ monitoring data for the 4th quarter of 2012. Be sure to include this demonstration in the AQA.

4. **Receptor network** – The receptor grid modeled should capture an appropriate maximum ground level concentration and exceedances for all pollutants, operating scenarios, and review types.

5. **Meteorological Data** – Be sure to include the meteorological data files with the AQA associated with the modeling analysis.

6. **Source Characterization** – As stated earlier, be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA. See Section II item 3 for additional information.

As noted in the protocol, the fugitive adjustment factor only applies to fugitive emissions with a release height of 10 meters or less.

V. Ozone Assessment Methodology

Please note the 8-hr ozone standard of 70 parts per billion will be in effect on December 28, 2015.

The protocol notes that on October 1, 2015, EPA lowered the NAAQS for ground-level ozone to 0.07 ppm (annual fourth-highest daily maximum 8-hour concentration, averaged

over three years). The protocol further notes that this standard is met when the ambient air quality monitoring data demonstrate concentrations less than 0.075 ppm (75 ppb). This is not true; the 8-hr ozone standard of 0.07 ppm is met when the ambient air quality monitoring data demonstrate concentrations less than or equal to 0.070 ppm (70 ppb).

1. **Current ozone Air Quality Assessment** – Table 7 of the protocol lists several monitors in the Beaumont/Port Arthur (BPA) area. Providing the monitoring data for all the monitors is appropriate to establish the ozone trends in the BPA area; however, be sure to select a single monitor to represent the project site when demonstrating compliance. In addition, considering 2015 monitoring data when evaluating the background concentrations is appropriate since the complete ozone season would be captured by the monitor for the BPA area (May 1 – October 31). Be sure to verify if each year meets the completeness criteria for the ozone monitor. The completeness criteria is met for the three-year period at a monitoring site if daily maximum 8-hr average concentrations are available for at least 90% of the days within the ozone monitoring season, on average, for the three-year period, with a minimum data completeness criteria in any one year of at least 75% of the days within the ozone monitoring season. Be sure to include this information in the AQA.
2. **Emissions Assessment** – In general, the ozone analysis is reasonable. However, the method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories. Information from the BPA 1997 Eight-Hour Ozone Redesignation Request and Maintenance Plan SIP could be used to support the ozone analysis, particularly section 4.2 - FUTURE EMISSIONS AND VERIFICATION OF CONTINUED ATTAINMENT. This section contains analyses demonstrating that for the BPA area, reducing NO_x emissions is more effective in reducing the eight-hour ozone Design Value (DV) than reducing VOC emissions.

VI. Background Air Quality

1. **Background Concentration** – As stated in Section IV item 2d, the protocol notes based on previous modeling that the maximum predicted concentrations are expected to be less than the applicable SILs, except for 1-hr and 24-hr SO_2. If the preliminary results change and the model predictions of any pollutant are greater than or equal to an applicable de minimis level, then a full Minor New Source Review NAAQS analysis will need to be conducted that includes the evaluation of all on-property and off-property sources. If evaluating off-property sources with a representative background monitor, be sure to provide complete documentation and technical justification for the selection of the monitor prior to submitting the AQA.
   - **b.** SO_2 – The selected monitor is reasonable.
   - e. $PM_{2.5}$ – Although addressed in other sections of the protocol, be sure to provide justification for using the $PM_{2.5}$ de minimis levels. Methods for justification can

be found in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232):

https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/nsr_mod_guidance.html

VII. Air Quality Impacts Analysis

1. **Model Results** – For the significance analyses, in general, report the predicted high, first high (H1H) concentration for each pollutant. The results of the modeling for 24-hr and annual $PM_{2.5}$, 1-hr NO_2, and 1-hr SO_2 analyses may be presented as the highest five-year averages of the maximum modeled concentrations predicted each year at each receptor, consistent with EPA guidance.

   For the full Minor new source review NAAQS analyses, in general, report the following for each criteria pollutant:

   - For 24-hr PM_{10}, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum high, sixth high (H6H) predicted concentration for the concatenated five-year period.
   - For 24-hr $PM_{2.5}$, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, the highest five-year average of the H1H predicted concentrations from all receptors may be used. For annual $PM_{2.5}$, when using one year of meteorological data, report the maximum predicted concentration from all receptors. When using five years of meteorological data, report the highest five-year average of the predicted concentrations from all receptors.
   - For 1-hr SO_2, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum five-year average of the 99th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, fourth high (H4H) predicted concentration) determined for each receptor. For 3-hr and 24-hr SO_2, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum H2H predicted concentration from all receptors. For annual SO_2, report the maximum predicted concentration from all receptors across the applicable meteorological data set.
   - For 1-hr NO_2, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum five-year average of the 98th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, eighth high (H8H) predicted concentration) determined for each receptor. For annual NO_2, report the maximum predicted concentration from all receptors across the applicable meteorological data set.

- For 1-hr and 8-hr CO, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum H2H predicted concentration from all receptors.

For the State Property Line and Health Effects analyses, report the maximum H1H predicted concentration for the applicable averaging times.

The protocol does not detail how off-property sources will be addressed if a full impacts analysis is required. If the applicant intends to rely on ambient monitoring data to account for off-property sources, then this method should be made clear in the AQA. In addition, the applicant will need to account for any recent permitting actions from nearby sources that would not be reflected in the monitor. The ADMT has identified a pending permit from an adjacent facility, Phillips 66 (RN102596210, permit No. PSDTX1466).

2. **Additional Impacts Analyses** – The protocol did not address the additional impacts analysis. The AQA should explain in detail how the project will affect the area in terms of a growth analysis, soil and vegetation analysis, and a Class II visibility impairment analysis. Be aware that the applicant can meet the visibility analysis by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111.

Deliverables – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Ahmed Omar or Justin Cherry. Ahmed can be reached at (512) 239-1285, by fax at (512) 239-1400, or by email at Ahmed.Omar@tceq.texas.gov. Justin can be reached at (512) 239-0955, by fax at (512) 239-1400, or by email at Justin.Cherry@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Wed 12/23/2015 2:04:28 PM
Subject: Modeling Protocol - PSDTX1466 Phillips 66 Pipeline LLC
Modeling Protocol - PSDTX1466 Phillips 66 Pipeline LLC.docx
A7797 P66 Beaumont Terminal Modeling Protocol v06.pdf

Ashley,

Attached are the modeling protocol submitted for the Phillips 66 Pipeline LLC Beaumont Terminal project, permit No. PSDTX1466, and TCEQ comments on the modeling protocol.

Please send confirmation that you received this e-mail.

Best Regards

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

December 22, 2015

Subject: Phillips 66 Pipeline LLC Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) and Minor New Source Review (NSR) Air Quality Analysis (AQA) Protocol for the Phillips 66 Pipeline LLC Beaumont Terminal project located in Nederland, Jefferson County, Texas, dated November 2015. My comments on the protocol are provided below. The comments in sections 2.3, 3.10, and 3.12 need to be addressed prior to submitting the AQA. Please submit a revised protocol addressing these comments to the TCEQ and EPA Region 6. The rest of the comments are reminders for information to be included with the AQA.

1.0 Introduction – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified on why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

2.0 Scope of Review –When conducting the PSD Significance analyses, consider all new and increased emissions from the site related to the project. For pollutants that exceed the associated significant impact levels, conduct a NAAQS analysis that considers all allowable emissions at the site, including emissions associated with all planned Maintenance, Start up, and Shutdown (MSS) activities, and emissions from off-property sources and activities. For the same pollutants, conduct a PSD Increment analysis that considers all PSD Increment consuming sources.

When conducting the Minor NSR analyses, consider all new and increased emissions from the site related to the project, including emissions associated with all planned MSS activities. For pollutants and averaging periods that exceed the associated de minimis levels, conduct a full Minor NSR NAAQS analysis that considers all allowable emissions at the site, including emissions associated with all planned MSS activities, and emissions from off-property sources and activities.

When conducting the State Property Line analysis, consider all emissions at the site. The AQA must include justification on why some emissions have not been modeled and how site-wide emissions have been considered in the demonstration of compliance with the standards.

When conducting the Health Effects analysis, consider all new and increased emissions from the site related to the project. For all health effects pollutants evaluated, provide the corresponding Chemical Abstract Service (CAS) numbers, as applicable, with the AQA.

2.1 Health Effects Review – The protocol notes that relevant ESLs will be taken from the most recent version of the TCEQ ESL list (March 17, 2014). The most recent ESL list from the Toxicology Division was updated (September 2015), and should be used for the analysis. If a contaminant is not listed on the ESL list, be sure to provide verification from the Toxicology Division for the ESL used.

2.2 National Ambient Air Quality Standards (NAAQS) – The protocol notes that if the initial modeling demonstration shows impacts above the de minimis levels for any criteria pollutant averaging period, further assessment inclusive of all potential criteria pollutant emissions from both new and existing emission sources will be performed and added to a listing of sources obtained from TCEQ. Please note that if the model predictions are greater than or equal to the applicable de minimis levels, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that include a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions. For determining representative background monitors, please review Appendix D of the TCEQ's Air Quality Modeling Guidelines (APDG 6232):

https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/nsr_mod_guidance.html

Table 2-2 of the protocol lists the 1-hr de minimis level for SO_2 as 7.9 µg/m^3. Note that the 1-hr de minimis level for SO_2 is 7.8 µg/m^3.

The protocol notes that screen modeling was conducted for all applicable health effects and criteria pollutants using the Environmental Protection Agency's (EPA) SCREEN3 model. Since AERMOD is being used for the refined modeling analysis, for consistency, the ADMT recommends using AERMOD for the screen modeling as well.

Also, the documentation with the protocol is not clear whether annual $PM_{2.5}$ passed the modeling demonstration using the screening modeling. Be sure that the documentation in AQA is clear.

2.3 State Property Line Standards – The purpose of the state property line standard analysis is to demonstrate compliance with state standards for net ground-level concentrations for sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and sulfuric acid (H_2SO_4). This analysis must demonstrate that resulting air concentrations from all on-property facilities and sources that emit the regulated pollutant will not exceed the applicable state standard.

Potential Intermittent Sources of 1-hour NAAQS Standards – Provide more details of the operations of the portable control unit (PCU) with the revised protocol to

support the use of intermittent guidance. Stating that the operations will be less than 500 hours does not fully support the use of intermittent guidance. Provide additional information on the expected number of events per year, the duration of each event, and any operations limitations, etc. In addition, provide all the calculations used to develop the modeled 1-hr emission rates.

3.1 Model Selection – Be sure to provide full documentation with the AQA for all screening modeling that will be conducted.

3.3 Sources – The protocol notes that existing unmodified sources are not expected to be modeled for NAAQS demonstrations due to the GLCmax being less than the applicable de minimis levels. If the model predictions are greater than or equal to the applicable de minimis levels, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that include a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration.

Provide a copy of the Table 1(a) that was submitted with the permit application with the AQA. Identify special source types such as covered stacks, horizontal exhausts, fugitive sources, area sources, volume sources, roads, stockpiles, and flares and how they will be modeled.

In the AQA, provide sufficient documentation that includes all assumptions and calculations to determine as appropriate the size, sides, rotation angles, height of release, initial dispersion coefficients, effective stack diameter, gross heat release and weighted (by volume) average molecular weight of the mixture being burned.

3.3.1 Point Sources – Be sure to provide flare effective stack diameter calculations with the AQA.

The protocol notes that PSXPL proposes to add 6 VCUs, 37 tanks, and a portable control unit (e.g. thermal oxidizer or vapor combustor). Be sure that the modeling demonstrations evaluate the worst-case scenario by evaluating all possible operating scenarios. The AQA should discuss and evaluate all possible or worst-case locations of the portable unit. In addition, if the option for either thermal oxidizer or vapor combustor has not been decided, then both options should be evaluated.

3.3.2 Volume Sources – Provide all supporting documentation used to justify the volume source characterization and all assumptions and calculations used to determine the size, height of release, and initial dispersion coefficients of the volume sources with the AQA.

Below are some items to consider when determining the appropriateness of the volume source characterization and the associated volume source parameters:

- What activity will be represented in the modeling analysis?
- What is the horizontal and vertical scale of the emissions associated with this activity?

- Does the activity occur at multiple locations throughout the site?
    - If yes, do the activities operate within certain areas of the site?
    - Are the activities adjacent to each other?
    - Do the activities operate simultaneously?

The protocol provides sample calculations for sources that will be modeled as a series of volume sources. Since these sources are considered a line source represented by separated volume sources, the horizontal sigma should be determined by dividing the side of the volume by 2.15 instead of 4.3.

The protocol characterized ship and barge loading fugitives as elevated sources adjacent to a building. If the ship/barge is being treated as the building, be sure to provide full technical justification for treating the ship/barge as the building with the AQA.

<u>All Tank Fugitives</u>
Using the size of the entire tanks area for the initial dispersion coefficients for activities that do not occur at all locations can lead to underestimated concentrations, particularly on a short-term basis. In the AQA, be sure to use representations that are either conservative or representative of actual operations.

<u>Uncontrolled Barge Loading Fugitives</u>
The protocol notes that Barge loading can occur on the Main Dock or Dock 3, but the highest concentration occurs during Main Dock barge loading. It is not clear what the basis is for making this statement. Be sure to provide technical justification to support this statement with the AQA.

<u>All Dock Fugitives</u>
The protocol notes that Dock fugitives can also occur at Dock 3, but were excluded from the model as it was not a conservative approach since Dock 3 is remotely located compared to other sources. The protocol did not provide sufficient justification for excluding Dock 3 from the modeling analysis. Be sure to provide sufficient justification for excluding Dock 3 from the modeling analysis with the AQA.

3.3.3 Area Sources – Provide all supporting documentation used to justify the area source characterization and all assumptions and calculations used to determine the size, height of release, and initial dispersion coefficients (if applicable) with the AQA.

The area source dimensions for Railcar Loading Fugitives and Railcar Loading Rack Fugitives appear too large for these types of activities, based on information with the protocol. Be sure to fully justify why the area source dimensions for these activities are appropriate as part of the documentation with the AQA.

Also, the proposed size of LACT Unit Fugitives appears too large based on information with the protocol. Provide sufficient justification for the proposed size of LACT Unit Fugitives with the AQA.

3.8 Background Data – The protocol identifies a CO monitor that would be used in the analysis; however, justification for the monitor was not provided, nor did the protocol include the applicable monitoring concentrations for review. Refer to section 2.2 for further information.

3.9 NO_x to NO_2 Conversion – The protocol notes that the NO_2 NAAQS compliance demonstrations will follow the three-tiered approach recommended by EPA to obtain 1-hr and annual average estimates of NO_2 from point sources. If a Tier III analysis is used for modeling of NO_x emissions, a revised protocol must be sent to the TCEQ for review prior to submitting the AQA. Furthermore, if a Tier III analysis is used, the revised protocol must include the methodology proposed along with full documentation and technical justification for the associated model input parameters.

3.10 $PM_{2.5}$ Air Quality Analysis AIR –

Preliminary Impact Analysis
Since the significant impact levels (SILs) for $PM_{2.5}$ have been vacated and remanded back to EPA, please provide justification for any proposed SIL for $PM_{2.5}$ that is relied upon in the AQA. Methods for SIL justification can be found in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232). This information should be provided prior to submitting the AQA.

The protocol notes that if the difference between the $PM_{2.5}$ NAAQS and the design background concentration is at least two times the vacated $PM_{2.5}$ SIL, additional analysis will be conducted on the potential for secondary formation of $PM_{2.5}$ from the project emissions. To address secondary formation of $PM_{2.5}$ from the project emissions, the SO_2 and NO_x project emissions should be presented for comparison with the $PM_{2.5}$ precursor significant emission rates (SERs). This evaluation should be used to conclude that significant secondary $PM_{2.5}$ formation is not expected based on the net project emissions, consistent with EPA guidance.

Please note that for minor NSR analyses, there is no requirement for conducting an increment analysis.

3.11 Preconstruction Ambient Monitoring Requirement – Be aware that if the modeled concentrations are greater than the Significant Monitoring Concentration (SMC), a revised protocol that discuses a preconstruction monitoring analysis will need to be submitted prior to submitting the AQA.

3.12 Ozone Impacts – Please note the new ozone standard of 70 parts per billion will be in effect on December 28, 2015.

In general, the ozone analysis is reasonable. However, the method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories. Information from the BPA 1997 Eight-Hour Ozone Redesignation Request and Maintenance Plan SIP could be used to support the ozone analysis, particularly section 4.2 - *FUTURE EMISSIONS AND*

VERIFICATION OF CONTINUED ATTAINMENT. This section contains analyses demonstrating that for the Beaumont-Port Arthur (BPA) area, reducing NO_X emissions is more effective in reducing the eight-hour ozone Design Value (DV) than reducing VOC emissions.

The protocol did not provide justification for the selected ozone monitor. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions (ozone precursor emissions). In addition, considering 2015 monitoring data when evaluating the background concentrations is appropriate since the complete ozone season would be captured by the monitor for the BPA area (May 1 – October 31).

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that outlines a specific methodology for addressing the ozone analysis and also includes a discussion on whether the area is NO_x-limited or VOC-limited and the monitor selection.

3.13 Modeling Results – For the significance analyses, in general, report the predicted high, first high (H1H) concentration for each pollutant. The results of the modeling for 24-hr and annual $PM_{2.5}$, 1-hr NO_2, and 1-hr SO_2 analyses may be presented as the highest five-year averages of the maximum modeled concentrations predicted each year at each receptor, consistent with EPA guidance.

For the full Minor NSR NAAQS analyses, in general, report the following for each criteria pollutant:

- For 24-hr PM_{10}, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum high, sixth high (H6H) predicted concentration for the concatenated five-year period.

- For 24-hr $PM_{2.5}$, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, the highest five-year average of the H1H predicted concentrations from all receptors may be used. For annual $PM_{2.5}$, when using one year of meteorological data, report the maximum predicted concentration from all receptors. When using five years of meteorological data, report the highest five-year average of the predicted concentrations from all receptors.

- For 1-hr SO_2, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum five-year average of the 99th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, fourth high (H4H) predicted concentration) determined for each receptor. For 3-hr and 24-hr SO_2, when using one year of meteorological data,

report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum H2H predicted concentration from all receptors. For annual SO_2, report the maximum predicted concentration from all receptors across the applicable meteorological data set.

- For 1-hr NO_2, when using one year of meteorological data, report the maximum H1H predicted concentration from all receptors. When using five years of meteorological data, report the maximum five-year average of the 98th percentile of the annual distribution of the maximum daily 1-hr predicted concentrations (or high, eighth high (H8H) predicted concentration) determined for each receptor. For annual NO_2, report the maximum predicted concentration from all receptors across the applicable meteorological data set.

For the PSD NAAQS analyses, in general, for 1-hr and 8-hr CO, when using five years of meteorological data, report the maximum H2H predicted concentration from all receptors.

For the State Property Line and Health Effects analyses, report the maximum H1H predicted concentration for the applicable averaging times.

If you have any questions, please contact Ahmed Omar at (512) 239-1285, by fax at (512) 239-1400, or by email at Ahmed.Omar@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Vennetta Hayes
Sent: Mon 12/21/2015 8:55:07 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November (REVISED DATES OF JANUARY 20 & 21, 2016)

Ashley I don't know if anyone here has responded yet, but it appears that 3 of us will be attending pending travel approval.

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, December 21, 2015 10:47 AM
To: Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Thomas Rheaume; Vennetta Hayes; Nguyen, Tien; Yvette Olmos
Cc: Snyder, Erik
Subject: FW: Potential R6 Modeling workshop in Dallas in early November (REVISED DATES OF JANUARY 20 & 21, 2016)

All –

I wanted to follow-up with you to see if you had any feedback on the proposed dates of January 20th and 21st for the Region 6 Modeling Workshop. So far we have received confirmation from a few of our states for these dates, but I wanted check once more before finalizing for conference room reservation and HQs staff travel plans. **Please let me know by COB today if you are making plans to attend and these dates do not work for you or your staff that would be in attendance.**

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Snyder, Erik
Sent: Wednesday, December 16, 2015 2:28 PM
To: Daniel Menendez <daniel.menendez@tceq.texas.gov>; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us) <Daniel.Jamieson@tceq.state.tx.us>; Ron Thomas <Ron.Thomas@tceq.texas.gov>; Zarena Post <ZPost@tceq.texas.gov>; Jeff Stonesifer <jstonesifer@cabq.gov>; Sufi Mustafa <Sufi.Mustafa@state.nm.us>; Eric Peters <eric.peters@state.nm.us>; Gi-Dong <gi-dong.kim@state.nm.us>; Eric Milligan <Eric.Milligan@deq.ok.gov>; Lee Warden <lee.warden@DEQ.OK.gov>; Thomas Rheaume <rheaume@adeq.state.ar.us>; vennetta.hayes@la.gov; Nguyen, Tien <Nguyen.Tien@epa.gov>; Yvette Olmos <Yvette.Olmos@LA.GOV>; Smith, Jim <Smith.Jim@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>; Mark McCorkle (MAC@adeq.state.ar.us) <MAC@adeq.state.ar.us>
Cc: Mohr, Ashley <Mohr.Ashley@epa.gov>; Feldman, Michael <Feldman.Michael@epa.gov>
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi,

Making another run at this. I have locked down conference rooms here at the Region for January 20-21st to have a permit modeling workshop with most of the focus on SO2 modeling for CD and DRR sources. Looking at having James Thurman down from RTP and then some others by teleconference or video. Would be 1.5 to two days. I know we are getting towards the holidays but if you can let Ashley and I know if these dates would work by the end of this week, we can make sure James can get his travel done. I am going to be out of pocket for the rest of this week but please follow up with Ashley on any questions.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Tuesday, September 22, 2015 10:31 AM
To: Snyder, Erik
Cc: Ron Thomas
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi Erik,

Any updates on potential Region 6 modeling meeting?

Thanks,

Daniel

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, August 19, 2015 11:16 AM
To: Daniel Menendez; Daniel Jamieson; Dominic Ruggeri; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; vennetta.hayes@la.gov; Tien Nguyen; Yvette Olmos; Jim Smith
Cc: Mohr, Ashley; Feldman, Michael; Robinson, Jeffrey; Donaldson, Guy
Subject: Potential R6 Modeling workshop in Dallas in early November

Hi,

We haven't had a Region 6 modelers workshop in Dallas in a while. With the final DRR and proposed changes in App. W, thought it might be a good time to have a meeting here in Dallas. I am not planning on discussing photochemical issues other than maybe secondary pollutant analysis for permits. The main focus would be modeling for the SO2 sources as part of the SO2

Phase 3 and 4 designations process (either modeling directly or modeling for monitor locations around a facility). We could also discuss other issues if there is interest. I was thinking some discussion on ozone and PM2.5 impacts from single source for permitting might and what sources should be included in cumulative analysis are two topics that might also be beneficial. At this time I am targeting the first week in November (11/2-11/5) as possible date(s). Would only plan for 1 or two days within this period but we have locked meeting space for M-R currently. I think we will be able to get one or two people from OAQPS that week to come to Dallas (James Thurman and/or George Bridgers most likely). They are available for travel and this would be after the close of the proposed changes to App. W, so we could talk about any of the proposed changes.

Please let me know your interest and availability (if this week works and if M-T, T-W or W-R is best). Also any ideas for specific topics/issues.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Snyder, Erik[snyder.erik@epa.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Daniel Menendez
Sent: Fri 12/18/2015 8:17:29 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi Erik and Ashely,

We can make January 20-21st work. At most it would be 3 people form Air Permits.

Thanks,

Daniel

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Cc: Mohr, Ashley; Feldman, Michael
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

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Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

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To: Snyder, Erik
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To: Daniel Menendez; Daniel Jamieson; Dominic Ruggeri; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume;

vennetta.hayes@la.gov; Tien Nguyen; Yvette Olmos; Jim Smith
Cc: Mohr, Ashley; Feldman, Michael; Robinson, Jeffrey; Donaldson, Guy
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Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]
From: Ahmed Omar
Sent: Thur 12/17/2015 9:55:03 PM
Subject: Modeling Protocol - PSDTX1416 Invista s.a r.l.
HMD PSD Air Quality Analysis - Letter and Report (2015_1112).pdf
HMD State Air Quality Analysis - Letter and Report (2015_1112).pdf
Modeling Protocol - PSDTX1416 INVISTA S.A R.L.docx

Ashley,

Attached are the modeling protocol submitted by Invista s.a r.l., permit No. PSDTX1416, and TCEQ comments on the modeling protocol.

Please provide confirmation that you received this e-mail.

Best Regards,

Ahmed Omar

TCEQ, Air Permits Division

Air Dispersion Modeling Team

Ahmed.Omar@tceq.texas.gov

(512)-239-1285

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November 12, 2015

Mr. Guillermo Reyes
Texas Commission on Environmental Quality
Air Permits Division, MC 163
12100 Park 35 Circle, Building C, Third Floor
Austin, Texas 78753

RE: Permit Amendment Application – State Air Quality Analysis
Permit Number: 23271
INVISTA Victoria Plant – HMD Unit
Victoria, Victoria County
Customer Reference Number (CN) 602582231
Regulated Entity Number (RN) 102663671

Dear Mr. Reyes:

On behalf of INVISTA S.à r.l., (INVISTA), I am submitting the State Air Quality Analysis for the permit amendment application dated June 16, 2014 for the INVISTA HMD Unit.

A State Air Quality Dispersion Modeling Analysis is required to demonstrate compliance with the NAAQS (State NAAQS Analysis) for particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), and sulfur dioxide (SO_2), as well as the 1-hour State Property Line standard for SO_2.

Additionally, a State Health Effects evaluation is required for emissions increases of speciated volatile organic compounds (VOC) from the proposed project at the Victoria Plant to demonstrate compliance with TCEQ toxicology division's Effects Screening Levels (ESL) guidelines. This document summarizes the methodologies used for the State NAAQS and Health Effects Evaluations, the data used to conduct the analyses, and the results of these analyses.

The proposed project is triggering PSD review for nitrogen dioxide (NO_2). The PSD modeling analysis is provided under separate cover.

If you have any questions regarding this submittal or require additional information, please contact me at (361) 572-6260 or via email at Ruben.Herrera@invista.com.

Sincerely,

Ruben Herrera
Air Team Leader

Attachment

ATTACHMENT 1

State Air Quality Analysis

STATE AIR QUALITY ANALYSIS

INVISTA S.à r.l.
Victoria Plant
Victoria County, Texas
NSR Permit No. 23271

INVISTA™

HMD Unit

Prepared By:

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November 2015

Project 134404.0034

Trinity Consultants

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1. EXECUTIVE SUMMARY

INVISTA S.à r.l. (INVISTA) owns and operates a synthetic organic chemical manufacturing plant in Victoria, Victoria County, Texas (Victoria Plant). INVISTA has been assigned Texas Commission on Environmental Quality (TCEQ) Costumer Number (CN) 602582231. Additionally, the Victoria Plant has been assigned TCEQ Air Quality Account No. VC 0008 Q and Regulated Entity Number (RN) 102663671. The Hexamethylenediamine (HMD) Unit at the Victoria Plant is authorized under TCEQ New Source Review (NSR) Permit No.23271.

The Victoria Plant is located in Victoria County, which is currently classified as "attainment/ unclassifiable" or "attainment (maintenance)" for all criteria pollutants with respect to compliance with the National Ambient Air Quality Standards (NAAQS).[1] The plant is a major source with respect to the Prevention of Significant Deterioration (PSD) and the Title V Operating Permit programs. In June 2014, INVISTA submitted an application to amend Permit No. 23271. The amendment application seeks
to authorize the following:

- Improvement of the distributed control system (DCS) and implementation of advanced process controls (APC) for the HMD Unit;
- Equipment replacement, reliability, and improvement projects;
- Update the Maintenance, Startup, and shutdown (MSS) representations in existing permit;
- Update the barge, railcar, and truck loading representations in current permit;
- Incorporate Permit by Rule (PBR) Registrations into TCEQ Permit No. 23271; and,
- Requesting changes to TCEQ Permit No. 23271 Special Conditions.

A State Air Quality Dispersion Modeling Analysis is required to demonstrate compliance with the NAAQS(State NAAQS Analysis) for particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), and sulfur dioxide (SO_2), as well as the 1-hour State Property Line standard for SO_2. The proposed project is triggering PSD review for nitrogen dioxide (NO_2). The PSD modeling analysis is provided under separate cover.

Additionally, a State Health Effects evaluation is required foremissions increases of speciated volatile organic compounds (VOC) from the proposed project at the Victoria Plant to demonstrate compliance with TCEQ toxicology division's Effects Screening Levels (ESL) guidelines.

This document summarizes the methodologies used for the State NAAQS and Health Effects Evaluations, the data used to conduct the analyses, and the results of these analyses. The methodologies used to perform these analyses are consistent with Modeling and Effects Review Applicability (MERA) guidance package, the TCEQ's *Air Quality Modeling Guidelines, and the EPA's Guideline on Air Quality Models (Revised)*[2,3,4] In consideration of the single property designation among INVISTA, DuPont, and Equistar[5], a combined single property line was used in the State Health Effects Evaluation.

---

[1] Based on TCEQ's internet site http://www.tceq.texas.gov/airquality/sip/victoria-sip/vic-status as of September, 2014.

[2] Code of Federal Regulations, Title 40–Protection of Environment, Part 51, Appendix W, November 9, 2005.

[3] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232 (Revised), Air Permits Division, Austin, TX, April 2015.

[4] TCEQ, *Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits*, APDG 5874, July 2009.

[5] Prior to INVISTA's acquisition of the EPH and other units from E. I. Du Pont de Nemours and Company, Inc. (DuPont), the Victoria Site consisted of units owned/operated by both DuPont and Equistar Chemical, LP (Equistar). By Findings of Fact, Conclusions of Law and Order Regarding Designation of Victoria Site as a Single Property approved on January 7, 1998 and revised on August 9, 2010 (the "Order"), the TCEQ granted the petition of INVISTA, DuPont, and Equistar to designate the Victoria site as a single property pursuant to 30 T.A.C. § 101.2. Pursuant to Ordering Provision 3 of the Order, the Single Property designation does not apply to applicable federal air quality statutes and rules including, but not limited to, permits issued under the Federal Clean Air Act, Title I, Parts C (Prevention of Significant Deterioration) and D (Nonattainment), and Title V (Operating Permits).

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This section discusses the air quality dispersion modeling methodologies used to perform the State NAAQS, State Property Line, and Health Effects Evaluation.

2.1. STATE NAAQS ANALYSIS

There are two principal steps for completing a State NAAQS analysis – the Significance Analysis and the NAAQS analysis. These steps are described in detail below. The techniques used in the air quality dispersion modeling analysis are consistent with current TCEQ and EPA modeling guidance.[6, 7]

2.1.1. Significance Analysis

The Significance Analysis is conducted to determine if the emissions increases from a project cause a significant impact upon the area surrounding the facility. "Significant" is defined by ambient concentration thresholds referred to as the Significant Impact Levels (SIL).

In the Significance Analysis, the increase in emissions of PM_{10} (24-hour averaging period), $PM_{2.5}$ (24-hour and annual averaging periods), CO (1-hour and 8-hour averaging periods), and SO_2 (1-hour, 3-hour, 24-hour, and annual averaging periods) from the project were evaluated to determine whether they have the potential for a significant impact upon the area surrounding the Victoria Plant. Per TCEQ modeling guidance, all impacts for the Significance Analysis are reported as the highest first high (H1H) modeled concentration.[8] If the highest ambient concentration for a pollutant is less than the SIL when emissions increases from only the project are modeled, then further analysis (NAAQS) is not required.

The results of the modeling analysis demonstrate that impacts from the Victoria Plant are below the SIL for PM_{10} (24-hour averaging period), $PM_{2.5}$ (24-hour and annual averaging periods), CO (1-hour and 8-hour averaging periods), and SO_2 (1-hour, 3-hour, 24-hour, and annual averaging periods). Therefore, a NAAQS analysis was not required for any of these criteria pollutants. Results of the Significance Analysis, conducted using the AERMOD model, are shown in Section 5 of this report.

2.1.1.1. $PM_{2.5}$ SILs

As required by TCEQ and EPA guidance on $PM_{2.5}$, prior to comparing the impact of on-site project-related sources to the $PM_{2.5}$ SILs, an analysis was performed to determine whether it was appropriate to use the $PM_{2.5}$ SILs in the area surrounding the Victoria Plant.[9] A background monitor that is representative of the area surrounding Victoria Plant was selected and analyzed. This analysis is presented in Section 4 of this report. Because the sum of the $PM_{2.5}$ SIL and the $PM_{2.5}$ background concentration determined by the representative monitor is less than the $PM_{2.5}$ NAAQS for both the 24-hour and annual averaging periods as summarized in Table 2-1, it can be concluded that the proposed project will not cause or contribute to an exceedance of the $PM_{2.5}$ NAAQS since the modeled impacts from the Significance Analysis are below the $PM_{2.5}$ SILs.[10]

---

[6] Code of Federal Regulations, Title 40–Protection of Environment, Part 51, Appendix W, accessed at www.bna.com.

[7] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232 (Revised), Air Permits Division, Austin, TX, April 2015.

[8] Ibid.

[9] EPA, Office of Air Quality Planning and Standards, *Guidance for $PM_{2.5}$ Permit Modeling*, (May 2014).

[10] Ibid.

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Table 2-1. Summary of SIL Justification for NAAQS Analysis

Pollutant	Averaging Period	SIL (µg/m³)	NAAQS (µg/m³)	Background Concentration (µg/m³)	NAAQS minus Background (µg/m³)	Usage of SIL Justified?
$PM_{2.5}$	24-hour	1.2	35	19.45	15.55	Yes
	Annual	0.3	12	8.03	3.97	Yes

2.2. STATE PROPERTY LINE ANALYSIS

An analysis for SO_2 (1-hour) was performed using AERMOD to demonstrate compliance with the state standard for net ground-level concentration of SO_2. The State Property Line standard for SO_2 is shown in Table 2-2 below. In this analysis, the maximum 1-hour modeled concentration predicted by AERMOD is compared to the applicable State Property Line standard. As summarized in Section 5 of this report, the maximum predicted SO_2 concentration due to emissions from the proposed project is below 2% of the State Property Line standard; therefore, site-wide modeling for the SO_2 State Property Line standard was not required.[11]

Table 2-2. State Property Line Standards

Pollutant	Averaging Period	Standard (µg/m³)
SO_2	30-min [1]	1,021

[1] Per TCEQ guidance, the modeled H1H concentration for 1-hour is used to compare the 30-minute averaging SO_2 standard.

2.3. STATE HEALTH EFFECTS EVALUATION

The State Health Effects Evaluation is based on the July 2009 TCEQ MERA guidance package. The TCEQ MERA guidance document provides a flowchart to be used to determine the required scope of the modeling and effects review for each compound required to be included in the analysis. The flowchart provides a process to determine if refined air dispersion modeling or effects review is required for a permitting project, and if required, the minimum requirements for the scope of the modeling and effects review.

Emissions of one hundred and sixteen (116) speciated non-criteria pollutants were evaluated per the July 2009 MERA guidance. ESLs for each constituent were obtained from the TCEQ Toxicology Division March 2014 ESL List, which was effective at the time of the application submittal.[12] Emissions were evaluated using Steps 4C, 4D, 5, 9A, and 11. A summary of the MERA analysis is provided in Appendix A.

2.3.1. Steps 4C and 4D

Per the MERA Guidance, Step 4C is as follows:

> *Are short-term emissions increases (total for a constituent from all EPNs) within one of the three following de minimis levels, and the annual ESL is ≥ 10 percent of the short-term ESL?*

[11] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232 (Revised), Air Permits Division, Austin, TX, April 2015.

[12] TCEQ Toxicology ESL List (March 2014), as obtained from http://www.tceq.texas.gov/toxicology/esl/list_main.html.

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Table 2-3. Step 4C De Minimis Levels

Short-term ESL ($\mu g/m^3$)	Short-term Emissions Increases (lb/hr)
≥ 2 < 500	≤ 0.04
≥ 500 < 3500	≤ 0.1
≥ 3500	≤ 0.4

The total short-term emission rate for each constituent, including normal operation and MSS, was determined and compared to the criteria in Table 2-3 above. Constituents not meeting the criteria of Step 4C were further evaluated under Step 4D:

Is the project increase ≤ 0.04 pound per hour (lb/hr) and the constituent's ESL < 2 $\mu g/m^3$?

If the total emission rate increase for a constituent is less thanor equal to 0.04 lb/hr and its ESL is less than 2 micrograms per cubic meter ($\mu g/m^3$), Air Permits Division (APD) may require further analysis on a case-by-case basis, and the constituent may be further evaluated in Step 11.

A summary of the Step 4C/4D analysis is provided in Appendix A. Of the one hundred and sixteen (116) total constituents, thirty (30) did not screen out at Step 4C/4D.

2.3.2. Step 5

Per the MERA Guidance, Step 5 is as follows:

Is the total concentration due to the emission increases ≤ 0.1ESL? Only increases in emissions are considered for this step.

Step 5 uses an equation that limits the ambient impact from an emissions increase to less than or equal to 10% of the associated ESL. Comparisons must be made to the short-term ESL. If a constituent has a long-term ESL that is less than 10% of the corresponding ESL, the concentration must also be compared to the long-term ESL. Concentrations can either be obtained from look-up tables included in the MERA Guidance or obtained through modeling.

For the thirty (30) constituents which did not screen out at or before Step 4C/4D, concentrations were obtained from the lookup tables. There wereeleven (11) constituents which did not screen out based on theconservative concentrations obtained from the lookup tables (Step 5). Modeling was then completed using AERMOD to obtain a refined concentration for comparison to 10% of theESLs (Step 9A). All remaining constituents screened out at Step 9A based on the modeled concentrations with the exceptionof HMD on a short and long-term basis.

2.3.3. Step 11 – Site-wide Modeling

Site-wide modeling was performed for short-term HMD, which was the only constituent that did not screen out at or before Step 5. If the modeled maximum ground-level concentration (GLC_{max}) is less than the corresponding ESL, no further evaluation is required and compliance with Step 11 of the State Health Effects Evaluation is therefore demonstrated. Modeled concentrations of HMD are below the short-term and long-term ESLs, as shown in Section 5.

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3. AIR DISPERSION MODELING METHODOLOGY

This section of the modeling report describes the procedures and data resources utilized in the air quality modeling analyses. The air dispersion modeling analyses were conducted in accordance with applicable TCEQ guidance documents, including the following:

- TCEQ Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits, APDG 5874v3, July 2009.
- TCEQ, *Air Quality Modeling Guidelines*, APDG 6232, April 2015.

3.1. DISPERSION MODEL SELECTION

Dispersion models predict pollutant concentrations downwind of a source by simulating the evolution of the pollutant plume over time and space given data inputs that include the quantity of emissions and the initial exhaust release conditions (e.g., velocity, flow rate, and temperature). AERMOD Version 15181 was used to estimate the GLC_{max}. AERMOD is a refined, steady-state, multiple source, dispersion model and was promulgated in December 2005 as the preferred model to use for industrial sources.[13]

3.2. BUILDING DOWNWASH

Building structures that obstruct wind flow near emission points may cause stack discharges to become caught in the turbulent wakes of these structures leading to downwash of the plumes. Wind blowing around a building creates zones of turbulence that are greater than if the building were absent. These effects generally cause higher ground-level pollutant concentrations since building downwash inhibits dispersion from elevated stack discharges. For this reason, building downwash algorithms are considered an integral component of the selected air quality model. Downwash effects are addressed through use of the AERMOD model, which has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version. The direction-specific building downwash dimensions used as input to AERMOD were determined by the Building Profile Input Program, PRIME version (BPIP PRIME), version 04274.[14] BPIP PRIME is designed to incorporate the concepts and procedures expressed in the Good Engineering Practice (GEP) Technical Support document, the Building Downwash Guidance document and other related documents[15], while incorporating the PRIME enhancements to improve prediction of modeled off-property concentrations in building cavities and wake regions.

Tables summarizing the structures considered in the modeling analysis and their corresponding heights are provided in Appendix B.

3.3. GEP STACK HEIGHT ANALYSIS

EPA has promulgated stack height regulations that restrict the use of stack heights in excess of "Good Engineering Practice" (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP is generally not creditable when modeling to determine source impacts. This essentially prevents the use of excessively tall stacks to reduce ground-level pollutant concentrations. The GEP stack height is defined as the greater of 65 meters or the result of the following formula:

---

[13] 40 CFR 51, Appendix W – *Guideline on Air Quality Models*, Appendix A.1 – AMS/EPA Regulatory Model (AERMOD).

[14] Earth Tech, Inc., Addendum to the ISC3 User's Guide, The PRIME Plume Rise and Building Downwash Model, November 1997.

[15] EPA, Office of Air Quality Planning and Standards, Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack height Regulations) (Revised), Research Triangle Park, North Carolina, EPA 450/4-80-023R, June 1985.

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$H_{GEP} = H + 1.5L$, where:

H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located a distance greater than 5L are not subject to the wake effects of the structure. The wind direction-specific downwash dimensions and the dominant downwash structures used in this analysis are determined using BPIP PRIME. In general, the lowest GEP stack height for any source is 65 meters by default.[16] Using the building dimensions for all on-site structures, a GEP analysis of the Victoria Plant stacks in relation to each building for each of the 36 wind directions was performed to evaluate which building height and dimensions have the greatest influence in terms of building downwash (enhanced dispersion) on each source's emissions. None of the emission sources at the Victoria Plant have a stack height that exceeds GEP height and as such were all modeled at their actual height.

3.4. TREATMENT OF TERRAIN

Receptor terrain elevations input to the AERMOD model were interpolated from 30 meter Digital Elevation Model (DEM) data obtained from the U.S. Geological Survey (USGS). The receptor elevations were interpolated using the latest version of the AERMOD terrain preprocessor, AERMAP (version 11103).

Through the use of AERMAP, AERMOD incorporates not only the source, building and receptor heights, but also an effective height (hill height scale) that represents the significant terrain features surrounding a given receptor that could lead to plume recirculation and other terrain interaction.

3.5. METEOROLOGICAL DATA

The air dispersion modeling for the proposed project was performed using AERMOD-ready meteorological data for Victoria County made available and approved by the TCEQ. The model runs were performed using preprocessed meteorological data for 2012. TCEQ has processed the meteorological data set using the albedo and Bowen Ratio representative of Victoria County. The data set is based on surface data from Victoria Regional Airport (Surface ID: VCT; National Weather Service [NWS] Station Number 12912) and upper air data from Corpus Christi (Upper Air ID: CRP; NWS Station Number 12924). The windrose for Victoria from 2012 is provided as Figure 3-1. The windrose shows the direction towards which wind is blowing.

Each TCEQ-provided data set processed with AERMET includes three different files, each representing a different surface roughness category:

- L – low surface roughness (0.05 m)
- M – medium surface roughness (0.5 m)
- H – high surface roughness (1.0 m)

The land use surrounding the Victoria Plant is predominantly cultivated land, grassland and deciduous forest. The typical surface roughness for this type of land use is generally between 0.1 – 0.7 m, which corresponds to the medium surface roughness category.

[16] 40 CFR §51.100(ii).

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To define the land use characteristics and micrometeorological parameters in the areas of interest, the AERSURFACE utility is used to perform a digital mapping of land use and cover in accordance with the procedures identified in the *AERMOD Implementation Guideline* and the *AERSURFACE User's Guide*.[17] Using publicly available digital land cover datasets and lookup tables of surface characteristics that vary by season and land cover type, the AERSURFACE tool can generate realistic and reproducible surface characteristics for any site of interest that can then be directly imported into AERMET for generating AERMOD-ready meteorological datasets. AERSURFACE is run by TCEQ to determine the appropriate surface characteristics for input to AERMET for development of the preprocessed meteorological data sets.

An analysis was performed using the latest version of AERSURFACE (13016) to confirm the appropriate surface roughness category for the Victoria Plant. As recommended by the AERSURFACE User's Guide, the land use analysis was prepared using digital LULC data developed by the Multi-Resolution Land Characteristics Consortium (MRLC). One of the objectives of the MRLC, a partnership of the EPA, NASA, NOAA, USGS, and U.S. Forest Service, among other federal agencies, was the production of land cover data derived from images acquired by Landsat's Thematic Mapper (TM) sensor. The 1992 National Land Cover Dataset (NLCD92), the only dataset currently accepted by AERSURFACE, is provided for public download as georeferenced images on the MRLC website.[18] The USGS NLCD92 data utilized by AERSURFACE provides land cover with a spatial resolution of 30 meters based on a 21-category classification scheme.

As Bowen Ratio and albedo do not vary significantly over the area immediately surrounding a meteorological observation or plant site, AERSURFACE uses a simple unweighted geometric mean for a default domain defined by a 10 km by 10 km area centered on the site of interest. However, based on the method for constructing realistic planetary boundary layer (PBL) similarity profiles in AERMOD and the heterogeneity of land use typical to areas surrounding an observation site at an airport or an industrial facility, accurately characterizing the surface roughness length, the key parameter in characterizing the mechanical turbulence in the approach wind flow, is the most important consideration in the AERSURFACE analysis. As such, AERSURFACE determines the surface roughness length based on an inverse distance weighted geometric mean (which can be varied by sector to account for consistent variations in the land cover near the site of interest provided the sector widths are no smaller than 30 degrees) for a default upwind distance of 1 km.

AERSURFACE was executed for a circle with a radius of 1 km centered on the Victoria Plant using the average moisture condition for the annual period. The resulting surface roughness falls into the medium category per TCEQ guidance. Thus the TCEQ meteorological data set for Victoria County processed with medium surface characteristics was used in the modeling analysis. An electronic copy of the AERSURFACE output file and NLCD92 data are provided on a CD with this air dispersion modeling report.

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[17] EPA, Office of Air Quality Planning and Standards. AERSURFACE User's Guide. EPA 454/B-08-001. Research Triangle Park, North Carolina. January 2008.

[18] http://www.mrlc.gov/viewerjs/

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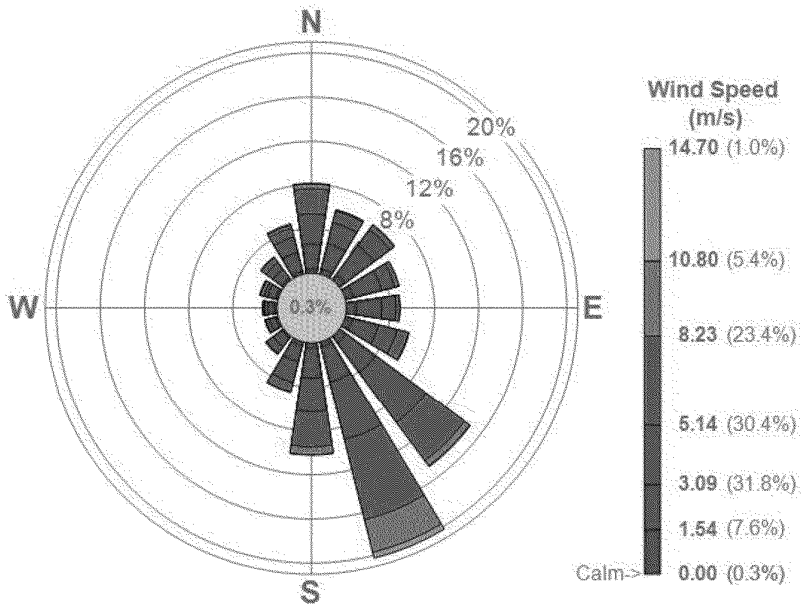
Figure 3-1. Frequency of Wind Speed and Direction for Meteorological Year 2012



3.6. COORDINATE SYSTEM

In all modeling files, the location of emission sources, structures, and receptors are represented in the Universal Transverse Mercator (UTM) coordinate system. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). The datum for this modeling analysis is based on North American Datum 1927 (NAD 27). UTM coordinates for this analysis all reside within UTM Zone 14. The center of the Victoria Plant is located near UTM coordinates 700,070 m East and 3,173,451 m North (NAD27, Zone 14).[19]

An area map of the combined property line associated with the site's single property designation (see footnote 5 in Section 1 of this report for more information) overlaid on the most recent United States Geological Survey (USGS) 1:24,000 scale (7.5-minute series) topographical map is provided in Appendix C. The area map depicts the property line with respect to the surrounding topography and predominant geographic features (such as highways, roads, streams, railroads, etc.).

3.7. RECEPTOR GRIDS

The modeled ground-level concentrations were determined within four (4) main Cartesian receptor grids. These four grids cover a region extending at least 10 km beyond the Victoria Plant sources. The grids are defined as follows:

1. The "property line grid" (corresponding to the single property designation) is a discrete receptor grid with the receptors spaced at 25 m intervals along the combined INVISTA/DuPont/Equistar property line. Note

[19] It should be noted that the area map, plot plan, and the UTM coordinates in the Table 1(a) that were submitted with the June 2014 Permit No. 23271 amendment application were based on the North American Datum (NAD) of 1983. Therefore, the UTM coordinates in the permit application are different than the UTM coordinates in this modeling report.

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that the property line grid also includes receptors spaced at 25 m along the roads and shipping canals within the INVISTA property that are accessible by the public.

2. The "fine grid" contains 100-m spaced receptors extending at least 1 km from the sources under consideration, excluding the receptors within the property line grid.
3. The "medium grid" contains 500-m spaced receptors extending 5 km from the sources under consideration, excluding the receptors within the property line and fine grids.
4. The "coarse grid" contains 1-km spaced receptors extending 10 km from the sources under consideration, excluding the receptors in the property line, fine, and medium grids.

Figures illustrating the receptor locations for these four receptor grids are included in Appendix D.

3.8. MODELED SOURCE TYPES AND STACK PARAMETERS

In a typical air dispersion modeling analysis, emission sources can be represented as point, area, line, volume, or open pit sources. Fugitive emissions at the Victoria Plant were represented as volume and area sources and all other sources were represented as point or pseudo point sources. Tables summarizing all modeled emission sources and stack parameters are included in Appendix E.

3.8.1. Point Sources

In development of the source inventory for the point and pseudo-point sources at the Victoria Plant, the following special procedures were utilized:

Tank emissions and sources with raincaps or horizontal discharges are modeled as pseudo-point sources with the following parameters:

Velocity = 0.001 m/s
Diameter[20] = 0.001 m
Temperature[21] = 0 K

To model emissions from the HMD Flare, stack parameters are determined using TCEQ guidance obtained from the report, *Air Quality Modeling Guidelines*[22] and the TCEQ memorandum, *Technical Basis for Flare Parameters*[23].

3.8.2. Volume Sources

The fugitive emissions associated with leakages from process piping and equipment, vent headers, tank piping and buildings are represented as volume sources. In general, volume source dimensions are based on the criteria documented in Table 3-1 below.

[20] Actual diameters are used where available; however, please note that some sources modeled as pseudo-point sources have no physical diameter.

[21] As per the nature of operation, some tanks operate consistently at higher temperatures; hence, such tanks are modeled at their actual temperatures instead of ambient temperature.

[22] Texas Commission on Environmental Quality, *Air Quality Modeling Guidelines*, RG-25 (Revised), Air Quality Planning Division, Austin, TX, February 1999, pg 51-52.

[23] Memorandum from Dom Ruggeri (TCEQ) to APD Technical Staff, *Air Quality Modeling Guidelines*, September 10, 2004.

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Table 3-1. Volume Source Dimension Criteria

Fugitive Source Location	Horizontal Dimension	Vertical Dimension
Process or piping fugitives (including MSS) inside a building	Building length and width	Building height
Process or piping fugitives (including MSS) located near a tank or loading spot	Length and width of area occupied by fugitive source equipment associated with the tank and loading spot	Tank or loading spot height

Detailed calculations of the volume source parameters are provided in Appendix E of this document. Note that in development of the source inventory for the volume sources at the Victoria Plant, the sources were split into multiple volume sources in the shape of the actual sources, as warranted. Emission rates were then equally distributed among the multiple volume sources.

According to EPA guidance for AERMOD, the initial lateral dimension (σ_{y0}) of a series of volume sources is set equal the side length divided by 2.15 while $\sigma y0$ for single volume sources is set equal the side length divided by 4.3.[24] The initial vertical dimension (σ_{z0}) is calculated per EPA guidance (for surface based sources and elevated sources on or adjacent to a building) as the volume height (building height) divided by 2.15. The release height is set equal to one-half the volume height.

3.8.3. Area Sources

Fugitive emissions from the cooling basin were modeled as a polygon area source. Because the cooling basin is surrounded by a berm that is approximately 3 feet above grade, it is modeled with a 0.91 meter release height. Further, since it contains water sprayers to improve the head exchange efficiency, it is modeled with an initial vertical dispersion calculated based on a 1 meter height. The source parameters were based on the physical dimensions of the source.

Plot plans depicting the location of the applicable sources considered in the modeling analysis for Step 11 are provided in Appendix D.

3.9. DETERMINATION OF EMISSION RATES

In development of various source emission rates at the Victoria Plant, the following methodology was used:

- For criteria pollutants, all impacts are conservatively based on the maximum proposed allowable emission rates.
- For all non-criteria pollutants and averaging periods except HMD sitewide modeling, all impacts are conservatively based on the maximum proposed allowable emission rates.
- Sitewide HMD impacts are based on four operating scenarios as the four noted MSS activities will not occur simultaneous to one another:
  - COLOPEN: sitewide HMD inventory plus column opening MSS activities;
  - COLDRN: sitewide HMD inventory plus column draining MSS activities;
  - 4TFX34A: sitewide HMD inventory plus opening of tank 04TFX-034A; and
  - 4TFX34B: sitewide HMD inventory plus opening of tank 04TFX-034B.

The modeled emission rate documentation can be found in Appendix E.

[24] Table 3-1, User's Guide for the AMS/ EPA Regulatory Model-AERMOD, EPA-454/B-03-001, September 2004.

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There are no $PM_{2.5}$ monitors in Victoria County. Therefore, as summarized in the following section, INVISTA evaluated the two nearest monitors from surrounding counties to determine their representativeness:

4.1.1.1. Monitor 48-355-0034 (Dona Park CAMS 0635)

The closest $PM_{2.5}$ monitor to INVISTA is Monitor 48-355-0034 (Dona Park CAMS 0635), located in Nueces County, approximately 107 km south of INVISTA. However, $PM_{2.5}$ monitoring at the CAMS 0635 started in June 2013, and therefore the monitor does not have three years of monitoring data. Therefore, data from this monitor cannot be used for determining background concentration.

4.1.1.2. Monitor 48-149-0001 (Fayette County CAMS 0601)

The next closest $PM_{2.5}$ monitor to INVISTA is Monitor 48-149-0001 (Fayette County CAMS 0601), located in Fayette County, approximately 146 km north of INVISTA Data from this monitor meets the data completeness requirement of 75% for each quarter for the most recent three years of data in accordance with Title 40 of the Code of Federal Regulations (40 CFR) Part 50 appendix N, Section 4.2(a).

Since CAMS 0601 is located in a different county, INVISTA uses the characteristics of Victoria County and Fayette County in order to determine the representativeness of the monitor. INVISTA used the population, and county emissions inventory to determine the appropriateness of the monitor. The data is listed in Table 4-1.
The relative locations of $PM_{2.5}$ monitors from INVISTA are shown in Table 4-1.

Table 4-1. $PM_{2.5}$ Monitor Appropriateness Determination

Monitor/ Site	County	Census 2013 Population[1]	Distance to Site (km)	2011 NO_2 Emissions[2] (tpy)
INVISTA	Victoria	91,081	0	2,315
CAMS 0601	Fayette	24,833	146	1,931

[1] 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov/qfd/states/48/48469.html, last accessed October 30, 2015.
[2] $PM_{2.5}$ data from 2011 NEI Data obtained from the US EPA: http://www.epa.gov/ttnchie1/net/2011inventory.html, last accessed October 30, 2015. Form options were County or Tribe Data, Region 6, $PM_{2.5}$ Primary (Filt + Cond), and all sectors.

Based on Table 4-1, the population of Fayette County is lower than Victoria County. The annual $PM_{2.5}$ emissions are slightly lower than Victoria County but are comparable. In addition, CAMS0601 is located in a rural area similar to INVISTA. Therefore, INVISTA determines CAMS 0618 to be the most representative monitor for $PM_{2.5}$ emissions. A summary of the monitor values for the 24-hr and annual averaging periods is provided in Table 4-2.

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Table 4-2. $PM_{2.5}$ Monitoring Data (Fayette County CAMS 601)

AQS Site ID	Local Site Name	Pollutant	Averaging Period	Year	Monitor Value		Monitor Value Units	Background Value
					Yearly[A,B]	Overall[C]		($\mu g/m^3$)
48-149-0001	Fayette County	$PM_{2.5}$	24-hr	2014	19.36	19.45	$\mu g/m^3$	19.45
				2013	20.41			
				2012	18.58			
			Annual	2014	8.03	8.00	$\mu g/m^3$	8.00
				2013	8.04			
				2012	7.95			

[A] The monitor value for 24-hour $PM_{2.5}$ is the 98th percentile of daily maximum values.

[B] The monitor value for annual $PM_{2.5}$ is the average annual value.

[C] This is the value, in the monitor units, which will be used in the full impacts analysis. For the 24-hour and annual $PM_{2.5}$ pollutant averaging periods, the background value is the average from the 3 years of background data.

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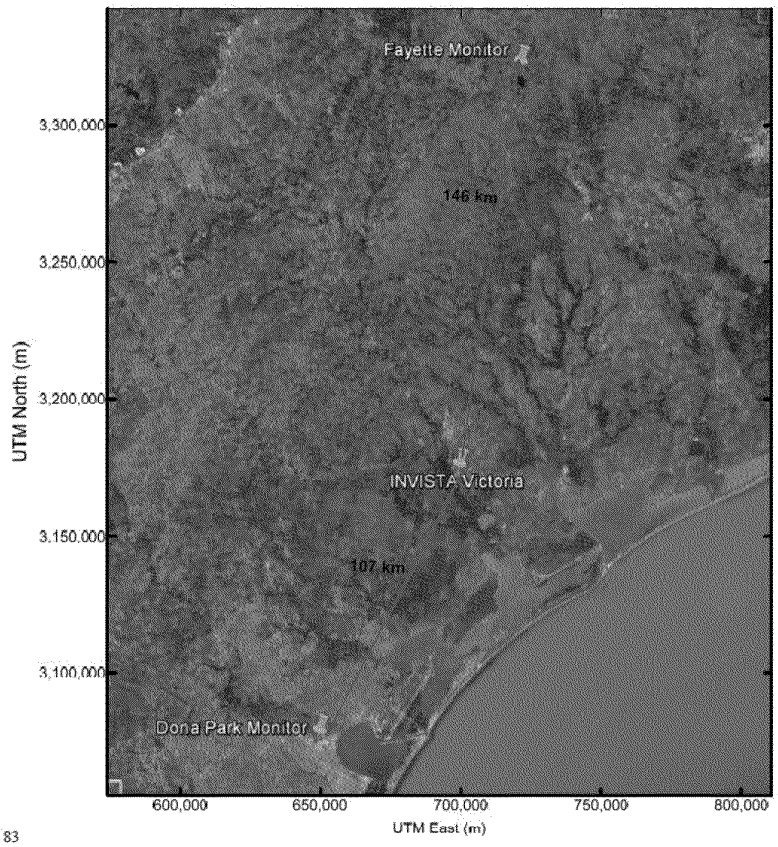
Figure 4-1. Relative Locations of $PM_{2.5}$ Monitors from INVISTA



UTM Zone: 14
UTM co-ordinates are in NAD 83

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This section summarizes the results of the State NAAQS, State Property Line, and State Health Effects Evaluations for the proposed project at the Victoria Plant.

5.1. STATE NAAQS AND PROPERTY LINE ANALYSES

The State NAAQS Significance Analysis involves modeling the impacts from on-site sources associated with the project to determine if the resulting concentrations exceed the SILs, thus requiring a Full Impacts Analysis.[25] The modeled concentrations for CO, PM_{10}, $PM_{2.5}$, and SO_2 for each averaging period are presented below.

Table 5-1. Summary of Significance Analysis Modeling Results

Pollutant	Averaging Period	UTM East (m)	UTM North (m)	Maximum Modeled Concentration (µg/m³)	SIL (µg/m³)	Below SIL (Yes or No)
CO	1-hr	701,411.0	3,174,079.0	14.23	2000	Yes
	8-hr	701,220.0	3,172,642.0	7.47	500	Yes
PM_{10}	24-hour	698,545.0	3,173,052.6	0.19	5	Yes
	Annual	699,119.0	3175,390.0	0.02	1	Yes
$PM_{2.5}$	24-hour	698,545.0	3,173,052.6	0.19	1.20	Yes
	Annual	699,119.0	3,175,390.0	0.02	0.3	Yes
SO_2	1-hr	698,545.0	3,173,052.6	2.07[1]	7.8	Yes
	3-hr	698,545.0	3,173,052.6	2.01	25	Yes
	24-hr	698,960.0	3,175,268.0	0.84	5	Yes
	Annual	699,158.0	3,175,420.0	0.12	1	Yes

[1] Compliance with the 1-hr SIL demonstration for SO_2 demonstrates compliance with the 30-minute SO_2 state property line standard of 1,021 µg/m³.

As Table 5-1 shows, the maximum modeled concentrations for all the pollutants under consideration for each averaging period did not exceed any of the corresponding SILs; therefore, the demonstration is complete and no additional review is required for these pollutants under a Full Impacts Analysis.

5.2. HEALTH EFFECTS EVALUATION

As described in Section 2 of this modeling report, the speciated constituents were first evaluated using MERA Steps 4C and 4D. The results of the MERA analysis are provided in Appendix A. Constituents not screened out using Steps 4C and 4D were evaluated according to Step 5 based on the concentrations obtained from lookup tables in the MERA Guidance. For any constituent that did not screen out based on these conservative concentrations, modeling was conducted using AERMOD to obtain a refined concentration per Step 9A, as summarized in Table 5-2.

[25] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232, Air Permits Division, Austin, TX, April 2015.

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Table 5-2. Maximum Modeled Concentrations in the Step 9A Analysis

Pollutant	Averaging Period	Step 9A GLC_{max} (µg/m³)	ESL (µg/m³)	10% of ESL (µg/m³)	Is GLCmax < 10% of ESL? (Yes/No)
3, 4 Pentenitriles	1-hour	4.99	50	5	Yes
	Annual	0.04	5	0.5	Yes
Bis-Hexamethylenemtriamine (BHMT)	1-hour	1.34	23	2.3	Yes
	Annual	0.01	2.3	0.23	Yes
Benzene	1-hour	16.36	170	17	Yes
	Annual	0.08	4.5	0.45	Yes
1,2-Diaminocyclohexane (DCH)	1-hour	14.46	470	47	Yes
	Annual	0.08	47	4.7	Yes
Hydrochloric Acid	1-hour	1.33	190	19	Yes
	Annual	0.01	7.9	0.79	Yes
Methylglutaronitrile (MGN)	1-hour	4.68	80	8	Yes
	Annual	0.04	8	0.8	Yes
Ammonia	1-hour	6.23	170	17	Yes
	Annual	0.04	17	1.7	Yes
2-Methylpentane	1-hour	13.77	3,500	350	Yes
	Annual	0.10	350	35	Yes
3-Methylpentane	1-hour	6.99	3,500	350	Yes
	Annual	0.05	350	35	Yes
3-Methylhexane	1-hour	2.94	3,070	307	Yes
	Annual	0.02	307	30.7	Yes

As shown in Table 5-2, all constituents subsequently screened out at Step 9A with the exception of HMD. Step 11 site-wide modeling was completed for HMD only.

In the evaluation of Step 11 of the TCEQ MERA guidance package, sitewide emissions of HMD were modeled to determine the GLC_{max} value for comparison to the constituent's ESLs. The TCEQ MERA guidance package presents a three-tiered approach in the evaluation of the health and welfare effects of emissions on a constituent-by-constituent basis. Tiers I through III represent progressively more complex levels of review with each level requiring more detailed information.

In this three-tiered approach, a comparison is made between a constituent's ESL guideline concentration and that constituent's GLC_{max}. It is important to note that if a constituent's predicted GLC is above its ESL, it is not indicative that adverse effects will occur, but rather, that further evaluation is warranted. Further evaluation may take into consideration additional analysis, including the ground-level concentration at the maximally affected non-industrial receptor (GLC_{ni}), the magnitudes and frequencies of exceedance, surrounding land use, existing concentrations of the constituent of concern, type of effect caused by the constituent, margin of safety between the ESL and known effect levels, degree of confidence in the toxicity database, and acceptable

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reductions from existing GLCs. A summary of the GLC_{max} values obtained from the Step 11 site-wide modeling for HMD is provided in Table 5-3.

5.2.1. Tier I Analysis

Based on the TCEQ MERA guidance package, Tier I asks:

"Are the off-property short- and annual (as applicable) $GLCs_{max}$ below the ESLs for the constituent under review?"

According to the guidance package, if it is less than the ESL, the GLC_{max} is acceptable and no further review is required. As shown in Table 5-3, the off-property short-term impacts of HMD for each modeled scenario are greater than its corresponding ESL. Therefore, further evaluation is warranted.

5.2.2. Tier II Analysis

Based on the TCEQ MERA guidance package, Tier II asks:

"For constituents whose GLCs exceed either a health-based or odor-based ESL, are the following conditions met?

- *The GLC_{max} occurs on industrial use property and does not exceed the ESL by more than twice; and*
- *The GLC_{ni} equals or does not exceed the ESL."*

According to the guidance package, if both the above conditions are met, the GLC_{max} is acceptable. As Table 5-3 shows, neither condition of Tier II is met for any modeled scenario; therefore, further evaluation is required under Tier III.

5.2.3. Tier III Analysis

Based on the TCEQ MERA guidance package, Tier III asks:

"Are there case-specific factors to consider?"

The land use surrounding the Victoria Plant is a combination of industrial, agricultural, and pasture land. To the south of the Victoria Plant is pastureland under the jurisdiction of the Port of Victoria. The western border of the INVISTA property is formed by the Guadalupe River, with the western bank of the river bordered by additional property owned by INVISTA and industrial-zoned property under the jurisdiction of the Port of Victoria and other entities. The property line along the Guadalupe River and the riveritself, as well as the barge canal, contain receptors; however, these receptors should be considered transient in nature, thereby minimizing any prolonged exposure to elevated concentrations of any compound of concern. The Victoria Plant is bordered on the north predominantly by pastureland and industrial property under thejurisdiction of the Port of Victoria; to the east is the Old Bloomington Road and a railroad (i.e., transient receptors), which are surrounded by property owned by INVISTA, but leased for agricultural purposes, with limited access. The overall worst-case HMD impacts (GLC_{max}) for all four modeled scenarios occurs at a receptor located in the Port of Victoria Barge Canal adjacent to INVISTA's barge dock (i.e., over industrial water). The GLC_{ni} for all four modeled scenarios occurs along Farm to Market Road 1432 along the northwest property line of the site.

As part of the Tier III analysis, magnitude and frequency of exceedance analyseswere conducted at the GLC_{max} and GLC_{ni} receptors. As Table 5-3 shows, the magnitudes of exceedance for the GLC_{max} for all modeled scenarios

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is less than 4x the short-term ESL, thereby meeting the TCEQ criteria of no more than 25x the ESL, no more than 24 exceedances of 10x the ESL and no more than 10exceedances of 20x the ESL for VOC over industrial water.[26]

The magnitudes of exceedance of the GLC_{ni} for all modeled scenarios are less than 2x, are less than 2x their corresponding short-term ESLs. In addition, the adjusted frequencies of exceedance meet the TCEQ criteria of no more than 24 exceedances of 1x their corresponding short-term ESLs.[27] Therefore, the Tier III demonstration is complete for HMD.

[26] TCEQ Interoffice Memorandum: *Effects Evaluation Procedure: Marine Vessels*, Draft August 2001.
[27] Ibid.

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Table 5-3. Summary of Step 11 Modeled HMD Impacts

Receptor Location	Scenario	Averaging Period	UTM E (m)	UTM N (m)	Max. Concentration (µg/m³)	ESL (µg /m³)	Magnitude of Exceedance	Frequency of Exceedance	Annual Hours of Operation[1]
GLC_{max}	COLOPEN	1-hr	699,048.70	3,172,190.60	89.19	23	3.88	--	--
		Annual	699,048.70	3,172,190.60	7.54	2.3	3.28	--	--
	COLDRN	1-hr	699,048.70	3,172,190.60	89.23	23	3.88	--	--
		Annual	699,048.70	3,172,190.60	7.58	2.3	3.30	--	--
	4TFX34A	1-hr	699,048.70	3,172,190.60	89.41	23	3.89	--	--
		Annual	699,048.70	3,172,190.60	7.63	2.3	3.32	--	--
	4TFX34B	1-hr	699,048.70	3,172,190.60	89.41	23	3.89	--	--
		Annual	699,048.70	3,172,190.60	7.63	2.3	3.32	--	--
GLC_{ni}	COLOPEN	1-hr	699,754.00	3,175,876.00	34.63	23	1.51	15	19
		Annual	699,694.00	3,175,830.00	0.44	2.3	--	--	--
	COLDRN	1-hr	699,754.00	3,175,876.00	39.26	23	1.71	27	7
		Annual	699,694.00	3,175,830.00	0.50	2.3	--	--	--
	4TFX34A	1-hr	699,754.00	3,175,876.00	40.78	23	1.77	28	8
		Annual	699,694.00	3,175,830.00	0.54	2.3	--	--	--
	4TFX34B	1-hr	699,754.00	3,175,876.00	40.72	23	1.77	29	8
		Annual	699,694.00	3,175,830.00	0.54	2.3	--	--	--

[1]Scenarios represented (column opening, column draining, and the opening of tanks 04TFX-34A and 04TFX-34B) are limited to the hours of operation presented. Therefore, the frequency of exceedance is limited to the annual hours of operation.

APPENDIX A: MERA ANALYSIS

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Table A-1. MERA Analysis

Chemical	CAS No.	TCEQ Short Term ESL	TCEQ Annual ESL	Total Project Increases		Emissions Decrease ?	MERA Step 2	MERA Step 3	MERA Step 4			MERA Step 5	
							Toxicology Emissions Screening List?	Is Site in APWL Area?	LT > 10% ST ESL?	Step 4C: Is Increase ≤ 0.04 lb/hr & 2 ≤ ESL < 500 μg/m^3? Is Increase ≤ 0.1 lb/hr & 500 ≤ ESL < 3500 μg/m^3? Is Increase ≤ 0.4 lb/hr& ESL ≥ 3500 μg/m^3?	Step 4D: Is Increase ≤ 0.04 lb/hr & ESL < 2 μg/m^3?	Ei-n	(E_i) ≤ E_{i-n}?
		ug/m^3	ug/m^3	(lb/hr)	(tpy)				(Yes/ No?)				
2,3 Dimethylbutane	79 29 8	1480	350	0.28	5.58E 03	No	No	No	Yes	No	No		
2 Butoxyethanol	111-76-2	210	3700	0.29	1.25	No	No	No	Yes	No	No		
2-Methylhexane	591-76-4	1720	307	0.45	4.51E 03	No	No	No	Yes	No	No		
2-Methylpentane	107-83-5	3500	350	1.37	0.03	No	No	No	Yes	No	No		
3-4 Pentenenitriles (3-4PN)	544-13-8	50	5	0.51	0.29	No	No	No	Yes	No	No		
3-Methylhexane	589 34 4	3070	307	0.29	2.84E 03	No	No	No	Yes	No	No		
3-Methylpentane	96 14 0	3500	350	0.69	0.01	No	No	No	Yes	No	No		
Adiponitrile (ADN)	111-69-3	90	9	0.10	0.14	No	No	No	Yes	No	No		
Butadiene (BD)	106-99-0	510	9.9	8.83E 03	0.03	No	No	No	No	No	No		
Bis Hexamethylenemtriamine (BHMT)	143-23-7	23	2.3	0.13	0.38	No	No	No	Yes	No	No		
Benzene	71-43-2	170	4.5	1.16	0.62	No	No	No	No	No	No		
Chromium	1308-38-9	3.6	0.041	1.18E-04	5.18E-04	No	No	No	No	No	No		
Cyclohexane (CYANE)	110-82-7	3400	340	1.13	0.41	No	No	No	Yes	No	No		
1,2-Diaminocyclohexane (DCH)	694-83-7	470	47	1.77	0.94	N/A	No	N/A	Yes	No	No		
Ethyl Succinonitrile (ESN)	110 61 2	200	20	0.06	0.11	No	No	No	Yes	No	No		
Hexane	110-54-3	5300	200	0.06	0.01	No	No	No	No	No	No		
Hexamethylene Diamine (HMD)	124-09-4	23	2.3	0.36	1.70	No	No	No	Yes	No	No		
Hexamethyleneimine (HMI)	111-49-9	100	10	0.53	0.85	No	No	No	Yes	No	No		
Hydrochloric Acid	7647-01-0	190	7.9	0.13	0.44	No	No	No	No	No	No		
Iso-Pentane	78 78 4	3800	7100	1.39	0.06	No	No	No	Yes	No	No		
Methylaminoethanol	109 83 1	140	14	0.06	4.24E-04	No	No	No	Yes	No	No		
Methylcyclohexane	108 87 2	600	1610	1.21	0.01	No	No	No	Yes	No	No		
Methylcyclopentane	96 37 7	2600	260	0.72	0.01	No	No	No	Yes	No	No		
Methylglutaronitrile (MGN)	4553 62 2	80	8	0.46	1.13	No	No	No	Yes	No	No		
Ammonia	7664-41-7	170	17	0.59	0.43	No	No	No	Yes	No	No		
n-Hexylamine (NHA)	111-26-2	97	9.7	0.06	0.06	No	No	No	Yes	No	No		
Octane	111-65-9	3500	350	0.59	3.24E-03	No	No	No	Yes	No	No		
Pentane	109 66 0	4100	7100	1.59	0.06	No	No	No	Yes	No	No		
Sulfur	7704 34 9	50	5	0.06	1.74E 05	No	No	No	Yes	No	No		

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Table A-2. TCEQ Flowchart Step Analysis for MERA - Step 5 - 2,3 Dimethylbutane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	5.29E-04	2.32E-03	26.50	4121.45	48.42	3.87	1480.00	350.00	3.06	--	Yes
MSS	04FUG-MSS	2.82E-01	3.26E-03	26.5	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	4.32E-04	7.02E-07	24.00	3912.53	51.92	4.15					

Table A-3. TCEQ Flowchart Step Analysis for MERA - Step 5 - 2-Butoxyethanol

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
MSS	04FUG-MSS	0.29	1.25	26.50	4121.45	48.42	3.87	210.00	3700.00	0.43	--	Yes

Table A-4. TCEQ Flowchart Step Analysis for MERA - Step 5 - 2-Methylhexane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	3.20E-04	1.40E-03	26.50	4121.45	48.42	3.87	1720.00	307.00	3.55	--	Yes
MSS	04FUG-MSS	0.45	3.10E-03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	2.03E-04	3.29E-07	24.00	3912.53	51.92	4.15					

Table A-5. TCEQ Flowchart Step Analysis for MERA - Step 5 - 2-Methylpentane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	2.35E-03	0.01	26.50	4121.45	48.42	3.87	50.00	5.00	0.10	--	No
MSS	04FUG-MSS	1.36E+00	1.48E-02	26.5	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	1.90E-03	3.08E-06	24.00	3912.53	51.92	4.15					

Table A-6. TCEQ Flowchart Step Analysis for MERA - Step 5 - 3-4 Pentenenitriles (3-4PN)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.06	0.25	26.50	4121.45	48.42	3.87	50.00	5.00	0.10	--	No
MSS	04FUG-MSS	0.43	0.04	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.01	2.86E-05	24.00	3912.53	51.92	4.15					

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Table A-7. TCEQ Flowchart Step Analysis for MERA - Step 5 - 3-Methylhexane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	2.00E-04	8.75E-04	26.50	4121.45	48.42	3.87	3070.00	6.00	6.34	0.15	Yes
MSS	04FUG-MSS	0.29	1.97E-03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	1.24E-04	2.01E-07	24.00	3912.53	51.92	4.15					

Table A-8. TCEQ Flowchart Step Analysis for MERA - Step 5 - 3-Methylpentane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	1.09E-03	4.76E-03	26.50	4121.45	48.42	3.87	100.00	10.00	0.21	--	No
MSS	04FUG-MSS	6.91E-01	7.12E-03	26.5	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	8.66E-04	1.41E-06	24.00	3912.53	51.92	4.15					

Table A-9. TCEQ Flowchart Step Analysis for MERA - Step 5 - Adiponitrile (ADN)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.03	0.10	26.50	4121.45	48.42	3.87	90.00	9.00	0.19	--	Yes
MSS	04FUG-MSS	0.08	0.04	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	1.41E-06	1.60E-09	24.00	3912.53	51.92	4.15					

Table A-10. TCEQ Flowchart Step Analysis for MERA - Step 5 - Butadiene (BD)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	3.16E-03	0.01	26.50	4121.45	48.42	3.87	510.00	9.90	1.03	0.26	Yes
MSS	04FUG-MSS	2.79E-03	0.01	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	2.88E-03	4.68E-06	24.00	3912.53	51.92	4.15					

Table A-11. TCEQ Flowchart Step Analysis for MERA - Step 5 - Bis-Hexamethylenemtriamine (BHMT)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.01	0.05	26.50	4121.45	48.42	3.87	23.00	2.30	0.05	--	No
MSS	04FUG-MSS	0.12	0.33	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	3.60E-07	1.80E-10	24.00	3912.53	51.92	4.15					

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Table A-12. TCEQ Flowchart Step Analysis for MERA - Step 5 - Benzene

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.07	0.29	26.50	4121.45	48.42	3.87	170.00	4.50	0.49	0.29	No
MSS	04FUG-MSS	0.96	0.20	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.06	1.01E-04	24.00	3912.53	51.92	4.15					
Flare	04FLR032	0.06	0.13	130.30	4967.12	5.72	0.46					
Baghouse Filters (PBR Auth)	11BAG311 & 11BAGACID	1.89E-04	8.28E-04	21.00	4812.96	39.43	3.15					

Table A-13. TCEQ Flowchart Step Analysis for MERA - Step 5 - Chromium

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Baghouse Filters (PBR Auth)	11BAG311 & 11BAGACID	1.18E-04	5.18E-04	21.00	4812.96	39.43	3.15	3.60	0.04	9.13E-03	1.30E-03	Yes

Table A-14. TCEQ Flowchart Step Analysis for MERA - Step 5 - Cyclohexane (CYANE)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.06	0.24	26.50	4121.45	48.42	3.87	3400.00	340.00	7.00	--	Yes
MSS	04FUG-MSS	1.01	0.17	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.06	9.71E-05	24.00	3912.53	51.92	4.15					

Table A-15. TCEQ Flowchart Step Analysis for MERA - Step 5 - 1,2-Diaminocyclohexane (DCH)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.03	0.13	26.50	4121.45	48.42	3.87	470.00	47.00	0.90	--	No
MSS	04FUG-MSS	0.32	0.75	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.72	2.95E-03	24.00	3912.53	51.92	4.15					
DCH Tank (PBR Auth)	04TFX-022B	0.70	0.06	30.00	3790.78	54.60	4.37					

Table A-16. TCEQ Flowchart Step Analysis for MERA - Step 5 - Ethyl Succinonitrile (ESN)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.03	0.11	26.50	4121.45	48.42	3.87	200.00	20.00	0.41	--	Yes
MSS	04FUG-MSS	0.03	8.95E-04	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	5.73E-06	5.28E-09	24.00	3912.53	51.92	4.15					

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Table A-17. TCEQ Flowchart Step Analysis for MERA - Step 5 - Hexane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	1.88E-03	8.22E-03	26.50	4121.45	48.42	3.87	5300.00	200.00	10.81	5.16	Yes
MSS	04FUG-MSS	0.05	6.15E-03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.01	7.13E-06	24.00	3912.53	51.92	4.15					

Table A-18. TCEQ Flowchart Step Analysis for MERA - Step 5 - Hexamethylene Diamine (HMD)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.06	0.27	26.50	4121.45	48.42	3.87	23.00	2.30	0.05	--	No
MSS	04FUG-MSS	0.29	1.44	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	7.24E-03	3.62E-06	24.00	3912.53	51.92	4.15					
Flare	04FLR032	1.76E-03	-2.00E-05	130.30	4967.12	5.72	0.46					
DCH Tank (PBR Auth)	04TFX-022B	1.50E-04	1.20E-05	30.00	3790.78	54.60	4.37					

Table A-19. TCEQ Flowchart Step Analysis for MERA - Step 5 - Hexamethyleneimine (HMI)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.02	0.08	26.50	4121.45	48.42	3.87	100.00	10.00	0.54	--	Yes
MSS	04FUG-MSS	0.37	0.77	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	8.11E-03	4.06E-06	24.00	3912.53	51.92	4.15					
Flare	04FLR032	0.11	-6.11E-03	130.30	4967.12	5.72	0.46					
DCH Tank (PBR Auth)	04TFX-022B	0.02	1.56E-03	30.00	3790.78	54.60	4.37					
Railcar Loading	04LRC-006F	2.64E-04	-4.45E-02	10.00	3766.80	55.36	4.43					
	04LRC-006	2.64E-04	-4.46E-02	30.00	3874.61	52.76	4.22					

Table A-20. TCEQ Flowchart Step Analysis for MERA - Step 5 - Hydrochloric Acid

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
MSS	04FUG-MSS	0.13	0.44	26.50	4121.45	48.42	3.87	190.00	7.90	0.39	0.20	No

Table A-21. TCEQ Flowchart Step Analysis for MERA - Step 5 - Iso-Pentane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	6.73E-03	0.03	26.50	4121.45	48.42	3.87	4920.00	492.00	10.16	--	Yes
MSS	04FUG-MSS	1.38	0.03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	5.95E-03	9.66E-06	24.00	3912.53	51.92	4.15					

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Table A-22. TCEQ Flowchart Step Analysis for MERA - Step 5 - Methylaminoethanol

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
MSS	04FUG-MSS	0.06	4.24E-04	26.50	4121.45	48.42	3.87	140.00	14.00	0.29	--	Yes
Tank Depressure (MSS)	04TANKOPEN	1.42E-05	7.10E-09	24.00	3912.53	51.92	4.15					

Table A-23. TCEQ Flowchart Step Analysis for MERA - Step 5 - Methylcyclohexane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	6.89E-04	3.02E-03	26.50	4121.45	48.42	3.87	600.00	1610.00	1.24	--	Yes
MSS	04FUG-MSS	1.21	7.73E-03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	3.86E-04	6.26E-07	24.00	3912.53	51.92	4.15					

Table A-24. TCEQ Flowchart Step Analysis for MERA - Step 5 - Methylcyclopentane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	8.70E-04	3.81E-03	26.50	4121.45	48.42	3.87	2600.00	260.00	5.37	--	Yes
MSS	04FUG-MSS	0.72	6.41E-03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	6.59E-04	1.07E-06	24.00	3912.53	51.92	4.15					

Table A-25. TCEQ Flowchart Step Analysis for MERA - Step 5 - Methylglutaronitrile (MGN)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.20	0.85	26.50	4121.45	48.42	3.87	80.00	8.00	0.17	--	No
MSS	04FUG-MSS	0.26	0.28	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	2.81E-05	3.75E-08	24.00	3912.53	51.92	4.15					

Table A-26. TCEQ Flowchart Step Analysis for MERA - Step 5 - Ammonia

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3, 4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	0.02	0.08	26.50	4121.45	48.42	3.87	170.00	17.00	0.35	--	No
MSS	04FUG-MSS	0.50	0.34	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	0.08	2.37E-04	24.00	3912.53	51.92	4.15					

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Table A-27. TCEQ Flowchart Step Analysis for MERA - Step 5 - n-Hexylamine (NHA)

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	6.34E-05	2.78E-04	26.50	4121.45	48.42	3.87	97.00	9.70	0.20	--	Yes
MSS	04FUG-MSS	0.06	0.06	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	2.34E-04	1.17E-07	24.00	3912.53	51.92	4.15					
DCH Tank (PBR Auth)	04TFX-022B	3.90E-03	3.55E-04	30.00	3790.78	54.60	4.37					

Table A-28. TCEQ Flowchart Step Analysis for MERA - Step 5 - Octane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
MSS	04FUG-MSS	0.59	3.24E-03	26.50	4121.45	48.42	3.87	3500.00	350.00	7.23	--	Yes
Tank Depressure (MSS)	04TANKOPEN	6.12E-05	9.94E-08	24.00	3912.53	51.92	4.15					

Table A-29. TCEQ Flowchart Step Analysis for MERA - Step 5 - Pentane

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
Fugitives	04 FUG	5.90E-03	0.03	26.50	4121.45	48.42	3.87	1000.00	100.00	2.06	--	Yes
MSS	04FUG-MSS	1.58	0.03	26.50	4121.45	48.42	3.87					
Tank Depressure (MSS)	04TANKOPEN	5.14E-03	8.34E-06	24.00	3912.53	51.92	4.15					

Table A-30. TCEQ Flowchart Step Analysis for MERA - Step 5 - Sulfur

Emission Source	EPN	Hourly Emissions Increase (lb/hr)	Annual Emissions Increase (tpy)	Stack height (ft)	Distance to property line (ft)	Table 1 Hourly X Value [1]	Table 1 Annual X Value [2]	ESL Short-Term ($\mu g/m^3$)	ESL Long-Term ($\mu g/m^3$)	Allowed Short-Term E [3] (lb/hr)	Allowed Long-Term E [3,4] (tpy)	Are the emission increases less than 10% of the ESL?
MSS	04FUG-MSS	0.06	1.74E-05	26.50	4121.45	48.42	3.87	50.00	5.00	0.10	--	Yes

[1] Interpolated value obtained from Appendix C of the TCEQ Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits, Table 1, APDG 5874v3, July 2009.

[2] Per Appendix C of the TCEQ Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits, APDG 5874v3, July 2009, the hourly value provided in Table 1 should be multiplied by 0.08 to obtain the annual value for comparison.

[3] E is calculated from the equations provided in the July 2009 MERA guidance. These two columns calculate E in the equations so that the comparison for Step 5 can be made. For multiple emission points ,a weighted average is used. The following equation is taken from the MERA guidance.

$$E = 0.1 \left[\frac{E_1}{E_{total}} \frac{ESL}{X_1} + \frac{E_2}{E_{total}} \frac{ESL}{X_2} + \frac{E_n}{E_{total}} \frac{ESL}{X_n} \right]$$

E_1 =emission rate increase in lb/hr for the constituent emitted from emission point i

E_{total} = sum of the emission rate increase in lb/hr for the constituent emitted from multiple emission points emitting simultaneously

ESL = the effects screening level (ESL) in µg/m3 for the constituent being evaluated (published in the most recent edition of the list of ESLs by the TD)

X_1 = the appropriate X-value in µg/m3 per lb/hr for the emission point i at the applicable distance D, taken from either Table 1, 2, 3 or Table 4, as applicable (see Appendix C)

[4] Long term emission increases are considered when the long term ESL is less than 10% of the short term ESL per MERA guidelines.

APPENDIX B: SUMMARY OF DOWNWASH STRUCTURES

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Table B-1. Description and Height of Buildings in Downwash Analysis

Building ID	Description	Height (ft)	Height (m)
BLD31	Abatement Complex	8.01	2.44
BLD32	BLDG 36	14.60	4.45
BLD33	BLDG 8	21.69	6.61
BLD35	BLDG 6	19.29	5.88
BLD36	BLDG 15	16.70	5.09
BLD37	BLDG 16	16.99	5.18
BLD38	BLDG 10	16.99	5.18
BLD39	BLDG 4	38.62	11.77
BLD42	BLDG 109	16.99	5.18
BLD43	BLDG 119	16.70	5.09
BLD44	BLDG 525	18.11	5.52
BLD45	BLDG 101 & 102	16.99	5.18
BLD46	BLDG 537	19.39	5.91
BLD47	BLDG 538	14.99	4.57
BLD48	BLDG 526	16.50	5.03
BLD50	BLDG 12	19.00	5.79
BLD51	BLDG 544	19.00	5.79
BLD54	BLDG 591	18.01	5.49
BLD58	BLDG 567	14.01	4.27
BLD59	BLDG 420	16.80	5.12
BLD70	BLDG 418	22.11	6.74
BLD73	PIPE SHOP	27.00	8.23
BLD75	ADMINISTRATION	15.49	4.72
BLD76	RECEIVING AND STORES	21.00	6.4
BLD77	PAINT SHOP	19.00	5.79
BLD79	BLDG 552	22.01	6.71
BLD82	BLDG 324	23.10	7.04
BLD85	SHOPS	20.01	6.1
BLD86	CHANGE ROOM	14.99	4.57
BLD87	BLDG 568	18.01	5.49
BLD100	OP SHELTER	12.80	3.9
BLD101	BLDG 572	12.99	3.96
BLD114	DEWATERING	23.59	7.19
BLD117	BLDG 339	18.41	5.61
BLD118	BLDG 417	14.99	4.57
BLD130	COGEN TURBINE	64.01	19.51
BLD131	EIR	21.29	6.49
BLD133	SHOP	25.00	7.62
BLD134	BLDG 17	31.59	9.63
BLD144	OP 1A	15.72	4.79

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Building ID	Description	Height (ft)	Height (m)
BLD146	OPERATION 1A	54.99	16.76
BLD148	NICKEL WHSE	20.01	6.1
BLD151	BLDG 509B	33.01	10.06
BLD153	BLDG 509A	27.00	8.23
BLD158	SUB 27 ECR	14.99	4.57
BLD160	BLDG 4093	31.40	9.57
BLD161	GARAGE	20.01	6.1
BLD162	BLDG 528	52.10	15.88
BLD164	ACIDS POWER SHOP	8.01	2.44
BLD166	BLDG 108	14.60	4.45
BLD169	BLDG N2	21.69	6.61
BLD172	BLDG 589TF	19.29	5.88
BLD174	BLDG 555B	16.70	5.09
BLD3	BLDG 483	16.99	5.18
BLD5	ChemTRT	16.99	5.18
BLD7	DVH1	38.62	11.77
BLD8	DVH2	16.99	5.18
BLD9	DVH3	16.70	5.09
BLD10	DVH4	18.11	5.52
BLD12	DVH5	16.99	5.18
BLD14	MAINT PAD	19.39	5.91
BLD17	DVH6	14.99	4.57
BLD27	OPSHELTERB	16.50	5.03
BLD28	OPER SHELTER	19.00	5.79
BLD29	INFLUENT COOLING TOWERS	19.00	5.79
BLD71	COOLING TOWER	18.01	5.49
BLD72	COOLING TOWER	14.01	4.27
BLD83	DRY STORAGE	16.80	5.12
BLD91	BLDG 3A	22.11	6.74
BLD93	LIBRARY	27.00	8.23
BLD95	COVERED STORAGE	15.49	4.72
BLD96	COVERED DRUM STORAGE	21.00	6.4
BLD97	COVERED STORAGE	19.00	5.79
BLD98	COVERED CYL STORAGE	22.01	6.71
BLD108	STORES WAREHOUSE	23.10	7.04
BLD110	FIRETRUCK SHELTER	20.01	6.1
BLD112	FTBLDG1	14.99	4.57
BLD123	FTBLDG2	18.01	5.49
BLD132	WATER TREATMENT	12.80	3.9
BLD139	WATER BLDG	12.99	3.96
BLD157	DELUGE	18.41	5.61
BLD159	ARTHUR BROS PAINT SHOP	14.99	4.57
BLD175	BLDG 31	64.01	19.51
BLD176	PAINT SHOP	21.29	6.49
BLD177	OIL DRUM STORAGE	25.00	7.62

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Building ID	Description	Height (ft)	Height (m)
USFLTR	US Filter Building	31.59	9.63
BLD102	08TFX001	40.78	12.43
BLD103	08RXN006	31.99	9.75
BLD105	08RXN008	31.99	9.75
BLD106	08CLF012	18.01	5.49
BLD107	08RXN007	31.99	9.75
BLD109	08RXN009	31.99	9.75
BLD111	08CLF013	18.01	5.49
BLD113	08TFX016	27.99	8.53
BLD119	NH3 TANK	110.01	33.53
BLD121	06TFX013	37.01	11.28
BLD122	06TFL014	37.01	11.28
BLD124	06TFL015	37.01	11.28
BLD125	06TFL016	37.01	11.28
BLD126	10TFX080	48.00	14.63
BLD128	10TANK01	28.81	8.78
BLD129	07TFX32F	28.81	8.78
BLD1	04TFX020	23.00	7.01
BLD6	04TFX021	23.00	7.01
BLD11	04TFX025	23.00	7.01
BLD13	04TFX026	23.00	7.01
BLD15	04TFX027	23.00	7.01
BLD30	04TFX028	23.00	7.01
BLD34	04TFX029	23.00	7.01
BLD138	04TFX031	23.00	7.01
BLD147	06TFX012	20.01	6.1
BLD180	06TFX033	20.01	6.1
BLD181	06TFX035	14.01	4.27
BLD182	06TFX038	37.01	11.28
BLD183	06TFX041	20.01	6.1
BLD184	06TFX044	31.99	9.75
BLD185	06TFX045	24.02	7.32
BLD186	06TFX054	20.01	6.1
BLD187	06TFX056	37.01	11.28
BLD188	06TFX065	20.01	6.1
BLD189	10TFX027	24.02	7.32
BLD190	10TFX028	24.02	7.32
BLD191	10TFX029	24.02	7.32
BLD192	10TFX030	24.02	7.32
BLD193	10TFX031	20.01	6.1
BLD194	10TFX032	20.01	6.1
BLD195	10TFX035	20.01	6.1
BLD196	10TFX035B	29.99	9.14
BLD197	10TFX035C	29.99	9.14
BLD198	10TFX035D	29.99	9.14

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Building ID	Description	Height (ft)	Height (m)
BLD199	10TFX036	20.01	6.1
BLD200	10TFX036A	39.99	12.19
BLD201	10TFX037	20.01	6.1
BLD202	10TFX037A	56.00	17.07
BLD203	10TFX054	29.00	8.84
BLD204	10TFX059	25.00	7.62
BLD205	10TFX067	25.00	7.62
BLD206	10TFX33	36.02	10.98
BLD207	10TFX34A	36.02	10.98
BLD208	10TFX34B	36.02	10.98
BLD209	11TFX036	25.00	7.62
BLD210	11TFX019	32.02	9.76
BLD211	11TFX018	32.02	9.76
BLD212	11TFX078	32.71	9.97
BLD154	04TFX023	20.01	6.1
BLD213	11TFX55	14.01	4.27
BLD214	11TFX064	8.99	2.74
BLD215	11TFX048	25.00	7.62
BLD216	11SEP055A	6.00	1.83
BLD217	11TFX070	4.00	1.22
BLD218	1TFX067	40.78	12.43
BLD219	11TFX053	31.99	9.75
BLD221	11TFX052	31.99	9.75
BLD222	11TFX051	18.01	5.49
BLD223	11TFX050	31.99	9.75
BLD224	11TFX049	31.99	9.75
BLD225	15TFX021	18.01	5.49
BLD226	15TFX023	27.99	8.53
BLD228	15TFX022	110.01	33.53
BLD229	15TFX024	37.01	11.28
BLD220	Head Tank 1	37.01	11.28
BLD227	Head Tank 2	37.01	11.28
BLD230	18TFX028	23.00	7.01
BLD231	18TFX062	48.00	14.63
BLD232	18TFX062A	28.81	8.78
BLD233	18TFL030	21.00	6.4
BLD234	18TFL027	23.00	7.01
BLD235	18TFX072	23.00	7.01
BLD237	18TFX073	23.00	7.01
BLD238	18TFL065	23.00	7.01
BLD239	18TFX061	23.00	7.01
BLD240	07TFX023	23.00	7.01
BLD241	07TFX040	23.00	7.01
BLD242	07TFX025	23.00	7.01
BLD243	07TFX057	20.01	6.1

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Building ID	Description	Height (ft)	Height (m)
BLD244	07TFX038B	20.01	6.1
BLD245	07TFX040A	14.01	4.27
BLD246	07TFX038A	37.01	11.28
BLD247	97TFX024	20.01	6.1
BLD248	07TFX034	31.99	9.75
BLD249	07TFX033A	24.02	7.32
BLD250	07TFX033B	20.01	6.1
BLD251	07TFX032C	37.01	11.28
BLD252	07TFX032D	20.01	6.1
BLD253	07TFX032B	24.02	7.32
BLD254	07TFX032A	24.02	7.32
BLD255	07TFX032E	24.02	7.32
BLD236	10TFX054A	24.02	7.32
BLD256	10TFX032B	20.01	6.1
BLD257	06TFX387	25.00	7.62
BLD258	07TFX039	19.00	5.79
BLD259	07TFX697	18.01	5.49
BLD260	07TFX013A	10.01	3.05
BLD261	07TFX013B	10.01	3.05
BLD262	07TFX014	8.99	2.74
BLD263	07TFX017	20.01	6.1
BLD264	07TFX698	18.01	5.49
BLD265	07TFX035	6.00	1.83
BLD266	07TFX054A	2.49	0.76
BLD145	17TFX547	29.99	9.14
BLD4	BLDG 11	23.88	7.28
BLD16	BLDG 1	14.01	4.27
BLD20	BLDG 531	17.81	5.43
BLD25	BLDG 530	14.40	4.39
BLD26	BLDG 539	53.71	16.37
BLD40	BLDG 2	9.19	2.8
BLD52	BLDG 551	22.01	6.71
BLD53	BLDG 561	64.99	19.81
BLD56	BLDG 560A	25.00	7.62
BLD57	BLDG 560	18.01	5.49
BLD60	BLDG 570	13.81	4.21
BLD61	BLDG 404	24.21	7.38
BLD62	BLDG 460	75.00	22.86
BLD63	BLDG 403	24.21	7.38
BLD64	BLDG 450	64.50	19.66
BLD65	BLDG 402	23.88	7.28
BLD66	BLDG 440	107.51	32.77
BLD67	BLDG 401	23.88	7.28
BLD68	BLDG 430	125.59	38.28
BLD69	REGRIG	46.10	14.05

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Building ID	Description	Height (ft)	Height (m)
BLD74	OFFICES	11.71	3.57
BLD78	BLDG 611	14.99	4.57
BLD84	BLDG 323	24.70	7.53
BLD88	OPER 4	89.30	27.22
BLD89	OPER 2&3	83.20	25.36
BLD90	OPER 1	146.92	44.78
BLD94	OFFICE & CCR	23.20	7.07
BLD99	OP 16	90.58	27.61
BLD115	BLDG 387	50.00	15.24
BLD116	BLDG 382	24.41	7.44
BLD120	NH3 STG&REFRIG	35.01	10.67
BLD135	BLRS 1THRU4	60.01	18.29
BLD136	OPER 5	73.49	22.4
BLD137	SHOP	25.00	7.62
BLD141	OP 13	61.81	18.84
BLD142	OP 12	54.59	16.64
BLD143	OP 11	53.31	16.25
BLD150	PRIMARY FILTRATION BLDG	47.60	14.51
BLD155	BLDG 542	50.00	15.24
BLD156	BLDG 543	22.01	6.71
BLD163	AOP	73.49	22.4
BLD165	BLDG 540	80.18	24.44
BLD167	BLDG 553	45.01	13.72
BLD168	BLDG 554 & 556	20.01	6.1
BLD170	BLDG 558 & 559	89.99	27.43
BLD171	BLDG 557	20.01	6.1
BLD173	BLDG 555A	18.01	5.49
BLD2	Natural Gas Purification	30.41	9.27
BLD18	TANK FARM #3	41.01	12.5
BLD19	TANK FARM #2	40.39	12.31
BLD21	TANK FARM #1	50.39	15.36
BLD22	CUBE SHOP	31.50	9.6
BLD23	OP 15	46.00	14.02
BLD24	OP 14	68.80	20.97
BLD41	WW EQUALIZATION	30.31	9.24
BLD49	ACIDS WW EQUALIZATION	49.31	15.03
BLD55	COOLING TOWERS	18.11	5.52
BLD80	BLDG 491	13.62	4.15
BLD81	SWITCH GEAR ROOM	17.81	5.43
BLD92	BLDG 3	14.60	4.45
BLD104	BLDG 5	30.91	9.42
BLD127	CHEMICAL BLDG	13.62	4.15
BLD140	WATER BLDG	16.70	5.09
BLD149	POWERHOUSE	60.20	18.35
BLD178	BLDG 13	14.60	4.45

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Building ID	Description	Height (ft)	Height (m)
BLD179	NRU PROCESS BLDG	125.59	38.28
BLD267	Op 11 A	25.00	7.62
04TFX22A		30.00	9.14
04TFX22B		30.00	9.14
4TFX034A	04TFX034A	32.00	9.75
4TFX034B	04TFX034B	32.00	9.75
4TFX044	04TFX044	24.00	7.32
BLD268	17TFX548	30.00	9.14

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APPENDIX C: AREA MAP

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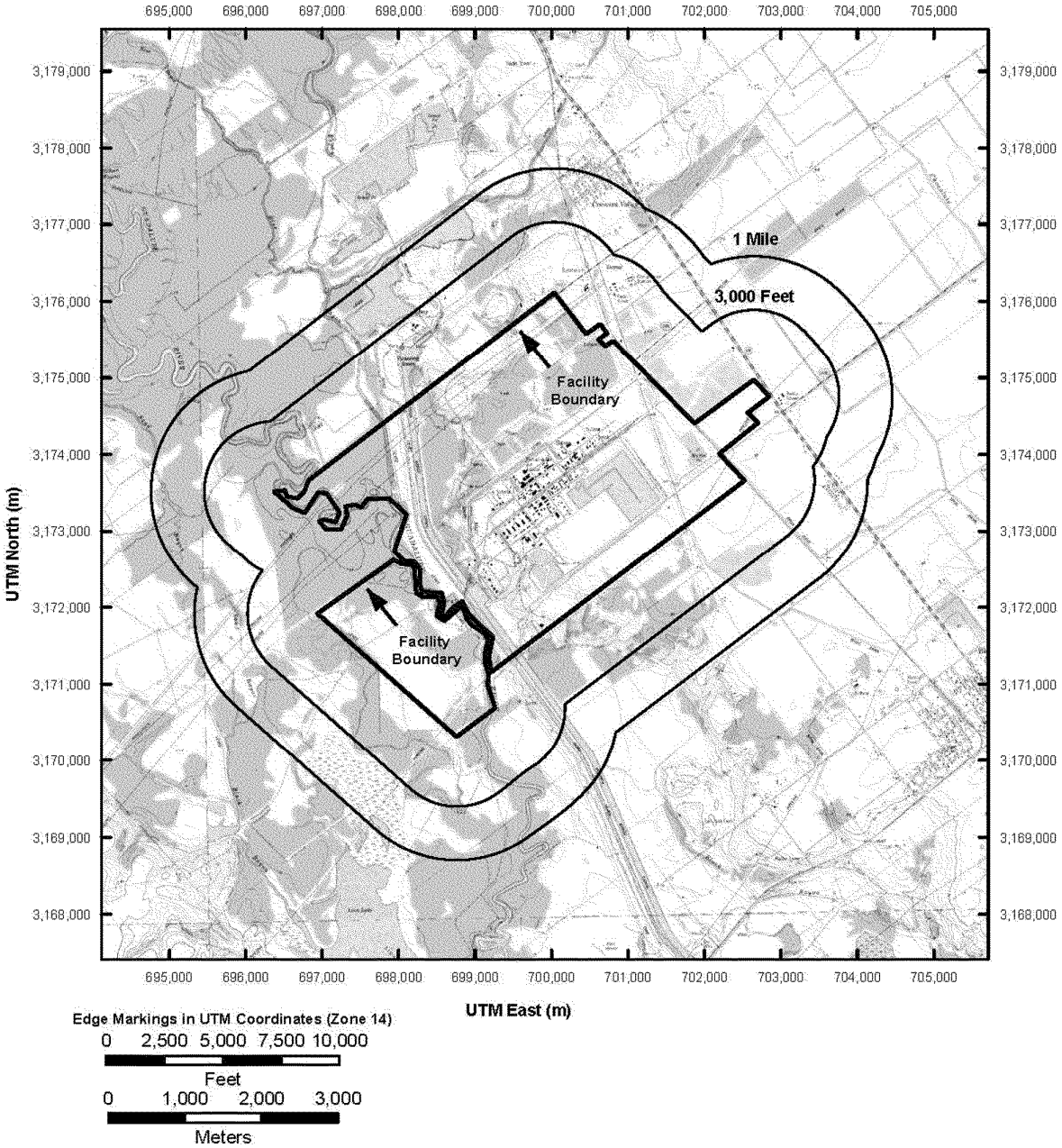
Figure C-1. Victoria Plant Area Map



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APPENDIX D: PLOT PLAN AND MODELED RECEPTOR GRIDS

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Figure D-1. Locations of Property Line Receptors

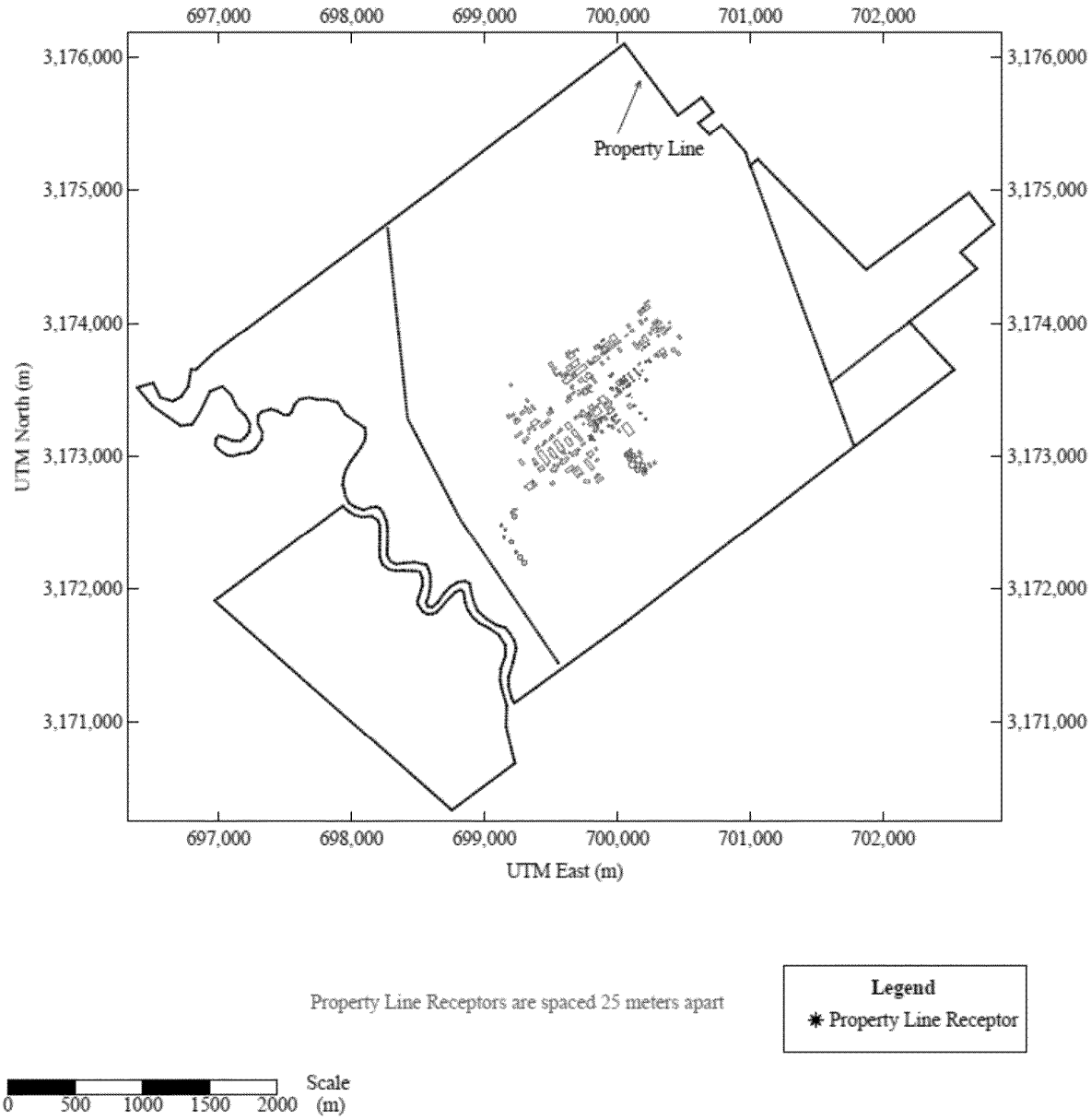

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Figure D-2. Locations of Fine Grid Receptors

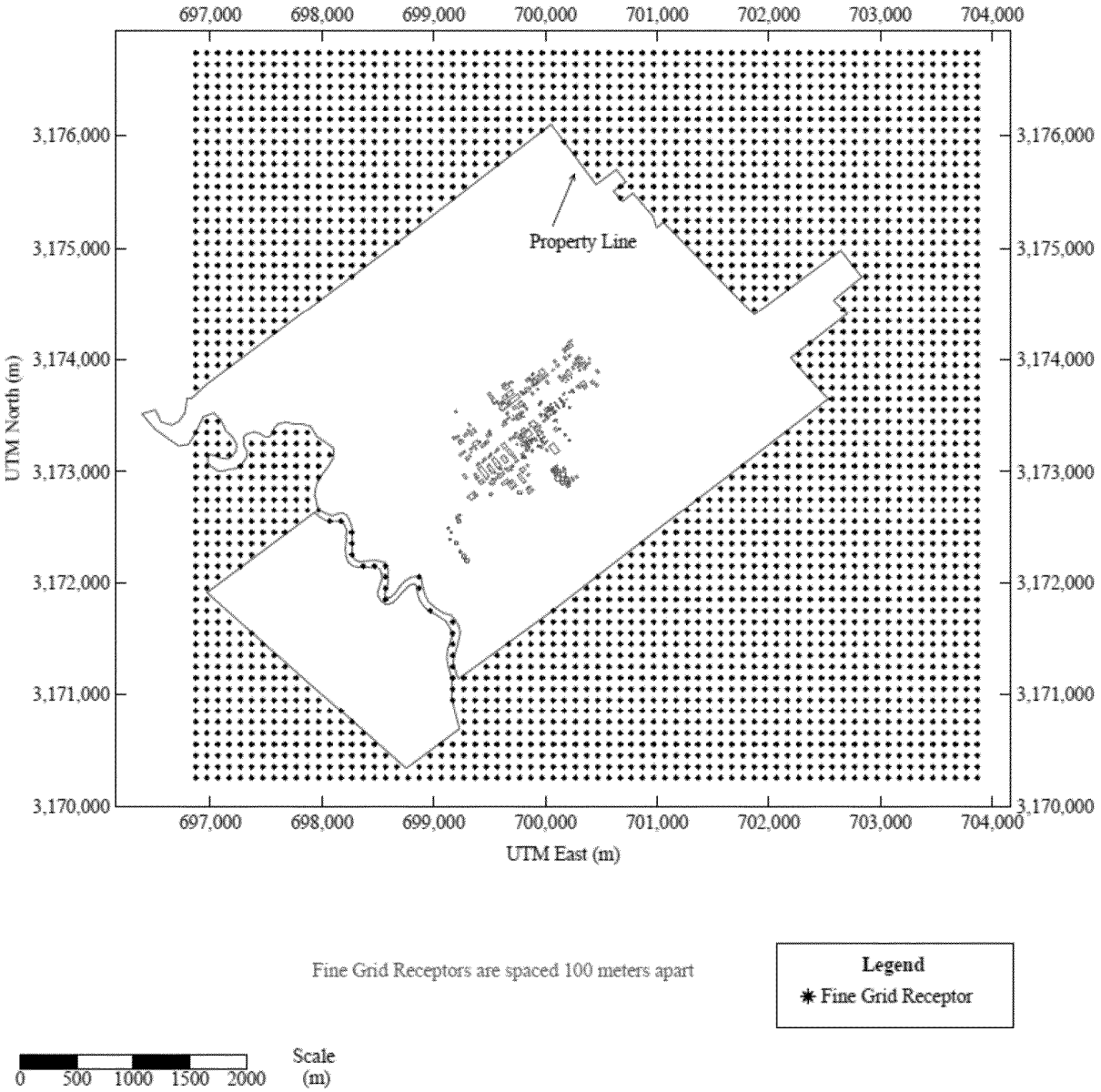

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Figure D-3. Locations of Medium Grid Receptors

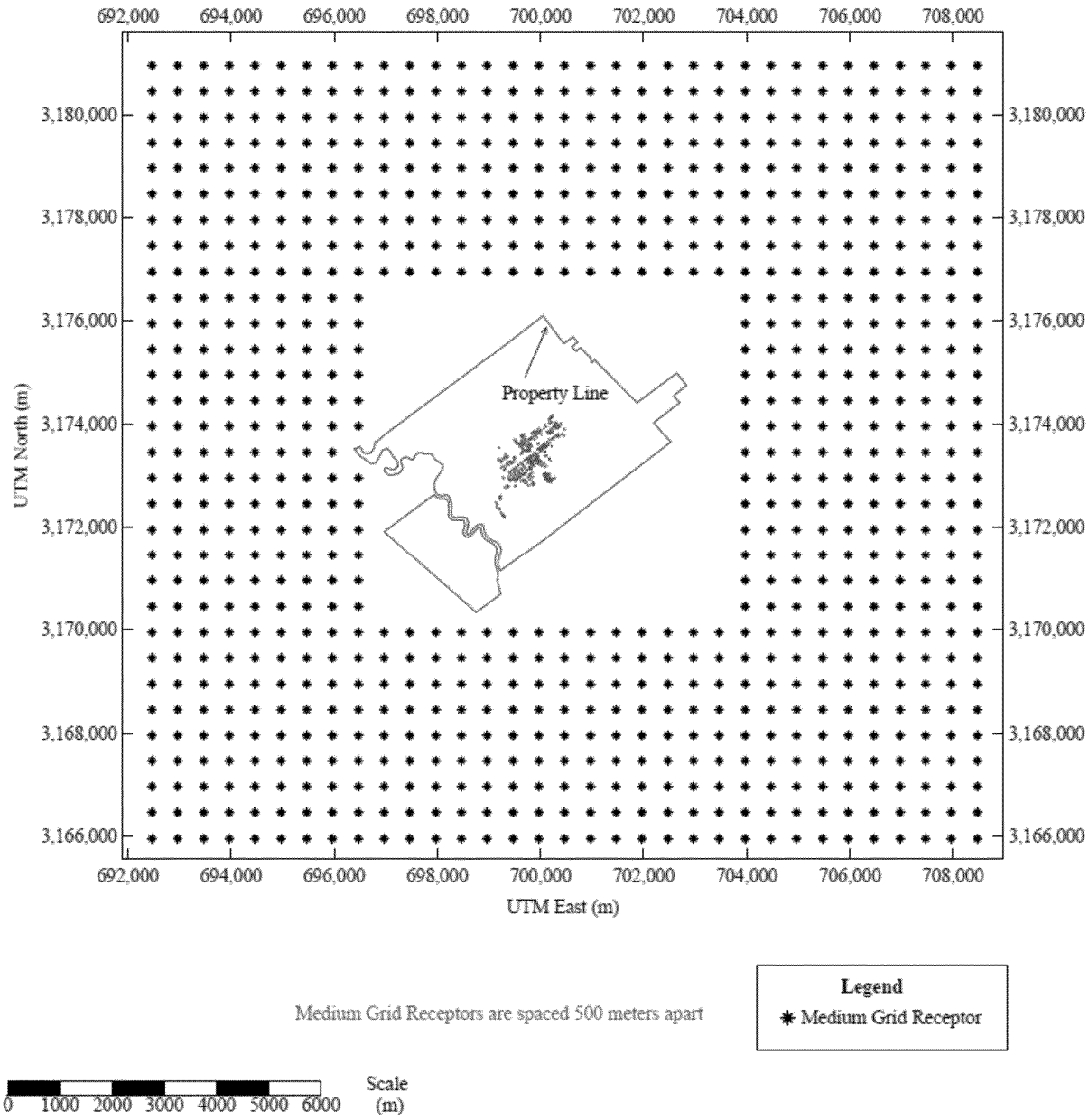

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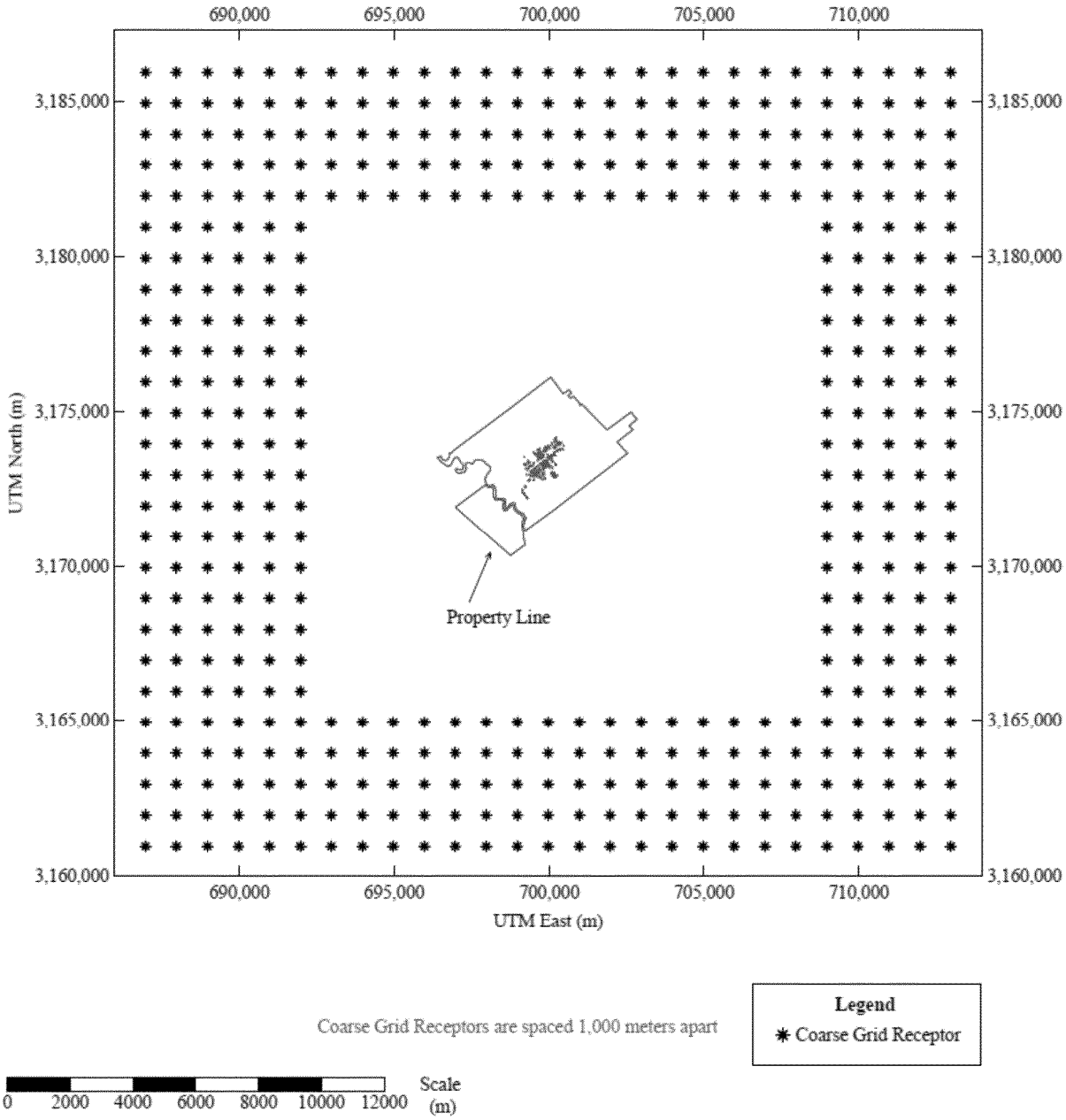
Figure D-4. Locations of Coarse Grid Receptors



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APPENDIX E: MODELED SOURCE PARAMETERS AND EMISSION RATES

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Table E-1. Point and Pseudo Point Source Parameters

Source ID	UTM E (m)	UTM N (m)	Stack Height (ft)	Stack Height (m)	Stack Temperature (F)	Stack Temperature (K)	Stack Velocity (ft/s)	Stack Velocity (m/s)	Stack Diameter (ft)	Stack Diameter (m)
4FLR32	699,934	3,173,707	130.32	39.72	1831.73	1273	65.62	20	6.63	2.02
17STK007	699,834	3,173,835	150	45.72	375.01	463.71	48.65	14.83	14.60	4.45
16STK01	699,936	3,173,862	60.0	18.29	402.01	478.71	28.74	8.76	6.59	2.01
16VNT02	699,908	3,173,841	58.0	17.68	--	0	--	0.001	--	0.001
4LRC6F	700,285	3,173,812	12	3.66	--	0	--	0.001	--	0.001
4LRC6	700,258	3,173,790	30	9.14	--	0	--	0.001	--	0.001
4TFX22B	700,317	3,173,704	30	9.14	--	0	--	0.001	--	0.001
4LTR18	700,191	3,173,646	21.5	6.55	--	0	--	0.001	--	0.001
11BAG311	700,007	3,173,560	21	6.40	--	0	--	0.001	--	0.001
4LTR18F	700,126	3,173,661	12	3.66	--	0	--	0.001	--	0.001
4TFX020	700,155	3,173,625	23	7.01	--	0	--	0.001	--	0.001
4TFX021	700,169	3,173,611	23	7.01	--	0	--	0.001	--	0.001
4TFX025	700,250	3,173,711	23	7.01	--	0	--	0.001	--	0.001
4TFX026	700,238	3,173,726	23	7.01	--	0	--	0.001	--	0.001
4TFX027	700,185	3,173,800	23	7.01	--	0	--	0.001	--	0.001
4TFX028	700,212	3,173,825	23	7.01	--	0	--	0.001	--	0.001
4TFX029	700,204	3,173,822	23	7.01	--	0	--	0.001	--	0.001
4TFX031	700,237	3,173,843	23	7.01	--	0	--	0.001	--	0.001
11TFX036	700,042	3,173,551	25	7.62	--	0	--	0.001	--	0.001
11TFX019	700,076	3,173,528	32	9.75	--	0	--	0.001	--	0.001
11TFX018	700,091	3,173,540	32	9.75	--	0	--	0.001	--	0.001
11TFX078	700,218	3,173,575	32.7	9.97	--	0	--	0.001	--	0.001
11TFX55	700,048	3,173,600	14	4.27	--	0	--	0.001	--	0.001
11TFX064	700,038	3,173,570	9	2.74	--	0	--	0.001	--	0.001
11TFX048	700,028	3,173,576	25	7.62	--	0	--	0.001	--	0.001
11TFX070	700,022	3,173,534	4	1.22	--	0	--	0.001	--	0.001
11TFX067	700,110	3,173,441	40.8	12.44	--	0	--	0.001	--	0.001
11TFX053	700,072	3,173,453	32	9.75	--	0	--	0.001	--	0.001
4TFX044	700,280	3,173,719	24	7.32	--	0	--	0.001	--	0.001
11TFX082	700,191	3,173,548	29.5	8.99	--	0	--	0.001	--	0.001
16TFX006	699,893	3,173,843	18.9	5.76	--	0	--	0.001	--	0.001
11TFX083	700,098	3,173,451	9.1	2.77	--	0	--	0.001	--	0.001
11PRC066	700,105	3,173,447	6	1.83	--	0	--	0.001	--	0.001
SEP055A	700,019	3,173,572	6	1.83	--	0	--	0.001	--	0.001
4TFX22A	700,332	3,173,719	30	9.14	--	0	--	0.001	--	0.001
11TFX052	700,081	3,173,454	32	9.75	--	0	--	0.001	--	0.001
11TFX051	700,086	3,173,458	18	5.49	--	0	--	0.001	--	0.001
11TFX050	700,093	3,173,463	32	9.75	--	0	--	0.001	--	0.001
11TFX049	700,098	3,173,468	32	9.75	--	0	--	0.001	--	0.001
15TFX021	699,792	3,173,492	18	5.49	--	0	--	0.001	--	0.001
15TFX023	699,808	3,173,488	28	8.53	--	0	--	0.001	--	0.001
15TFX022	699,765	3,173,564	110	33.53	--	0	--	0.001	--	0.001
15TFX024	699,709	3,173,500	37	11.28	--	0	--	0.001	--	0.001
17TFX547	699,892	3,173,877	30	9.14	--	0	--	0.001	--	0.001
17TFX548	699,882	3,173,868	30	9.14	--	0	--	0.001	--	0.001
10TFX35B	700,076	3,173,528	32	9.75	--	0	--	0.001	--	0.001
10TFX35C	700,091	3,173,540	32	9.75	--	0	--	0.001	--	0.001
10TFX35D	700,218	3,173,575	32.7	9.97	--	0	--	0.001	--	0.001
04TFX504	700,199	3,173,856	3	0.91	--	0	--	0.001	--	0.001

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Table E-2. Volume Source Parameters

Source ID	UTM E (m)	UTM N (m)	Release Height (ft)	Release Height (m)	Intial Lateral Dimension (m)	Initial Vertical Dimension (m)
4FUG1	700,126	3,173,850	26.51	8.08	6.73	6.66
4FUG2	700,135	3,173,839	26.51	8.08	6.73	6.66
4FUG3	700,145	3,173,828	26.51	8.08	6.73	6.66
4FUG4	700,154	3,173,817	26.51	8.08	6.73	6.66
4FUG5	700,207	3,173,883	41.60	12.68	8.77	10.94
TFW1	700,170	3,173,790	11.52	3.51	6.88	2.41
TFW2	700,184	3,173,801	11.52	3.51	6.88	2.41
TFE1	700,213	3,173,823	11.52	3.51	6.09	2.41
TFE2	700,224	3,173,832	11.52	3.51	6.09	2.41
TF2	700,232	3,173,710	11.52	3.51	7.09	2.41
TFP1	700,266	3,173,733	13.48	4.11	7.09	1.49
TFP2	700,292	3,173,696	13.48	4.11	7.09	1.49
4TFX034A	700,257	3,173,666	16.00	4.88	5.81	4.54
4TFX034B	700,274	3,173,679	16.00	4.88	5.81	4.54
4TFX030A	700,220	3,173,832	10.00	3.05	1.74	2.84
4TFX030B	700,226	3,173,836	10.00	3.05	1.74	2.84
4TXFX033	700,176	3,173,792	10.00	3.05	2.79	2.84
TFX004_8	699,886	3,173,773	6.50	1.98	3.31	1.84
TFX005_1	699,915	3,173,835	26.87	8.19	7.71	7.61
TFX005_2	699,931	3,173,848	26.87	8.19	7.71	7.61
11SMP081	700,008	3,173,554	9.84	3.00	6.98	1.4
4TFX23	700,222	3,173,710	10.00	3.05	5.33	2.84

Table E-3. Fugitive Source Parameters: Process/Piping Fugitives Located Inside a Building - HMD Unit and Tank Farms

Parameter	Source ID								
	4FUG[1]	4FUG5	4TFX34A/B	4TFX30A/B	4TFX033	TFX004_8	TFX005[1]	11SMP081	4TFX23
Building Height [ft]	50	80.2	32	20	20	13	53.7	19.68	20
Building Length (approx.) [ft]	190	123.69	41	12.27	19.7	46.7	54.38	49.23	37.59
Building Width (approx.) [ft]	47.5	123.69	41	12.27	19.7	46.7	54.38	49.23	37.59
Ratio (No. Vol Sources)	4	1	1	1	1	1	1	1	1
H_{min} [ft]	3	3	0	0	0	0	0	0	0
D [ft]	47	77.2	32	20	20	13	53.7	19.68	20
Release Height [m]	8.08	12.68	4.88	3.05	3.05	1.98	8.18	3.00	3.05
Sigma Y [m][2]	6.73	8.77	5.81	1.74	2.79	3.31	7.71	6.98	5.33
Sigma Z [m][3]	6.66	10.94	4.54	2.84	2.84	1.84	7.61	1.39	2.84

[1] For sources represented with greater than 1 volume source, the source is represented by identical sources, with the parameters listed in this table. The source IDs for these sources are the name listed in this table followed by 1,2,3, etc. For example, the four Source IDs representing 4FUG are 4FUG1, 4FUG2, 4FUG3, and 4FUG4.

[2] For single volume sources, Sigma Y is calculated using L/4.3; for series of volume sources, Sigma Y is calculated using L/2.15.

[3] For volume sources on or adjacent to a building, Sigma Z is calculated using D/2.15.

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Table E-4. Criteria Pollutant Project Emissions Increase

	CO		$PM_{10}/PM_{2.5}$		SO_2	
Source ID	**(lb/hr)**	**(g/s)**	**(lb/hr)**	**(g/s)**	**(lb/hr)**	**(g/s)**
4FLR32	80.32	10.12	0.00	0.00	17.61	2.22
17STK007	0.17	0.02	0.27	0.03	0.23	0.03
16STK01	1.41	0.18	0.13	0.02	2.51E-03	3.17E-04
16VNT02	0.64	0.08	--	--	--	--

Table E-5. Criteria Pollutant Project Emissions Increase from Volume Sources

	CO		$PM_{10}/PM_{2.5}$		SO_2	
Source ID	**(lb/hr)**	**(g/s)**	**(lb/hr)**	**(g/s)**	**(lb/hr)**	**(g/s)**
4FUG1	--	--	0.04	8.08	--	--
4FUG2	--	--	0.04	8.08	--	--
4FUG3	--	--	0.04	8.08	--	--
4FUG4	--	--	0.04	8.08	--	--
4FUG5	--	--	0.04	12.68	--	--

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Table E-6. MERA Step 9 Modeled Emission Rates

Source ID	3,4 PN		BHMT		Benzene		DCH		HMD		HCl		MGN		NH_3		2 Methylpentane		3 Methylpentane		3 Methylhexane	
	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)
4FLR32	0	0	0	0	0.06	7.67E-03	0	0	1.76E-03	2.22E-04	0	0	0	0	0	0	0	0	0	0	0	0
4LRC6F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4LRC6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4TFX22B	0	0	0	0	0	0	0.71	0.09	1.50E-04	1.89E-05	0	0	0	0	0	0	0	0	0	0	0	0
4LTR18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11BAG311	0	0	0	0	1.89E 04	2.38E 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4LTR18F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4TFX020	0	0	0	0	1.04E-04	1.31E-05	3.55E-04	4.47E-05	4.66E-05	5.87E-06	0	0	0	0	4.22E-05	5.32E-06	0	0	0	0	0	0
4TFX021	0	0	0	0	0	0	1.97E-04	2.49E-05	3.78E-08	4.77E-09	0	0	0	0	0	0	0	0	0	0	0	0
4TFX025	0	0	0	0	1.04E 04	1.31E 05	3.55E 04	4.47E 05	4.66E 05	5.87E 06	0	0	0	0	4.22E 05	5.32E 06	0	0	0	0	0	0
4TFX026	0	0	5.29E 10	6.67E 11	1.14E 05	1.44E 06	3.42E 06	4.31E 07	4.07E 04	5.12E 05	0	0	0	0	1.08E 04	1.36E 05	0	0	0	0	0	0
4TFX027	0	0	1.71E-10	2.15E-11	1.38E-06	1.73E-07	4.16E-06	5.25E-07	1.04E-05	1.31E-06	0	0	1.42E-05	1.78E-06	1.26E-03	1.59E-04	0	0	0	0	0	0
4TFX028	0	0	0	0	0	0	0	0	2.92E-04	3.68E-05	0	0	0	0	0	0	0	0	0	0	0	0
4TFX029	0	0	0	0	0	0	0	0	2.92E-04	3.68E-05	0	0	0	0	0	0	0	0	0	0	0	0
4TFX031	0	0	0	0	3.95E-07	4.98E-08	9.64E-09	1.21E-09	1.11E-06	1.40E-07	0	0	0	0	3.36E-04	4.23E-05	0	0	0	0	0	0
11TFX036	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX019	1.23E 06	1.55E 07	0	0	1.85E 06	2.33E 07	0	0	0	0	0	0	1.43E 09	1.80E 10	1.37E 05	1.73E 06	0	0	0	0	0	0
11TFX018	1.23E-06	1.55E-07	0	0	1.85E-06	2.33E-07	0	0	0	0	0	0	1.43E-09	1.80E-10	1.37E-05	1.73E-06	0	0	0	0	0	0
11TFX078	1.91E-07	2.41E-08	0	0	1.46E-06	1.83E-07	6.69E-09	8.42E-10	1.91E-09	2.41E-10	0	0	1.03E-10	1.30E-11	1.35E-05	1.70E-06	0	0	0	0	0	0
11TFX55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX064	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX070	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX067	9.49E 05	1.20E 05	0	0	3.25E 03	4.10E 04	0	0	0	0	0	0	6.55E 08	8.26E 09	0	0	0	0	0	0	0	0
11TFX053	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4TFX044	0	0	2.71E-15	3.42E-16	1.41E-08	1.78E-09	1.54E-10	1.94E-11	1.45E-07	1.82E-08	0	0	3.05E-13	3.84E-14	8.37E-05	1.05E-05	0	0	0	0	0	0
11TFX082	5.46E-03	6.89E-04	0	0	7.15E-03	9.00E-04	0	0	0	0	0	0	8.59E-06	1.08E-06	0.06	6.96E-03	0	0	0	0	0	0
16TFX006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11TFX083	8.56E-03	1.08E-03	0	0	0.05	5.91E-03	0	0	0	0	0	0	4.49E-06	5.66E-07	0	0	1.90E-03	2.39E-04	8.66E-04	1.09E-04	1.24E-04	1.56E-05
11PRC066	5.60E 05	7.05E 06	0	0	1.86E 03	2.35E 04	0	0	0	0	0	0	1.60E 08	2.01E 09	0.01	1.40E 03	0	0	0	0	0	0
SEP055A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4TFX22A	0	0	0	0	0	0	0	0	5.80E-08	7.30E-09	0	0	0	0	0	0	0	0	0	0	0	0
11TFX052	0	0	0	0	2.96E 08	3.73E 09	0	0	0	0	0	0	5.37E 12	6.77E 13	1.75E 05	2.21E 06	0	0	0	0	0	0
11TFX051	0	0	0	0	2.96E 08	3.73E 09	0	0	0	0	0	0	5.37E 12	6.77E 13	1.75E 05	2.21E 06	0	0	0	0	0	0
11TFX050	6.69E-09	8.42E-10	0	0	2.16E-08	2.72E-09	2.56E-10	3.23E-11	1.00E-10	1.26E-11	0	0	4.34E-12	5.46E-13	6.37E-06	8.02E-07	0	0	0	0	0	0
11TFX049	6.82E-05	8.59E-06	0	0	2.34E-03	2.94E-04	0	0	0	0	0	0	4.71E-08	5.93E-09	0	0	0	0	0	0	0	0
15TFX021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15TFX023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15TFX022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15TFX024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17TFX547	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17TFX548	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10TFX35B	3.75E 05	4.73E 06	0	0	4.41E 04	5.56E 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10TFX35C	3.75E 05	4.73E 06	0	0	4.41E 04	5.56E 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10TFX35D	3.75E-05	4.73E-06	0	0	4.41E-04	5.56E-05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04TFX504	0	0	0	0	7.57E-09	9.54E-10	3.34E-06	4.20E-07	2.00E-07	2.52E-08	0	0	7.41E-07	9.34E-08	3.72E-07	4.69E-08	0	0	0	0	0	0
4FUG1	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
4FUG2	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
4FUG3	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
4FUG4	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
4FUG5	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
TFW1	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
TFW2	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
TFE1	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
TFE2	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
TF2	0.04	5.16E-03	0.01	1.39E-03	0.09	0.01	0.03	3.66E-03	0.03	3.67E-03	0.01	1.38E-03	0.04	4.87E-03	0.04	5.40E-03	0.11	0.01	0.06	7.27E-03	0.02	3.06E-03
TFP1	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
TFP2	0.04	5.16E 03	0.01	1.39E 03	0.09	0.01	0.03	3.66E 03	0.03	3.67E 03	0.01	1.38E 03	0.04	4.87E 03	0.04	5.40E 03	0.11	0.01	0.06	7.27E 03	0.02	3.06E 03
4TFX034A	0	0	0	0	9.90E-06	1.25E-06	3.77E-09	4.75E-10	9.12E-04	1.15E-04	0	0	0	0	3.30E-03	4.16E-04	0	0	0	0	0	0
4TFX034B	0	0	0	0	9.90E-06	1.25E-06	3.77E-09	4.75E-10	9.12E-04	1.15E-04	0	0	0	0	3.30E-03	4.16E-04	0	0	0	0	0	0
4TFX030A	0	0	2.45E 09	3.09E 10	9.94E 06	1.25E 06	3.80E 09	4.79E 10	9.14E 04	1.15E 04	0	0	0	0	7.05E 06	8.88E 07	0	0	0	0	0	0
4TFX030B	0	0	2.42E 09	3.05E 10	9.90E 06	1.25E 06	3.77E 09	4.75E 10	9.12E 04	1.15E 04	0	0	0	0	3.30E 03	4.16E 04	0	0	0	0	0	0
4TXFX033	0	0	3.55E-07	4.47E-08	0	0	2.52E-07	3.17E-08	1.33E-03	1.67E-04	0	0	0	0	0	0	0	0	0	0	0	0
TFX004_8	0	0	5.41E-12	6.82E-13	1.61E-04	2.02E-05	1.19E-09	1.50E-10	1.52E-06	1.91E 07	0	0	5.14E 09	6.48E 10	1.21E 04	1.53E 05	0	0	0	0	0	0
TFX005_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TFX005_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11SMP081	5.11E 07	6.43E 08	0	0	3.01E 06	3.80E 07	0	0	0	0	0	0	4.99E 10	6.29E 11	2.99E 05	3.76E 06	0	0	0	0	0	0
4TFX23	0	0	0	0	0	0	0	0	1.17E 03	1.47E 04	0	0	0	0	0	0	0	0	0	0	0	0

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Table E-7. Point and Pseudo Point Source Parameters for the HMD Step 11 Analysis

Source ID	UTM E (m)	UTM N (m)	Modeled Emission Rate (lb/hr)	Modeled Emission Rate (g/s)	Stack Height (ft)	Stack Height (m)	Stack Temperature (F)	Stack Temperature (K)	Stack Velocity (ft/s)	Stack Velocity (m/s)	Stack Diameter (ft)	Stack Diameter (m)
4FLR32	699,934	3,173,707	3.52E-01	4.44E-02	130.315	39.72	--	1273	--	20	--	2.02
4LRC6F	700,285	3,173,812	1.36E-01	1.71E-02	12	3.66	--	0	--	0.001	--	0.001
4LRC6	700,258	3,173,790	1.36E-01	1.71E-02	30	9.14	--	0	--	0.001	--	0.001
04TFX22B	700,317	3,173,704	1.52E-04	1.92E-05	30	9.14	--	0	--	0.001	--	0.001
4LTR18	700,191	3,173,646	3.24E-01	4.08E-02	21.5	6.55	--	0	--	0.001	--	0.001
11BAG311	700,007	3,173,560	0.0	0.0	21	6.40	--	0	--	0.001	--	0.001
4LTR18F	700,126	3,173,661	8.42E-02	1.06E-02	12	3.66	--	0	--	0.001	--	0.001
04TFX020	700,155	3,173,625	1.70E-02	2.14E-03	23	7.01	--	0	--	0.001	--	0.001
04TFX021	700,169	3,173,611	1.16E-05	1.46E-06	23	7.01	--	0	--	0.001	--	0.001
04TFX025	700,250	3,173,711	9.18E-02	1.16E-02	23	7.01	--	0	--	0.001	--	0.001
04TFX026	700,238	3,173,726	3.40E-01	4.29E-02	23	7.01	--	0	--	0.001	--	0.001
04TFX027	700,185	3,173,800	9.30E-04	1.17E-04	23	7.01	--	0	--	0.001	--	0.001
04TFX028	700,212	3,173,825	9.78E-02	1.23E-02	23	7.01	--	0	--	0.001	--	0.001
04TFX029	700,204	3,173,822	5.87E-02	7.40E-03	23	7.01	--	0	--	0.001	--	0.001
04TFX031	700,237	3,173,843	5.17E-05	6.52E-06	23	7.01	--	0	--	0.001	--	0.001
11TFX036	700,042	3,173,551	0.0	0.0	25	7.62	--	0	--	0.001	--	0.001
11TFX019	700,076	3,173,528	0.0	0.0	32	9.76	--	0	--	0.001	--	0.001
11TFX018	700,091	3,173,540	0.0	0.0	32	9.76	--	0	--	0.001	--	0.001
11TFX078	700,218	3,173,575	3.30E-06	4.15E-07	32.7	9.97	--	0	--	0.001	--	0.001
04TFX023	700,215	3,173,709	0.0	0.0	20	6.10	--	0	--	0.001	--	0.001
11TFX55	700,048	3,173,600	0.0	0.0	14	4.27	--	0	--	0.001	--	0.001
11TFX064	700,038	3,173,570	0.0	0.0	9	2.74	--	0	--	0.001	--	0.001
11TFX048	700,028	3,173,576	0.0	0.0	25	7.62	--	0	--	0.001	--	0.001
11TFX070	700,022	3,173,534	0.0	0.0	4.0	1.22	--	0	--	0.001	--	0.001
1TFX067	700,110	3,173,441	0.0	0.0	41	12.43	--	0	--	0.001	--	0.001
11TFX053	700,072	3,173,453	0.0	0.0	32	9.75	--	0	--	0.001	--	0.001
04TFX044	700,280	3,173,719	5.41E-05	6.81E-06	24.0	7.32	--	0	--	0.001	--	0.001
11TFX082	700,191	3,173,548	0.0	0.0	29.5	8.99	--	0	--	0.001	--	0.001
16TFX006	699,893	3,173,843	0.0	0.0	18.9	5.76	--	0	--	0.001	--	0.001
11TFX083	700,098	3,173,451	0.0	0.0	9	2.76	--	0	--	0.001	--	0.001
11PRC066	700,105	3,173,447	0.0	0.0	6	1.83	--	0	--	0.001	--	0.001
SEP055A	700,019	3,173,572	0.0	0.0	6	1.83	--	0	--	0.001	--	0.001
TFX022A	700,332	3,173,719	6.19E-05	7.80E-06	30	9.14	--	0	--	0.001	--	0.001

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Table E-7. Point and Pseudo Point Source Parameters for the HMD Step 11 Analysis

Source ID	UTM E (m)	UTM N (m)	Modeled Emission Rate (lb/hr)	Modeled Emission Rate (g/s)	Stack Height (ft)	Stack Height (m)	Stack Temperature (F)	Stack Temperature (K)	Stack Velocity (ft/s)	Stack Velocity (m/s)	Stack Diameter (ft)	Stack Diameter (m)
11TFX052	700,081	3,173,454	0.0	0.0	32	9.75	--	0	--	0.001	--	0.001
11TFX051	700,086	3,173,458	0.0	0.0	18	5.49	--	0	--	0.001	--	0.001
11TFX050	700,093	3,173,463	5.08E-08	6.40E-09	32	9.75	--	0	--	0.001	--	0.001
11TFX049	700,098	3,173,468	0.0	0.0	32	9.75	--	0	--	0.001	--	0.001
15TFX021	699,792	3,173,492	0.0	0.0	18	5.49	--	0	--	0.001	--	0.001
15TFX023	699,808	3,173,488	0.0	0.0	28	8.53	--	0	--	0.001	--	0.001
15TFX022	699,765	3,173,564	0.0	0.0	110	33.53	--	0	--	0.001	--	0.001
15TFX024	699,709	3,173,500	0.0	0.0	37	11.28	--	0	--	0.001	--	0.001
17TFX547	699,892	3,173,877	0.0	0.0	30	9.14	--	0	--	0.001	--	0.001
17TFX548	699,882	3,173,868	0.0	0.0	30	9.14	--	0	--	0.001	--	0.001
10TFX35B	700,076	3,173,528	0.0	0.0	32	9.76	--	0	--	0.001	--	0.001
10TFX35C	700,091	3,173,540	0.0	0.0	32.0	9.76	--	0	--	0.001	--	0.001
10TFX35D	700,218	3,173,575	0.0	0.0	32.7	9.97	--	0	--	0.001	--	0.001
04TFX504	700,199	3,173,856	2.72E-06	3.42E-07	3.0	0.91	--	0	--	0.001	--	0.001
04TFX506	700,151	3,173,830	2.36E-03	2.98E-04	6.0	1.83	--	0	--	0.001	--	0.001
04TFX508	700,145	3,173,837	3.28E-05	4.14E-06	9.0	2.74	--	0	--	0.001	--	0.001
4TVS23	700,215	3,173,709	2.15E-01	2.71E-02	23.0	7.01	--	0	--	0.001	--	0.001
4VNT13	700,126	3,173,852	1.30E-02	1.64E-03	50.0	15.24	122	323.15	67.5	20.57	0.2	0.06
4VNT07	700,202	3,173,866	5.72E-05	7.21E-06	56.0	17.07	212	373.15	8.0	2.44	1.6	0.49
4VNT09	700,162	3,173,825	2.06E-03	2.60E-04	45.0	13.72	104	313.15	4.4	1.34	0.2	0.05
4LBA06A	699,084	3,172,221	5.98E-02	7.53E-03	22.0	6.71	--	0	--	0.001	--	0.001
4LBA06F	699,059	3,172,198	5.98E-02	7.53E-03	12.0	3.66	--	0	--	0.001	--	0.001
4LDR22D	700,283	3,173,750	2.73E-06	3.44E-07	12.0	3.66	--	0	--	0.001	--	0.001
4LDR25B	700,290	3,173,728	9.88E-03	1.24E-03	12.0	3.66	--	0	--	0.001	--	0.001
4LDR20B	700,203	3,173,658	3.50E-06	4.41E-07	12.0	3.66	--	0	--	0.001	--	0.001
4LDR28B	700,193	3,173,736	1.77E-02	2.23E-03	12.0	3.66	--	0	--	0.001	--	0.001
4LDR33D	700,149	3,173,809	2.88E-03	3.63E-04	12.0	3.66	--	0	--	0.001	--	0.001
4SEP001	700,168	3,173,823	1.80E-04	2.27E-05	8	2.44	--	0	--	0.001	--	0.001

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Table E-8. Volume Source Parameters for the HMD Step 11 Analysis

Source ID	UTM E (m)	UTM N (m)	Modeled Emission Rate (lb/hr)	Modeled Emission Rate (g/s)	Release Height (ft)	Release Height (m)	Intial Lateral Dimension (m)	Initial Vertical Dimension (m)
4FUG1	700,126	3,173,850	3.40E-01	4.28E-02	26.51	8.08	6.73	6.66
4FUG2	700,135	3,173,839	3.40E-01	4.28E-02	26.51	8.08	6.73	6.66
4FUG3	700,145	3,173,828	3.40E-01	4.28E-02	26.51	8.08	6.73	6.66
4FUG4	700,154	3,173,817	3.40E-01	4.28E-02	26.51	8.08	6.73	6.66
4FUG5	700,207	3,173,883	3.40E-01	4.28E-02	41.60	12.68	8.77	10.94
4TFX034A	700,257	3,173,666	1.74E+00	2.20E-01	16.01	4.88	5.81	4.54
4TFX034B	700,274	3,173,679	1.74E+00	2.20E-01	16.01	4.88	5.81	4.54
4TFX030A	700,220	3,173,832	1.25E-01	1.57E-02	10.01	3.05	1.74	2.84
4TFX030B	700,226	3,173,836	1.22E-01	1.54E-02	10.01	3.05	1.74	2.84
4TXFX033	700,176	3,173,792	1.05E-01	1.32E-02	10.01	3.05	2.79	2.84
TFX004_8	699,886	3,173,773	4.25E-05	5.36E-06	6.50	1.98	3.31	1.84
TFX005_1	699,915	3,173,835	0.0	0.0	26.87	8.19	7.71	7.61
TFX005_2	699,931	3,173,848	0.0	0.0	16.00	8.19	7.71	7.61
11SMP081	700,008	3,173,554	0.0	0.0	16.00	3.00	6.98	1.4
4TFX023A	700,222	3,173,710	3.40E-01	4.29E-02	10.00	3.05	5.33	2.84
TFW1	700,170	3,173,790	3.40E-01	4.28E-02	10.00	3.51	6.88	2.41
TFW2	700,184	3,173,801	3.40E-01	4.28E-02	10.00	3.51	6.88	2.41
TFE1	700,213	3,173,823	3.40E-01	4.28E-02	11.52	3.51	6.09	2.41
TFE2	700,224	3,173,832	3.40E-01	4.28E-02	11.52	3.51	6.09	2.41
TF2	700,232	3,173,710	3.40E-01	4.28E-02	11.52	3.51	7.09	2.41
COLOPN1	700,126	3,173,850	2.70E-02	3.40E-03	26.51	8.08	6.73	6.66
COLOPN2	700,135	3,173,839	2.70E-02	3.40E-03	26.51	8.08	6.73	6.66
COLOPN3	700,145	3,173,828	2.70E-02	3.40E-03	26.51	8.08	6.73	6.66
COLOPN4	700,154	3,173,817	2.70E-02	3.40E-03	26.51	8.08	6.73	6.66
COLOPN5	700,207	3,173,883	2.70E-02	3.40E-03	41.60	12.68	8.77	10.94
TFP1	700,266	3,173,733	3.40E-01	4.28E-02	13.48	4.11	7.09	1.49
COLDRN1	700,126	3,173,850	1.74E-01	2.19E-02	26.51	8.08	6.73	6.66
COLDRN2	700,135	3,173,839	1.74E-01	2.19E-02	26.51	8.08	6.73	6.66
COLDRN3	700,145	3,173,828	1.74E-01	2.19E-02	26.51	8.08	6.73	6.66
COLDRN4	700,154	3,173,817	1.74E-01	2.19E-02	26.51	8.08	6.73	6.66
COLDRN5	700,207	3,173,883	1.74E-01	2.19E-02	41.60	12.68	8.77	10.94
TFP2	700,292	3,173,696	3.40E-01	4.28E-02	13.48	4.11	7.09	1.49

Table E-9. Polygon Area Source Parameters for the HMD Step 11 Analysis

Source ID	UTM E (m)	UTM N (m)	Modeled Emission Rate		Release Height		Initial Vertical Dimension (m)
			($lb/hr\text{-}ft^2$)	($g/s\text{-}m^2$)	(ft)	(m)	
CWA	701035	3173143	3.13E-10	4.25E-10	2.99	0.91	0.47

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Table E-10. HMD Model Scenarios for the Step 11 Analysis

Scenario	COLOPEN	COLDRN	4TFX34A	4TFX34B
Description	Sitewide HMD inventory plus column opening MSS acitivities	Sitewide HMD inventory plus column draining MSS acitivities	Sitewide HMD inventory plus opening of tank 04TFX-034A	Sitewide HMD inventory plus opening of tank 04TFX-034B
EPN Modeled (Yes/No)				
4FLR32	Yes	Yes	Yes	Yes
4LRC6F	Yes	Yes	Yes	Yes
4LRC6	Yes	Yes	Yes	Yes
04TFX22B	Yes	Yes	Yes	Yes
4LTR18	Yes	Yes	Yes	Yes
11BAG311	Yes	Yes	Yes	Yes
4LTR18F	Yes	Yes	Yes	Yes
04TFX020	Yes	Yes	Yes	Yes
04TFX021	Yes	Yes	Yes	Yes
04TFX025	Yes	Yes	Yes	Yes
04TFX026	Yes	Yes	Yes	Yes
04TFX027	Yes	Yes	Yes	Yes
04TFX028	Yes	Yes	Yes	Yes
04TFX029	Yes	Yes	Yes	Yes
04TFX031	Yes	Yes	Yes	Yes
11TFX036	Yes	Yes	Yes	Yes
11TFX019	Yes	Yes	Yes	Yes
11TFX018	Yes	Yes	Yes	Yes
11TFX078	Yes	Yes	Yes	Yes
04TFX023	Yes	Yes	Yes	Yes
11TFX55	Yes	Yes	Yes	Yes
11TFX064	Yes	Yes	Yes	Yes
11TFX048	Yes	Yes	Yes	Yes
11TFX070	Yes	Yes	Yes	Yes
1TFX067	Yes	Yes	Yes	Yes
11TFX053	Yes	Yes	Yes	Yes
04TFX044	Yes	Yes	Yes	Yes
11TFX082	Yes	Yes	Yes	Yes

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Table E-10. HMD Model Scenarios for the Step 11 Analysis

Scenario	COLOPEN	COLDRN	4TFX34A	4TFX34B
Description	Sitewide HMD inventory plus column opening MSS acitivities	Sitewide HMD inventory plus column draining MSS acitivities	Sitewide HMD inventory plus opening of tank 04TFX-034A	Sitewide HMD inventory plus opening of tank 04TFX-034B
16TFX006	Yes	Yes	Yes	Yes
11TFX083	Yes	Yes	Yes	Yes
11PRC066	Yes	Yes	Yes	Yes
SEP055A	Yes	Yes	Yes	Yes
TFX022A	Yes	Yes	Yes	Yes
11TFX052	Yes	Yes	Yes	Yes
11TFX051	Yes	Yes	Yes	Yes
11TFX050	Yes	Yes	Yes	Yes
11TFX049	Yes	Yes	Yes	Yes
15TFX021	Yes	Yes	Yes	Yes
15TFX023	Yes	Yes	Yes	Yes
15TFX022	Yes	Yes	Yes	Yes
15TFX024	Yes	Yes	Yes	Yes
17TFX547	Yes	Yes	Yes	Yes
17TFX548	Yes	Yes	Yes	Yes
10TFX35B	Yes	Yes	Yes	Yes
10TFX35C	Yes	Yes	Yes	Yes
10TFX35D	Yes	Yes	Yes	Yes
04TFX504	Yes	Yes	Yes	Yes
04TFX506	Yes	Yes	Yes	Yes
04TFX508	Yes	Yes	Yes	Yes
4TVS23	Yes	Yes	Yes	Yes
4VNT13	Yes	Yes	Yes	Yes
4VNT07	Yes	Yes	Yes	Yes
4VNT09	Yes	Yes	Yes	Yes
4LBA06A	Yes	Yes	Yes	Yes
4LBA06F	Yes	Yes	Yes	Yes
4LDR22D	Yes	Yes	Yes	Yes
4LDR25B	Yes	Yes	Yes	Yes
4LDR20B	Yes	Yes	Yes	Yes

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Table E-10. HMD Model Scenarios for the Step 11 Analysis

Scenario	COLOPEN	COLDRN	4TFX34A	4TFX34B
Description	Sitewide HMD inventory plus column opening MSS acitivities	Sitewide HMD inventory plus column draining MSS acitivities	Sitewide HMD inventory plus opening of tank 04TFX-034A	Sitewide HMD inventory plus opening of tank 04TFX-034B
4LDR28B	Yes	Yes	Yes	Yes
4LDR33D	Yes	Yes	Yes	Yes
4SEP001	Yes	Yes	Yes	Yes
4FUG1	Yes	Yes	Yes	Yes
4FUG2	Yes	Yes	Yes	Yes
4FUG3	Yes	Yes	Yes	Yes
4FUG4	Yes	Yes	Yes	Yes
4FUG5	Yes	Yes	Yes	Yes
4TFX034A	No	No	Yes	No
4TFX034B	No	No	No	Yes
4TFX030A	Yes	Yes	Yes	Yes
4TFX030B	Yes	Yes	Yes	Yes
4TXFX033	Yes	Yes	Yes	Yes
TFX004_8	Yes	Yes	Yes	Yes
TFX005_1	Yes	Yes	Yes	Yes
TFX005_2	Yes	Yes	Yes	Yes
11SMP081	Yes	Yes	Yes	Yes
4TFX023A	Yes	Yes	Yes	Yes
TFW1	Yes	Yes	Yes	Yes
TFW2	Yes	Yes	Yes	Yes
TFE1	Yes	Yes	Yes	Yes
TFE2	Yes	Yes	Yes	Yes
TF2	Yes	Yes	Yes	Yes
COLOPN1	Yes	No	No	No
COLOPN2	Yes	No	No	No
COLOPN3	Yes	No	No	No
COLOPN4	Yes	No	No	No
COLOPN5	Yes	No	No	No
TFP1	Yes	Yes	Yes	Yes
COLDRN1	No	Yes	No	No

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Table E-10. HMD Model Scenarios for the Step 11 Analysis

Scenario	COLOPEN	COLDRN	4TFX34A	4TFX34B
Description	Sitewide HMD inventory plus column opening MSS acitivities	Sitewide HMD inventory plus column draining MSS acitivities	Sitewide HMD inventory plus opening of tank 04TFX-034A	Sitewide HMD inventory plus opening of tank 04TFX-034B
COLDRN2	No	Yes	No	No
COLDRN3	No	Yes	No	No
COLDRN4	No	Yes	No	No
COLDRN5	No	Yes	No	No
TFP2	Yes	Yes	Yes	Yes
CWA	Yes	Yes	Yes	Yes

APPENDIX F: ELECTRONIC FILES

The CD included with this appendix contains all input and output data files used to generate the results from the air quality analyses presented in Section 5. The following section provides a description of the contents of each folder included on the attached CD.

AERMAP

- Contains the TIF format NED data file and the AERMAP input and output files for the emission sources and receptor grids.

AERSURFACE

- Contains the NLCD92 data and AERSURFACE input (.inp) and output (.out) files for the Victoria Plant based on average moisture conditions.

BPIP

- Contains the input, output, and summary files from the building downwash analysis. This analysis includes all modeled sources and buildings at the Victoria Plant.

BOUNDARY

- Contains the boundary file specifying the coordinates of the boundary receptors (.bln)

Criteria Pollutant

- CO - Includes a zip file containing the AERMOD input (.inp), output (.out), and plot (.plt) files for CO SIL modeling.
- PM_{10}/ $PM_{2.5}$ - Includes a zip file containing the AERMOD input (.inp), output (.out), and plot (.plt) files for CO SIL modeling.
- SO_2 - Includes a zip file containing the AERMOD input (.inp), output (.out), and plot (.plt) files for CO SIL modeling.

ESL

- HMD – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the HMD Step 11 modeling.
- 2MP – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the 2MP Step 5 modeling.
- 3MH – includes a zip file containing the AERMOD input (.inp), output (.out) plot (.plt) files, and post-processing spreadsheet for the 3MH Step 5 modeling.
- 3MP – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the 3MP Step 5 modeling.
- 34PN – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the 34PN Step 5 modeling.
- BHMT – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the BHMT Step 5 modeling.
- BZ – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the HMD Step5 modeling.
- DCH – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post-processing spreadsheet for the DCH Step 5 modeling.
- HCl – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the HCl Step 5 modeling.

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- MGN – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the MGN Step 5 modeling.
- NH_3 – includes a zip file containing the AERMOD input (.inp), output (.out), plot (.plt) files, and post processing spreadsheet for the NH_3 Step 5 modeling.

MET

Contains the TCEQ preprocessed surface (.sfc) and upper air (.pfl) meteorological data files used in this analysis.

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December 17, 2015

Subject: Invista S.A R.L. Air Quality Analyses

The ADMT received two Air Quality Analyses (AQA) for the Invista S.A R.L. project located at the Victoria Plant in Victoria, Victoria County, Texas, dated November 2015 (Prevention of Significant Deterioration [PSD] Air Quality Analysis and State New Sources Review [NSR] Air Quality Analysis). I have reviewed the analyses as protocols and my comments are provided below.

PSD Air Quality Analysis

1. Executive Summary – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or PSD Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

The AQA notes that in consideration of the single property designation among Invista, DuPont, and Equistar, a combined single property line was used in the modeling. This is appropriate for minor NSR analyses; however, single property line agreements do not apply to PSD modeling, and ambient air starts at the applicant's fence line or other physical barrier to public access (refer to section 4.7 below, Receptor Grids, for more information).

2. Project Analysis – Provide a plot plan with the revised AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

2.1 Pollutants to be Evaluated – The AQA notes that the Victoria Plant, located in Victoria County, is within Air Quality Control Region (AQCR) 214, as described in 40 CFR §81.38. The portion of this AQCR that contains Victoria County has been designated by the United States Environmental Protection Agency (U.S. EPA) as "in severe nonattainment" for both ozone standards and as "unclassifiable" or "in attainment" for the CO, NO_2, PM_{10}, and $PM_{2.5}$ NAAQS. Please note that Victoria County is now unclassifiable/attainment for the ozone standard.

In addition, the AQA did not provide information on the proposed project emissions of VOCs and NO_x to determine if an ozone analysis is required. However, based on a

meeting with the applicant, the project emissions are greater than 100 tons per year of NO_x; therefore, an ozone impact analysis is required.

When evaluating the project emissions as part of the ozone analysis, first determine if the project area is considered VOC- or NO_x-limited. If the local atmosphere's ozone formation is NO_x-limited, the ADMT recommends that the project NO_x emissions be evaluated following a screening approach recommended by the EPA on previous projects (see attachment). Full documentation of the ozone analyses must be submitted with the revised AQA.

Also, please note that the new ozone standard of 70 parts per billion (ppb) will be in effect on December 28, 2015.

2.2 General Modeling Approach – The AQA did not discuss the pre-application analysis for NO_2. One way to address this requirement is to compare the maximum predicted concentration obtained from the preliminary impact determination modeling to the significant monitoring concentration (SMC) for annual NO_2. If the maximum concentration is less than the SMC, the demonstration is complete. If the maximum concentration equals or exceeds the SMC, provide an analysis of the ambient air quality in the area that the project emissions would affect for NO_2. Please update the AQA to address the pre-application analysis for NO_2.

2.2.2 Full Impacts Analysis – The AQA notes that the proposed project is not

significant (i.e., the off - property impacts of the project NO_2 emissions for the 1 - hr and

annual averaging periods are less than their corresponding significant impact levels [SILs]); therefore, no further discussion of elements or methodologies of the air quality analysis related to the Full Impacts Analysis is presented in the report. If additional modeling is needed and the model predictions are greater than or equal to the applicable SILs, then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that include a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Be sure to provide the justification for the selected monitor and include the monitoring concentrations that would be used. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions.

4.7 Receptor Grids – The AQA notes that the "property line grid" (corresponding to the single property designation) is a discrete receptor grid with the receptors spaced at 25 m intervals along the combined Invista/DuPont/Equistar property line. As noted above, single property line agreements do not apply to PSD modeling, and ambient air starts at the applicant's fence line or other physical barrier to public access. It is unclear from the information provided with the AQA whether the single property line and the

fence line are the same. In addition, receptors were not placed over DuPont/Equistar properties, and a discussion on the exclusion of receptors over these areas was not provided with the AQA. Excluding receptors over DuPont/Equistar properties may be appropriate if Invista adequately controls public access to these properties. More details on the fence line/property line relationship as well as the appropriate justification for excluding receptors over the properties in question will need to be provided in the revised AQA.

4.8 Modeled Source Types and Stack Parameters – Provide a copy of the Table 1(a) that was submitted with the permit application with the revised AQA.

Be sure to provide flare effective stack diameter calculations with the revised AQA.

4.9 Air Quality Monitoring Data – The AQA discusses air quality monitoring data without providing the reason for using ambient air monitoring data. Refer to comments in sections 2.2 and 2.2.2 above for when ambient air monitoring data may be used and how the selected monitor should be justified.

Table 4-1 of the AQA summarizes EPA 2011 National Emissions Inventory (NEI) data to support the appropriateness of the selected NO_2 monitor. This deviates from guidance, which recommends identifying emission sources located within ten kilometers (km) of the project site/monitor for comparisons. Please note that the TCEQ 2013 point source emissions inventory data are available and can be used to evaluate emissions that are near the project site/monitor. The data are located at the following web page:

http://www.tceq.texas.gov/airquality/point-source-ei/psei.html

Also, Table 4-2 of the AQA includes background concentrations and the conversion of the background concentrations from ppb to microgram per cubic meter ($\mu g/m^3$) were not appropriate.

4.10 Determination of Emission Rates – The AQA notes that in development of various source emission rates at the Victoria Plant, the following methodology was used:

for the 1 - hr averaging period, only modified sources were modeled; for the annual

averaging period, modified sources and affected upstream/downstream source emissions were modeled. Be sure to verify project sources that will be included in the modeling demonstration, as well as the emission rates to model with the permit reviewer prior.

6.0 Electronic Files – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

State NSR Air Quality Analysis

2. Project Analysis – Provide a plot plan with the revised AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

2.1.1 Significant Analysis – The AQA notes that the results of the modeling analysis demonstrate that impacts from the Victoria Plant are below the SIL for PM_{10} (24-hr averaging period), $PM_{2.5}$ (24-hr and annual averaging periods), CO (1-hr and 8-hr averaging periods), and SO_2 (1-hr, 3-hr, 24-hr, and annual averaging periods). Therefore, a NAAQS analysis is not required for any of these criteria pollutants. If additional modeling is needed and the model predictions are greater than or equal to the applicable SILs, then a revised protocol will need to be submitted that includes a discussion on how off-property sources will be evaluated, as well as the monitor selected for the background concentration. Refer to the comment in section 4.1.1.2 below for how the selected monitor should be justified.

2.1.1.1 $PM_{2.5}$ SILS – The summary of the analysis for justifying the $PM_{2.5}$ De Minimis levels in the AQA should be in consistent with EPA guidance for $PM_{2.5}$. The EPA guidance states that if background monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the EPA's $PM_{2.5}$ De Minimis level, then a proposed source with a $PM_{2.5}$ impact below the $PM_{2.5}$ De Minimis level would not cause or contribute to a violation of the $PM_{2.5}$ NAAQS.

2.3 State Health Effects Evaluation – The AQA notes that ESLs for each constituent were obtained from the TCEQ Toxicology Division March 2014 ESL List, which was effective at the time of the application submittal. Be sure to use the most recent ESL list from the Toxicology Division (September 2015). If a contaminant is not on the ESL list, be sure to provide verification from the Toxicology Division for the ESL used.

2.3.3 Step 11 – Site-wide Modeling – The AQA indicates that a single property line designation (SPLD) exists between Invista, DuPont, and Equistar. The single property line boundary should be used as the basis for receptor placement as well as identifying "site-wide" sources for minor NSR analyses. It is unclear from documentation with the AQA if the other tenants of the SPLD have emissions of the pollutant that went to site-wide modeling. Please address this in the revised AQA.

3.8 Modeled Source Types and Stack Parameters – Provide a copy of the Table 1(a) that was submitted with the permit application with the revised AQA.

---

[3] www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

Be sure to provide flare effective stack diameter calculations with the AQA.

3.9 Determination of Emission Rates – Be sure to verify project sources that will be included in the modeling demonstration, as well as the emission rates to model with the permit reviewer.

4.1.1.1 Monitor 48-355-0034 (Dona Park CAMS 0635) – The AQA notes that $PM_{2.5}$ monitoring at the CAMS 0635 started in June 2013, and therefore, the monitor does not have three years of monitoring data and data from this monitor cannot be used for determining background concentration. It should be noted that the monitor has more than three years of monitoring data and these monitoring data can be obtained from the link below:

http://www3.epa.gov/airdata/ad_maps.html

4.1.1.2 Monitor 48-149-0001 (Fayette County CAMS 0601) – The AQA notes that Invista used the population and county emissions inventory to determine the appropriateness of the monitor (data are listed in Table 4-1). Note that Table 4-1 includes NO_2 county emissions data instead of $PM_{2.5}$ county emissions data. Be sure to provide the appropriate county emissions data.

In addition, Table 4-1 summarizes EPA 2011 National Emissions Inventory (NEI) data to support the appropriateness of the selected monitor. This deviates from guidance, which recommends identifying emission sources located within ten km of the project site/monitor for comparisons. Please note that the TCEQ 2013 point source emissions inventory data are available and can be used to evaluate emissions that are near the project site/monitor. The data are located at the following web page:

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5.2.3 Tier III Analysis – The AQA notes that the magnitudes of exceedance for the GLCmax for all modeled scenarios is less than 4x the short-term ESL, thereby meeting the TCEQ criteria of no more than 25x the ESL, no more than 24 exceedances of 10x the ESL and no more than 10 exceedances of 20x the ESL for VOC over industrial water. Based on the Toxicology Division's general guidance, for industrial areas, the frequency of exceedance for predicted concentrations greater than 2xESL must be no more than 24 hours. Please provide the frequency of exceedance for predicted concentrations greater than 2xESL at GLCmax as the Toxicology Division may request this information.

The AQA also notes that the adjusted frequencies of exceedance meet the TCEQ criteria of no more than 24 exceedances of 1x their corresponding short-term ESLs. Therefore, the Tier III demonstration is complete for Hexamethylene Diamine (HMD). The predicted hours of exceedance may be adjusted to the operating hours of the source or sources causing the ESL exceedances, provided there are data to support the refinements. Provide technical justification for the refinements made to the predicted frequencies of exceedance. Specifically, if the predicted hours of exceedance will be adjusted to the operating hours of particular source or sources, provide technical

justification that the particular source or sources is causing/contributing to the ESL exceedances.

If you have any questions, please contact Ahmed Omar at (512) 239-1285, by fax at (512) 239-1400, or by email at Ahmed.Omar@tceq.texas.gov.

To: Snyder, Erik[snyder.erik@epa.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Ron Thomas[Ron.Thomas@tceq.texas.gov]; Daniel Menendez[daniel.menendez@tceq.texas.gov]; Stephen Davis[stephen.davis@tceq.texas.gov]
From: Zarena Post
Sent: Thur 12/17/2015 9:44:26 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi, Erik and Ashley,

We in SIP modeling can make January 20 and 21 work for a modeling workshop and would probably bring a couple or several folks.

We'll let Air Permits officially chime in separately with their availability.

Thanks!

Zarena

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, December 16, 2015 2:28 PM
To: Daniel Menendez <daniel.menendez@tceq.texas.gov>; Daniel Jamieson <daniel.jamieson@tceq.texas.gov>; Ron Thomas <Ron.Thomas@tceq.texas.gov>; Zarena Post <zarena.post@tceq.texas.gov>; Jeff Stonesifer <jstonesifer@cabq.gov>; Sufi Mustafa <Sufi.Mustafa@state.nm.us>; Eric Peters <eric.peters@state.nm.us>; Gi-Dong <gi-dong.kim@state.nm.us>; Eric Milligan <Eric.Milligan@deq.ok.gov>; Lee Warden <lee.warden@DEQ.OK.gov>; Thomas Rheaume <rheaume@adeq.state.ar.us>; vennetta.hayes@la.gov; Nguyen, Tien <Nguyen.Tien@epa.gov>; Yvette Olmos <Yvette.Olmos@LA.GOV>; Smith, Jim <Smith.Jim@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>; Mark McCorkle (MAC@adeq.state.ar.us) <MAC@adeq.state.ar.us>
Cc: Mohr, Ashley <Mohr.Ashley@epa.gov>; Feldman, Michael <Feldman.Michael@epa.gov>
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

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Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Tuesday, September 22, 2015 10:31 AM
To: Snyder, Erik
Cc: Ron Thomas
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi Erik,

Any updates on potential Region 6 modeling meeting?

Thanks,

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Please let me know your interest and availability (if this week works and if M-T, T-W or W-R is best). Also any ideas for specific topics/issues.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Huser, Jennifer
Location: R6-ConfRm-PineTree-06O15
Importance: Normal
Subject: Monthly Louisiana SIP Planning Coordination Call
Start Date/Time: Thur 12/17/2015 4:00:00 PM
End Date/Time: Thur 12/17/2015 5:00:00 PM

Good morning everyone!

We are changing the date of the December call to 12/17, since our regularly scheduled time would have us meeting on the 24th, and I'm assuming very few folks will be around.

Thanks and Happy Thanksgiving!

Call in number:
866-299-3188
Code:
Ex. 6 - Personal Privacy

Louisiana - EPA SIP Planning Monthly Call
December 17, 2015, 10:00 - 11:00 a.m.
Conference Number: 866-299-3188, Access Code Ex. 6 - Personal Privacy

Introductions

Current Actions: Status Update - EPA & LDEQ

- **Clean Power Plan** - *LDEQ: Bryan Johnston; EPA: Kathleen Aisling*
  - ON HOLD UNTIL JANUARY

- **Chapter 15 Withdrawal for portions of AQ271 and MM002** - *LDEQ: Tricia Kelihan; EPA: Alan Shar*
  - EPA published Notice of Proposed Rulemaking on 11/5/15 (80 FR 68481)
  - EPA expects the Final General Rules revisions to be signed by RA late December 2015

- **Sewage Sludge Incinerators** - *LDEQ: Sonya Eastern; EPA: ~~Ken Boyce~~ Randy Pitre*
  - Update to delegation request draft and routed. October 2015 LA Register Notice.
  - Comment period closed 11/24; hearing on 11/24

- **SSM EPA National SIP call** - *LDEQ: Bryan Johnston; EPA: Alan Shar*
  - LDEQ is discussing path forward - possibly through rule and permit revisions.
  - GD voiced concern over affecting 110(l).
  - Bryan was working on drafting; stakeholder meeting for flares (opacity)
  - Working to mirror federal VOC regs (MACT, NSPS)

- **2010 SO_2 NAAQS**
  - **Sierra Club and Natural Resources Defense Council Suit**

- Sierra Club submitted 26 modeling efforts - CLECO in LA
- **SO_2 Data Requirements Rule** - EPA: *Dayana Medina*
  - Does not affect CLECO
  - Working on list and MvsM decision to EPA for January and July 2016
- **SO_2 SIP** - *EPA: Dayana Medina*, *Erik Snyder*
  - **Phase I**: St. Bernard Parish - LDEQ: *Vivian Aucoin* and *Vennetta Hayes*
    - EPA submitted comments; LDEQ is addressing comments
      - Modeling grid EPA: *Tyler Fox*
      - Ambient air EPA: *James Thurman*
  - **Phase II**: Calcasieu Parish (NISCO and Nelson) & De Soto Parish (CLECO) - *LDEQ: Amanda Polito*
    - Recommendations submitted by LDEQ
  - **Modeling**
    - LOWWIND3 option
    - Vennetta to share draft RTC as soon as possible for the modeling portion

- **2012 PM 2.5**
  - **i-SIP** - *EPA: Carl Young*; *LDEQ: Vivian Aucoin & Amanda Polito*
  - **Chapter 2 Fees** *EPA: Tracie Donaldson*
    - LDEQ will public notice this SIP submittal 12/20
  - **Transport SIP** - due on December 14, 2015
    - Emailed copy on 12/11/15
    - Have not seen hard copy yet

- **Ozone**
  - **Does LDEQ have any input regarding the appropriate deadline for EPA action on the interstate transport portion of the 2008 ozone infrastructure SIP submittal?**
    - EPA is negotiating a consent decree date
    - The lawsuit is because we did not act on the submittal by our statutory date
    - The lawsuit covers all four interstate transport elements of CAA 110(a)(2)(D)(i)
  - **2008 NAAQS BRNA Redesignation Request** - *EPA: Carl Young; LDEQ Amanda Polito*
    - 9/22 call:
      - Provide draft response to EPA
      - LDEQ wants to project emissions from 2011 to only 2027
    - Moves2010 timeline - *EPA: Jeff Riley; LDEQ: Vivian Aucoin*
    - MVEB clarification
    - December 2015
  - **2015 Ozone NAAQS**
  - **NOI on 2008 Ozone NAAQS Transport SIP (part of infrastructure submittal)**
  - **2008 Ozone Transport NODA published August 4, 2015**
  - **CSAPR Update Rule**
    http://www2.epa.gov/airmarkets/proposed-cross-state-air-pollution-update-rule

- **Regional Haze:** *LDEQ: Vivian Aucoin/Vennetta Hayes; EPA: Jennifer Huser/Erik Snyder/Colin Schwartz*
    - D.C. Circuit Decision on CSAPR and potential impacts to Louisiana Regional Haze
    - Sierra Club complaint
    - **Non-EGU BART:**
        - A potpourri notice is scheduled to be published on December 20, 2015; the comment period will end at the close of business on January 27, 2016.
        - EPA reviewed the draft SIP revision and Mosaic AOCs
        - Minor comments have been provided to LDEQ regarding the SIP narrative and the Mosaic AOC
    - **EGU BART**
        - BART analyses for all 13 sources have been received
        - Timeline issues
        - Vennetta to check to see if LDEQ received the CAMx modeling files from Entergy
    - **Regional Haze 5-year Report**
        - After non EGU is final

- **2011-2013 Volatile Organic Compound Rules Revision**
    - proposed 5/20/14; LDEQ working on response to EPA comment letter

Other Items/News

- RVP standard requests - LDEQ Amanda Polito

Action Items

Next Call: Thursday January 28, 2015 @ 10-11 am

Invited Participants

EPA:
Guy Donaldson
Mark Hansen
Mary Stanton
Jennifer Huser
Carrie Thomas
Carrie Paige
Carl Young
Alan Shar
Sherry Fuerst
Tracie Donaldson
Nevine Salem
John Walser

Dayana Medina
Erik Snyder
Michael Feldman
Lucinda Watson
Wendy Jacques
Josh Olszewski
Kathleen Aisling
Jim Grady
Robert Todd
Ken Boyce
Randy Pitre
Ashley Mohr

LDEQ:
Cheryl Nolan
Vivian Aucoin
Vennetta Hayes
Sonya Eastern
Gilberto Cuadra
Sandra Hilton
Amanda Polito
John Babin
Maureen Fleming
Tricia Kelihan
Kelly Phillips
Kelly Peterson
Bryan Johnston

To: Snyder, Erik[snyder.erik@epa.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]
From: Milligan, Eric
Sent: Thur 12/17/2015 2:22:58 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

It looks like we are available for these dates.

Please include Joseph Wills on future communications.

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, December 16, 2015 2:28 PM
To: Daniel Menendez; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us); Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Milligan, Eric; Warden, Lee; Thomas Rheaume; vennetta.hayes@la.gov; Nguyen, Tien; Yvette Olmos; Smith, Jim; Clark, David; Mark McCorkle (MAC@adeq.state.ar.us)
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Thanks,

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To: Snyder, Erik[snyder.erik@epa.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Clark, David
Sent: Wed 12/16/2015 8:36:37 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Erik & Ashley,

January 20-21 works for me.

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

Confidentiality Notice: This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message.

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Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Daniel Menendez[daniel.menendez@tceq.texas.gov]; Daniel Jamieson (Daniel.Jamieson@tceq.state.tx.us)[Daniel.Jamieson@tceq.state.tx.us]; Ron Thomas[Ron.Thomas@tceq.texas.gov]; Zarena Post[ZPost@tceq.texas.gov]; Jeff Stonesifer[jstonesifer@cabq.gov]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Peters[eric.peters@state.nm.us]; Gi-Dong[gi-dong.kim@state.nm.us]; Eric Milligan[Eric.Milligan@deq.ok.gov]; Lee Warden[lee.warden@DEQ.OK.gov]; Thomas Rheaume[rheaume@adeq.state.ar.us]; vennetta.hayes@la.gov[vennetta.hayes@la.gov]; Nguyen, Tien[Nguyen.Tien@epa.gov]; Yvette Olmos[Yvette.Olmos@LA.GOV]; Smith, Jim[Smith.Jim@epa.gov]; Clark, David[CLARKD@adeq.state.ar.us]; Mark McCorkle (MAC@adeq.state.ar.us)[MAC@adeq.state.ar.us]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]
From: Snyder, Erik
Sent: Wed 12/16/2015 8:27:42 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi,

Making another run at this. I have locked down conference rooms here at the Region for January 20-21st to have a permit modeling workshop with most of the focus on SO2 modeling for CD and DRR sources. Looking at having James Thurman down from RTP and then some others by teleconference or video. Would be 1.5 to two days. I know we are getting towards the holidays but if you can let Ashley and I know if these dates would work by the end of this week, we can make sure James can get his travel done. I am going to be out of pocket for the rest of this week but please follow up with Ashley on any questions.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Tuesday, September 22, 2015 10:31 AM
To: Snyder, Erik

Cc: Ron Thomas
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

Hi Erik,

Any updates on potential Region 6 modeling meeting?

Thanks,

Daniel

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, August 19, 2015 11:16 AM
To: Daniel Menendez; Daniel Jamieson; Dominic Ruggeri; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Thomas Rheaume; vennetta.hayes@la.gov; Tien Nguyen; Yvette Olmos; Jim Smith
Cc: Mohr, Ashley; Feldman, Michael; Robinson, Jeffrey; Donaldson, Guy
Subject: Potential R6 Modeling workshop in Dallas in early November

Hi,

We haven't had a Region 6 modelers workshop in Dallas in a while. With the final DRR and proposed changes in App. W, thought it might be a good time to have a meeting here in Dallas. I am not planning on discussing photochemical issues other than maybe secondary pollutant analysis for permits. The main focus would be modeling for the SO2 sources as part of the SO2 Phase 3 and 4 designations process (either modeling directly or modeling for monitor locations around a facility). We could also discuss other issues if there is interest. I was thinking some discussion on ozone and PM2.5 impacts from single source for permitting might and what sources should be included in cumulative analysis are two topics that might also be beneficial.

At this time I am targeting the first week in November (11/2-11/5) as possible date(s). Would only plan for 1 or two days within this period but we have locked meeting space for M-R currently. I think we will be able to get one or two people from OAQPS that week to come to Dallas (James Thurman and/or George Bridgers most likely). They are available for travel and this would be after the close of the proposed changes to App. W, so we could talk about any of the proposed changes.

Please let me know your interest and availability (if this week works and if M-T, T-W or W-R is best). Also any ideas for specific topics/issues.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
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To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Dianne Anderson[dianne.anderson@tceq.texas.gov]; Daniel Jamieson[daniel.jamieson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]; Amanda Jones[Amanda.Jones@tceq.texas.gov]
From: Rachel Melton
Sent: Thur 12/10/2015 7:17:51 PM
Subject: 5th Protocol Reponse: DECORDOVA II POWER COMPANY LLC
Modeling Protocol Revisions 110915.pdf
Revised Protocol Pages Decordova 120315.pdf
Fifth Modeling Protocol Response - DECORDOVA II POWER COMPANY LLC.docx

Good Afternoon Ashley,

Attached is the TCEQ's response for the Decordova II Power Company Revised Modeling Protocol and additional revisions, Permit No.: 107569. Please respond to verify receipt of this information .

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

T: 512-239-2358

E: Rachel.Melton@tceq.texas.gov

November 9, 2015

Mr. Paul Coon
Luminant Power
1601 Bryan Street
Dallas, Texas 75201

via Email

RE: Revised Modeling Protocol
Permit Nos. 107569, PSD-TX-1432
DeCordova II Power Company LLC
DeCordova Steam Electric Station
Regulated Entity Number RN100664812

Dear Mr. Coon:

Zephyr Environmental Corporation (Zephyr) has prepared the enclosed revisions to the October 2014 Modeling Protocol and August 2015 Revised Modeling Protocol. These revisions correspond to: the use of meteorological data processed using AERMET and AERMINUTE (as suggested by the TCEQ modeling staff in their September 8, 2015 comments); the use of revised site-specific surface roughness values; the use of the Ambient Ratio Method 2 (ARM2) to determine the 1-hour NO_X to NO_2 conversion in the vicinity of the Weatherford Aerospace, Inc. facility in Parker County, Texas; the use of more appropriate, site-specific meteorological data and background concentrations in the vicinity of the Weatherford Aerospace, Inc. facility; and the use of the Plume Volume Molar Ratio Method (PVMRM2) to determine the 1-hour NO_X to NO_2 conversion at all other locations. These revisions only affect Sections 5.0, 6.4.11, 7.0, 8.0 and 11.0 of the protocol.

If you have any further questions on this issue, please contact me at (512) 579-3820 or at dcastro@zephyrenv.com.

Sincerely,
Zephyr Environmental Corporation

David L. Castro
Project Engineering Associate

Enclosure

cc: Ms. Jeremy Halland, Luminant Power
Mr. Larry Moon, P.E.; Zephyr Environmental Corporation

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5.0 AIR QUALITY MONITORING DATA

Estimates for the current ambient air background concentrations at the proposed project site may be required for two distinct and separate purposes: (1) to demonstrate that the ambient air concentrations of PSD-significant pollutants are currently in compliance with the NAAQS and (2) for use in a full impact NAAQS modeling analysis. DeCordova II proposes to use ambient air quality data from existing air quality monitoring stations to establish background concentrations for these contaminants.

5.1 AVAILABLE BACKGROUND CONCENTRATIONS

5.1.1 DCSES Analysis (Section Revised 11-09-15)

Based on a review of the TCEQ's *Air Quality Data* website and the EPA's *AirData* website (http://www.epa.gov/air/data/), DeCordova II proposes using data collected at the following monitor stations to establish representative background concentrations to be used in the NAAQS compliance demonstrations:

- NO_2 – Eagle Mountain Lake [Continuous Air Monitoring Station (CAMS) 75, EPA ID 48-439-0075]
- CO – Fort Worth Northwest (CAMS 13, EPA ID 48-439-1002)
- SO_2 – Dallas Hinton (CAMS 60, EPA ID 48-113-0069)
- PM_{10} – Stage Coach (EPA ID 48-439-3010)
- $PM_{2.5}$ (total) – Midlothian OFW (CAMS 52, EPA ID 48-139-0016)
- $PM_{2.5}$ Nitrates – Dallas Hinton (CAMS 60, EPA ID 48-113-0069)
- $PM_{2.5}$ Sulfates – Dallas Hinton (CAMS 60, EPA ID 48-113-0069)
- O_3 – Granbury (CAMS 73, EPA ID 48-221-0001)

The appropriateness of using data from these monitoring stations to establish background concentrations is discussed in Section 5.2.

Guidance from the TCEQ's *draft AQMG* was followed in selecting the form of the monitored concentration for each pollutant and averaging period. The proposed background concentrations are summarized in Table 5-1.

These background concentration estimates were calculated based on hourly data obtained from the TCEQ website. Following guidance received from the TCEQ Modeling Staff (for a different but recent analysis), the calculations: (1) include hourly data from days that do not meet EPA's definition of completeness and (2) no rounding was conducted at any step of the calculations. Therefore, the calculated concentration values are more conservative than values that may be available elsewhere.

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Table 5-1
Proposed Background Concentrations (Revised 11-09-15)

Contaminant	Monitor Station	County	Averaging Period	Concentration ($\mu g/m^3$)	Form
NO_2	Eagle Mountain Lake	Tarrant	1-Hour	See Attachment 11	3-Year Maximum of 98th Percentiles of the Hour-of-Day Maximums 2012-2014
			Annual	9.16	1st High, 2014
CO	Fort Worth Northwest	Tarrant	1-Hour	1,945	2nd High, 2013
			8-Hour	1,001	2nd High, 2013
SO_2	Dallas Hinton	Dallas	1-Hour	13.5	3-Year Average of 99th Percentiles of the Daily 1-Hour Maximums 2012-2014
			3-Hour	10.5	2nd High, 2014
			24-Hour	3.45	2nd High, 2014
			Annual	0.817	1st High, 2014
PM_{10}	Stage Coach	Tarrant	24-Hour	66.0	2nd High, 2012-2014
$PM_{2.5}$	Midlothian OFW	Ellis	24-Hour	22.3	3-Year Average of 98th Percentiles of the Daily Maximums 2012-2014
			Annual	9.10	3-Year Average of 1st Highs 2012-2014
$PM_{2.5}$ Nitrates	Dallas Hinton	Dallas	24-Hour	4.74	1st High, 2011-2013
			Annual	1.00	3-Year Average of Daily Averages 2011-2013
$PM_{2.5}$ Sulfates	Dallas Hinton	Dallas	24-Hour	9.30	1st High, 2011-2013
			Annual	2.37	3-Year Average of Daily Averages 2011-2013
O_3	Granbury	Hood	1-Hour	See Attachment 11	Seasonal Hour-of-Day Maximums 2014

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The monitor data collected during the following time periods meet the EPA requirements for completeness for the following ambient air concentrations:

- 1-hour NO_2 concentration – from three-years of data collected at the Eagle Mountain Lake monitor,
- Annual NO_2 concentration – from one year of data collected at the Eagle Mountain Lake monitor,
- 3-hour, 24-hour and annual SO_2 concentrations – from one year of data collected at the Dallas Hinton monitor,
- 1-hour and 8-hour CO concentrations – from one year of data collected at the Fort Worth Northwest monitor,
- 24-hour PM_{10} concentration – from three years of data collected at the Stage Coach monitor,
- 24-hour $PM_{2.5}$ nitrates concentration – from three years of data collected at the Dallas Hinton monitor,
- 24-hour $PM_{2.5}$ sulfates concentration – from three years of data collected at the Dallas Hinton monitor, and
- 1-hour O_3 concentration – from three years of data collected at the Granbury monitor.

The Dallas Hinton monitor SO_2 data includes one calendar quarter that does not meet the EPA completeness guidelines for the 1-hour concentration. Therefore, the EPA substitution test described in Appendix T to 40 CFR Part 50 was conducted. The Midlothian OFW monitor station $PM_{2.5}$ data includes one calendar quarter that does not meet the EPA completeness guidelines for the 24-hour and annual concentrations. Therefore, the EPA substitution test described in Appendix N to 40 CFR Part 50 was conducted. For these pollutants, calendar quarters that do not meet the EPA completeness guidelines were identified. For each identified quarter, the highest reported daily maximum value from the three year period was determined. All daily maximum values from all days in the quarter of interest were considered, even those from days with less than 75 percent data capture. For each calendar quarter that did not meet the EPA completeness guidelines, the daily maximum value for that quarter was then substituted for all days with less than 75 percent data capture – making that adjusted quarter 100% complete. The 3-year "test design value" was then compared to the applicable standard.

The SO_2 and $PM_{2.5}$ "test design values" are less than the NAAQS. Therefore, the primary standard design values are deemed to have passed the diagnostic test and are valid. The Dallas Hinton and Midlothian OFW monitors can be used to represent background 1-hour SO_2, 24-hour $PM_{2.5}$ and annual $PM_{2.5}$ concentrations for the NAAQS analyses. As stated in Appendices T and N to 40 CFR Part 50, the applicable 3-year design value is based on the actual reported data and not the "test design value" obtained using the substitution test.

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Electronic copies of the ambient air concentration calculations and the EPA substitution test calculations are included in Attachment 6 of this submittal.

5.1.2 Weatherford Aerospace, Inc. Analysis (Section Added 11/09/15)

A separate full impact NO_2 NAAQS analysis will be conducted for eight modeling receptors located within 2.2 kilometers (1.4 miles) of the Weatherford Aerospace, Inc. facility. This facility is located approximately 42 kilometers from the DCSES and is located in Parker County. In order to obtain modeling results that are representative to this area, DeCordova II proposes using NO_2 and ozone data collected at the Parker County monitor station (CAMS 76, EPA ID 48-367-0081) to establish representative background concentrations to be used in the full impacts NAAQS modeling analysis for this location.

NO_2 data is available from the Parker County monitoring station from the years 2010 to 2013. This monitor does not have three calendar years of complete data, since the 2010 data includes only one calendar quarter (quarter 4) and the 2013 data includes only three calendar quarters (quarters 1 through 3). However, the monitor does provide 12 continuous calendar quarters (i.e. 3 years) of complete data. DeCordova II proposes that this data is representative for the Weatherford Aerospace, Inc. facility and better represents this location than the Eagle Mountain Lake monitoring station.

Following guidance included in the EPA's *Clarification on the use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard, R. Chris Owen and Roger Brode, September 30, 2014*; the modeling was conducted using hour-of-day background NO_2 concentration values. These concentration values were conservatively calculated using the highest of the 98th percentile of the hourly concentrations for each hour of the day, for each of the available years of data (2010 through 2013). The NO_2 background hour-of-day values used in the Weatherford Aerospace, Inc. modeling are summarized in a table included as Attachment 11.

Ozone data is available from the Parker County monitoring station from the years 2012 to 2014. The monitor data collected during this time period meets the EPA requirements for completeness. The proposed background concentrations are summarized in Table 5-2.

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Table 5-2
Proposed Weatherford Aerospace Background Concentrations (Added 11-09-15)

Contaminant	Monitor Station	County	Averaging Period	Concentration ($\mu g/m^3$)	Form
NO_2	Parker County	Parker	1-Hour	See Attachment 11	3-Year Maximum of 98th Percentiles of the Hour-of-day Maximums 2010-2013
			Annual	Not Required	1st High, 2014
O_3	Parker County	Parker	8-Hour	74.4	3-Year Average of 99th Percentiles of the Daily 8-Hour Maximums 2012-2014

Electronic copies of the ambient air concentration calculations are included in Attachment 6.

5.2 REPRESENTATIVENESS OF THE SELECTED MONITOR STATIONS

5.2.1 DCSES Analyses (Sections Renumbered 11/09/15)

Following guidance contained in TCEQ's *draft AQMG and Background Concentration Determination for Use in NAAQS Analyses* (September 2, 1998) and EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), EPA-450/4-87-007* (May 1987); DeCordova II concludes, as described below, that the air quality monitoring data used to establish background concentrations is representative of the area around the DCSES.

Each of the proposed monitoring stations are located outside of the "same general area" of the DCSES. Therefore, in accordance with TCEQ modeling guidance for demonstrating conservative representativeness of data collected at these monitors, population and air emission information compiled for the counties in which the monitors reside (i.e., Tarrant County, Dallas County and Ellis County) were compared to Hood County. In addition, the magnitudes of reported emissions within 10 km and 15 km of each site were also compared.

5.2.1.1 Topography

DCSES and the six monitor locations share similar topography. The area surrounding each location (within several kilometers) is relatively flat.

5.2.1.2 Population Density

Population estimates were obtained from the United States Census Bureau for year 2013 (http://quickfacts.census.gov/qfd/index.html). The population data for Tarrant, Hood, Dallas and Ellis counties is summarized in Table 5-3.

Table 5-3

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Population Comparison Analysis (Revised 03-02-15)

County	Population Estimate for year 2013
Hood	52,905
Tarrant	1,911,541
Dallas	2,480,331
Ellis	155,976

Dallas County, Tarrant County and Ellis County have significantly greater populations than Hood County. Air emissions associated with population density (e.g. automobile traffic) near these monitors are greater than the emissions associated with population density in Hood County. Therefore, each of the proposed monitoring stations offer conservative estimates of ambient concentration contributions associated with population density in Hood County.

As SO_2 and NO_X are precursors to the formation of secondary $PM_{2.5}$, the Dallas Hinton monitoring station also offers conservative estimates for $PM_{2.5}$ nitrates and $PM_{2.5}$ sulfates ambient air concentrations in Hood County.

5.2.1.3 County-wide and Nearby Source Emissions

Air emission rate data for Hood, Tarrant, Dallas and Ellis counties were obtained from the EPA National Emissions Inventory (NEI) Database through the EPA *AirData* website (http://www.epa.gov/airdata/). The data provides estimates of the point source and non-point/mobile source emissions in each county. The total air emissions for each county are summarized in Table 5-4.

Table 5-4
Comparison of County-Wide Air Emissions (Revised 03-02-15)

County	Location	County-wide Air Emission Estimates (tpy) (EPA 2011 NEI Data)				
		NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
Hood	DCSES	4,045	14,951	8,974	1,711	77
Tarrant	Eagle Mountain Lake, Fort Worth Northwest, Stage Coach	39,793	158,911	34,236	6,379	1,594
Dallas	Dallas Hinton	45,939	231,763	55,090	9,565	2,166
Ellis	Midlothian OFW	9,781	26,455	27,053	4,604	6,978

Reported emissions from stationary sources located within 10 km and 15 km of each site were obtained from the TCEQ point source emissions inventory (EI) database workbook (2012statesum.xlsx) for the year 2012. Emissions from stationary sources located within 10 km and 15 km of each site are summarized in Table 5-5 and Table 5-6, respectively. Detailed emission rate information is provided in Attachment 3.

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Table 5-5
Comparison of Emissions from Stationary Sources Located within 10 Km
(Revised 03-02-15)

Location	CAMS	County	Air Emission Estimates for 2012 (tpy) (TCEQ 2012 EI)				
			NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
DCSES	-	Hood	716	1,030	92	92	13.8
Fort Worth Northwest	13	Tarrant	-	166	-	-	-
Eagle Mountain Lake	75	Tarrant	480	-	-	-	-
Stage Coach	-	Tarrant	-	-	25.1	-	-
Midlothian OFW	52	Ellis	-	-	-	773	-
Dallas Hinton	60	Dallas	-	-	-	-	240

Table 5-6
Comparison of Emissions from Stationary Sources Located within 15 Km
(Revised 03-02-15)

Location	CAMS	County	Air Emission Estimates for 2012 (tpy) (TCEQ 2012 EI)				
			NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
DCSES	-	Hood	737	1,072	96	96	13.8
Fort Worth Northwest	13	Tarrant	-	261	-	-	-
Eagle Mountain Lake	75	Tarrant	798	-	-	-	-
Stage Coach	-	Tarrant	-	-	57	-	-
Midlothian OFW	52	Ellis	-	-	-	782	-
Dallas Hinton	60	Dallas	-	-	-	-	280

SO_2 emissions within Dallas County are significantly greater than those found in Hood County. Emissions of SO_2 from stationary sources located within 10 km of the proposed monitor station are greater than those found within 10 km of the DCSES. Therefore, the Dallas Hinton monitoring station offers conservative estimates for background SO_2 concentrations at the DCSES.

$PM_{2.5}$ emissions within Ellis County are significantly greater than those found in Hood County. Emissions of $PM_{2.5}$ from stationary sources located within 10 km of the proposed monitor station are greater than those found within 10 km of the DCSES. Therefore, the Midlothian OFW monitoring station offers conservative estimates for background $PM_{2.5}$ concentrations at the DCSES.

NO_2, CO and PM_{10} emissions within Tarrant County are significantly greater than those found in Hood County. NO_2, CO and PM_{10} emissions from stationary sources located within 10 km of the DCSES are greater than those from stationary sources located within 10 km of the proposed monitor locations. However, NO_2 and PM_{10} emissions from stationary sources located within 15 km of the DSCES are comparable to those from stationary sources located within 15 km of the

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proposed monitor locations. DeCordova II believes that the emissions associated with countywide sources will provide a conservative estimate of the background concentration for the DCSES location. Ambient air contributions from stationary sources located within 10 km of the DCSES (including existing DCSES sources) will be reflected by modeling these sources in the full impact analyses. Therefore, the Eagle Mountain Lake, Fort Worth Northwest and Stage Coach monitoring stations offer conservative estimates for background NO_2, CO and PM_{10} concentrations.

Secondary $PM_{2.5}$ emissions are formed through the emission of gaseous compounds such as SO_2 and NO_X. Portions of these gaseous emissions can form fine particulates in the atmosphere through chemical reactions or condensation. These chemical transformations occur in the atmosphere gradually over time (hours or days depending on atmospheric conditions and other variables). Therefore, secondary $PM_{2.5}$ impacts are expected to occur at some distance from the source of its gaseous emission precursors. Due to the required formation distances, comparison of nearby SO_2 and NO_X emissions (i.e. within 10 km) is not appropriate. County-wide emissions are proposed as an appropriate air shed comparison. As shown on Table 5-3, the NEI database SO_2 and NO_X air emissions for Dallas County are greater than those found in Hood County. Therefore, the Dallas Hinton monitoring station offers conservative estimates for $PM_{2.5}$ nitrates and $PM_{2.5}$ sulfates background concentrations.

NO_x and VOC air emissions are precursors to ozone formation. Due to the distances required for ozone formation, comparison of nearby emissions (i.e. within 10 km) is not appropriate for this justification. The DCSES and the Granbury monitoring station are 10.5 kilometers apart and are located within the same county and air shed. Therefore, the Granbury monitor provides representative estimates for the ozone background concentration at the DCSES location.
Based on the discussion presented above concerning the topography, population density, county-wide emissions, and the stationary source emissions in the vicinity of monitor locations and source location, ambient air monitoring data from the Eagle Mountain Lake, Fort Worth Northwest, Dallas Hinton, Stage Coach, Granbury, and Midlothian OFW monitoring stations are conservatively representative and appropriate for use as conservative background concentration estimates for the DCSES location.

5.2.2 Weatherford Aerospace, Inc. Analysis (Section Added 11-09-15)

Following guidance contained in TCEQ's *draft AQMG and Background Concentration Determination for Use in NAAQS Analyses* (September 2, 1998) and EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), EPA-450/4-87-007* (May 1987); DeCordova II concludes, as described below, that the air quality monitoring data used to establish background concentrations is representative of the area around Weatherford Aerospace, Inc.

The Parker County monitoring station is located within 14 km of Weatherford Aerospace, Inc. facility. It is the nearest ambient air monitor station from the Weatherford Aerospace, Inc. facility; therefore, it offers representative NO_2 and ozone estimates of the background concentration for the Weatherford Aerospace, Inc. location.

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Both the Weatherford Aerospace, Inc. facility and the Parker County monitoring station are located in areas with relatively few industrial activities. The Weatherford Aerospace, Inc. facility is located adjacent to a residential area. The Parker County monitoring station is located in a rural setting. Air emission rate data for Parker County was obtained from the EPA National Emissions Inventory (NEI) Database through the EPA *AirData* website (http://www.epa.gov/airdata/). The data provides estimates of the point source and non-point/mobile source emissions in each county. The majority (81%) of county wide NO_X emissions in Parker County are generated by highway vehicles (automobiles) and off-highway vehicles (i.e. farm-related). DeCordova II believes that the Parker County monitor provides representative estimates for the NO_X concentrations of these types of emissions at the Weatherford Aerospace, Inc. location.

NO_x and VOC air emissions are precursors to ozone formation. Due to the distances required for ozone formation, comparison of nearby emissions (i.e. within 10 km) is not appropriate for this justification. The Weatherford Aerospace, Inc. facility and the Parker County monitoring station are 14 kilometers apart and are located within the same county and air shed. Therefore, the Parker County monitor provides representative estimates for the ozone background concentration at the Weatherford Aerospace, Inc. location.

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6.4.11 NO_X to NO_2 Conversion

6.4.11.1 DCSES Analysis (Revised 11-09-15)

As stated in Section 7.0, DeCordova II proposes a Tier 3 PVMRM2 analysis for determining the NO_X to NO_2 conversion for the 1-hour NO_2 analyses. The following NO_2 / NO_X assumptions will be utilized in the PVMRM2 analysis.

- Except for intermittent sources, NO_2 emissions corresponding to 100% NO_X.
- For intermittent sources, the Tier 2 default NO_X to NO_2 conversion factor of 80 percent will be applied to hourly emissions prior to modeling.
- The default ambient equilibrium NO_2 / NO_X ratio of 0.90.
- A NO_2 / NO_X In-Stack Ratio (ISR) of 1.0 will be utilized for all DCSES and off-property intermittent sources of emissions per guidance provided by the TCEQ in the 2014 Advanced Air Permitting Seminar. A 1.0 ISR value effectively turns off the PVMRM2 algorithms and utilizes AERMOD algorithms for the specified sources.
- A NO_2 / NO_X ISR of 0.10 will be utilized for existing DCSES simple cycle turbines (EPNs DC_CST1, DC_CST2, DC_CST3, and DC_CST4).
- A NO_2 / NO_X ISR of 0.15 will be utilized for proposed DCSES simple cycle GE turbines (EPNs DC_CST5 and DC_CST6).
- A NO_2 / NO_X ISR of 0.20 will be utilized for proposed DCSES simple cycle Siemens turbines (EPNs DC_CTHS5 and DC_CTHS6).
- A NO_2 / NO_X ISR of 0.30 will be utilized for proposed DCSES combined cycle GE turbines (EPNs DC_CTHS5 and DC_CTHS6).
- A NO_2 / NO_X ISR of 0.40 will be utilized for proposed DCSES combined cycle Siemens turbines (EPNs DC_CTHS5 and DC_CTHS6).
- The EPA default NO_2 / NO_X ISR of 0.50 will be utilized for all other DCSES combustion sources and for all off-property sources “near” the DCSES (within 3 km per EPA guidance).
- The EPA default NO_2 / NO_X ISR of 0.20 will be utilized for all off-property sources that are not “near” the DCSES (i.e. farther than 3 km).

DeCordova II requested representative in-stack NO_2/NO_X ratios from the turbine manufacturers since operational data is not yet available. GE and Siemens both provided recommended conservative (tends to overestimate) in-stack ratios for the F-Class turbines to use in the analysis. GE also provided a discussion on the effects of an SCR and oxidation catalyst and also provided a second ratio to use which accounts for the effects of the SCR and oxidation catalyst. The same logic was applied to the Siemens units to arrive at the second ratio accounting for the SCR and oxidation catalyst for the Siemens turbine. For the existing four CTs at DeCordova, DeCordova II is using the results of a recent in-stack NO_2/NO_X ratio analysis of a sister-unit at their Permian Basin Steam Electric Station. The analysis evaluated in-stack NO_2/NO_X ratio data for CT-4, when

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it was operating between 50% and base load. The maximum in-stack ratio was found to be less than 0.05 (i.e., 5% NO_2). Therefore, DeCordova II is proposing to use an in-stack ratio of 0.10 to conservatively represent the existing four CTs, which is more than double the measured value for the sister unit. The Permian Basin unit is the identical make, model and age as the DeCordova units, with identical emission limits as the DeCordova units. Therefore, the in-stack ratios should be very similar between the Permian Basin and DeCordova units.

Technical documentation regarding the proposed ISRs is provided in Attachment 12.

6.4.11.2 Weatherford Aerospace, Inc. Analysis (Section Added 11/09/15)

Following guidance included in the EPA's *Clarification on the use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard, R. Chris Owen and Roger Brode, September 30, 2014*; the new Tier 2 method, the Ambient Ratio Method 2 (ARM2), will be utilized for modeling conducted at the Weatherford Aerospace, Inc. facility. This method applies a variable NO_2/NO_X ratio that is a function of model predicted 1-hour NO_X concentrations and an analysis conducted by EPA of hourly ambient NO_X monitoring data from approximately 580 stations over the period of 2001-2010. The EPA believes that the modeling results using the ARM2 modeling method are generally more conservative relative to the Tier 3 method of OLM and PVMRM. DeCordova II proposes the use of the ARM2 method to provide more refined modeling results at the Weatherford Aerospace, Inc. location.

The EPA indicates that the ARM2 method may not be appropriate when the NO_2/NO_X in-stack ratio of the source is relatively high and when there is particularly high background ozone in the area. The guidance contained in the referenced memorandum were followed in demonstrating that the ARM2 method is appropriate for modeling the Weatherford Aerospace, Inc. (and full impact NAAQS inventory) sources. Tier 1 modeling was conducted on the Weatherford Aerospace, Inc. and full impact NAAQS analysis sources. The maximum predicted Tier 1 modeling result was 181 parts per billion (ppb) of NO_X. This value meets the EPA threshold of "150 to 200 ppb." Additionally, the monitored ozone level at the Weatherford Aerospace, Inc. location corresponding to the most recent three years of complete data is 74.4 ppb which is less than the EPA threshold of 90 ppb. Therefore, the ARM2 method is appropriate for estimating the NO_2/NO_X ratios at the Weatherford Aerospace, Inc. facility.

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7.0 MODELS PROPOSED AND MODELING TECHNIQUES

The American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD), Version 15181, will be used to perform the dispersion modeling in this air quality impacts analysis. AERMOD is the latest generation of atmospheric dispersion models suitable for industrial sources and is the model preferred by the EPA for such applications. To facilitate the running of AERMOD, the Providence/ORIS, LLC's "BEE-Line BEEST for Windows" graphic user interface (Version 11.02) will be used.

The following model options will be used in the application of the AERMOD modeling:

A. Regulatory default option will be enabled, for all pollutants except 1-hour NO_2.

B. Elevated terrain will be used for modeling the area around the facility.

C. The proposed emissions will be modeled at their actual stack heights. None of the proposed DCSES stacks exceed the calculated GEP height or 65 meters, whichever is greater.

D. The profile base elevation will be set to the Mineral Wells Airport meteorological station base elevation of 296.3 meters.

For the 1-hour NO_2 analyses outside of the Weatherford Aerospace modeling domain, DeCordova II proposes to use a Tier 3 analysis using the Plume Volume Molar Ratio Method (PVMRM), Version 15181, to perform the dispersion modeling. On July 29, 2015 EPA proposed in the *Revision to the Guideline on Air Quality Models, 80 Fed. Reg. 45340,* making the PVMRM a preferred Tier 3 screening method for NO_2 modeling, and proposed replacing the current PVMRM the revised version of the PVMRM, referred to as PVMRM2, into AERMOD as a non-default option. Each of the three EPA NO_2 modeling Tiers are considered screening techniques. Each Tier has increasing complexity, which includes more refined estimates of NO and NO_2 speciation. A Tier 3 analysis will provide more accurate modeling results than a Tier 1 (AERMOD) analysis.

The current version of PVMRM uses relative dispersion coefficients which are likely to overestimate the plume volume (and therefore the NO_2 concentrations) during stable conditions. The latest version of PVMRM (PVMRM2) uses total dispersion coefficients for stable conditions and relative dispersion coefficients for unstable conditions to obtain more accurate estimates. The current version of PVMRM uses a radial distance from the source to receptor to define the plume volume and the amount of O3 available for NO-NO_2 conversion. However, due to the meander component, plume impacts can occur upwind of the sources. These impacts can occur at receptors that are far off the plume centerline. PVMRM2 includes modifications to more accurately account for plume volumes in these situations. Therefore, DeCordova II proposed the use of the latest version of PVMRM2 for this analysis. To facilitate the running of AERMOD, the Providence/ORIS, LLC's "BEE-Line BEEST for Windows" graphic user interface (Version 11.02) will be used.

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The following model options will be used in the application of the PVMRM2 modeling:

A. Elevated terrain will be used for modeling the area around the facility.

B. The proposed emissions will be modeled at their actual stack heights. None of the proposed DCSES stacks exceed the calculated GEP height or 65 meters, whichever is greater.

C. Temporally varying background O_3 concentrations corresponding to seasonal hour of the day values (as discussed in Section 5.1).

D. Temporally varying background NO_2 concentrations corresponding to hour of the day values (as discussed in Section 5.1).

E. The NO_2 / NO_X assumptions described in Section 6.4.11.1.

F. The profile base elevation will be set to the Mineral Wells Airport meteorological station base elevation of 296.3 meters.

Modeling receptors will be placed to a distance that clearly identifies the area of impact. The receptor grid spacing is discussed in Section 11 of this protocol.

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8.0 INFORMATION ON URBAN/RURAL CHARACTERISTICS

8.1.1 DCSES Analyses

A determination of the albedo, Bowen ratio, and surface roughness length of the modeling domain must be made before an atmospheric dispersion model can be run. The TCEQ has determined the albedo values and Bowen ratios for each county in Texas. The TCEQ default albedo values and Bowen ratios will be utilized for the DCSES Analysis.

TCEQ modeling staff has provided *Air Dispersion Modeling Team Initiative to Update Meteorological Data, Update – October 2013* as a reference in determining the appropriate roughness length for meteorological data set selection. Following this guidance, the EPA's AERSURFACE tool was utilized to determine the surface roughness length for this project. A surface roughness of 0.012 meters was obtained for region within a 1 km radius of the DCSES Project location. This value is the average of all land category values from the U.S. Geological Survey (USGS) 1992 Land Cover Data in the area within 1 kilometer of the DCSES Project location. This is within the 0.001 to 0.1 range stated in the referenced TCEQ AERMOD Training document for Category 1 for the TCEQ's "low surface roughness" meteorological dataset. The AERSURFACE surface roughness length results do not match DeCordova II's assessment of the land categorization within 1 kilometer of the DCSES Project.

A detailed review was conducted on the USGS National Land Cover Data 1992 archive data used in the AERSURFACE analyses. The review identified several inaccurate representations, including: areas near the project center which are misclassified as water instead of industrial, and the data's lack of accountability of the expansion in the early 1990s which added the four existing combustion turbines (and associated equipment) to the area east-northeast of the current project. The land categories used in the AERSURFACE analysis are illustrated in the first figure included in Attachment 7. These 1992 land categories do not match the current assessment of the land categorization of the DCSES property. Therefore, representative land categories were identified for individual parcels of land located within 1 kilometer of the DCSES Project based on first-hand knowledge of the property. An aerial map illustrating the area within a 1 kilometer radius is included as the second figure in Attachment 7. A general depiction of the land use categories determined to be representative of the DCSES property are illustrated in the third figure in Attachment 7, where a more refined analysis of land parcels has been conducted for use in the calculations for the surface roughness analysis.

The DCSES project is located on an elongated peninsula, where the dominant land cover within 1 kilometer to north and south is "open water" with very little water located elsewhere. As depicted in the figures of Attachment 7, four (4) sectors were identified to account for the varying land use categories within 1 kilometer of the Project location. The boundaries of each sector are as follows: Sector 1 corresponds to the land between 39° and 78°, Sector 2 between 78° and 210°, Sector 3 between 210° and 300° and Sector 4 between 300° and 39°. The surface roughness length in each sector at DCSES is based on the representative land categories identified in each sector. Within each of these four sectors, the property was further subdivided for calculation purposes

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into smaller parcels using the land categories from *AERSURFACE Users Guide, Revised 01/16/2013*. The surface roughness length for each of these four sectors was then calculated using the inverse-distance weighted geometric mean. This calculation (within a given sector) required the total area of that sector, the area of each individual parcel of land, the distance between the DCSES center and the centroid of each individual parcel of land, and the surface roughness length value for each individual parcel of land. The inverse-distance weighted geometric mean formula was obtained from *ADEC Guidance re AERMET Geometric Means, How to Calculate the Geometric Mean Bowen Ratio and the Inverse-Distance Weighted Geometric Mean Surface Roughness Length in Alaska, Alaska Department of Environmental Conservation, Air Permits Program, Revised June 17, 2009* (copy included as Attachment 8). The surface roughness length values used for each land use category are included as Attachment 9. The surface roughness length calculations for each sector are provided in the tables included as Attachment 10.

The surface roughness length values determined in this site specific analysis will be utilized as input to the AERMET meteorological data set development program. The creation of site specific meteorological data sets is discussed in Section 11.1.1.

The files used in the surface roughness analysis and calculations are included in electronic form in Attachment 6.

8.1.2 Weatherford Aerospace, Inc. Analysis (Section Added 11/09/15)

A determination of the albedo, Bowen ratio, and surface roughness length of the modeling domain must be made before an atmospheric dispersion model can be run. The TCEQ has determined the albedo values and Bowen ratios for each county in Texas. In order to maintain consistency in the modeling of all proposed projects in Texas, the TCEQ has created pre-processed meteorological data sets for the three general roughness lengths that cover each county in Texas. The low surface roughness category represents surface roughness length values ranging from 0.001 to 0.1 meters. The medium surface roughness category represents surface roughness length values ranging from 0.1 to 0.7 meters and the high surface roughness category represents surface roughness length values ranging from 0.7 to 1.5 meters. The default modeling method used by the TCEQ is to choose one of these three roughness lengths based on a review of the modeling domain.

TCEQ modeling staff has provided *Air Dispersion Modeling Team Initiative to Update Meteorological Data, Update – October 2013* as a reference in determining the appropriate roughness length for meteorological data set selection. Following this guidance, the EPA's AERSURFACE tool was utilized to determine the surface roughness length for the modeling conducted in the vicinity of the Weatherford Aerospace, Inc. facility. A surface roughness of 0.176 meters was obtained for the Weatherford Aerospace, Inc. location. This is within the 0.1 to 0.7 range stated in the referenced TCEQ AERMOD Training document for Category 1 for the TCEQ's "medium surface roughness" meteorological dataset. Therefore, the "medium surface roughness" meteorological data set will be utilized in the Weatherford Aerospace, Inc. modeling analysis. All AERSURFACE files are included in electronic form in the AQA submitted to the TCEQ.

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11.0 METEOROLOGICAL DATA

11.1.1 DCSES Analysis (Revised 11-09-15)

AERMOD-ready meteorological input files will be generated using the AERMET meteorological preprocessing program (Version 15181). AERMET requires surface and upper air measurements, along with local surface characteristics including surface roughness, Bowen Ratio, and albedo, to generate the meteorological input file. DeCordova II will use the latest five years of complete National Weather Service meteorological data (2008 to 2012) to generate the surface and profile meteorological data files for AERMOD.

DeCordova II will use surface meteorological data observations from Mineral Wells Airport (WBAN ID 93985) and upper air data collected at the Fort Worth National Weather Service station (WBAN ID 3990). The hourly surface data in the Integrated Surface Hourly Data (ISHD) format will be obtained from the National Centers for Environmental Information (NCEI) (ftp://ftp.ncdc.noaa.gov/pub/data/noaa/) and the 1-minute Automated Surface Observing System (ASOS) will be obtained from NOAA (ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/). The upper air data in Forecast Systems Laboratory (FSL) format will be obtained from the NOAA/ESRL Radiosonde Database (http://esrl.noaa.gov/raobs/).

The 1-minute ASOS data will be preprocessed using AERMINUTE Version 14337. In the AERMINUTE processing, the low wind speed threshold will be set at 0.5 m/s.

The TCEQ default values for Hood County will be utilized for the surface characteristics values for albedo and Bowen ratio. The TCEQ default Hood County values for albedo and Bower ratios are 0.2594 and 0.6, respectively. The site-specific surface roughness values, as discussed in Section 8, will be used in the AERMET processing.

For PSD modeling, five years of representative National Weather Service (NWS) meteorological data will be used (2008, 2009, 2010, 2011 and 2012). For State NSR modeling, a single year of representative NWS meteorological data will be used (2012).

The base elevation for the Mineral Wells Airport station is 296.3 meters.

All the input and output files related to AERMINUTE and AERMET processing are provided in Attachment 6.

11.1.2 Weatherford Aerospace, Inc. Analysis (Section Added 11/09/15)

Current TCEQ guidance will be followed concerning meteorological data for AERMOD modeling for sources located in Parker County. Pre-processed meteorological data will be obtained from the TCEQ. Pre-processed meteorological data consisted of surface data from the Mineral Wells Airport meteorological station and upper air data from the Fort Worth National Weather Service

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station. The TCEQ processed the data using AERMET version 12345, and incorporates the AERMINUTE data along with the low wind speed threshold of 0.5 m/s. More details regarding the pre-processed meteorological data are available on the TCEQ website (http://www.tceq.texas.gov/permitting/air/modeling/aermod-datasets.html). The most recent five years of meteorological data available from the TCEQ on the date of the AQA will be utilized (2008, 2009, 2010, 2011 and 2012).

The TCEQ preprocessed meteorological data associated with a "medium" surface roughness value was utilized, as discussed in Section 8.1.2.

The base elevation for the Mineral Wells Airport station is 296.3 meters.

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ATTACHMENT 6
ELECTRONIC FILES

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ATTACHMENT 7
LAND CATEGORY FIGURES

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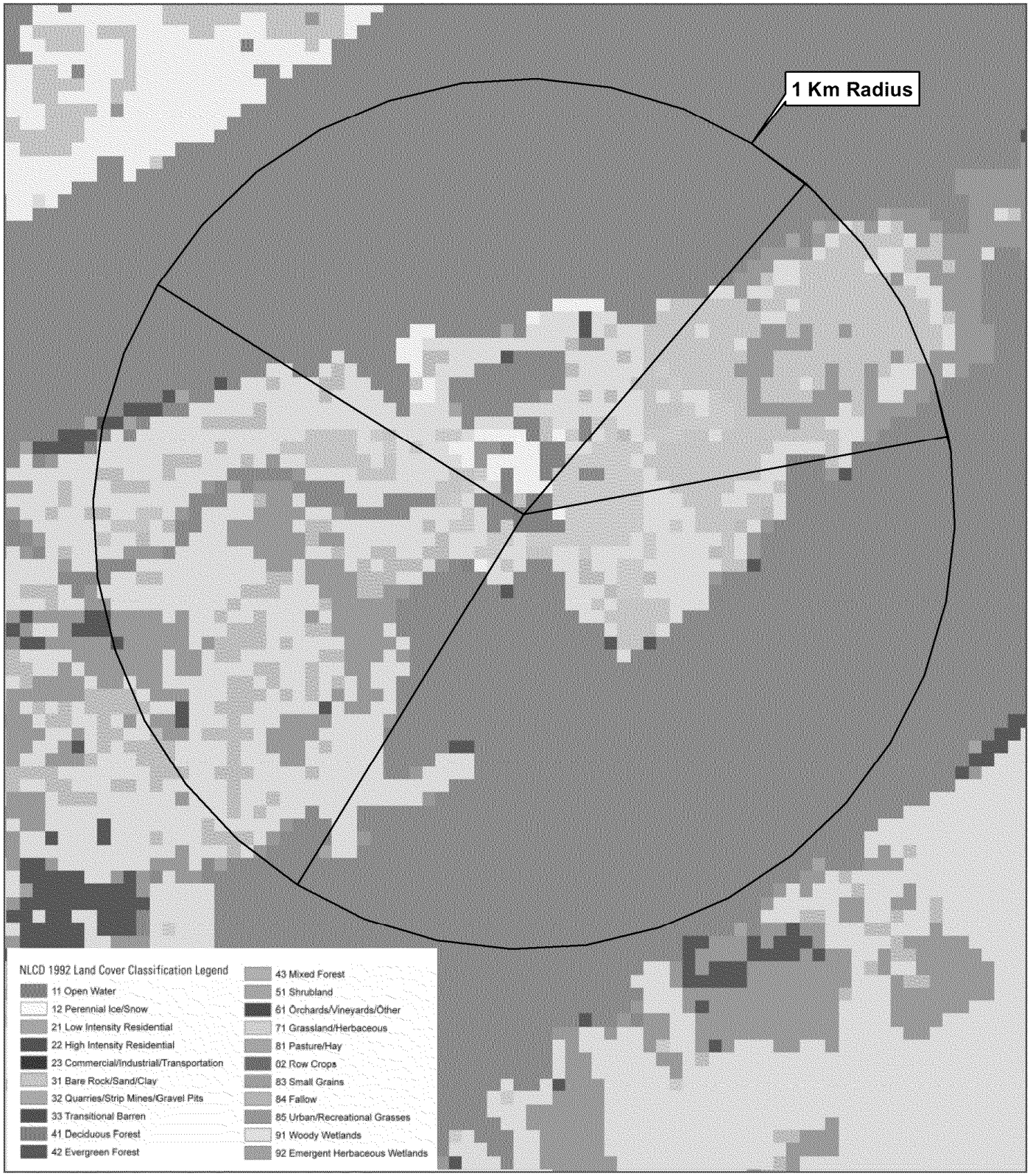

Datum: GCS NAD 1983 Map Sources: NAIP 2014 Texas Imagery

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0 1,000 2,000 Feet

zephyr

USGS National Land Cover Data, 1992 Archive

DECORDOVA S.E.S.

DeCordova II Power Company LLC
Hood County, Texas

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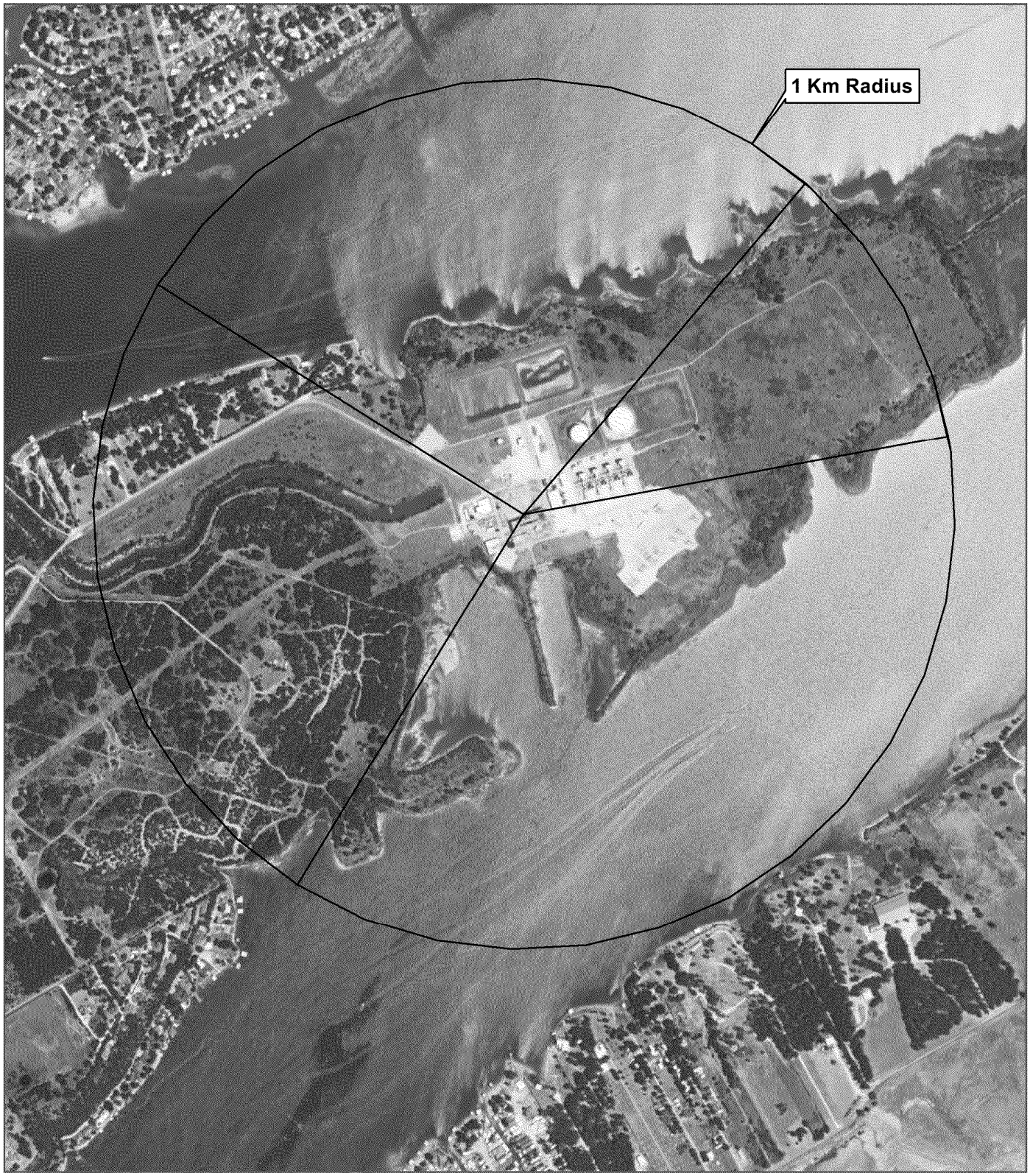
Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	D. Castro	013378.002	11/3/2015



Datum: GCS NAD 1983 Map Sources: NAIP 2014 Texas Imagery

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zephyr

AERIAL MAP

DECORDOVA S.E.S.

DeCordova II Power Company LLC

Hood County, Texas

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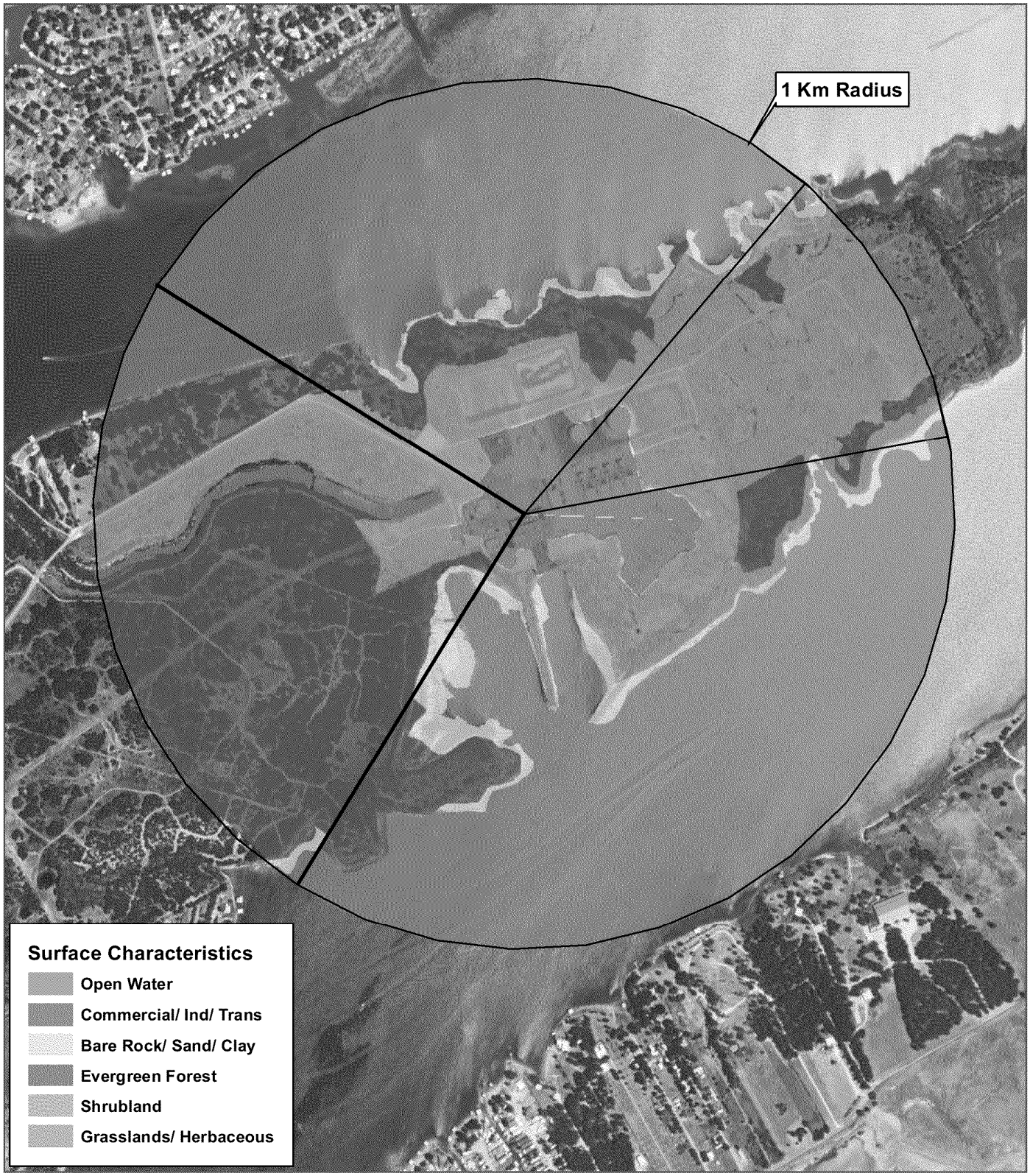
Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	D. Castro	013378.002	11/3/2015



Datum: GCS NAD 1983 Map Sources: NAIP 2014 Texas Imagery

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SURFACE CHARACTERISTICS MAP

DECORDOVA S.E.S.

DeCordova II Power Company LLC

Hood County, Texas

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Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. Vaidhyanathan	013378.002	11/3/2015

ATTACHMENT 8
REFERENCE: SURFACE ROUGHNESS LENGTH CALCULATIONS

ADEC Guidance re AERMET Geometric Means

How to Calculate the Geometric Mean Bowen Ratio and the Inverse-Distance Weighted Geometric Mean Surface Roughness Length in Alaska

Alaska Department of Environmental Conservation
Air Permits Program
Revised June 17, 2009

April 7, 2009 Note: ADEC revised this guidance to correct mathematical errors found in Tables 2 and 3. Other than these corrections, this revision is identical to the original April 23, 2008 version of this guidance.

June 17, 2009 Note: ADEC added clarification regarding the approach for when the land classification is homogeneous.

INTRODUCTION

This guidance describes alternative methods for determining the "geometric mean Bowen Ratio" and the "inverse-distance weighted geometric mean surface roughness length" needed by AERMET, for those situations where AERSURFACE is not a viable option.

BACKGROUND

The January 9, 2008 *AERMOD Implementation Guide* issued by the U.S. Environmental Protection Agency (EPA) states:

- the **surface roughness length** "should be based on an inverse-distance weighted geometric mean for a default upwind distance of 1 kilometer relative to the measurement site. Surface roughness length may be varied by sector … " and
- the **Bowen Ratio** "should be based on a simple unweighted geometric mean (i.e., no direction or distance dependency) for a representative domain, with a default domain defined by a 10km by 10km region centered on the measurement site."

EPA has also released a computer program (AERSURFACE) to calculate these values from the U.S. Geological Survey (USGS) National Land Cover Data 1992 archives (NLCD92) – see http://landcover.usgs.gov/natllandcover.php for additional information regarding the NLCD92 data set. Unfortunately, the NLCD92 database is not available for all of Alaska, which means AERSURFACE is not a viable tool for those areas. Availability is changing though, which means the website should be checked for the current status.

When AERSURFACE cannot be run, the geometric means must be hand-calculated from the estimated fractions of the surface characteristics found within a given area. Since land fractions must be used for this estimate rather than a gridded database, the land fraction must be used to weight all surface parameters, including the Bowen Ratio. The recommended approach for making these calculations is based on the following principals and equations.

The geometric mean of a data set $[x_1, x_2, .., x_n]$ is given by the equation:

(*Eq 1*) Geometric Mean = $(x_1 \cdot x_2 \cdot \ldots \cdot x_n)^{1/n}$

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The weighted geometric mean ($\bar{x}$) is given by the equation:

(*Eq 2*) $$\bar{x} = [(x_1)^{w_1} \cdot (x_2)^{w_2} \cdot \ldots \cdot (x_n)^{w_n}]^{1/\Sigma(w)}$$

where w_i is the weighted value for each data point.

The weighted geometric mean can also be expressed as:

(*Eq 3*) $$\bar{x} = \left[\prod_{i=1}^{n} x_i^{w_i}\right]^{1/\sum_{i=1}^{n} w_i} = \exp\left[\frac{\sum_{i=1}^{n} w_i \ln(x_i)}{\sum_{i=1}^{n} w_i}\right]$$

SUGGESTED METHOD

- Use EPA's stated guidance for determining the applicable areas/sectors for calculating the Bowen Ratio and Surface Roughness Length.
- Use photographs, site visits, maps, etc., to determine the types of land classifications for the given area/sector.
- Estimate the fraction of land that each classification covers within the given area/sector. When assessing the surface roughness length, also estimate the approximate distance (in kilometers) to the centroid of each classification.
- Put the above values in a table, along with the seasonal Bowen Ratio or Surface Roughness Length (as applicable) associated with each classification.
- When calculating the geometric mean Bowen ratio, weight each value by the applicable land fraction.
- When calculating the inverse weighted geometric mean surface roughness length, weight each value by the applicable land fraction divided by the distance.

Example Calculation – Bowen ratio

The land within a 10 km by 10 km domain centered on the meteorological tower can be classified as indicated in Table 1. The area of each classification, the fraction of the total area and the associated Bowen ratio (*B*) for a given season (winter), are also shown.

The geometric mean Bowen ratio ($\bar{B}$) would therefore be:

(*Eq 4*) $$\bar{B} = [(0.5)^{0.57} \cdot (6)^{0.37} \cdot (6)^{0.02} \cdot (0.5)^{0.02} \cdot (0.5)^{0.01} \cdot (0.1)^{0.01}]^{1/1}$$

$$\bar{B} = \mathbf{1.30}$$

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Table 1 – Bowen Ratio Example

Land Cover Category	Area (km^2)	Fraction of Total Area	Bowen Ratio
Evergreen Forest	57	0.57	0.5
Shrubland	37	0.37	6
Bare Rock/Sand/Clay	2	0.02	6
Quarries/Strip Mines/Gravel Pits	2	0.02	0.5
Low Intensity Residential	1	0.01	0.5
Open Water	1	0.01	0.1
TOTAL	100	1.00	

Example Calculation – Surface Roughness Length

The land within a 1-km radius of the meteorological tower can be divided into sectors. One of the sectors has the classifications indicated in Table 2. The area of each classification, the fraction of the total area, the distance between the meteorological tower and the centroid of each classification are also shown, along with the inverse of the distance, the weighting value (fraction divided by distance), and the associated surface roughness (s_z) for a given season (summer).

Table 2 – Surface Roughness Length Example

Land Cover Category	Area (km^2)	Fraction of Total Area	Distance (km)	Weighting (Frac/Dist)	s_z (m)
Evergreen Forest	1.26	0.40	0.66	0.61	1.3
Shrubland	0.79	0.25	0.13	1.92	0.15
Low Intensity Residential	0.63	0.20	0.74	0.27	0.54
Open Water	0.46	0.15	0.23	0.65	0.001
TOTAL	3.14	1.00		3.45	

The inverse-distance weighted geometric mean surface roughness length $\overline{s_z}$ would therefore be:

(Eq 5) $$\overline{s_z} = [(1.3)^{0.61} \cdot (0.15)^{1.92} \cdot (0.54)^{0.27} \cdot (0.001)^{0.65}]^{(1/3.45)}$$

$$\overline{s_z} = \mathbf{0.094}$$

The surface roughness length could also be calculated using the logarithmic approach. In this case, the table could be expanded to include the natural logarithm of each surface roughness length; and the product of the weighting and natural logarithm; as illustrated in Table 3.

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Table 3 – Alternative Surface Roughness Length Example

Land Cover Category	Area (km^2)	Fraction of Total Area	Distance (km)	Weighting (Frac/Dist)	s_z (m)	Ln (s_z)	Wt · Ln (s_z)
Evergreen Forest	1.26	0.40	0.66	0.61	1.3	0.262	0.160
Shrubland	0.79	0.25	0.13	1.92	0.15	-1.897	-3.642
Low Intensity Residential	0.63	0.20	0.74	0.27	0.54	-0.616	-0.166
Open Water	0.46	0.15	0.23	0.65	0.001	-6.908	-4.490
TOTAL	3.14	1.00		3.45			-8.139

In this case, the inverse-distance weighted geometric mean surface roughness length $\overline{s_z}$ would be calculated as:

(Eq 6) $\overline{s_z}$ = exp (-8.139 / 3.45)

$\overline{s_z}$ **= 0.095** (*note: the difference in values is due to round-off error*)

ADDITIONAL COMMENTS

Albedo should be based on an arithmetic mean, weighted by land-fraction, of the values found in a 10 km by 10 km domain centered on the meteorological measurement site. As stated in EPA's AERMOD Implementation Guide, albedo has no direction or distance dependency (i.e., no sector or inverse-distance weighting).

In all cases, the surface characteristics should be calculated on a monthly basis rather than a quarterly or annual basis. Applicants will also need to document and justify their selected values. Justification can include, but is not limited to: maps, photographs, and published reports/studies of local surface characteristics.

The surface characteristics provided by EPA in the AERMET and AERSURFACE User Guides may be used when local data is unavailable (which is the typical case). *However, be aware that EPA used different assumptions in reporting the winter Bowen Ratio values in these two documents*. In the AERMET User's Guide, EPA assumed continuous snow cover. In the AERSURFACE User's Guide, EPA assumed some snow melt occurs during the day. Therefore, for most parts of Alaska, the values reported in the AERMET User's Guide may be more appropriate than the values reported in the AERSURFACE User's Guide.

If the land-use classification is homogeneous (e.g., all tundra), then the surface roughness length, Bowen ratio, and albedo for the given classification and month can be used without going through the calculations provided in this guidance.

The Department encourages applicants to provide their proposed values in a modeling protocol prior to conducting the modeling analysis. This step allows the Department to review and approve the proposed approach prior to incurring the expense of conducting the actual modeling analysis.

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ATTACHMENT 9
SURFACE ROUGHNESS LENGTH PER LAND CLASSIFICATION

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Estimated Surface Roughness Estimates Per Land Category at Decordova Site

AERSURFACE User's Guide (Revised 01/16/2013) Table A-3								Annual Estimate For Decordova Site				
		Seasonal Catagories						1	2	3	5	Total
		1	2	3	4	5	Reference	3	3	3	3	
11	Open Water	0.001	0.001	0.001	0.001	0.001	Stull	0.00025	0.00025	0.00025	0.00025	0.001
12	Perennial Ice/Snow	0.002	0.002	0.002	0.002	0.002	Stull	0.0005	0.0005	0.0005	0.0005	0.002
21	Low Intensity Residential	0.4	0.4	0.3	0.3	0.7	50% 22 + 25% 43 + 25% 85	0.1	0.1	0.075	0.175	0.45
22	High Intensity Residential	1	1	1	1	1	AERMET	0.25	0.25	0.25	0.25	1
23	Commercial/Indust/Transp (Site at Airport)	0.07	0.07	0.07	0.07	0.07	10% 22 & 90% 31	0.0175	0.0175	0.0175	0.0175	0.07
23	Commercial/Indust/Transp (Not at Airport)	0.7	0.7	0.7	0.7	0.7	90% 22 & 10% 31	0.175	0.175	0.175	0.175	0.7
31	Bare Rock/Sand/Clay (Arid Region)	0.05	0.05	0.05	NA	0.05	Slade	0.0125	0.0125	0.0125	0.0125	0.05
31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.05	0.05	0.05	0.05	Slade	0.0125	0.0125	0.0125	0.0125	0.05
32	Quarries/Strip Mines/Gravel	0.3	0.3	0.3	0.3	0.3	Estimate	0.075	0.075	0.075	0.075	0.3
33	Transitional	0.2	0.2	0.2	0.2	0.2	Estimate	0.05	0.05	0.05	0.05	0.2
41	Deciduous Forest	1.3	1.3	0.6	0.5	1	AERMET	0.325	0.325	0.15	0.25	1.05
42	Evergreen Forest	1.3	1.3	1.3	1.3	1.3	AERMET	0.325	0.325	0.325	0.325	1.3
43	Mixed Forest	1.3	1.3	0.9	0.8	1.1	50% 41 & 50% 42	0.325	0.325	0.225	0.275	1.15
51	Shrubland (Arid Region)	0.15	0.15	0.15	NA	0.15	50% 51 (Non-arid)	0.0375	0.0375	0.0375	0.0375	0.15
51	Shrubland (Non-arid Region)	0.3	0.3	0.3	0.15	0.3	AERMET	0.075	0.075	0.075	0.075	0.3
61	Orchards/Vineyards/Other	0.3	0.3	0.1	0.05	0.2	Garratt	0.075	0.075	0.025	0.05	0.225
71	Grasslands/Herbaceous	0.1	0.1	0.01	0.005	0.05	AERMET	0.025	0.025	0.0025	0.0125	0.065
81	Pasture/Hay	0.15	0.15	0.02	0.01	0.03	Garratt, Slade	0.0375	0.0375	0.005	0.0075	0.0875
82	Row Crops	0.2	0.2	0.02	0.01	0.03	Garratt, Slade	0.05	0.05	0.005	0.0075	0.1125
83	Small Grains	0.15	0.15	0.02	0.01	0.03	Garratt, Slade	0.0375	0.0375	0.005	0.0075	0.0875
84	Fallow	0.05	0.05	0.02	0.01	0.03	31 & 81,82,83	0.0125	0.0125	0.005	0.0075	0.0375
85	Urban/Recreational Grasses	0.02	0.015	0.01	0.005	0.015	Randerson	0.005	0.00375	0.0025	0.00375	0.015
91	Woody Wetlands	0.5	0.5	0.4	0.3	0.5	50% 43 & 50% 92	0.125	0.125	0.1	0.125	0.475
92	Emergent Herbaceous Wetlands	0.2	0.2	0.2	0.1	0.2	AERMET	0.05	0.05	0.05	0.05	0.2

Seasonal Catagories		At Decordova Site
1	Midsummer with lush vegitation	Applicable the majority of the year (assumed 6 months)
2	Autumn with unharvested cropland	Applicable part of the year (assumed 3 months)
3	Late autumn after frost and harvest; Winter with no snow	Not applicable to existing vegetation for any time of year
4	Winter with continuous snow on ground	Not applicable to existing vegetation for any time of year
5	Transitional spring with partial grean coverage or short annuals	Applicable part of the year (assumed 3 months)

ATTACHMENT 10
SURFACE ROUGHNESS LENGTH CALCULATIONS

ED_001261_00098165

Summary of Surface Roughness Calculations

Sector	Sector Start (degrees)	Sector End (degrees)	Surface Roughness Length Sz' (m)
1	39	78	0.151
2	78	210	0.010
3	210	300	0.296
4	300	39	0.017

ED_001261_00098165

Surface Roughness Length Calculation
Sector "1"

Sector	Parcel ID	Land Cover Category	Sz (m)	Parcel Area (km2)	Distance (km)	Fraction of Total Area	Weighting (Fraction/Distance)	Sz' (m)
1	3b - 43	Evergreen Forest	1.3	0.00071	0.63881	0.0021	0.003318	1.0009
	15 - 43	Evergreen Forest	1.3	0.00639	0.76784	0.0192	0.024982	1.0066
	62-43	Evergreen Forest	1.3	0.00460	0.79340	0.0138	0.017381	1.0046
	64-43	Evergreen Forest	1.3	0.00566	0.93291	0.0170	0.018194	1.0048
	1- 23B	Commercial/Indust/Transp (Not at Airport)	0.7	0.03099	0.19812	0.0930	0.469352	0.8459
	4 - 51B	Shrubland (Non-arid Region)	0.3	0.01124	0.53634	0.0337	0.062906	0.9271
	6 - 51B	Shrubland (Non-arid Region)	0.3	0.00212	0.65961	0.0064	0.009658	0.9884
	7- 51B	Shrubland (Non-arid Region)	0.3	0.00232	0.69970	0.0070	0.009967	0.9881
	11b - 51B	Shrubland (Non-arid Region)	0.3	0.00105	0.68474	0.0032	0.004619	0.9945
	12 - 51B	Shrubland (Non-arid Region)	0.3	0.00405	0.66923	0.0121	0.018144	0.9784
	13b - 51B	Shrubland (Non-arid Region)	0.3	0.00516	0.56742	0.0155	0.027272	0.9677
	14 - 51B	Shrubland (Non-arid Region)	0.3	0.00500	0.74496	0.0150	0.020140	0.9760
	16 - 51B	Shrubland (Non-arid Region)	0.3	0.00077	0.84293	0.0023	0.002742	0.9967
	17 - 51B	Shrubland (Non-arid Region)	0.3	0.01531	0.89842	0.0459	0.051140	0.9403
	54-71	Grasslands/Herbaceous	0.065	0.05285	0.40108	0.1586	0.395367	0.3394
	55-71	Grasslands/Herbaceous	0.065	0.05761	0.60276	0.1729	0.286795	0.4566
	57-71	Grasslands/Herbaceous	0.065	0.05936	0.78105	0.1781	0.228059	0.5361
	59-71	Grasslands/Herbaceous	0.065	0.00263	0.89850	0.0079	0.008773	0.9763
	60-71	Grasslands/Herbaceous	0.065	0.00204	0.91038	0.0061	0.006724	0.9818
	61-71	Grasslands/Herbaceous	0.065	0.04635	0.92547	0.1391	0.150283	0.6631
	65-51B	Grasslands/Herbaceous	0.065	0.00787	0.90272	0.0236	0.026156	0.9310
	56-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00055	0.77624	0.0017	0.002128	0.9936
	66-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00021	0.68408	0.0006	0.000939	0.9972
	68-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00234	0.93792	0.0070	0.007487	0.9778
	69-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00257	0.95486	0.0077	0.008073	0.9761
	9 - 11	Open Water	0.001	0.00007	0.68617	0.0002	0.000314	0.9978
	20 - 11	Open Water	0.001	0.00179	0.97463	0.0054	0.005523	0.9626
	21 - 11	Open Water	0.001	0.00164	0.97373	0.0049	0.005065	0.9656
	Total			**0.33327**		**1.0000**	**1.871499**	**0.151**

* The "Total" value corresponds to the inverse-distance weighted geometric mean surface roughness length:

$$Sz' = [\ (Sz_1)^{w1} * (Sz_2)^{w2} * (Sz_3)^{w3} * \ldots (Sz_n)^{wn}\ ]^{(1/\Sigma w)}$$

ED_001261_00098165

Surface Roughness Length Calculation
Sector "2"

Sector	Parcel ID	Land Cover Category	Sz (m)	Parcel Area (km2)	Distance (km)	Fraction of Total Area	Weighting (Fraction/Distance)	Sz' (m)
2	3 - 43	Evergreen Forest	1.3	0.01571	0.58382	0.0137	0.023550	1.0062
	62b-43	Evergreen Forest	1.3	0.00273	0.76623	0.0024	0.003114	1.0008
	84-43	Evergreen Forest	1.3	0.01001	0.54415	0.0088	0.016095	1.0042
	84A-43	Evergreen Forest	1.3	0.06887	0.67801	0.0603	0.088873	1.0236
	45-23	Commercial/Indust/Transp (Not at Airport)	0.7	0.05462	0.21389	0.0478	0.223413	0.9234
	8 - 51B	Shrubland (Non-arid Region)	0.3	0.00264	0.65678	0.0023	0.003519	0.9958
	46-51	Shrubland (Non-arid Region)	0.3	0.01299	0.24509	0.0114	0.046353	0.9457
	47-51	Shrubland (Non-arid Region)	0.3	0.03965	0.34053	0.0347	0.101880	0.8846
	85-51	Shrubland (Non-arid Region)	0.3	0.00928	0.55241	0.0081	0.014699	0.9825
	63-51B	Grasslands/Herbaceous	0.065	0.00503	0.77457	0.0044	0.005679	0.9846
	57b-71	Grasslands/Herbaceous	0.065	0.00080	0.75361	0.0007	0.000924	0.9975
	83-71	Grasslands/Herbaceous	0.065	0.05971	0.36637	0.0522	0.142598	0.6772
	83A-71	Grasslands/Herbaceous	0.065	0.00276	0.11083	0.0024	0.021803	0.9421
	66b-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00412	0.60190	0.0036	0.005992	0.9822
	67-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00609	0.83317	0.0053	0.006391	0.9810
	86-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.01004	0.41395	0.0088	0.021213	0.9384
	87-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00285	0.25466	0.0025	0.009805	0.9711
	88-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00426	0.22496	0.0037	0.016560	0.9516
	89-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.01471	0.40578	0.0129	0.031709	0.9094
	90-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.01655	0.55807	0.0145	0.025948	0.9252
	91-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00024	0.49536	0.0002	0.000420	0.9987
	92-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00114	0.48994	0.0010	0.002044	0.9939
	44-11	Open Water	0.001	0.08493	0.34673	0.0743	0.214302	0.2276
	44A-11	Open Water	0.001	0.18154	0.55750	0.1588	0.284908	0.1397
	44B-11	Open Water	0.001	0.24805	0.65568	0.2170	0.330990	0.1016
	44C-11	Open Water	0.001	0.28364	0.74793	0.2482	0.331804	0.1011
	Total			**1.14296**		**1.0000**	**1.974583**	**0.010**

* The "Total" value corresponds to the inverse-distance weighted geometric mean surface roughness length:

$$Sz' = [\ (Sz_1)^{w1} * (Sz_2)^{w2} * (Sz_3)^{w3} * \ldots (Sz_n)^{wn}\ ]^{(1/\Sigma w)}$$

ED_001261_00098165

Surface Roughness Length Calculation
Sector "3"

Sector	Parcel ID	Land Cover Category	Sz (m)	Parcel Area (km2)	Distance (km)	Fraction of Total Area	Weighting (Fraction/Distance)	Sz' (m)
3	35-42	Evergreen Forest	1.3	0.07444	0.38685	0.0970	0.250717	1.0680
	35A-42	Evergreen Forest	1.3	0.13764	0.57169	0.1793	0.313673	1.0858
	35B-42	Evergreen Forest	1.3	0.11708	0.75046	0.1525	0.203264	1.0548
	35C-42	Evergreen Forest	1.3	0.10452	0.90246	0.1362	0.150888	1.0404
	53-43	Evergreen Forest	1.3	0.08363	0.80982	0.1090	0.134546	1.0359
	37-23	Commercial/Indust/Transp (Not at Airport)	0.7	0.01429	0.08680	0.0186	0.214437	0.9264
	77-71	Grasslands/Herbaceous	0.065	0.07697	0.29731	0.1003	0.337306	0.3977
	78-71	Grasslands/Herbaceous	0.065	0.02783	0.58238	0.0363	0.062247	0.8435
	79-71	Grasslands/Herbaceous	0.065	0.02092	0.78838	0.0273	0.034572	0.9098
	80-71	Grasslands/Herbaceous	0.065	0.01662	0.92536	0.0217	0.023400	0.9380
	81-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00362	0.93140	0.0047	0.005062	0.9850
	82-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00943	0.30036	0.0123	0.040911	0.8847
	34-11	Open Water	0.001	0.03219	0.93420	0.0419	0.044891	0.7334
	36-11	Open Water	0.001	0.00511	0.23978	0.0067	0.027774	0.8254
	42-11	Open Water	0.001	0.00230	0.95756	0.0030	0.003130	0.9786
	74-11	Open Water	0.001	0.01124	0.34260	0.0146	0.042739	0.7444
	75-11	Open Water	0.001	0.00712	0.60256	0.0093	0.015405	0.8991
	76-11	Open Water	0.001	0.00374	0.77028	0.0049	0.006332	0.9572
	76A-11	Open Water	0.001	0.01592	0.80048	0.0207	0.025918	0.8361
	94-11	Open Water	0.001	0.00293	0.92956	0.0038	0.004102	0.9721
	Total			**0.76756**		**1.0000**	**1.941312**	**0.296**

* The "Total" value corresponds to the inverse-distance weighted geometric mean surface roughness length:

$$Sz' = [\ (Sz_1)^{w1} * (Sz_2)^{w2} * (Sz_3)^{w3} * \ldots (Sz_n)^{wn}\ ]^{(1/\Sigma w)}$$

ED_001261_00098165

Surface Roughness Length Calculation
Sector "4"

Sector	Parcel ID	Land Cover Category	Sz (m)	Parcel Area (km2)	Distance (km)	Fraction of Total Area	Weighting (Fraction/Distance)	Sz' (m)
4	2 - 43	Evergreen Forest	1.3	0.00100	0.44299	0.0011	0.002513	1.0007
	29-43	Evergreen Forest	1.3	0.08799	0.39565	0.0983	0.248567	1.0674
	29A-43	Evergreen Forest	1.3	0.00581	0.51277	0.0065	0.012654	1.0033
	28-23B	Commercial/Indust/Transp (Not at Airport)	0.7	0.03529	0.13056	0.0394	0.302055	0.8979
	55b-71	Grasslands/Herbaceous	0.065	0.01437	0.63181	0.0161	0.025424	0.9329
	73B-71	Grasslands/Herbaceous	0.065	0.09317	0.26992	0.1041	0.385798	0.3484
	56b-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00978	0.83299	0.0109	0.013119	0.9615
	70-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00390	0.43464	0.0044	0.010023	0.9704
	71-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00059	0.50525	0.0007	0.001295	0.9961
	72-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.00578	0.47049	0.0065	0.013723	0.9597
	73-31	Bare Rock/Sand/Clay (Non-arid Region)	0.05	0.01159	0.59007	0.0130	0.021953	0.9363
	10 - 51B	Shrubland (Non-arid Region)	0.3	0.00890	0.55371	0.0100	0.017971	0.9786
	11 - 51B	Shrubland (Non-arid Region)	0.3	0.00098	0.67326	0.0011	0.001627	0.9980
	13 - 51B	Shrubland (Non-arid Region)	0.3	0.00112	0.55047	0.0013	0.002273	0.9973
	17b- 51B	Shrubland (Non-arid Region)	0.3	0.00202	0.83652	0.0023	0.002697	0.9968
	18 - 11	Open Water	0.001	0.00981	0.78286	0.0110	0.014003	0.9078
	25-11	Open Water	0.001	0.57529	0.70659	0.6430	0.909992	0.0019
	26-11	Open Water	0.001	0.01297	0.28626	0.0145	0.050625	0.7049
	27-11	Open Water	0.001	0.01438	0.32277	0.0161	0.049795	0.7090
	Total			**0.89471**		**1.0000**	**2.086108**	0.017

* The "Total" value corresponds to the inverse-distance weighted geometric mean surface roughness length:

$$Sz' = [\ (Sz_1)^{w1} * (Sz_2)^{w2} * (Sz_3)^{w3} * \ldots (Sz_n)^{wn}\ ]^{(1/\Sigma w)}$$

ATTACHMENT 11
MONITOR CONCENTRATIONS – TEMPORIALLY VARYING

ED_001261_00098165

Maximum 98th % Hour Of Day NO2 Background Concentrations
From Available Eagle Mountain Lake Monitor Data

Hour of Day	2012 Q1-Q4 (ppb)	2013 Q1-Q4 (ppb)	2014 Q1-Q4 (ppb)	3-Year Maximum* (ppb)	3-Year Maximum* (µg/m3)
0:00	32.6	31.8	27.9	32.6	61.3
1:00	32.0	32.2	24.7	32.2	60.5
2:00	31.7	27.3	22.1	31.7	59.6
3:00	31.1	29.2	21.7	31.1	58.4
4:00	32.1	30.9	21.9	32.1	60.3
5:00	30.4	29.8	24.1	30.4	57.1
6:00	30.7	27.0	24.3	30.7	57.7
7:00	27.1	26.7	21.7	27.1	50.9
8:00	23.2	21.8	19.7	23.2	43.6
9:00	21.8	18.5	14.9	21.8	41.0
10:00	16.0	15.1	11.9	16.0	30.1
11:00	11.9	12.3	9.5	12.3	23.1
12:00	9.9	11.2	9.9	11.2	21.0
13:00	10.0	10.6	9.1	10.6	19.9
14:00	9.6	8.8	8.0	9.6	18.0
15:00	9.0	9.1	8.7	9.1	17.1
16:00	9.3	11.0	11.3	11.3	21.2
17:00	14.8	15.3	13.0	15.3	28.8
18:00	26.1	17.7	15.8	26.1	49.0
19:00	34.7	27.3	18.8	34.7	65.2
20:00	36.2	34.1	24.2	36.2	68.0
21:00	36.3	34.4	25.1	36.3	68.2
22:00	36.7	33.0	25.6	**36.7**	**69.0**
23:00	33.9	30.7	27.4	33.9	63.7

* TCEQ guidance (for modeling Weatherford Aerospace)

Maximum (H1H) Hour Of Day O3 Background Concentrations
From Available Granbury Monitor Data

Hour of Day	2013-14	2014		
	Winter	Spring	Summer	Fall
	(ppb)	(ppb)	(ppb)	(ppb)
0:00	35.0	58.0	46.0	46.0
1:00	36.0	59.0	47.0	45.0
2:00	39.0	55.0	39.0	45.0
3:00	36.0	53.0	36.0	46.0
4:00	34.0	52.0	36.0	36.0
5:00	35.0	44.0	62.0	34.0
6:00	36.0	42.0	64.0	31.0
7:00	36.0	50.0	59.0	33.0
8:00	38.0	57.0	52.0	36.0
9:00	41.0	59.0	58.0	47.0
10:00	46.0	61.0	62.0	53.0
11:00	46.0	64.0	67.0	61.0
12:00	47.0	66.0	74.0	60.0
13:00	49.0	70.0	76.0	64.0
14:00	52.0	72.0	87.0	68.0
15:00	51.0	76.0	95.0	74.0
16:00	51.0	81.0	101.0	76.0
17:00	49.0	82.0	107.0	71.0
18:00	44.0	77.0	106.0	70.0
19:00	44.0	67.0	87.0	64.0
20:00	46.0	61.0	79.0	53.0
21:00	43.0	58.0	56.0	51.0
22:00	37.0	63.0	50.0	48.0
23:00	36.0	61.0	46.0	50.0

Maximum 98th % Hourly NO2 Background Concentrations
From Available Parker County Monitor Data

Hour of Day	2010 Q2-Q4 (ppb)	2011 Q1-Q4 (ppb)	2012 Q1-Q4 (ppb)	2013 Q1 (ppb)	4-Year Maximum (ppb)
0:00	15.4	14.1	12.5	18.5	18.5
1:00	10.7	12.2	10.9	10.6	12.2
2:00	8.3	13.1	11.3	11.4	13.1
3:00	9.9	11.4	11.0	14.1	14.1
4:00	11.3	11.5	11.1	10.0	11.5
5:00	11.6	14.0	14.1	11.9	14.1
6:00	22.3	20.1	20.9	21.0	22.3
7:00	17.6	19.0	16.8	26.9	26.9
8:00	9.9	11.8	10.8	20.8	20.8
9:00	7.9	8.8	7.3	13.8	13.8
10:00	7.2	8.0	5.8	15.4	15.4
11:00	5.9	7.0	6.1	13.7	13.7
12:00	5.3	8.7	5.6	13.0	13.0
13:00	5.3	6.9	6.0	23.3	23.3
14:00	5.4	7.4	5.6	12.6	12.6
15:00	4.3	8.5	5.3	14.5	14.5
16:00	5.4	8.6	5.3	10.3	10.3
17:00	11.6	10.3	7.4	14.0	14.0
18:00	15.3	11.1	9.7	14.1	15.3
19:00	15.3	12.4	10.4	20.2	20.2
20:00	14.1	14.0	8.8	13.5	14.1
21:00	15.0	13.4	12.0	24.1	24.1
22:00	14.3	13.1	12.2	21.4	21.4
23:00	16.3	13.9	12.4	15.2	16.3

ATTACHMENT 12
IN-STACK NO_2 / NO_X RATIO DOCUMENTATION

ED_001261_00098165

Halland, Jeremy

From: Cecil.Lawrence@fluor.com
Sent: Tuesday, October 21, 2014 3:12 PM
To: Purvis, Kevin
Cc: Halland, Jeremy; Marvin.Kawamoto@fluor.com; michael.j.martin@fluor.com; Coon, Paul
Subject: Fw: GE 7FA.05 NO2 to NOx Ratio

Here is GE's guidance on the stack NO2 to NOx ratio. It is very similar to what they advised for 7FA.04 on LCRA.

Please let me know if you have any additional question.

Best Regards,
Cecil Lawrence, MBA, MSME, PE | **FLUOR** | Senior Process / Specialty Engineer – Power Group | cecil.lawrence@fluor.com | IODC 30.2345 | O +1.949.349.2345 | www.fluor.com
----- Forwarded by Cecil Lawrence/AV/FD/FluorCorp on 10/21/2014 12:45 PM -----

From: "Dicke, Andrew (GE Power & Water)" <andrew.dicke@ge.com>
To: "Cecil.Lawrence@fluor.com" <Cecil.Lawrence@fluor.com>,
Cc: "Thuillez, Mike (GE Power & Water)" <mike.thuillez@ge.com>
Date: 10/21/2014 12:39 PM
Subject: RE: GE 7FA.05 NO2 to NOx Ratio

Cecil,

The following is GE's guidance for the stack NO2 ratio.

Regards,
Andy

GE provides the following guidance regarding Gas Turbine ratio of NO2 to total plant NOx emissions to support emission modeling in relation with the 1 hr NO2 NAAQS.

The oxidation of NO to NO2 within gas turbine exhaust is very sensitive to the exhaust gas temperature, exhaust constituents, residence time through the exhaust system, temperature of the downstream equipment and presence of CO catalyst and SCR. As such, GE provides the following guidance based on field measurement experience and input from catalyst vendors.

Emission Compliant Operation
During emission compliant Gas Turbine operation (approximately 50% gas turbine load or greater including load ramping), the measured NO2 levels are consistently 15% or less of total NOx levels. GE recommends assuming NO2 to total NOx ratio of 15%.

When SCR and CO catalyst are present and fully functional, the CO catalyst will oxidize a portion of the NO to NO2 and the SCR will remove the constituents at varying rates dependent catalyst operating conditions (e.g. temperature, residence time, ammonia & NOx concentrations). Recent field measurements indicate the NO2 is approximately 20 to 25% of total NOx when measured at the HRSG stack when a CO catalyst and SCR are present and operational. This ratio was verified through discussion with catalyst vendors, who indicated a recommended NO2 ration of 30% of total NOx. GE recommends assuming an NO2 to total NOx ratio of 30% during emission compliant operation with a CO catalyst and SCR in operation.

Halland, Jeremy

From: Purvis, Kevin
Sent: Wednesday, October 15, 2014 1:31 PM
To: Michael.J.Martin@fluor.com; Kagolanu, Ramesh (PG ES EN ORL PTEC); Cecil.Lawrence@fluor.com
Cc: Halland, Jeremy
Subject: RE: Luminant Siemens SGT6-5000F5 (ee) NOx Information

Thanks everyone for the follow up.

From: Michael.J.Martin@fluor.com [mailto:Michael.J.Martin@fluor.com]
Sent: Wednesday, October 15, 2014 12:28 PM
To: Kagolanu, Ramesh (PG ES EN ORL PTEC)
Cc: Cecil.Lawrence@fluor.com; Halland, Jeremy; Purvis, Kevin
Subject: RE: Luminant Siemens SGT6-5000F5 (ee) NOx Information

Ramesh,
Thanks for the confirmation. Mike

Michael J. Martin, Fluor Fellow | **FLUOR** | Director II, Health Safety & Environmental 100 Fluor Daniel Dr. Greenville, SC 29607 IODC 20-1744 O 864-517-1744 | C 864-704-4885 Michael.J.Martin@Fluor.com

From: "Kagolanu, Ramesh (PG ES EN ORL PTEC)" <ramesh.kagolanu@siemens.com>
To: "Michael.J.Martin@fluor.com" <Michael.J.Martin@fluor.com>,
Cc: "Halland, Jeremy" <Jeremy.Halland@luminant.com>, "kevin.purvis@luminant.com" <kevin.purvis@luminant.com>, "Cecil.Lawrence@fluor.com" <Cecil.Lawrence@fluor.com>
Date: 10/15/2014 01:26 PM
Subject: RE: Luminant Siemens SGT6-5000F5 (ee) NOx Information

---

Mike: Yes, Please use 20% as NO2 portion of total NOx.

Regards

Ramesh Kagolanu
Manager, Environmental Engineering
Siemens Energy Inc., Orlando
407-736-7395
From: Michael.J.Martin@fluor.com [mailto:Michael.J.Martin@fluor.com]
Sent: Wednesday, October 15, 2014 1:24 PM
To: Kagolanu, Ramesh (PG ES EN ORL PTEC)
Cc: Halland, Jeremy; kevin.purvis@luminant.com; Cecil.Lawrence@fluor.com
Subject: Luminant Siemens SGT6-5000F5 (ee) NOx Information

Ramesh,
This email is to confirm our discussion this afternoon regarding a Luminant Air Permitting question as to the 'NO2/NOx Ratio' for the F5ee machine as to the portion of the NOx emissions that are directly emitted as NO2. As stated, for the Siemens F5ee machine, the value is low from approximately 50 100 Load. The value that applies during this load range is 20%.

By this email, if the above is incorrect, please advise as Luminant is copied and advise to use 20% during the specified Load.

Thanks – Mike

Michael J. Martin, Fluor Fellow | **FLUOR** | Director II, Health Safety & Environmental 100 Fluor Daniel Dr. Greenville, SC 29607 IODC 20-1744 O 864-517-1744 | C 864-704-4885 Michael.J.Martin@Fluor.com

ED_001261_00098165

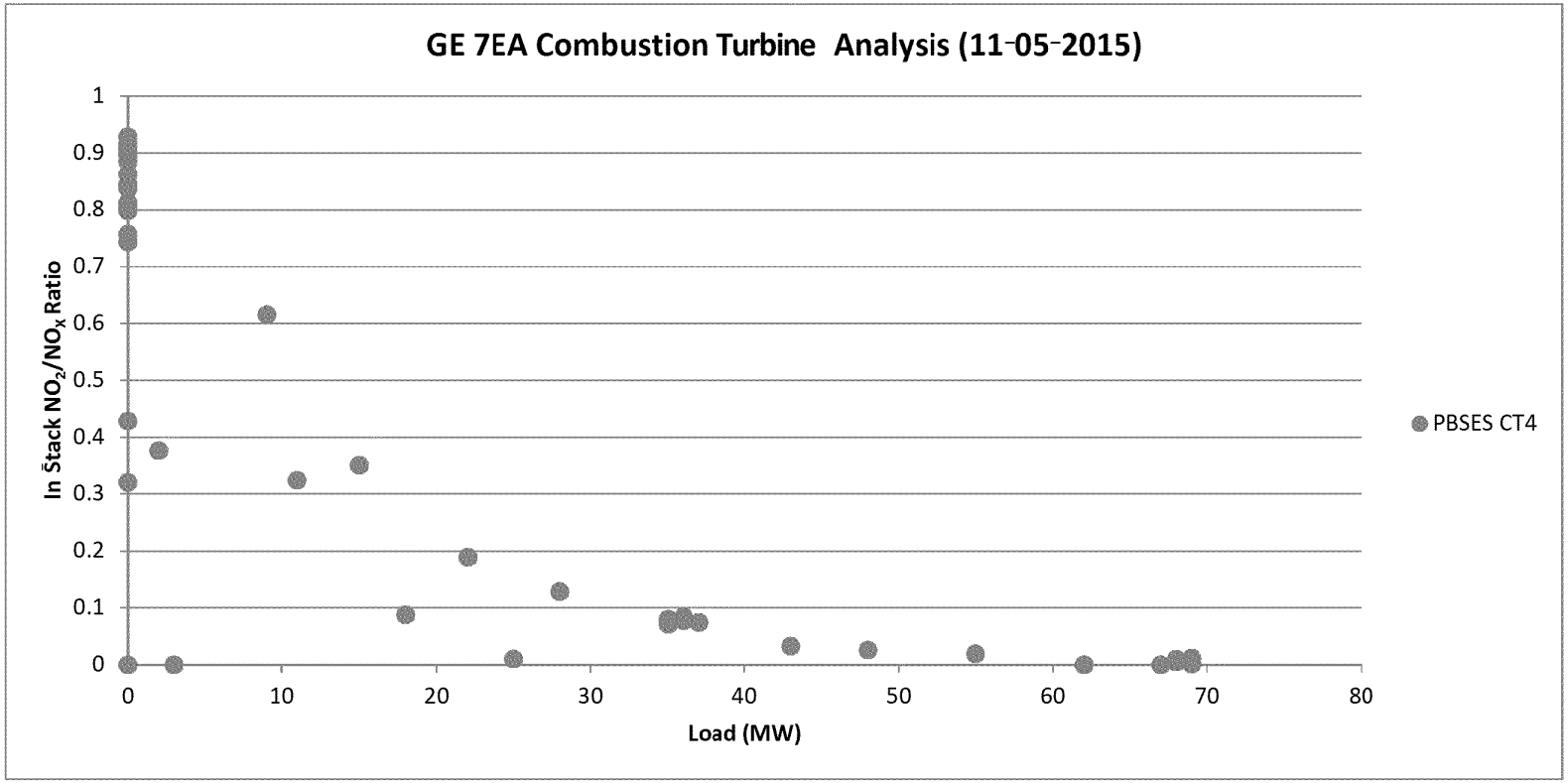
ED_001261_00098165

DeCordova SES CT1-CT4 In-Stack Ratio Justification

		Analyzer Results[1]	
Load	MW	Parameter	CT-4
100% - 50%	>40	Average	0.013
		Max	0.033

Note:

1. The NO_X analyzer results from November 5, 2015 runtime of Permian Basin CT4.



November 24, 2015

Subject: Panda Sherman Power II LLC Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis (AQA) Protocol for Panda Sherman Power II LLC located near Sherman, Grayson County, Texas, dated November 2015, and my comments are provided below. The comments in sections 3.2, 4.2, and 7.0 should be addressed before the AQA is submitted. Please provide a revised protocol addressing the comments mentioned below to the TCEQ and EPA Region 6 for review.

2.0 Project Overview – The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or PSD Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

2.1 Plot Plan – Be sure to clearly label all applicable modeled sources, building structures, and fence line/property line representations on the plot plan.

2.2 Project Description – The protocol notes that three different turbine models are being considered. In order to reduce review time, the ADMT recommends initially evaluating the three turbine models using unit modeling to determine the worst-case turbine and operating scenario. Then the evaluation of the worst-case turbine and operating scenario can be used to evaluate the applicable pollutants.

2.3 Type of Permit Review – The protocol notes that with respect to PSD new source review (NSR), the applicant will only evaluate impacts for NO_2, CO, PM_{10}, and $PM_{2.5}$. The protocol does not have a discussion on conducting an SO_2 NAAQS demonstration. Although SO_2 does not trigger a PSD review, a minor NSR NAAQS review is required. Be sure to include this demonstration in the AQA.

2.4 NAAQS and PSD Increment Analysis – The protocol notes that major offsite sources will be included in the NAAQS modeling, and PSD increment consuming sources will be included in the increment analysis. If a full impacts analysis is required for any pollutant or averaging time, then off-property minor sources will need to be evaluated as well. For $PM_{2.5}$, the major source baseline date is October 20, 2010 and the minor source baseline date for Grayson County is June 23, 2014. Be sure to document how the off-property source inventory information was obtained in the AQA.

2.5 Proposed Ozone Analysis – The selected ozone monitor is reasonable. Consider using 2015 monitoring data when evaluating the background concentrations since the complete ozone season would be captured by the monitor for the Dallas-Fort Worth area (May 1 – October 31). Be sure

to verify if each year meets the completeness criteria for the ozone monitor. The completeness criteria is met for the three-year period at a monitoring site if daily maximum 8-hr average concentrations are available for at least 90% of the days within the ozone monitoring season, on average, for the three-year period, with a minimum data completeness criteria in any one year of at least 75% of the days within the ozone monitoring season. Be sure to include this information in the AQA.

The method for determining the predicted ozone concentration is generally acceptable. The protocol notes that the procedures contained in Appendix Q of the TCEQ Draft Air Quality Modeling Guidelines will be used. It should be noted that final guidance for the TCEQ Air Quality Modeling Guidelines was released in April 2015. The final guidance notes that Appendix Q is undergoing revisions; therefore, any guidance in the draft document should be used with caution. The ADMT recommends that the applicant rely on information in the Dallas-Fort Worth State Implementation Plan (SIP) to demonstrate that the area is NO_x-limited, instead of using county-level emissions:

http://www.tceq.texas.gov/assets/public/implementation/air/sip/dfw/dfw_ad_sip_2016/DFW_SIP_Appendix_D_pro.pdf

2.6 Secondary Formation of $PM_{2.5}$ – The method for addressing secondary formation of $PM_{2.5}$ is generally acceptable. As noted in the protocol, the proposed SO_2 emissions are less than 40 tpy; therefore, significant secondary $PM_{2.5}$ formation is not expected, which is consistent with EPA guidance.

The protocol notes that EPA's guidance suggests the offset interpollutant trading ratios can be used to estimate total $PM_{2.5}$ secondary emissions. It should be noted that the EPA no longer supports the "preferred" offset ratios in the 2008 final rule without additional technical demonstration specific to the source(s) and area(s) for which the ratios would be applied. The ADMT recommends supplementing this approach by reviewing speciated $PM_{2.5}$ monitoring data from the Kaufman monitor (EPA AIRS monitor 482570005) and showing that the total nitrates are a small fraction of $PM_{2.5}$. In addition, the applicant should consider the potential contribution of secondary $PM_{2.5}$ from the proposed precursor emissions for the project expansion with a comparison to existing regional $PM_{2.5}$ precursor emissions based on TCEQ's 2013 Point Source Emissions Inventory and demonstrate that the precursor emissions from the project are a small percentage of the precursor emissions from the region. A link to TCEQ's 2013 Point Source Emissions Inventory is provided for your convenience:

http://www.tceq.texas.gov/airquality/point-source-ei/psei.html

The protocol notes that the highest 24-hr and annual $PM_{2.5}$ three-year average monitored concentrations are 24.3 $\mu g/m^3$ and 11.5 $\mu g/m^3$, respectively. However, these values do not reflect any of the monitored concentrations reported in Table 4-2 of the protocol. Be sure to be consistent throughout the AQA when providing any demonstration using monitoring data.

2.7 Minor New Source Review – The protocol states that minor sources included in the emissions inventory information received from the TCEQ will be included in the NAAQS

analysis. It's not clear what this statement refers to: including minor sources as part of the PSD NAAQS analysis or conducting a minor NSR NAAQS analysis for pollutants that do not trigger PSD review. Be sure to coordinate with the permit reviewer on what analyses to address.

3.1 On-Property Sources – Be sure to include full documentation for each source characterization and complete technical justification for the associated source parameters in the AQA.

In addition, there is not much detail provided regarding cold/warm starts. Be sure to provide a detailed discussion on how cold/warm starts were evaluated for the modeling demonstration as part of the documentation with the AQA.

3.2 Off-Property Sources – The protocol notes that the project is expected to exceed Class II significant impact levels (SILs) for $PM_{2.5}$. Be sure to follow the guidance in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232, April 2015) to justify the SILs for $PM_{2.5}$. Also note that there is a separate procedure for justifying the SILs for the $PM_{2.5}$ increment. Justification for the SILs for the $PM_{2.5}$ NAAQS and increment demonstrations should be provided prior to submitting the AQA. A link to APDG 6232 is provided for your convenience:

http://www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/airquality-mod-guidelines6232.pdf

The approach to develop the off-property inventory is generally reasonable. The protocol notes that the applicant will update the retrieval based upon permit information available online. The ADMT recommends that the applicant review the retrievals for completeness and accuracy prior to conducting any modeling. In addition, be sure to clearly identify and justify any changes to the retrieval sources.

In addition, if the applicant is aware of data not contained in the retrieval, such as recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide any retrieval files that were obtained from the TCEQ and all supporting materials with the AQA.

The protocol notes that there is no PSD Class II increment associated with the 1-hr NO_2 averaging time and an increment consumption analysis will not be applicable for this pollutant. Please note that there is a PSD Class II increment associated with the annual NO_2 averaging time, which may need to be addressed.

4.1 Proposed Models – The protocol notes that the previous version of AERMOD (14134) will be used in the modeling demonstration if the meteorological data provided by the TCEQ has not been updated to use the newest version of AERMOD (15181). The ADMT recommends that the applicant use the newest version of AERMOD (15181) with the current meteorological data available from the TCEQ website. The changes made in the newest version should not affect the demonstration.

4.2 NO_2 Ambient Impact Analysis – The protocol notes that the NO_2 concentrations will be determined using the Tier 2 ambient ratio method and a NO_2-to-NO_x ratio of 0.8. It should be noted that the NO_2-to-NO_x ratio of 0.8 applies to the 1-hr averaging time, while a NO_2-to-NO_x ratio of 0.75 applies to the annual averaging time.

The protocol notes that the emissions from the emergency engines will be annualized. The ADMT interprets this to mean that EPA's intermittent guidance will be applied to these sources for the 1-hr NO_2 modeling. It is not clear from the information provided in the protocol that the emergency equipment qualifies as intermittent sources. Information such as the number of engines, the number of times per day, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA. Also note that the intermittent guidance only applies to the 1-hr NO_2 and 1-hr SO_2 NAAQS demonstrations. It should not be used for any other pollutant or averaging time, including the SO_2 State Property Line analysis.

4.3.1 NO_2 Background Air Quality – The selected monitor to represent NO_2 background is reasonable for the NAAQS demonstration to capture background sources that are not explicitly modeled; however, if monitoring data are needed for the preconstruction monitoring requirement, then the selected monitor would not be appropriate based on review of nearby sources that are located near the project site compared to the monitor site.

Be sure to update Figures 4-1, 4-2, and 4-3 to reflect this project and not a previous project. The legends and proposed location of the project in these figures refer to Van Alstyne Energy Center instead of Panda Sherman Power II LLC.

4.3.2 $PM_{2.5}$ Background Air Quality – Utilizing the monitor with the highest monitored concentration in the Dallas-Fort Worth area is a reasonable approach and a conservative representation of the project site.

4.4 Representativeness of Proposed Monitor Stations – When providing the justification for the selected monitors, please limit the comparative information between the project site and the selected monitor, except in the case of $PM_{2.5}$ since the monitor with the highest concentration in the area is being utilized.

4.5 PSD Ambient Monitor Requirement – As stated in section 4.3.1 above, the selected monitor for NO_2 is appropriate for the NAAQS demonstration; however, this monitor would not be appropriate for meeting the preconstruction monitoring requirement. There are several off-property sources located nearby the project site; however, there appears to be very little off-property sources near the monitor.

The monitor selected for $PM_{2.5}$ is appropriate to satisfy the preconstruction monitoring requirement.

The protocol notes in Table 2-1 that H_2SO_4 triggers federal review. Since the project triggers PSD review for H_2SO_4, the AQA should address the pre-application analysis for H_2SO_4. However, NAAQS do not exist for H_2SO_4; the TCEQ has discretion on how the pre-application

analysis should be conducted. The evaluation for the State Property Line standard for H_2SO_4 is sufficient for the pre-application analysis. The applicant can satisfy the pre-application analysis by acknowledging this in the AQA.

6.0 Building Wake Effects – Provide all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

Ensure that all GEP heights used in BPIP PRIME are justified according to Guideline for Determination of Good Engineering Practice Stack Height:

http://www.epa.gov/scram001/guidance/guide/gep.pdf

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

7.0 Receptor Grids – The protocol notes that significant receptors will be used in the cumulative impact analyses. Be aware that justification will need to be provided for limiting the receptors to significant receptors in regard to the $PM_{2.5}$ modeling demonstrations. As stated above, this can be accomplished by following the guidance in Appendix A of the TCEQ's Air Quality Modeling Guidelines (APDG 6232, April 2015). Also note that there is a separate procedure for justifying the SILs for the $PM_{2.5}$ increment. Justification for the SILs for the $PM_{2.5}$ NAAQS and increment demonstrations should be provided prior to submitting the AQA.

However, since there are not any monitors near the project site, it is unlikely that justification for using the $PM_{2.5}$ SILs for the increment analysis can be provided. Yet the PSD increment analysis could be limited to significant receptors provided that the magnitude and location of the increment affecting emissions are evaluated relative to the proposed project. If nearby increment affecting emissions are small and distant relative to the project site, then a case could be made for limiting the analysis to the significant receptors.

8.0 Meteorological Data – The protocol notes that the ADMT pre-processed meteorological data for years 2008-2012 will be used for the PSD modeling; this is appropriate. Please note that only one year (2012) of meteorological data is needed for the minor NSR modeling (i.e. State Property Line analyses and minor NSR NAAQS analyses). Be sure to include the meteorological data files with the AQA associated with the modeling analysis. In addition, be sure to provide the AERSURFACE files with the AQA associated with the modeling analysis.

The protocol also notes that the ADMT's pre-processed meteorological data were processed with AERMET Version 14134. It should be noted that the available pre-processed meteorological data were processed with AERMET Version 12345. This discrepancy does not change the validity of the proposed approach.

10.2 Additional Impact Analyses – Please note that the applicant can meet the visibility analysis by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111.

Deliverables – All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Justin Cherry at (512) 239-0955 or by fax at (512) 239-1400, or by email at justin.cherry@tceq.texas.gov.

To: Snyder, Erik[snyder.erik@epa.gov]
Cc: McCorkle, Mark[MAC@adeq.state.ar.us]; Mohr, Ashley[Mohr.Ashley@epa.gov]; vuong@adeq.state.ar.us[vuong@adeq.state.ar.us]
From: Clark, David
Sent: Wed 10/21/2015 3:05:05 PM
Subject: RE: Sierra Club 1-Hour SO2 modeling

Thank you Erik; a heavy dose of meds has me here in body, anyway. That time works for us, talk to you guys at 2pm today.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, October 21, 2015 10:01 AM
To: Clark, David
Cc: McCorkle, Mark; Mohr, Ashley; Vuong, Tam
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hi David,

Glad you are feeling better. 2-3 would work today (if that works on your end). Ashley and I are working from home so we can use my teleconference #. It is 1-866299-3188 Code # Ex. 6 - Personal Privacy

Ex. 6 - Personal Privacy

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Wednesday, October 21, 2015 9:21 AM
To: Snyder, Erik
Cc: McCorkle, Mark; Mohr, Ashley; vuong@adeq.state.ar.us
Subject: RE: Sierra Club 1-Hour SO2 modeling

Erik & Ashley,

Sorry for the cancelation yesterday. Could we reschedule for some time this week, either mid-morning (9-10am) or midafternoon (2-3)?

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

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From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Monday, October 19, 2015 4:52 PM
To: Clark, David
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

10 works for me and think Ashley is available. Do you have a number you want us to call or do you want to use my conference line?

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, October 19, 2015 12:24 PM

To: Snyder, Erik
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

Thank you Erik. Just a brief conversation about the various approaches for the current modeling efforts and the modeling efforts for the future facilities. Does 10am work for the call?

David

David W. Clark, M.S.

Epidemiologist

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From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Monday, October 19, 2015 11:14 AM
To: Clark, David
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hi David,

Tomorrow is open for me including mid-morning. Any specific topics that you want to discuss?

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, October 19, 2015 10:53 AM
To: Snyder, Erik
Cc: McCorkle, Mark
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hello Erik,

We would like to get the Sierra Club modeling files for Independence and White Bluff from you and would also like to have a brief phone conversation related to 1-Hour SO2. Are you available this afternoon anytime between 2-3pm or tomorrow mid-morning or mid-afternoon? Later in the week at similar times would also work.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

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From: McCorkle, Mark
Sent: Friday, October 16, 2015 8:45 AM
To: Snyder, Erik
Cc: Clark, David; Davis, Anthony; Spencer, Stuart
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hi Erik,

Thanks for the update. We did get correspondence and reports from Sierra Club but, despite them being described as included, the model files were not. If you think there is something in them worth sharing, please talk to David. He can set up a call if you want to talk.

We didn't receive the Sierra Club request for us to make their preferred recommendation until after our recommendation was sent your way. Let me know if you require additional information regarding our submittal - Mark

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Friday, October 16, 2015 8:38 AM
To: McCorkle, Mark
Subject: Sierra Club 1-Hour SO2 modeling

Hi Mark,

Wanted to touch base on a couple of things related to 1-Hour SO2. First I wanted to confirm that you all had the Sierra Club modeling files for Independence and White Bluff. Let me know if you don't have it and we can figure a way to get to you.

We are currently reviewing all the modeling from industry, states, and SC currently. As we do our review we also wanted to reach out to our states. If you all were reviewing the SC modeling and if you have comments wanted to discuss with you sometime next week if you have time.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Clark, David[CLARKD@adeq.state.ar.us]
Cc: McCorkle, Mark[MAC@adeq.state.ar.us]; Mohr, Ashley[Mohr.Ashley@epa.gov]; vuong@adeq.state.ar.us[vuong@adeq.state.ar.us]
From: Snyder, Erik
Sent: Wed 10/21/2015 3:00:45 PM
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hi David,

Glad you are feeling better. 2-3 would work today (if that works on your end). Ashley and I are working from home so we can use my teleconference #. It is 1-866299-3188 Code # Ex. 6 - Personal Privacy

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-Erik

Erik Snyder

Lead Regional Air Quality Modeler
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Phone: 214-665-7305
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email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Wednesday, October 21, 2015 9:21 AM
To: Snyder, Erik
Cc: McCorkle, Mark; Mohr, Ashley; vuong@adeq.state.ar.us
Subject: RE: Sierra Club 1-Hour SO2 modeling

Erik & Ashley,

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David

David W. Clark, M.S.

Epidemiologist

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Subject: RE: Sierra Club 1-Hour SO2 modeling

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-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6

Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, October 19, 2015 12:24 PM
To: Snyder, Erik
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

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David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Monday, October 19, 2015 11:14 AM
To: Clark, David
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

Hi David,

Tomorrow is open for me including mid-morning. Any specific topics that you want to discuss?

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
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To: Snyder, Erik
Cc: McCorkle, Mark
Subject: RE: Sierra Club 1-Hour SO2 modeling

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Cc: McCorkle, Mark[MAC@adeq.state.ar.us]; Mohr, Ashley[Mohr.Ashley@epa.gov]; vuong@adeq.state.ar.us[vuong@adeq.state.ar.us]
From: Clark, David
Sent: Wed 10/21/2015 2:20:44 PM
Subject: RE: Sierra Club 1-Hour SO2 modeling

Erik & Ashley,

Sorry for the cancelation yesterday. Could we reschedule for some time this week, either mid-morning (9-10am) or midafternoon (2-3)?

David

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Sent: Monday, October 19, 2015 4:52 PM
To: Clark, David
Cc: McCorkle, Mark; Mohr, Ashley
Subject: RE: Sierra Club 1-Hour SO2 modeling

10 works for me and think Ashley is available. Do you have a number you want us to call or do you want to use my conference line?

-Erik

Erik Snyder

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
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To: vennetta.hayes@la.gov[vennetta.hayes@la.gov]
Cc: Vivian Aucoin[Vivian.Aucoin@LA.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]; Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Snyder, Erik
Sent: Tue 10/20/2015 7:54:49 PM
Subject: Modeling files in support of LDEQ's recommendation

Hi Vennetta,

I left a voicemail but did not know if you are on travel or not so following up via email. The 1-Hour SO2 recommendation letter for the Consent Decree sources included modeling reports for Dolete Hills and Lake Calcasieu stakeholder group (RS Nelson sources) but did not include any modeling files to support the conclusions of the reports. The conclusions of the modeling report can't be evaluated or weighted without the modeling files for review. Can you provide the information via ftp or other method or send a USB key with the files?

Thanks,

Erik

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Cc: McCorkle, Mark[MAC@adeq.state.ar.us]; Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Snyder, Erik
Sent: Mon 10/19/2015 9:52:23 PM
Subject: RE: Sierra Club 1-Hour SO2 modeling

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9111 Jollyville Road | Suite 255 | Austin, TX 78759 | P (512) 349-5800 | F (512) 233-0803
trinityconsultants.com

Trinity Consultants

September 28, 2015

Laura Gibson
Texas Commission on Environmental Quality
Air Permit Division
Mail Code 161, Building C, Third Floor, Room 300 W
12100 Park 35 Circle
Austin, TX 78753

RE: TCEQ Air Quality New Source Review (NSR) Permit Application – NSR Permit No. 135322
Prevention of Significant Deterioration (PSD) Permit No. PSDTX1470
Greenhouse Gas (GHG) PSD Permit No. GHGPSDTX141
PSD Air Dispersion Modeling Protocol
Xcel Energy – Gaines County Power Plant
Customer Reference Number (CN) CN601481336
Regulated Entity Number (RN) RN108733106

Dear Ms. Gibson:

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy (Xcel), previously submitted a PSD NSR Permit Application dated August 21, 2015, to the Texas Commission on Environmental Quality (TCEQ) to authorize construction of Greenfield electric power generation facility in Gaines County, Texas (Gaines County Power Plant). With this enclosure, Xcel is submitting the PSD Air Dispersion Modeling Protocol prepared in support of this PSD Permit Application.

If you have any questions or comments regarding this protocol, please do not hesitate to contact Mr. Kevin Worley, Xcel, at (806) 378-2185 or me at (512) 349-5800.

Sincerely,

TRINITY CONSULTANTS

Deborah Walden-Hersh

Ms. Deborah Walden-Hersh, P.E.
Managing Consultant

Enclosure

ED_001261_00098428

cc: Mr. David Low, Xcel Energy
Mr. Kevin Worley, Xcel Energy
Ms. Melissa Dakas, Trinity Consultants
Ms. Lorinda Gardner, Regional Director, TCEQ Region 7
Mr. Jeffrey Robinson, Permit Section Chief, U.S. EPA Region 6

PSD AIR DISPERSION MODELING PROTOCOL

Xcel Energy > Gaines County Power Plant

Doug Taylor – Project Manager
Kevin Worley – Environmental Analyst V

Xcel Energy
600 South Tyler Street
Amarillo, Texas 79101

Prepared By:

Deborah Walden-Hersh – Managing Consultant
Christine Chambers – Principal Consultant
Curtis DeVore – Managing Consultant
Aubrey Jones – Senior Consultant
Elizabeth McGurk – Consultant
Yiyue Zhang – Consultant

TRINITY CONSULTANTS
9111 Jollyville Road
Suite 255
Austin, TX 78789
(512) 349-5800
Fax: (512) 233-0803

September 2015

Project 144404.0012

Trinity Consultants

Environmental solutions delivered uncommonly well

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1. EXECUTIVE SUMMARY

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy (Xcel), proposes to construct a Greenfield combined cycle electric power generation facility in Gaines County, Texas (Gaines County Power Plant). The primary Standard Industrial Classification code of the proposed Gaines County Power Plant is 4911 (Electric Services). Xcel has previously been assigned a Texas Commission on Environmental Quality (TCEQ) Customer Reference Number (CN) 601481336. The Gaines County Power Plant has been assigned TCEQ Regulated Entity Number (RN) 108733106.

Xcel is proposing to build the Gaines County Power Plant in two phases: transitioning from four simple cycle combustion turbines (SCCTs) to two 2-on-1 combined cycle combustion turbine (CCCT) configurations. Each CCCT will be equipped with two heat recovery steam generators (HRSGs) with supplemental natural gas-fired "duct" burners, one for each combustion turbine (CT). Ultimately, the Gaines County Power Plant will be designed to have an estimated site-wide nominal power generation summer condition output capacity of approximately 1,518 megawatts (MW). The project will also include additional auxiliary equipment described in detail in Section 2 of this protocol.

Due to the potential emissions of certain regulated New Source Review (NSR) pollutants, the proposed project will be subject to the Prevention of Significant Deterioration (PSD) permitting requirements of Title 30 of the Texas Administrative Code (30 TAC) Section (§) 116.160. The Gaines County Power Plant previously submitted an Air Quality PSD NSR Permit Application dated August 21, 2015 to the TCEQ for the proposed project, and TCEQ approved the project for expedited review.[1] Based on emissions estimates for the proposed project presented in the permit application, the proposed full build-out project will trigger PSD review for nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), PM with an aerodynamic diameter of 10 microns or less (PM_{10}), PM with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4) mist, and greenhouse gases (GHGs).

As part of the PSD permit application, an air quality modeling analysis (AQA) must be completed for those pollutants that will trigger PSD review, as well as pollutants subject to state review. AQAs are an essential component of the PSD permitting process. Accordingly, this protocol has been prepared for the TCEQ to review and approve the proposed modeling data resources and procedures. The modeling methods to be followed and described herein are consistent with U.S. Environmental Protection Agency (U.S. EPA) procedures specified in the *Guideline on Air Quality Models* and current TCEQ modeling guidance.[2,3]

The remainder of this modeling protocol is organized as follows. Section 2 provides a description of the proposed project. Section 3 describes the Class II area modeling analyses that are required to be conducted as part of the PSD permit application process. Section 4 describes the choice of dispersion model, meteorological data, data inputs and the modeling methodologies that will be followed in conducting the Class II area modeling analyses. Section 5 discusses the selection of ambient background concentration monitors to be used in the AQA. Section 7 addresses the ozone ambient impact analysis requirements under Title 40 of the Code of Federal Regulations (40 CFR) Section (§) 52.21(i)(5)(i)(f). Section 8 discusses the proposed approach for evaluating secondary $PM_{2.5}$ formation. Section 9 addresses the PSD additional impacts analyses for growth, visibility, and

[1] Per email from Mr. Michael Partee, TCEQ, to Mr. David Low, Xcel, dated August 25, 2015.

[2] 40 CFR 51, Appendix W, *Guideline on Air Quality Models*

[3] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

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soils and vegetation. Section 10 discusses the proposed methodology for the Class I Area impacts analysis, and Section 11 discusses state-specific modeling requirements applicable to the proposed project.

Xcel is supplying this written protocol so that TCEQ can formally comment on and approve the methodologies and data resources to be used in the AQA. Given the anticipated construction timeline, Xcel requests a written response to this protocol for the project record at TCEQ's earliest convenience.

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2. PROJECT DESCRIPTION

2.1. SITE LOCATION

The Gaines County Power Plant will be located in Gaines County, Texas. The approximate Universal Transverse Mercator (UTM) coordinates of the facility are 683.09 km east and 3,612.25km north (UTM Zone 13, North American Datum 1983 [NAD83]). An area map was previously submitted with the NSR permit application dated August 21, 2015.

2.2. PROJECT DESCRIPTION

Xcel is proposing to build the Gaines County Power Plant in two phases: transitioning from four SCCTs to two 2-on-1 CCCT configurations. Ultimately, the Gaines County Power Plant will be designed to have an estimated site-wide nominal power generation summer condition output capacity of approximately 1,518 MW.

Over the course of the project, four gas turbines will be converted into two 2-on-1 CCCTs. Each CCCT will be equipped with two HRSGs with supplemental natural gas-fired "duct" burners, one for each CT. In the 2-on-1 configuration, steam from the two HRSGs will serve a single steam turbine generator. Exhaust gases from each CT and associated duct burner will pass through the associated HRSG and exit through a common exhaust stack. Therefore, each CCCT will have two associated emission points. The turbines will be fueled by pipeline-quality natural gas only.

Construction of the Gaines County Power Plant will consist of two distinct phases. In Phase I, one SCCT (Emission Point Number [EPN] SCCT1] will be constructed first. This SCCT will operate as a peaking unit while a second SCCT (EPN SCCT2) is constructed. At this point, both SCCTs will be used for peaking purposes as they are converted into a single 2-on-1 configuration CCCT (EPNs HRSG1 and HRSG2). During Phase II, the CCCT constructed in Phase I will operate with an estimated site-wide nominal power generation summer condition output capacity of approximately 759 MW. Two additional SCCTs (EPNs SCCT3 and SCCT4), and ultimately another 2 on-1 configuration CCCT (EPNs HRSG3 and HRSG4), will be added to the site following the same construction process described above for Phase I

Following conversion of the four SCCT units to two 2-on-1 CCCT units, Xcel will maintain the option to operate the turbines in simple cycle mode for a limited number of hours per year. Therefore, as further discussed in Section 4.8, this modeling protocol presents multiple operating scenarios to be evaluated against applicable state and national air quality standards.

The proposed Gaines County Power Plant will include the emission sources listed below, which will operate at different points during the build-out process. Emissions from these sources will be evaluated against applicable federal and state ambient air quality standards as part of the AQA. Some sources may not be modeled if there are no applicable federal or state ambient air quality standards (e.g., emissions of greenhouse gases).

- Four (4) natural gas-fired SSCTs, including planned maintenance, start-up, and shutdown (MSS) activities (EPNs SCCT1, SCCT2, SCCT3, and SCCT4);
- Two (2) natural gas-fired CCCT configurations with duct burners and HRSGs, including planned MSS activities (EPNs HRSG1, HRSG2, HRSG3, and HRSG4);
- One (1) auxiliary boiler (EPN BOILER);
- One (1) diesel emergency generator (EPN EGEN);
- One (1) diesel fire pump engine (EPN FPENG);
- Two (2) diesel storage tanks (EPNs EGTANK and FRPTANK);

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- Circuit breakers (EPN GHG-FUG);
- Ammonia (NH_3) storage and unloading system (EPN NH3-FUG);
- Lube oil system (EPNs LOV-1, LOV-2, LOV-3, LOV-4, LOV-5, and LOV-6);
- Fuel gas fugitives (EPN GHG-FUG); and
- Various inherently low-emitting MSS activities (EPN ILE-MSS).

A plot plan was included with the NSR permit application dated August 21, 2015. A final plot plan will be provided with the AQA.

2.3. PSD APPLICABILITY

PSD regulations define a stationary source as a major source if it emits or has the potential to emit (PTE) any of the following:

- 250 tons per year (tpy) or more of any PSD pollutant (except GHGs); or
- 100 tpy or more of any PSD pollutant (except GHGs) and the facility belongs to one of the 28 listed PSD major facility categories.

Fossil fuel-fired steam electric plants with heat input greater than 250 million British thermal units per hour (MMBtu/hr) are one of the 28 PSD major facility categories. Sources on this list are also required to include fugitive emissions in determining whether the source is a "major stationary source" and, therefore, subject to the PSD permitting program.

The proposed full build-out of the Gaines County Power Plant is within a major facility category subject to a 100 tpy threshold for classification as a PSD major source. Because potential emissions of at least one regulated NSR pollutant will exceed the 100 tpy threshold, the proposed Gaines County Power Plant will be a major source with respect to the PSD permitting program. The Gaines County Power Plant will trigger PSD review for NO_X, CO, VOC, PM, PM_{10}, $PM_{2.5}$, SO_2, and H_2SO_4. Emissions of all other regulated NSR pollutants from the process are either nonexistent or negligible, and they also will not trigger PSD.

The Gaines County Power Plant will also trigger PSD review for GHGs. The U.S. EPA has not promulgated National Ambient Air Quality Standards (NAAQS) or PSD Increments for GHGs and is not expected to do so based on the characteristics of the underlying air quality issue. Therefore, no dispersion modeling analysis to assess impacts from GHG emissions from the proposed project is required. In addition, the U.S. EPA has not identified any methodology for assessing impacts from GHG emissions on sensitive soils and vegetation, so no additional impacts analysis for GHGs will be provided in the AQA.

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3. CLASS II AREA PSD AIR DISPERSION MODELING REQUIREMENTS

The Class II PSD modeling demonstration will be conducted in three principal steps– the Significance Analysis, the NAAQS Analysis, and the PSD Increment Analysis.

3.1. SIGNIFICANCE ANALYSIS

The Significance Analysis is conducted to determine if the emissions increases from the proposed project cause a significant impact upon the area surrounding the facility. "Significant" is defined by ambient concentration thresholds referred to as the Significant Impact Level (SIL). Table 3-1 lists the SILs, NAAQS, and PSD Increments for criteria pollutants relevant to this project.

The Significance Analysis will include CO, nitrogen dioxide (NO_2), SO_2, PM_{10}, and $PM_{2.5}$. If the model predicted highest ambient concentration for a pollutant is less than the SIL when emission increases of that pollutant are modeled, then further analysis (NAAQS and PSD Increment) will not be performed. For deterministic standards established on a "not to be exceeded more than"a given number of times per year basis, the highest modeled impacts from the Significance Analysis will be the highest first highest (H1H) concentrations. For probabilistic standards based on the 98th or 99th percentile of modeled concentrations, the highest modeled impacts from the Significance Analysis will be the H1H 5-year average concentrations. If modeled impacts are greater than the SIL for any averaging period, full impact analyses will be conducted to demonstrate that the project neither causes nor contributes to any exceedances of the NAAQS or PSD Increment for that particular pollutant. The geographic extent to which significant impacts occur will be used to define the significantly impacted receptors within which compliance with the NAAQS and PSD Increments will be demonstrated.

The U.S. EPA finalized a 24-hour SIL and an annual SIL for $PM_{2.5}$ that apply to both NAAQS and PSD Increment analyses.[4] Per a recent court ruling regarding the use of the $PM_{2.5}$ SIL and subsequent U.S. EPA guidance on $PM_{2.5}$ permit modeling, prior to comparing the impact of project related emission increases from on-site sources to the $PM_{2.5}$ SILs, an analysis is conducted to determine whether it is appropriate to use the $PM_{2.5}$ SILs for the NAAQS analysis in the area surrounding the site.[5,6] This analysis is based on using monitoring data to determine whether a substantial portion of the NAAQS has been consumed. Using the methodology described in Section 5 of this report, Xcel selected a $PM_{2.5}$ background monitor representative of the conditions at the location of the proposed Gaines County Power Plant. Since the difference between the $PM_{2.5}$ NAAQS and the measured $PM_{2.5}$ concentrations from the representative monitor are greater than the SILs, it is concluded that if the modeled impacts from the Xcel project are less than the SIL values at a particular receptor, the project will not cause or contribute to an exceedance of the NAAQS and a cumulative modeling analysis for the $PM_{2.5}$ NAAQS will not be required at that receptor.[7]

Recent U.S. EPA guidance on $PM_{2.5}$ permit modeling states that comparing the ambient $PM_{2.5}$ background concentrations to the NAAQS, when modeled impacts are less than the SIL, would not by itself provide adequate justification for foregoing a cumulative modeling analysis for the $PM_{2.5}$ Increment standards.[8] Based on the most recent TCEQ guidance, the use of the 24-hour and annual SILs in the $PM_{2.5}$ increment analyses can be justified

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[4] Federal Register Vol. 75, No. 202, 64866, October 20, 2010, Final Rule.

[5] On January 22, 2013, the U.S. Court of Appeals for the District of Columbia Circuit issued a ruling to vacate the $PM_{2.5}$ SIL (Sierra Club v. EPA).

[6] U.S. EPA Memorandum, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

[7] U.S. EPA Publication, *Guidance for $PM_{2.5}$ Permit Modeling*, EPA-454/B-14-001, May 20, 2014.

[8] U.S. EPA Memorandum, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

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using representative background monitor data[9]. In this analysis, the difference between ambient background concentrations between the most recent year (e.g. 2014) and the major source baseline date (e.g. 2010) is compared to the Class II Increment. If the difference is greater than the applicable SIL, use of the SIL in the Increment analysis is justified. Justification for the 24-hour and annual $PM_{2.5}$ SILs for the Increment analysis is included in Section 5.3. In the SIL analysis for the $PM_{2.5}$ increment, the maximum predicted concentration (H1H) from all receptors over the 5 years of meteorological data will be used instead of the 5-year average.

Table 3-1. Significant Impact Levels, NAAQS, PSD Class II Increments, and Significant Monitoring Concentrations for Criteria Air Pollutants

Pollutant	Averaging Period	PSD SIL (μg/m³)	Primary and Secondary NAAQS (μg/m³)	Class II PSD Increment (μg/m³)	Significant Monitoring Concentration (μg/m³)
CO	1-hour	2,000	40,000 (35 ppm)[1]	--	--
	8-hour	500	10,000 (9 ppm)[1]	--	575
NO_2	1-hour	7.5[2]	188 (100 ppb)[3]	--	--
	Annual	1	100 (0.053 ppm)[4]	25	14
SO_2	1-hour	7.8[5]	196 (0.075 ppm)	--	--
	3-hour	25	1,300 (0.5 ppm)[1]	512	--
	24-hour	5	365 (0.14 ppm)[1,6]	91	13
	Annual	1	80 (0.03 ppm)[4,6]	20	--
PM_{10}	24-hour	5	150[7]	30	10
	Annual	1	N/A	17	--
$PM_{2.5}$	24-hour	1.2[8]	35[9]	9[8]	0[8]
	Annual	0.3[8]	12[10]	4[8]	--

1 Not to be exceeded more than once per year.
2 Interim SIL proposed in clarification memorandum from Mr. Tyler Fox to Regional Air Division Directors, *Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*, June 28, 2010.
3 The 3-year average of the 98th percentile of the daily maximum 1-hour average.
4 Annual arithmetic average.
5 Interim SIL proposed in clarification memorandum from Mr. Tyler Fox to Regional Air Division Directors, *Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard*, August 23, 2010.
6 U.S. EPA revoked the 24-hour and annual SO_2 NAAQS on June 2, 2010 (75 FR 33520, *Primary National Ambient Air Quality Standard for Sulfur Dioxide; Final Rule*). These standards remain in effect until one year after an area is designated for the 2010 standard.
7 Not to be exceeded more than three times in 3 consecutive years.
8 U.S. EPA promulgated $PM_{2.5}$ SILs, Significant Monitoring Concentrations (SMCs), and PSD Increments on October 20, 2010 (75 FR 64864, *Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC); Final Rule*). The SILs and SMC became effective on December 20, 2010 (i.e., 60 days after the rule was published in the Federal Register) and the PSD Increments became effective on October 20, 2011 (i.e., one year after the date of promulgation). On January 22, 2013 the $PM_{2.5}$ SILs were vacated/remanded and the SMC was vacated by the U.S. Court of Appeals for the District of Columbia Circuit. Furthermore, on December 9, 2013, the U.S. EPA published a final rule (78 FR73698) to revise the $PM_{2.5}$ SMC to 0 μg/m³.
9 The 3-year average of the 98th percentile.
10 Annual arithmetic mean averaged over 3 consecutive years.

[9] TCEQ, Air Quality Modeling Guidelines, APDG 6232v2 (Revised), April 2015.

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3.1.1. Secondary $PM_{2.5}$

On May 16, 2008, U.S. EPA issued the final $PM_{2.5}$ NSR Implementation Rule, which requires sources in State Implementation Plan (SIP)-approved states like Texas to conduct an ambient air quality analysis for $PM_{2.5}$ in accordance with 40 CFR §51.166(k).[10] While the preamble to this rule states that no changes to the PSD regulations on air quality impact analyses were made for the purposes of implementing the $PM_{2.5}$ NSR program, conducting an ambient air quality analysis using the current regulatory air dispersion models for a pollutant like $PM_{2.5}$, which can be formed from precursors through atmospheric reactions downwind of an industrial source, poses several technical difficulties. The current guideline model for Class II Area air dispersion modeling, AERMOD, does not account for many of the complex atmospheric physical and chemical mechanisms that influence secondary $PM_{2.5}$ formation.

On May 20, 2014, U.S. EPA issued guidance for $PM_{2.5}$ permit modeling to clarify how applicants should address secondary $PM_{2.5}$ in the context of a PSD modeling analysis.[11] In this guidance document, U.S. EPA identifies four "assessment" cases outlining what air quality analysis, if any, is required to demonstrate compliance with the $PM_{2.5}$ NAAQS. The PSD Significant Emission Rates (SERs) for NO_X and SO_2 ($PM_{2.5}$ precursors) are utilized to determine whether a proposed source or modification contributes sufficient quantities of precursor emissions requiring consideration. The most recent TCEQ modeling guidelines includes guidance for evaluating secondary $PM_{2.5}$ that is consistent with the U.S. EPA assessment cases.[12]

The proposed project falls under Assessment Case 3, with direct $PM_{2.5}$ emissions above the SER and SO_2 and NO_X emissions greater than the respective SERs. As such, Xcel is required to address both direct and secondary $PM_{2.5}$ emissions. Per the guidance, an applicant can account for the impact of precursor emissions on secondary $PM_{2.5}$ formation in a completely qualitative manner, through the use a hybrid of qualitative and quantitative assessment using existing technical work, or through a full quantitative photochemical grid modeling approach. Xcel will use a hybrid qualitative screening approach as discussed in more detail in Section 8 of this protocol.

3.1.2. Preconstruction Ambient Monitoring Requirements

In addition to determining whether the applicant can forego further analysis, the Significance Analysis is used to determine whether ambient monitoring requirements apply. Pursuant to 40 CFR §52.21(i)(5), a source may be exempted from pre-construction monitoring if the ambient impacts predicted in the Significance Analysis portion of the Class II Area modeling analysis are below the significant monitoring concentration (SMC). When this exemption does not apply, in lieu of installing on-site monitors, an applicant may request a waiver to use existing monitoring data from an approved State or Local Air Monitoring Station (SLAMS) or a PSD monitor operated by a nearby stationary source.

To determine whether pre-construction ambient monitoring should be considered for the proposed project, the maximum impacts attributable to the proposed project will be assessed against the SMCs. The SMC for the applicable averaging periods for CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are provided in 40 CFR §52.21(i)(5)(i) and are listed in Table 3-1. If the modeled impact from the project is less than the SMC, Xcel will presume that it is exempt from pre-construction ambient monitoring for that pollutant. If the Significance Analysis shows ambient impacts exceeding the SMC, Xcel will propose that obtaining background concentrations from monitors that are

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[10] 75 FR 28321, *Final Rule for Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)*, May 16, 2008.

[11] U.S. EPA Publication, *Guidance for $PM_{2.5}$ Permit Modeling*, EPA-454/B-14-001, May 20, 2014.

[12] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

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representative of the site location is acceptable in lieu of performing preconstruction monitoring. Representative background monitor selection is discussed in Section 5 of this protocol.

3.1.3. Significant Impact Area and NAAQS/Increment Inventories

For any off-site impact calculated in the Significance Analysis that is greater than the SIL for a given pollutant, the radius of the significant impact area (SIA) is determined. The SIA encompasses a circle centered on the facility with a radius extending out to either (1) the farthest location where the emissions increase of a pollutant from the project causes a significant impact (i.e., modeled impact above the SIL on a H1H basis), or (2) a distance of 50 km, whichever is less. For pollutants except NO_2 and SO_2, sources of the affected pollutant(s) within 50 km of the proposed site are evaluated for possible inclusion in the NAAQS and PSD Increment analyses. U.S. EPA has acknowledged that this procedure may in many cases result in cumulative impact assessments that are overly conservative and that this procedure may not always be necessary to fulfill the requirements of a cumulative impact assessment.[13]

Per the U.S. EPA's 1-hour NO_2 modeling guidance:

> *"Even accounting for some terrain influences on the location and gradients of maximum 1-hour concentrations, these considerations suggest that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within about 10 kilometers of the project location in most cases. The routine inclusion of all sources within 50 kilometers of the project location, the nominal distance for which AERMOD is applicable, is likely to produce an overly conservative result in most cases."*

Per the U.S. EPA, the guidance in the above-referenced memorandum applies equally to the 1-hour SO_2 standard.[14] Therefore, consistent with this guidance and PSD projects approved in U.S. EPA Region 6, Xcel proposes limiting the 1-hour NO_2 and SO_2 inventory sources to those located within the radius of the SIA plus 10 km.

Xcel will determine the SIA for each pollutant and will use this information to determine which regional sources need to be included in the NAAQS and Increment analyses. The SIA is expected to include portions of Gaines County as well as adjacent counties in both Texas and New Mexico.

Potential sources within the SIA in Texas will be determined using NSR air permit and Title V air permit information available from the TCEQ. Xcel has obtained Texas regional source data from TCEQ's Air Permits Allowable Database (APAD). Since the information obtained from APAD may be incomplete or not up-to-date, Xcel will evaluate the available permits for the APAD sources and make updates as necessary to make the data more complete and up-to-date. Xcel will also evaluate and include Title V sources within either 50 km of the proposed project (for analyses except 1-hour NO_2 and SO_2) or within the modeled SIA plus 10 km (for the 1-hour NO_2 and SO_2 analyses) that may not already be included in the APAD data by reviewing permitting activities available at the TCEQ's New Source Review Air Permits website and obtaining additional permitting files (including permits, technical review documents, and permit applications). In addition, in order to evaluate impacts of minor sources that may not be included in the APAD data, such as sources permitted via Permit By Rule (PBR), Standard Permit (SP), or minor NSR permit, Xcel will conduct a permit search for those permitting activities available at the TCEQ's New Source Review Air Permits website and obtained additional permitting

[13] U.S. EPA Memorandum from Tyler Fox to Regional Air Division Directors, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard*, March 1, 2011.

[14] Ibid.

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files (including permits, technical review documents, and permit applications). Only the permitting activities for the off-site inventory sources up to the date that TCEQ provides comments on this protocol will be considered.

In order to reduce the scope of the inventory search, Xcel will evaluate the SIA for each Significance analysis as well as the distribution and magnitude of inventory emissions. Depending on the radius of the SIA and nature of the inventory for each pollutant and averaging period, it may be determined that minor sources (i.e. those authorized by PBR, SP, or minor NSR) would not reasonably contribute to a NAAQS or Increment exceedance if located greater than 10 km from the proposed Gaines County Power Plant. If this proves true, Xcel may limit the search for minor permitting activities to those sources within 10 km of the site. Justification for limiting the inventory search, if applicable, will be provided in the AQA.

A list of potential sources within the project SIA in New Mexico will be developed based on data obtained from the New Mexico Environment Department (NMED) Air Quality Bureau.[15]

Identified inventory sources will be evaluated to determine whether any further refinements to the data set are warranted or if any screening procedures need to be applied to eliminate sources in the inventory that are not expected to cause a significant concentration gradient at the Gaines County Power Plant's significant receptors. A detailed review of the modeled source parameters provided will be conducted and impacts from the inventory sources will be evaluated in preliminary NAAQS and PSD Increment modeling scenarios. If Xcel determines that refinements are necessary to correct potential data errors or to yield more accurate representations of emissions and dispersion from the regional sources, Xcel will document and justify in the AQA any changes to the regional source inventory data sets. The complete list of modeled regional sources and model input parameters for regional sources will also be provided in the AQA.

3.2. NAAQS ANALYSIS

The primary NAAQS are the maximum concentration ceilings, measured in terms of total concentration of a pollutant in the atmosphere, which define the "levels of air quality which the U.S. EPA judges are necessary, with an adequate margin of safety, to protect the public health." Secondary NAAQS define the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The primary and secondary NAAQS are shown in Table 3-1 for CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. In the NAAQS analysis, the potential emissions from emission units at the Gaines County Power Plant combined with the emission rates of sources included in the NAAQS inventory (APAD provided by TCEQ and supplemental data generated by Xcel) will be modeled together to compute the cumulative impact.

The objective of the NAAQS Analysis is to demonstrate through air quality modeling that emissions from the Gaines County Power Plant do not cause or contribute to an exceedance of the NAAQS at any ambient location at which the impact from the proposed project is greater than the SIL. The modeled cumulative impacts are added to appropriate background concentrations and are assessed against the applicable NAAQS as listed in Table 3-1 to make this demonstration.

Based on preliminary modeling results, the modeling analyses listed below are expected to be used to determine the design concentration in the NAAQS Analysis. The final analyses will be provided in the AQA.

[15] Inventory data will be requested and processed as outlined in the New Mexico Air Quality Bureau *Air Dispersion Modeling Guidelines* (Revised February 18, 2014).

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- NO_2 (annual): Maximum modeled annual arithmetic mean impact from among the five years modeled.
- NO_2 (1-hour): Maximum five-year average of the 98th percentile of the annual distribution of the daily maximum 1-hour concentrations at each receptor. The eighth highest daily maximum 1-hour concentration (H8H) is considered to correspond to the 98th percentile.
- PM_{10} (24-hour): The 24-hour PM_{10} standard is not to be exceeded more than three times in any consecutive three year period, meaning that generally the highest-sixth-high (H6H) modeled concentration over the full five years of meteorological data is compared against the NAAQS. However, Xcel may choose to use the H2H concentrations among five individual modeled years as a more conservative approach to avoid the long model run times associated with running all five meteorological years (concatenated) within one model run.
- $PM_{2.5}$ (annual): Maximum modeled annual arithmetic mean impact averaged over five years modeled.
- $PM_{2.5}$ (24-hour): Maximum five-year average of the 98th percentile of the annual distribution of the of the maximum 24-hour concentrations at each receptor. This corresponds to the H8H modeled 24-hour concentrations at each receptor.
- CO (1-hour): Maximum H2H concentrations among five individual modeled years.
- SO_2 (1-hour): Maximum five-year average of the 99th percentile of the annual distribution of the daily maximum 1-hour concentrations at each receptor. The 4th highest (H4H) daily maximum 1-hour concentration is considered to correspond to the 99th percentile.
- SO_2 (3-hour and 24-hour): Maximum H2H concentrations for 3-hour and 24-hour period respectively among five individual modeled years.

3.2.1. Emissions Inventory Adjustment

In the process of reviewing the NAAQS inventory compiled from APAD and NMED data and permit files gathered by Xcel, stack parameters for many emission points may be undetermined. Xcel will first evaluate permitting files and emissions inventory reports to determine missing stack parameters. Xcel may also determine stack parameters including stack height, diameter, or location using aerial/geographic imagery or by visiting site locations.

Even after these additional analyses, however, it is possible that some stack parameters may remain undetermined. In these cases, TCEQ suggests using conservative default values (i.e., stack height of 1.0 m, temperature of 0 Kelvin, velocity of 0.001 m/s, and diameter of 0.001 m) for missing parameters.[16] This is a conservative representation since it minimizes plume rise, which results in higher impacts than if actual release parameters were used. Xcel may use this approach for some sources with missing stack parameters, but based upon knowledge of typical combustion sources and stack parameters included in the APAD data, these parameters are overly conservative for the combustion sources surrounding the proposed site.

As necessary, Xcel proposes to use reasonably conservative stack parameters for certain combustion sources with missing stack parameters. For each combustion source, the type and design capacity will be identified and a conservative set of stack parameters will be applied. These parameters will be derived using the manufacturer's specifications for similar sources and APAD data for similar sources. The average stack parameters for the various classes of combustion sources will be calculated using APAD data. Based on these average values, lower, more conservative values will be assumed for sources where the stack parameters were not available. On a parameter-by-parameter basis, using a lower value generally produces higher modeled ground level concentrations. Thus, using a value lower than the average for all parameters is a very conservative approach. Table 3-2 presents the proposed stack parameters to be used in the NAAQS and Increment inventory for combustion sources with missing stack parameters. For all other sources, Xcel will use the default stack temperature and velocity.

[16] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

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Table 3-2. Proposed Stack Parameters for Selected Combustion Sources

Combustion Source Type	Stack Height (ft)	Temperature (°F)	Exit Velocity (ft/s)	Diameter (ft)
Engines	20	650	60	0.75
Turbines	50	525	65	5.0
Incinerators/Flares	100	600	40	1.5
Boilers	55	375	45	4.5
Heaters, Scrubber Stacks, Reboilers, Dryers	35	500	25	1.5

The TCEQ default stack height of 1.0 m for off-site inventory sources with missing stack heights is an overly conservative representation because it minimizes plume rise, which results in higher impacts than if actual release parameters were used. Therefore, for off-site sources with missing stack heights, Xcel will employ a stack height of 10 feet. The assumption of 10 feet stack height will be used for (but not limited to) the following sources types with missing stack heights:

- Sources noted as baghouse or dust collector emissions, as dust collectors for the type of specific sources noted are generally elevated;
- Sources noted as silo filling, as the vent discharge are usually located on or near the top of the storage silo;
- Sources noted as truck loadout or agricultural trash hoppers, as the discharge point must be located at a point higher than the height of a truck;
- Sources noted as building fugitives, as the release height of such a source is driven by the height of the structure; and
- Sources noted as storage piles, as the pile height is typically at least 10 feet.

Based on source data received from both TCEQ and NMED, the stack height of 10 feet is a reasonable assumption for point sources with missing stack heights. Any additional changes or assumptions made to the inventory data will be provided with the AQA.

3.3. PSD INCREMENT ANALYSIS

The PSD regulations are primarily in place to "prevent deterioration" of air quality in areas of the country where the air quality is better than the NAAQS. To achieve this goal, the U.S. EPA has established PSD Increments for PM_{10}, $PM_{2.5}$, SO_2, and NO_2. A PSD Increment is the maximum increase in ambient concentrations allowed to occur above a baseline concentration for a pollutant. The PSD Increments are further broken into Class I, II, and III Increments. The Class II PSD Increments for NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are listed in Table 3-1.[17] No 1-hour average NO_2 or SO_2 Class II Increments have been promulgated; therefore, no PSD Increment Analysis is required for these pollutants for the 1-hour averaging period. An Increment analysis is required for the pollutants and averaging times described above if the Significance modeling results exceed the applicable SILs. Based on preliminary modeling, Xcel expects to perform Increment analyses for SO_2, NO_2, PM_{10}, and $PM_{2.5}$.

Since all short-term PSD Increments are not to be exceeded more than once per year, the highest-second-high (H2H) modeled impacts for SO_2, PM_{10}, and $PM_{2.5}$ from among the five modeled years will be compared against

[17] No Class III air quality areas have been established.

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the applicable short-term Increment. The highest annual average $PM_{2.5}$ and NO_2 impacts will be compared against the annual Increment.[18]

Significant deterioration is said to have occurred if a change in emissions occurring after a pollutant-specific major source baseline date results in an impact at an ambient air receptor greater than the PSD Increment (i.e., the increased emissions "consume" more than the available PSD Increment). The determination of whether an emissions change at a given source consumes or expands Increment is based on the source definition and the time the change occurs in relation to the baseline dates. The major source baseline date for SO_2 and PM_{10} is January 6, 1975. The major source baseline date for NO_x is February 8, 1988. The major source baseline date for $PM_{2.5}$ is December 20, 2010.[19] Increases or decreases in actual emissions at major sources after the major source baseline date as a result of construction of a new source, a physical or operational change (i.e., modification) to an existing source, or shutdown of an existing source affect the available Increment, and therefore, must be included in an Increment analysis. Actual emission changes at minor sources only affect Increment after the minor source baseline date, which is set at the time when the first PSD application is completed in a given area, usually arranged on a county-by-county basis. The Gaines County Power Plant will establish the minor source $PM_{2.5}$ baseline date for Gaines County as the first complete PSD application filed since the $PM_{2.5}$ trigger date of October 21, 2011. The PSD permit application for this project was dated August 21, 2015, and was declared administratively complete on September 9, 2015. Therefore, September 9, 2015 is the $PM_{2.5}$ minor source baseline date for Gaines County.[20] Since the minor source baseline date in Gaines County for $PM_{2.5}$ is being established by the Gaines County Power Plant project, only new major sources that commenced construction after the major source baseline date, projects at major sources that commenced construction after the major source baseline date, and minor sources that commenced construction after the minor source baseline date are considered to affect $PM_{2.5}$ Increment.[21]

To demonstrate compliance with the Class II PSD Increments, potential emissions from the Gaines County Power Plant along with the "Increment-affecting emissions" from PSD inventory sources within 50 km of the proposed Gaines County Power Plant will be modeled and assessed cumulatively against the PSD Increments. If required, minor sources within a given distance of the proposed Gaines County Power Plant, as previously described in Section 3.1.3, may also be included in the analysis. The "Increment-affecting emissions" will be determined on a pollutant-by-pollutant basis and will be based on the applicable major and minor source baseline dates. The NAAQS inventory may conservatively be used in the PSD Increment Analysis. The Increment Inventory will be included with the AQA.

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[18] Based on preliminary modeling it is anticipated that modeled concentrations of annual PM_{10} and SO_2 will be below the respective annual SILs.

[19] 75 FR 64864, *Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$) Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC)*; Final Rule, October 20, 2010.

[20] Per 40 CFR §51.166(a)(14)(ii), the minor source baseline date is the earliest date after the trigger date on which a major stationary source or a major modification subject to 40 CFR §52.21 or to regulations approved pursuant to 40 CFR §51.166 submits a complete application under the relevant regulations.

[21] TCEQ Memorandum, $PM_{2.5}$ Implementation Guidance for Increments, SILs, and SMC, October 14, 2011.

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4. CLASS II AIR DISPERSION MODELING METHODOLOGY

This section of the modeling protocol describes the procedures and data resources to be utilized in the Class II PSD air quality modeling analyses. In general, the air dispersion modeling analyses will be conducted in accordance with applicable U.S. EPA and TCEQ guidance documents, including the following:

- U.S. EPA's *Guideline on Air Quality Models*, 40 CFR Part 51, Appendix W (Revised, November 9, 2005)
- U.S. EPA 's *AERMOD Implementation Guide* (http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_implmtn_guide_3August2015.pdf)
- U.S. EPA's *New Source Review Workshop Manual* (Draft, October 1990)
- U.S. EPA, Office of Air Quality Planning and Standards, Memorandum from Mr. Tyler Fox to Regional Air Division Directors. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard* (March 1, 2011)
- U.S. EPA, Office of Air Quality Planning and Standards, Memorandum from Mr. Tyler Fox to Regional Air Division Directors. *Applicability of Appendix W Modeling Guidance for the 1-hour SO2 National Ambient Air Quality Standard* (August 23, 2010).
- U.S. EPA, Office of Air Quality Planning and Standards, *Guidance for $PM_{2.5}$ Permit Modeling* (May 20, 2014).
- TCEQ, *Air Dispersion Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

4.1. DISPERSION MODEL SELECTION

Dispersion models predict pollutant concentrations downwind of a source by simulating the evolution of the pollutant plume over time and space given data inputs that include the quantity of emissions and the initial exhaust release conditions (e.g., velocity, flow rate, and temperature). The latest version (15181) of AERMOD is the dispersion model that will be used to estimate maximum ground-level concentrations in all air pollutant analyses conducted for this application. AERMOD is a refined, steady-state, multiple source, dispersion model and was promulgated in December 2005 as the preferred model to use for industrial sources in this type of air quality analysis.[22] Following procedures outlined in the *Guideline on Air* Quality *Models*, the AERMOD modeling will be performed using regulatory default options for all pollutants and averaging periods. The regulatory default option includes the following:

- Stack-tip downwash; and
- A routine for processing averages when calm wind conditions occur or when meteorological data is missing.

AERMOD contains algorithms for modeling the effects of aerodynamic downwash on point source emissions due to nearby buildings and structures. In accordance with U.S. EPA requirements, direction-specific building dimensions were used for the Schulman downwash algorithms. The treatment of downwash is discussed in the following section.

4.2. BUILDING DOWNWASH

Building structures that obstruct wind flow near emission points may cause stack discharges to become caught in the turbulent wakes of these structures leading to downwash of the plumes. Wind blowing around a building creates zones of turbulence that are greater than if the building were absent. These effects generally cause higher ground level pollutant concentrations since building downwash inhibits dispersion from elevated stack

[22] 40 CFR 51, Appendix W - *Guideline on Air Quality Models*, Appendix A.1 - AMS/EPA Regulatory Model (AERMOD).

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discharges. AERMOD incorporates the Plume Rise Model Enhancements (PRIME) algorithms for estimating enhanced plume growth and restricted plume rise for plumes affected by building wakes.[23]

The U.S. EPA has promulgated stack height regulations that restrict the use of stack heights in excess of "Good Engineering Practice" (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP is generally not creditable when modeling to determine source impacts. This essentially prevents the use of excessively tall stacks to reduce ground-level pollutant concentrations. The minimum stack height not subject to the effects of downwash, called the GEP stack height, is defined by the following formula:

$H_{GEP} = H + 1.5L$, where:

H_{GEP} = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located a distance greater than 5L from a structure are not subject to the wake effects of the structure. If there is more than one stack at a given facility, the above equation must be successively applied to each stack. If more than one structure is involved, the equations must also be successively applied to each structure. In general, the lowest GEP stack height for any source is 65 meters by default.[24] Based on the initial design for the configuration of the Gaines County Power Plant, none of the emission sources will have stack heights that exceed the GEP height.

The direction-specific building downwash dimensionsand the dominant downwash structures used as input to AERMOD will be determined using the *BREEZE*®BPIPP software, developed by Trinity Consultants, Inc. This software incorporates the algorithms of the U.S. EPA-sanctioned Building Profile Input Program, PRIME version (BPIP PRIME), version 04274.[25] BPIP PRIME is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document and other related documents[26], while incorporating the PRIME enhancements to improve prediction of ambient impacts in building cavities and wake regions. The height for the structures considered in the downwash analysis and the location and size of the downwash structures will be provided in the AQA.

4.3. TERRAIN

Source, building, and receptor terrain elevations input to the AERMOD model will be those interpolated from 1/3 arc second (approximately 10 meter resolution) National Elevation Dataset (NED) data obtained from the U.S. Geological Survey (USGS). The building, receptor and source elevations will be interpolated using the latest version of the AERMOD terrain preprocessor, AERMAP (version 11103).

Through the use of AERMAP, AERMOD incorporates not only the source, building and receptor heights, but also an effective height (hill height scale) that represents the significant terrain features surrounding a given receptor that could lead to plume recirculation and other terrain interaction.

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[23] L.L. Schulman, D.G. Strimaitis, and J.S. Scire, Development and Evaluation of the Prime Plume Rise and Building Downwash Model, *AWMA*, 50:378-390, 2000.

[24] 40 CFR §51.100(ii)

[25] Earth Tech, Inc., *Addendum to the ISC3 User's Guide, The PRIME Plume Rise and Building Downwash Model*, November 1997.

[26] U.S. EPA, Office of Air Quality Planning and Standards, *Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack height Regulations)* (Revised), Research Triangle Park, North Carolina, EPA 450/4-80-023R, June 1985.

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4.4. METEOROLOGICAL DATA

Site-specific dispersion models require a sequential hourly record of dispersion meteorology representative of the region within which the source is located. Specifically, permit modeling using AERMOD requires either one year or five years of quality-assured meteorological data.

TCEQ has preprocessed National Weather Service (NWS) meteorological data using AERMET (version 12345) for use in AERMOD. The data selection for a project is made on a county basis. This modeling analysis will be performed using preprocessed data based on surface observations from Lubbock International Airport (Surface ID LBB; NWS Station Number 23042) and upper air observations obtained from Midland (Surface ID MAF;NWS Station Number 23023), which is the TCEQ specified data set for Gaines County.

Each TCEQ-provided data set processed with AERMET comes with three different files, each representing a different surface roughness category:

- L – low surface roughness (0.05 m)
- M – medium surface roughness (0.5 m)
- H – high surface roughness (1.0 m)

Per U.S. EPA guidance, the appropriate values for surface roughness length (z_0) should be used in the AERMET meteorological processor to prepare the meteorological data for AERMOD.[27] The U.S. EPA recommended upwind distance for processing the land cover data to determine the effective z_0 for input to AERMET is 1 kilometer (km) relative to the meteorological tower (measurement site). However, for this modeling analysis the TCEQ guidance of using the 1 km distance relative to the application site is used to process the land cover data.[28] U.S. EPA has developed a tool called AERSURFACE that can be used as an aid in determining realistic and reproducible surface characteristic values, including surface roughness.

An analysis was performed by Xcel using the latest version of AERSURFACE (13016) to confirm the appropriate surface roughness category for the proposed project site. As recommended by the AERSURFACE User's Guide, the land use analysis was prepared using digital LULC data developed by the Multi-Resolution Land Characteristics Consortium (MRLC). The 1992 National Land Cover Dataset (NLCD92), the only dataset currently accepted by AERSURFACE, is provided for public download as geo-referenced images on the MRLC website.[29] The USGS NLCD92 data utilized by AERSURFACE provides land cover with a spatial resolution of 30 meters based on a 21-category classification scheme.

AERSURFACE was run using the USGS NLCD92 data for a circle with a radius of 1 km centered on the Gaines County Power Plant using the average moisture condition for the annual period. The resulting surface roughness estimate was 0.120 meters, which falls into the medium category per TCEQ guidance.[30] Therefore, the TCEQ meteorological data set for Gaines County processed with medium surface characteristics will be used in the modeling analysis. An electronic copy of the AERSURFACE output file and NLCD92 data will be provided with the AQA.

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[27] U.S. EPA, *AERMOD Implementation Guide*, August 3, 2015.

[28] Electronic communication between Mr. Robert Opiela, TCEQ, and Anand Masuraha, Trinity Consultants, May 20, 2008.

[29] http://www.mrlc.gov/viewerjs/, last accessed 08/24/2015.

[30] TCEQ, Technical Basis for AERMOD Meteorological Data Sets, Updated October 2013.

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4.5. COORDINATE SYSTEM

In all modeling analysis data files, the location of emission sources, structures, and receptors, are represented in the UTM coordinate system. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). The datum for this modeling analysis is based on NAD83. The proposed Gaines County Power Plant will reside within UTM Zone 13. Modeled receptors and inventory sources will all be located in UTM Zone 13.

4.6. RECEPTOR GRIDS

For the Class II air dispersion modeling analyses, ground-level concentrations will be calculated on a series of nested receptor grids in the Significance Analysis:

- Fence line grid with 25 m resolution;
- Tight Cartesian grid with 25 m resolution extending at approximately 300 m from the facility fence line;
- Fine Cartesian receptor grid with 100 m resolution extending from approximately 300 m to approximately 1 km from the facility fence line;
- Medium Cartesian receptor grid with 500 m resolution extending from approximately 1.0 km to approximately 5 km from the facility fence line; and
- Coarse Cartesian receptor grid with 1 km resolution extending from approximately 5.0 km to at least 10 km from the facility fence line.

For pollutants with modeled ambient impacts exceeding the SIL, the grid will be sufficiently large to ensure that the full SIA is captured. Subsequent NAAQS and PSD increment analyses will be performed for only those receptors within the SIA for which the Gaines County Power Plant is significant. Refined modeling techniques may be applied on a case-by-case basis to the significant receptors as described below.

As discussed previously, off-property inventory sources will be included in any required NAAQS and Increment analyses. In these analyses, significant receptors located within inventory property lines may be evaluated separately without the contribution of that particular site's respective sources. This methodology has been accepted by U.S. EPA and is referred to as the Mitsubishi approach.[31] Therefore, for the NAAQS and Increment Analyses, separate modeling runs may be conducted for the significant receptors within any given inventory source's property line which exclude the site's sources as inventory sources.

Following the Mitsubishi approach, the significant receptors obtained from the Significance Analysis and evaluated separately in the NAAQS and Increment analyses may be divided into following:

- Run 1: All significant receptors except those located within the specified inventory site's property; all sources (including Gaines County Power Plant and all inventory sources including those at the specified site's property) are included.
- Run 2: All significant receptors within the inventory site's property line; all sources are included except those within the property line of the specified inventory site.

[31] Memorandum from Robert D. Bauman, Chief, SO_2/Particulate Matter Programs Branch (MD-15) to Gerald Fontenot, Chief, Air Programs Branch, Region VI (6T-A), Ambient Air, October 17, 1989.

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The Mitsubishi approach may be implemented for one or more inventory sources in the required NAAQS and Increment analyses. Should the Mitsubishi approach be used, full details and documentation will be provided with the AQA.

4.7. AMBIENT AIR

According to TCEQ modeling guidelines, "ambient air" is defined as the portion of the atmosphere external to buildings to which the public has access.[32] The TCEQ further recognizes that "ambient air" begins at the property line.[33] However, for PSD modeling, ambient air begins at the applicant's fenceline or other physical barrier to public access.[34] For the purposes of this air dispersion modeling analysis, land located outside of the fenceline is considered ambient air.

4.8. MODELED SOURCE TYPES AND STACK PARAMETERS

4.8.1. Modeled Source Inventory

Full descriptions of the emission sources of regulated pollutants at the proposed Gaines County Power Plant and their associated emission rates was previously included in the NSR application dated August 21, 2015. Should any previously-submitted information change, updated calculations will be submitted to TCEQ and a final TCEQ Table 1(a) will be submitted with the AQA.

The sources to be included in the AQA are summarized in Section 2. As previously discussed, there are multiple operating scenarios at the proposed Gaines County Plant as the turbines may be operated in simple or combined cycle mode. As such, Xcel will model multiple scenarios in order to ensure that worst case impacts are evaluated.

The following turbine scenarios will be evaluated for the modeling analyses:

- Scenario 1: All turbines are operating in combined cycle mode for 8,760 hours annually
  - Emissions will be modeled from EPNs HRSG1 through HRSG 4 for short-term and annual averaging periods.
- Scenario 2: All turbines are operating in simple cycle mode. This scenario is applicable for short-term averaging periods only as the simple cycle turbines are each proposed to operate a maximum of 2,000 hours annually.
  - Emissions will be modeled from EPNs SCCT1 through SCCT4 for short-term averaging periods (1-hour, 3-hour, 8-hour, and 24-hour averaging periods).

The above-described modeling scenarios are proposed to represent the extreme boundaries of possible operating scenarios at the Gaines County Power Plant (i.e., all four SCCTs with no add-on controls and all four HRSGs with the largest annual emission rates). The scenarios are proposed to provide a reasonable expectation of maximum modeled impacts from the site. As the SCCTs (EPNs SCCT 1 through SCCT 4) will operate only a limited number of hours per year, their operation is proposed to be modeled for short-term averaging periods only. Each unit will operate in only one mode at a time, either SCCT or CCCT, and the total annual emissions from the HRSGs (EPNs HRSG 1 through HRSG 4) are much higher than those from the SCCTs. Furthermore, the

[32] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[33] Ibid.

[34] Ibid.

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stack conditions of the CCCTs are much less favorable for dispersion than those of the SCCTs (i.e., the HRSG stacks have a lower temperature and exit velocity than those of the SCCTs). Thus, modeling the four HRSG stacks for annual averaging periods is a conservative representation of annual operating conditions at the proposed Gaines County Power Plant. As the CCCTs are permitted to operate 8,760 hours per year, all four HRSG stacks will be modeled for short term averaging periods as well.

For each pollutant and averaging period, all receptors identified as Significant in any modeled scenario will be included in the NAAQS and Increment analyses.

4.8.2. Source Types

The AERMOD dispersion model allows for emission units to be represented as point, area, or volume sources. For point sources with unobstructed vertical releases, it is appropriate to use actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit velocity) in the modeling analyses. The stack parameters for all emission sources will be documented in the AQA. The procedure for developing the initial lateral and vertical dimensions in the U.S. EPA *AERMOD User Guide* will be used in modeling impacts from any volume source.[35] The shape and dimension of any modeled area sources will be based on the location of the emissions.

4.8.3. Treatment of Emergency Sources

The fire pump engine and emergency generator will operate no more than 2 hours per day and 100 hours per year to account for routine testing, maintenance and inspection. As such, they are not operated continuously or frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations. Per TCEQ's Air Quality Modeling Guidelines and U.S. EPA guidance, the emissions from these units will be excluded from 1-hour NO_2 and SO_2 NAAQS modeling.[36] All other short-term emission rates for the fire pump engine and emergency generator will be calculated as the hourly rate multiplied by the daily maximum hours of operation divided by the number of hours in the averaging period.

4.8.4. Load Analysis

The *Guideline on Air Quality Models* states that modeling should contain sufficient detail to determine the maximum ambient concentration of the pollutant under consideration, and that this will likely involve modeling several operating loads or production rates. For some types of sources, operating at a reduced load translates into reduced stack gas exit velocities leading to different and potentially higher impact characteristics. Xcel used manufacturer emissions data at several operating loads in order to determine the worst-case emission levels for the HRSGs and SCCTs at the Gaines County Power Plant. These emission limits were included with the previously-submitted NSR application dated August 21, 2015. Xcel will model the proposed emission limits in the AQA. The previously-submitted NSR application also included a TCEQ Table 1(a) which included a range of stack parameters for the HRSGs and SCCTs. Xcel will select stack parameters (i.e., exit velocity and exhaust temperature) which conservatively represent the operation of these sources at load levels expected during normal operating conditions. Any changes to the proposed approach will be provided in the AQA.

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[35] U.S. EPA, *User's Guide for the AMS/EPA Regulatory Model – AERMOD*, EPA-454/B-03-001, September 2004.

[36] U.S. EPA Memorandum, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*, March 1, 2011.

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4.8.5. Treatment of Startup/Shutdown Emissions

A startup (SU) is defined as the period that begins when the data acquisition and handling system (DAHS) measures fuel flow to the CT and ends when the CT generator (CTG) load reaches 50%. A shutdown (SD) is defined as the period that begins when the CTG output drops below 50% load and ends when there is no longer measurable fuel flow to the CT.

Emissions of PM, PM_{10}, $PM_{2.5}$, and SO_2 during startup/shutdown (SUSD) events are assumed to be no more than the emissions from normal operations. Maximum hourly emissions of NO_X and CO during the SUSD events are based on engineering estimations and represent the maximum emissions that could occur in an hour during the SUSD event. Total annual SUSD emissions of NO_X and CO are calculated based on hourly emissions and operating hours during SUSD per year per combustion turbine. As SUSD events for each SCCT and HRSG are approximately 200 hours per year, the modeled hourly NO_X emissions from the SCCTs and HRSGs will be based on the annualized emission rate and the total annual operating hours of each unit.[37]

4.9. NO_2 MODELING APPROACH

U.S. EPA's *Guideline on Air Quality Models* recommends a tiered approach for determining annual average NO_2 concentrations from point sources. The *Guideline* provides that:

a) *A tiered screening approach is recommended to obtain annual average estimates of NO_2 from point sources for New Source Review analysis, including PSD…For Tier 1 …use an appropriate Gaussian model to estimate the maximum annual average concentration and assume a total conversion of NO to NO_2. If the concentration exceeds the NAAQS and/or PSD Increments for NO_2, proceed to the 2nd level screen.*

b) *For Tier 2 (2nd level) screening analysis, multiply the Tier 1 estimate(s) by an empirically derived NO_2/NO_X value of 0.75 (annual national default).*

c) *For Tier 3 (3rd level) analysis, a detailed screening method may be selected on a case-by-case basis. For point source modeling, detailed screening techniques such as the Ozone Limiting Method may also be considered.*

Xcel will begin by utilizing the Ambient Ratio Method (ARM), or Tier 2 approach, in both the 1-hour and annual NO_2 NAAQS and Increment analyses. ARM represents the equilibrium ratio of NO_2 to NO_X in the atmosphere considering the atmospheric chemistry which determines the amount of NO_X emitted primarily from mobile and industrial sources that converts in the presence of ozone and other photochemical oxidants to NO_2. The ARM approach is detailed in Section 6.2.3 of U.S. EPA's *Guideline*. The value of 0.75 referenced for the ARM is considered the annual average national default.

U.S. EPA issued a memorandum on March 1, 2011 providing additional clarifications regarding application of Appendix W modeling guidance for the 1-hour NO_2 NAAQS.[38] In this memorandum, U.S. EPA recommends the use of 0.80 as a default ambient ratio for the 1-hour NO_2 standard under the Tier 2 approach. Based on this guidance, Xcel will utilize 0.80 as the ambient NO_2:NO_X ratio for the 1-hour analysis, but the 0.75 default ratio from the *Guideline* will be applied to the annual NO_X concentrations. Should further refinement be needed, such

[37] U.S. EPA Memorandum, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011.

[38] Ibid.

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as the Ozone Limiting Method (OLM) or Plume Volume Molar Ratio Method (PVMRM), Xcel will submit an update to the modeling protocol detailing the approach.

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5. AMBIENT BACKGROUND MONITORING DATA

If the maximum modeled impact for a PSD-triggering pollutant is greater than its respective SIL in the Significance Analysis, a NAAQS analysis is required for that pollutant. To appropriately assess compliance with the NAAQS, modeled impacts from the Gaines County Power Plant and the NAAQS inventory sources will be combined with background concentrations, which represent the air quality concentrations due to sources that are not explicitly modeled (e.g., mobile sources, small but local stationary sources, non-regulated fugitive sources, and large but distant sources). However, the background concentration may also include industrial emission sources already accounted for in the inventory. Thus, adding the background concentration to the modeled ground-level concentrations should yield a conservative total concentration since impacts from the inventory sources are included in both the maximum modeled ground-level concentration and the background concentration. Also, background concentrations obtained from monitors that are representative of the site location are used in lieu of performing preconstruction monitoring for these pollutants, as appropriate.

Based on preliminary modeling results, it is expected that monitoring background data will be required for the following pollutants and averaging periods:

- NO_2 (1-hour and annual);
- PM_{10} (24-hour);
- $PM_{2.5}$ (24-hour and annual);
- CO (1-hour);
- SO_2 (1-hour, 3-hour, and 24-hour); and
- Ozone (8-hour).

Criteria used to determine whether monitoring station data is representative of the ambient air quality at the proposed site include location of the monitor compared to the site, similarity of land use and land cover, population of the area in which the proposed monitor is located as compared to the site, and tonnage of emissions released in the area of the monitor as compared to the site. In addition, the monitoring data must be of high quality, from an approved SLAMS or similar monitor subject to the quality assurance requirements in 40 CFR Part 58 Appendix A and TCEQ Guidance.[39]

Each proposed representative background monitor is discussed in more detail in the subsections below.

5.1. PROPOSED NO_2 BACKGROUND MONITOR

According to TCEQ guidance, a 1-hour NO_2 monitored background concentration should be developed using the most recent three-year average of the annual 98th percentile daily maximum 1-hour values. A year meets completeness requirements when the sampling data in all four quarters is at least 75% complete. The annual monitored background concentration should be developed using the most recent complete year (at least 75% of the hours within a year are reported).[40]

Xcel proposes U.S. EPA Site No. 48-039-1016 (Lake Jackson Monitor) as the representative NO_2 background monitor for the Gaines County Power Plant. This monitor is located in Brazoria County near Lake Jackson, Texas.

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[39] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[40] Ibid.

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The area directly surrounding the Lake Jackson Monitor is suburban and contains a number of NO_2-emitting industrial sources, including the Texas Division Plant located within 10km of the monitor location. The Texas Division Plant reported emissions greater than 1,800 tpy NO_X in 2011.[41] Conversely, the proposed Gaines County Power Plant will be located in a rural area of Gaines County. Per the 2011 National Emissions Inventory (NEI), only one industrial source within 10 km from the proposed Gaines County Power Plant reported NO_2 emissions.[42]

Table 5-1 includes the population of Gaines and Brazoria Counties alongside NO_X emissions for each county as obtained from the NEI database.[43] Table 5-2 summarizes the sources and emissions within 10 km of the monitor and the proposed Gaines County Power Plant. Figure 5-1 and Figure 5-2 show a visual comparison of the areas surrounding the Lake Jackson Monitor and the Gaines County Power Plant location. The blue circles on these aerial images indicate a 10-km radius surrounding the monitor and the Gaines County Plant, and the yellow points indicate nearby industrial sources as included in the 2011 NEI. The county population and emissions data, along with Figure 5-1 and Figure 5-2, clearly indicate that the area surrounding the monitor is more densely populated and developed, and there are approximately 100 times more NO_X-emissions within 10 km of the monitor than within 10 km of the proposed site location. Therefore, based on the aerial images, population data, and industrial activity in the region of the Lake Jackson monitor, Xcel proposes that the Lake Jackson Monitor offers a conservative representative background concentration for NO_2 at the proposed Gaines County Power Plant location.

The background concentration data completeness and a summary of the concentrations for NO_2 are shown below in Table 5-3 and Table 5-4 respectively.

Table 5-1. Population and NO_X NEI Data for Gaines and Brazoria Counties

County	Census 2014 Estimated Population [1]	2011 NO_X Total Emissions [2] (tpy)
Gaines County	19,425	4,868
Brazoria County	338,124	15,272

1 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov, last accessed September 15, 2015.

2 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries: http://www3.epa.gov/air/emissions/where.htm

[41] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm)

[42] Ibid.

[43] Ibid.

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Table 5-2. Industrial Sources within 10 km of the Lake Jackson Monitor and the Gaines County Power Plant

Site	Monitor ID	Number of Industrial Sources within 10 km [1]	2011 NO_X Emissions within 10 km [1] (tpy)
Xcel Gaines County Power Plant	--	1	22.59
Lake Jackson Monitor	48-039-1016	4	2,275

1 NO_X data from 2011 NEI Data obtained from the U.S. EPA: http://www.epa.gov/air/emissions/where.htm, last accessed September 8, 2015. Form options used for the query were Texas, New Mexico, and NO_X. All source types are queried by the site and included in the results.

Table 5-3. NO_2 Background Concentration Data Completeness for the Lake Jackson Monitor[1]

Pollutant	Year	Percent Complete [2]			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
NO_2	2012	96.67%	97.78%	100.00%	98.91%
	2013	97.78%	100.00%	98.91%	93.48%
	2014	97.78%	98.88%	95.65%	100.00%

1 Data for U.S. EPA Site No. 48-039-1016 obtained from the TCEQ website on September 15, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 Data is demonstrated to be at least 75% complete to satisfy the requirements of 40 CFR Part 50 Appendix S, Section 3.1(b) and 40 CFR Part 50 Appendix S, Section 3.2(b).

Table 5-4. Monitored Background Concentrations for NO_2 1-hour and Annual Averaging Periods for the Lake Jackson Monitor

Pollutant	Year	Quarterly Averages (ppb) [1]				98th Percentile 1-hour Concentration [2] (ppb)	Annual Average [3] (ppb)
		Quarter 1 Average	Quarter 2 Average	Quarter 3 Average	Quarter 4 Average		
NO_2	2012	3.28	2.01	1.56	3.98	18.80	2.71
	2013	4.14	1.83	1.27	2.64	21.70	2.46
	2014	3.18	0.40	0.64	3.03	17.80	1.82
Three-Year Average Concentration (ppb) [4]:						***19***	--
Three-Year Average Concentration (µg/m³) [5]:						***35.7***	--
Most Recent Year Concentration (ppb) [6]:						--	***2***
Most Recent Year Concentration (µg/m³) [5]:						--	***3.8***

1 Data for U.S. EPA Site No. 48-039-1016 obtained from the TCEQ website on September 15, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 The 98th percentile 1-hour concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix S, Section 5.2.

3 The annual average concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix S, Section 4.1.

4 The three-year concentration data is rounded as prescribed in 40 CFR Part 50 Appendix S, Section 4.2(c).

5 The three-year average concentration is multiplied by 1.88 to convert ppb to µg/m³.

6 The most recent year concentration data is used to determine the annual background monitored concentration.

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Figure 5-1. NO_X Sources Near the Gaines County Power Plant

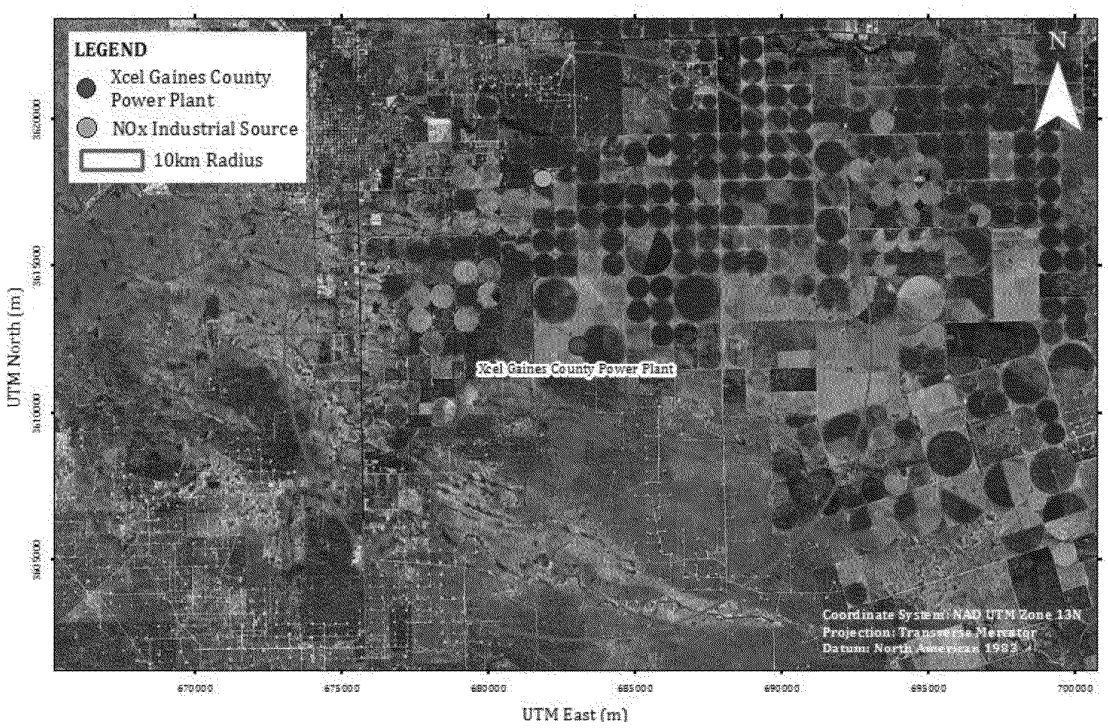
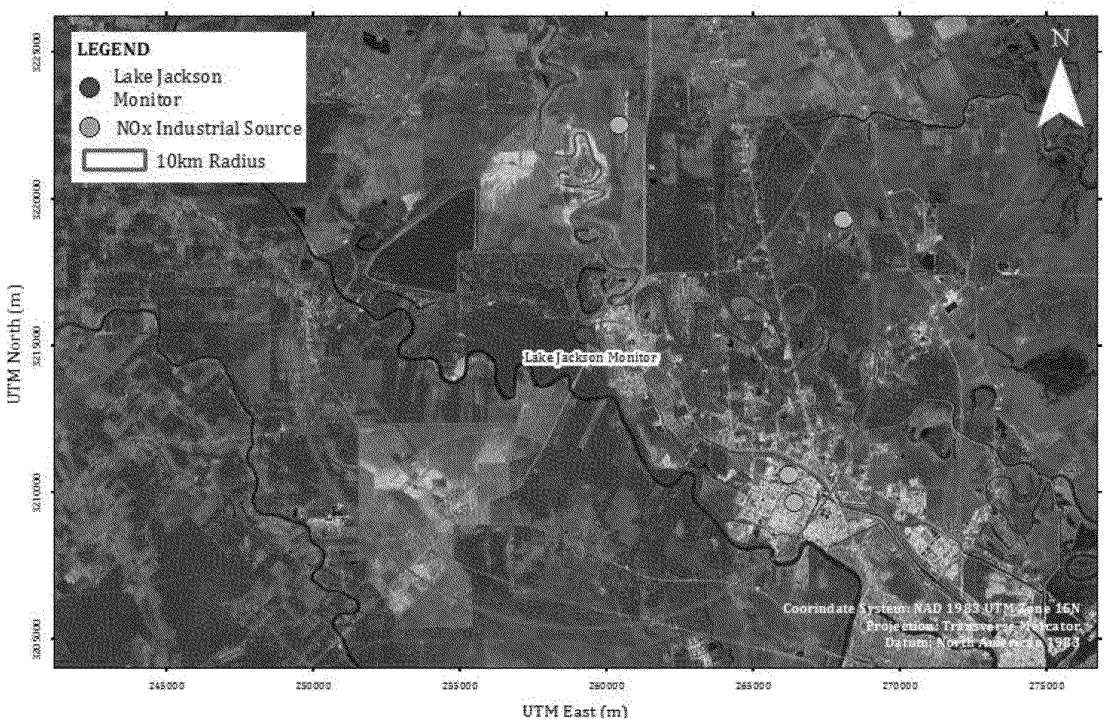


Figure 5-2. NO_X Sources Near the Lake Jackson Monitor



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5.2. PROPOSED PM_{10} BACKGROUND MONITOR

According to TCEQ guidance, a 24-hour PM_{10} monitored background concentration should be developed using the H2H monitored concentration for the 24-hour averaging time that encompasses the three most recent consecutive calendar years of complete data for a monitoring site. A year meets completeness requirements when the sampling data in all four quarters is at least 75% complete.[44]

Xcel proposes U.S. EPA Site No. 48-141-0029 (El Paso Ivanhoe Monitor) as the representative PM_{10} background monitor for the Gaines County Power Plant. This monitor is located in El Paso County in El Paso, Texas.

The Ivanhoe Monitor is located in a suburban area on the east side of the city of EI Paso, a dense residential, commercial and industrial urban area. There are a number of PM_{10}-emitting industrial sources within close proximity to the El Paso Ivanhoe Monitor, including three sources located within six km of the monitor location.[45] Conversely, the proposed Gaines County Power Plant will be located in a rural area. Per the 2011 NEI, only one industrial source within 10 km from the proposed Gaines County Power Plant reported PM_{10} emissions.[46]

Table 5-5 include the population of EI Paso and Gaines Counties alongside PM_{10} emissions for each county as obtained from the NEI database.[47] EI Paso County has a population over 40 times higher than that of Gaines County. Therefore, the monitor will capture significantly more PM contributions from mobile sources and commercial/residential activity than will occur in the area of the proposed Gaines County Power Plant. Table 5-6 summarizes the number of industrial PM_{10} sources and the emissions within 10 km of the monitor and the Gaines facility. As demonstrated below, the industrial PM_{10} emissions within 10 km of the El Paso Ivanhoe Monitor are over 750 times higher than the industrial PM_{10} emissions reported within 10 km of the proposed Gaines Count Power Plant.[48] Figure 5-3 and Figure 5-4 show a visual comparison of the areas surrounding the Gaines County Power Plant location and the El Paso Ivanhoe Monitor. The blue circles on these aerial images indicate a 10-km radius surrounding the monitor and the Gaines County Plant, and the yellow points indicate nearby industrial sources as included in the 2011 NEI. Based on the aerial images, population data, and industrial activity in the region of the El Paso Ivanhoe monitor, Xcel proposes that the El Paso Ivanhoe Monitor offers a conservative representative background concentration for PM_{10} at the proposed Gaines County Power Plant location.

The background concentration data completeness and a summary of the concentrations for PM_{10} obtained from the Ivanhoe Monitor are shown below in Table 5-7 and Table 5-8.

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[44] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[45] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www.epa.gov/air/emissions/where.htm)

[46] Ibid.

[47] Ibid.

[48] Ibid.

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Table 5-5. Population and PM_{10} NEI Data for Gaines and El Paso Counties

County	Census 2014 Estimated Population [1]	2011 PM_{10} Total Emissions [2] (tpy)
Gaines County	19,425	14,074
El Paso County	833,487	16,915

1 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov, last accessed September 11, 2015.

2 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

Table 5-6. Industrial Sources within 10 km of the El Paso Ivanhoe Monitor and the Gaines County Power Plant

Site	Monitor ID	Number of Industrial Sources within 10 km [1]	2011 PM_{10} Emissions within 10 km [1] (tpy)
Xcel Gaines County Power Plant	--	1	0.27
El Paso Ivanhoe Monitor	48-141-0029	11	209.79

1 PM_{10} data from 2011 NEI Data obtained from the U.S. EPA: http://www.epa.gov/air/emissions/where.htm, last accessed September 8, 2015. Form options used for the query were Texas, New Mexico, and PM_{10}. All source types are queried by the site and included in the results.

Table 5-7. PM_{10} Background Concentration Data Completeness for the El Paso Ivanhoe Monitor[1]

Pollutant	Year	Percent Complete [2]			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
PM_{10}	2012	98.90%	98.90%	84.78%	91.30%
	2013	100.00%	92.31%	97.83%	97.83%
	2014	100.00%	98.90%	97.83%	91.30%

1 Data for U.S. EPA Site No. 48-141-0029 obtained from the TCEQ website on September 14, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 Per TCEQ's Air Quality Modeling Guidelines, APDG 6232v2 (Revised), April 2015, monitoring data is complete if 75% of the period's data is present. These measurements are collected every 6 days, and the year is complete if at least 45 days of data are available.

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Table 5-8. Monitored Background Concentrations for PM_{10} 24-hour Averaging Period for the El Paso Ivanhoe Monitor

Pollutant	Year	Quarterly Averages (µg/m³) [1]				H2H 24-hour Concentration [2] (µg/m³)
		Quarter 1 Average	Quarter 2 Average	Quarter 3 Average	Quarter 4 Average	
PM_{10}	2012	17.67	16.27	19.15	24.86	35
	2013	24.07	24.00	19.20	13.07	66
	2014	24.27	22.40	13.87	12.86	53
Three-Year Maximum H2H Concentration [3]:						***66***

1 Data for U.S. EPA Site No. 48-141-0029 obtained from the TCEQ website on September 14, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 The H2H 24-hour concentration is obtained per TCEQ's Air Quality Modeling Guidelines, APDG 6232v2 (Revised), April 2015.

3 Consistent with current TCEQ guidance, the maximum H2H concentration from the three years evaluated is selected as the monitored background concentration.

Figure 5-3. PM_{10} Sources Near the Gaines County Power Plant

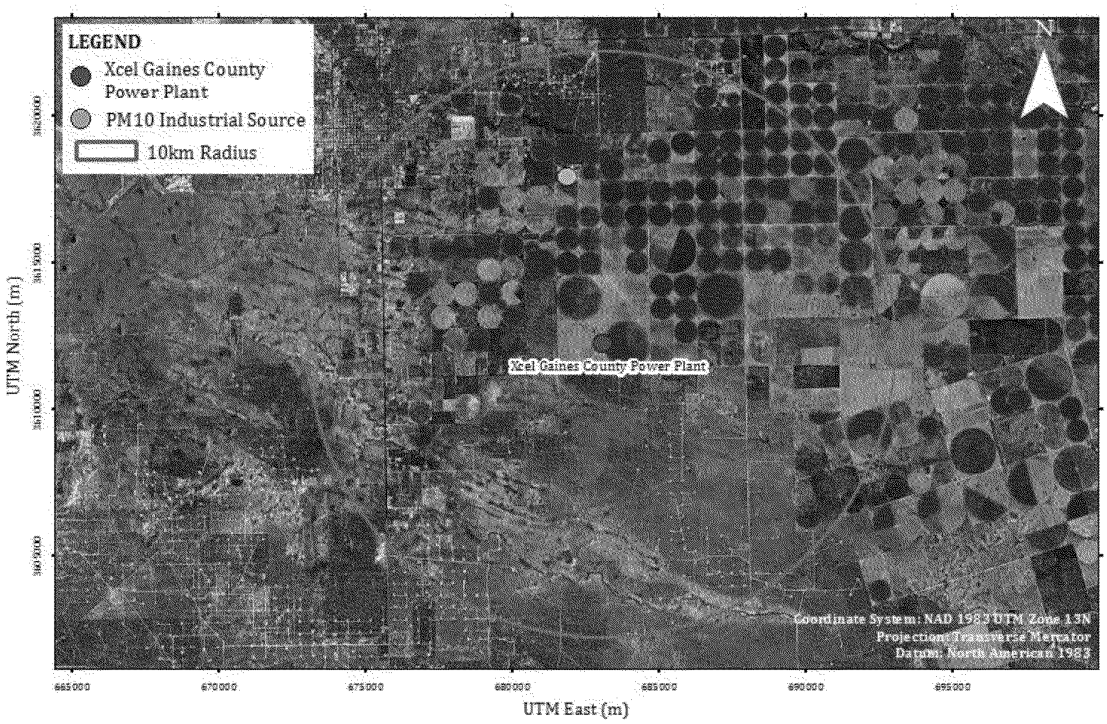

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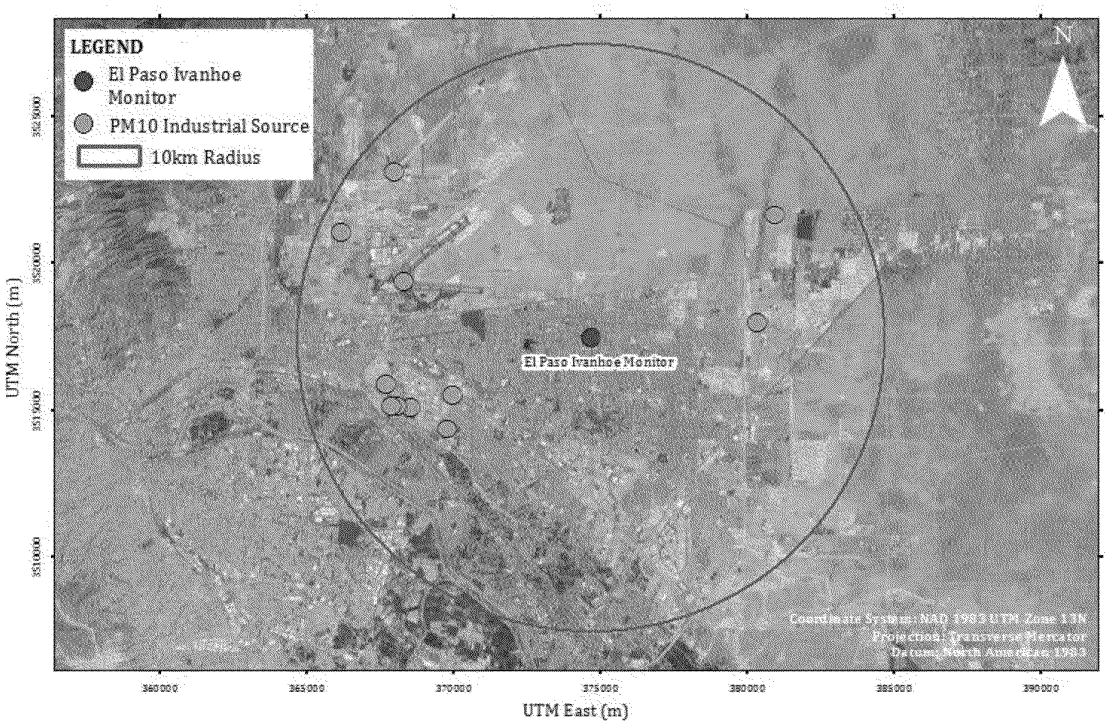
Figure 5-4. PM_{10} Sources Near the El Paso Ivanhoe Monitor



5.3. PROPOSED $PM_{2.5}$ BACKGROUND MONITOR

According to TCEQ guidance, a 24-hour $PM_{2.5}$ monitored background concentration should be developed using the most recent 3-year average of the annual 98th percentile daily maximum 1-hour values. A year meets completeness requirements when at least 75% of the scheduled sampling days of each quarter have valid data. The annual monitored background concentration should be developed using the most recent three-year average of the annual monitored concentrations from three consecutive years of complete data.[49]

Xcel proposes U.S. EPA Site No. 35-013-0025 (Las Cruces Monitor) as the representative $PM_{2.5}$ background monitor for the Gaines County Power Plant. This monitor is located in Las Cruces in Doña Ana County in New Mexico.

The Las Cruces Monitor is surrounded by a relatively dense residential urban area. There are two $PM_{2.5}$-emitting industrial sources within five km of the monitor location.[50] Conversely, the proposed Gaines County Power Plant will be located in a rural area. Per the 2011 National Emissions Inventory (NEI), only one industrial source within 10 km from the proposed Gaines County Power Plant reported less than 0.3 tpy of $PM_{2.5}$ emissions in 2011.

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[49] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[50] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www.epa.gov/air/emissions/where.htm)

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Table 5-9 includes the population of Doña Ana and Gaines Counties alongside $PM_{2.5}$ emissions for each county as obtained from the NEI database.[51] Table 5-10 summarizes the sources and emissions within 10 km of the monitor and the proposed Gaines County Power Plant. Per 2011 NEI data, the county-wide $PM_{2.5}$ emissions in Doña Ana County were over three times greater than those in Gaines County, and the emissions reported within 10 km of the Las Cruces Monitor were almost 8 times larger than those reported within 10 km of the proposed Gaines County Power Plant.[52] Furthermore, since the population of Doña Ana County is over11 times higher than that of Gaines County and the Las Cruces Monitor is located in an urban area, the Las Cruces Monitor is expected to capture significantly more $PM_{2.5}$ emissions from mobile and residential/industrial sources than are expected in Gaines County.

Year [1]	Concentration (μg/m³)	
	24-hour H2H [2]	Annual Average
2010	9.90	4.79
2014	12.00	5.30
2014 – 2010	**2.10**	**0.51**
Increment	**9**	**4**
SIL	**1.2**	**0.3**
Increment – (2014-2010) > SIL? [3]	**Yes**	**Yes**

[1] The difference between the ambient background concentration between the most recent year (2014) and the major source baseline date (2010) are evaluated in this analysis.

[2] If the difference between the Increment and the increase in monitored background concentration between 2010 and 2014 is greater than the SIL, the use of the SIL is justified in the Increment analysis.

Figure 5-5 and Figure 5-6 show a visual comparison of the areas surrounding the Las Cruces Monitor and the Gaines County Power Plant location. The blue circles on these aerial images indicate a 10-km radius surrounding the monitor and the Gaines County Plant, and the yellow points indicate nearby industrial sources as included in the 2011 NEI. Based on the aerial images, population data, and industrial activity in the region of the Las Cruces Monitor, Xcel proposes that the Las Cruces Monitor offers a conservative representative background concentration for $PM_{2.5}$ concentration at the proposed Gaines County Power Plant location.

The 24-hour $PM_{2.5}$ background concentration is calculated as the three-year average of the annual 98th percentile of the daily maximum concentrations. Table 5-11 shows the data completeness for the monitor. As shown below, the 2012 data does not meet completeness requirements as outlined by 40 CFR Part 50 Appendix S, Section 3.1(b) and 40 CFR Park 50 Appendix S, Section 3.2(b).

For the quarter with less than 75% data capture (e.g. 2012, Quarter 4), substitution criteria was employed as specified in 40 CFR Part 50 Appendix N, Section 4, to verify the monitoring data is valid. In order to perform the test, the following procedure was followed: the highest reported daily $PM_{2.5}$ value for that quarter (excluding any approved exceptional events) looking across those three quarters of all three years under consideration, was substituted for all missing daily data in the deficient quarter (i.e., to make that quarters 100% complete). Then, the 24-hour 98th percentile and the annual average for the three years were calculated and compared to the NAAQS. Table 5-12 summarizes the 24-hour and annual results of the substitution test.

Since the recalculated 3-year 24-hour NAAQS test design value (DV) and recalculated 3-year annual NAAQS test DV are equal to or less than the corresponding standard (NAAQS Standard: 35 μg/m³ for 24-hour, 12 μg/m³ for annual), then the data set has passed the diagnostic test and are considered valid.

[51] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www.epa.gov/air/emissions/where.htm)

[52] Ibid.

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The original 24-hour and annual design values (without substituted low values) shall be considered the official design values for this site. The 98th percentile 24-hour concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix N, Section 4.5.

The highest monitored concentration of Quarter 4 in either 2012, 2013, or 2014 is substituted for all missing data in 2012 Quarter 4. The 98th Percentile 24-hour and Annual Concentrations for 2012 are calculated after the data substitution.

[1] Per 40 CFR Part 50 Appendix N, the data from the monitor is valid if the 98th Percentile 24-hour and Annual Concentrations following the data substitution techniques do not exceed the NAAQS.

Table 5-13 summarizes the background concentration for the24-hour and annual averaging period. Xcel proposes to use this representative background monitor data in the AQA.

Table 5-13 also evaluates the appropriateness of the use of the $PM_{2.5}$ SIL in the NAAQS analysis based on the monitored background concentration considered to be representative of the area surrounding the proposed Gaines County Power Plant. Similarly, Table 5-14 evaluates the appropriateness of the use of the $PM_{2.5}$ SIL in the Increment analysis based on the monitored background concentration considered to be representative of the area surrounding the proposed Gaines County Power Plant.

Table 5-9. Population and $PM_{2.5}$ NEI Data for Gaines and Doña Ana Counties

County	Census 2014 Estimated Population [1]	2011 $PM_{2.5}$ Total Emissions [2] (tpy)
Gaines County	19,425	2,607
Doña Ana County	213,676	8,347

[1] 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov, last accessed September 11, 2015.
[2] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

Table 5-10. Industrial Sources within 10 km of theLa Cruces Monitor and the Gaines County Power Plant

Site	Monitor ID	Number of Industrial Sources within 10 km [1]	2011 $PM_{2.5}$ Emissions within 10 km [1] (tpy)
Xcel Gaines County Power Plant	--	1	0.27
Las Cruces Monitor	35-013-0025	2	2.08

[1] $PM_{2.5}$ data from 2011 NEI Data obtained from the U.S. EPA: http://www.epa.gov/air/emissions/where.htm, last accessed September 8, 2015. Form options used for the query were Texas, New Mexico, and $PM_{2.5}$. All source types are queried by the site and included in the results.

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Table 5-11. $PM_{2.5}$ Background Concentration Data Completeness for the Las Cruces Monitor[1]

Pollutant	Year	Percent Complete [2,3]			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
$PM_{2.5}$	2012	79.12%	89.01%	84.78%	68.48%
	2013	86.67%	89.01%	97.83%	81.52%
	2014	96.67%	98.90%	100.00%	88.04%

1 Data for U.S. EPA Site No. 35-013-0025 obtained from the TCEQ website on September 14, 2015 (http://www3.epa.gov/airdata/ad_data_daily.html).

2 Per phone conversations between Mary Hilbert and Eric Peters, New Mexico Environmental Department, and Elizabeth McGurk, Trinity Consultants, on September 23, 2015, the Las Cruces Monitor is scheduled to obtain measurements every three days. Therefore, any quarter with 23 or more measurements is demonstrated to be at least 75% complete.

3 Data for 2013 and 2014 is demonstrated to be at least 75% complete to satisfy the requirements of 40 CFR Part 50 Appendix N, Section 4.1(b) and 40 CFR Part 50 Appendix N, Section 4.2(a). The 2012 monitor data does not meet the completeness requirements for Quarter 4. Therefore, data substitution is used to validate the monitor.

Table 5-12. $PM_{2.5}$ 24-hour and Annual Substitution Test Results

Year	98th Percentile 24-hour Concentration [1] (µg/m³)	Annual Average (µg/m³)
2012 [2]	15.00	7.36
2013	13.90	6.63
2014	11.00	5.30
Average	**13.30**	**6.43**
NAAQS	**35**	**12**
Average < NAAQS? [3]	**Yes**	**Yes**

2 The 98th percentile 24-hour concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix N, Section 4.5.

3 The highest monitored concentration of Quarter 4 in either 2012, 2013, or 2014 is substituted for all missing data in 2012 Quarter 4. The 98th Percentile 24-hour and Annual Concentrations for 2012 are calculated after the data substitution.

4 Per 40 CFR Part 50 Appendix N, the data from the monitor is valid if the 98th Percentile 24-hour and Annual Concentrations following the data substitution techniques do not exceed the NAAQS.

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Table 5-13. Monitored Background Concentrations for $PM_{2.5}$ 24-hour and Annual Averaging Periods for the Las Cruces Monitor

Pollutant	Year	Quarterly Averages (µg/m³) [1]				98th Percentile 24-hour Concentration [2] (µg/m³)	Annual Average [3] (µg/m³)
		Quarter 1 Average	Quarter 2 Average	Quarter 3 Average	Quarter 4 Average		
$PM_{2.5}$	2012	5.24	6.59	7.83	6.96	15.00	6.65
	2013	8.94	7.34	5.11	5.14	13.90	6.63
	2014	5.23	5.47	5.61	4.88	11.00	5.30
Three-Year Average Concentrations [4]:						***13***	***6.2***
National Ambient Air Quality Standards (NAAQS):						**35**	**12**
Significant Impact Level (SIL):						**1.2**	**0.3**
NAAQS – Three Year Average Background Concentration [5]						**22**	**5.8**
NAAQS – Three Year Average Background Concentration > SIL? [5]						**Yes**	**Yes**

1 Data for U.S. EPA Site No. 35-013-0025 obtained from the TCEQ website on September 14, 2015 (http://www3.epa.gov/airdata/ad_data_daily.html).

2 The 98th percentile 24-hour concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix N, Section 4.5.

3 The annual average concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix N, Section 4.4.

4 The final background monitor design values are rounded as prescribed in 40 CFR Part 50 Appendix N, Section 4.3.

5 Per Appendix A of the TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015, since the $PM_{2.5}$ 24-hour and annual NAAQS minus the three year average 24-hour and annual background concentration are greater than the previously vacated $PM_{2.5}$ SILs, the SILs are appropriate to use in the NAAQS analysis.

Table 5-14. $PM_{2.5}$ SIL Justification for Use in Increment Analysis

Year [1]	Concentration (µg/m³)	
	24-hour H2H [2]	Annual Average
2010	9.90	4.79
2014	12.00	5.30
2014 – 2010	**2.10**	**0.51**
Increment	**9**	**4**
SIL	**1.2**	**0.3**
Increment – (2014-2010) > SIL? [3]	**Yes**	**Yes**

3 The difference between the ambient background concentration between the most recent year (2014) and the major source baseline date (2010) are evaluated in this analysis.

4 If the difference between the Increment and the increase in monitored background concentration between 2010 and 2014 is greater than the SIL, the use of the SIL is justified in the Increment analysis.

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Figure 5-5. $PM_{2.5}$ Sources Near the Gaines County Power Plant

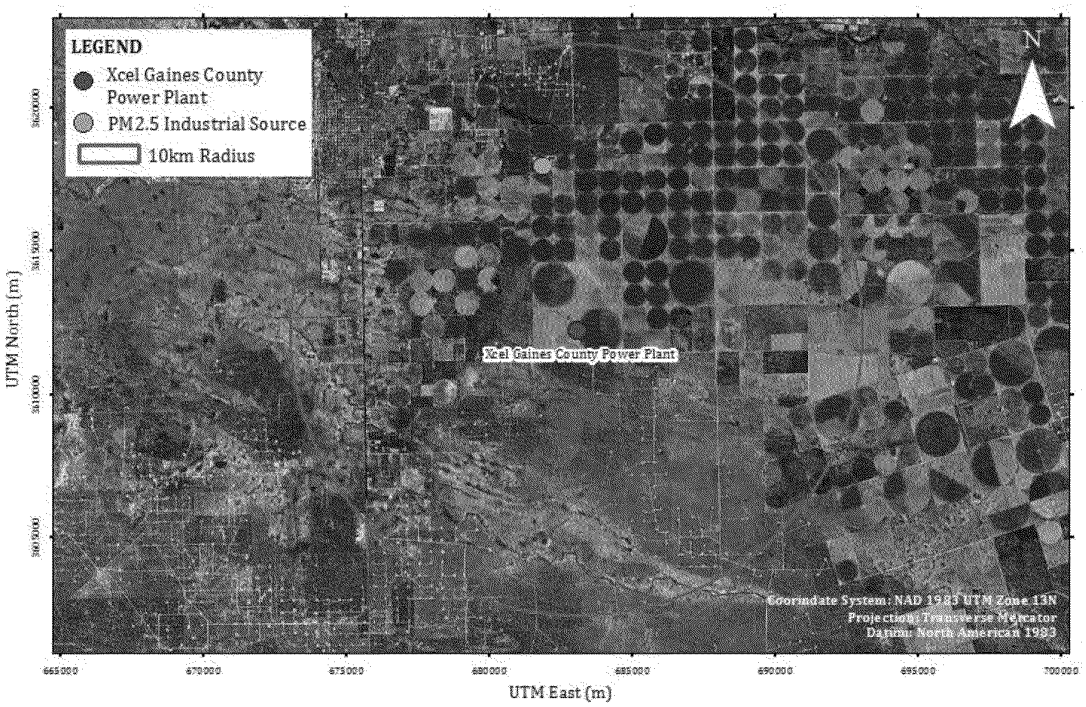

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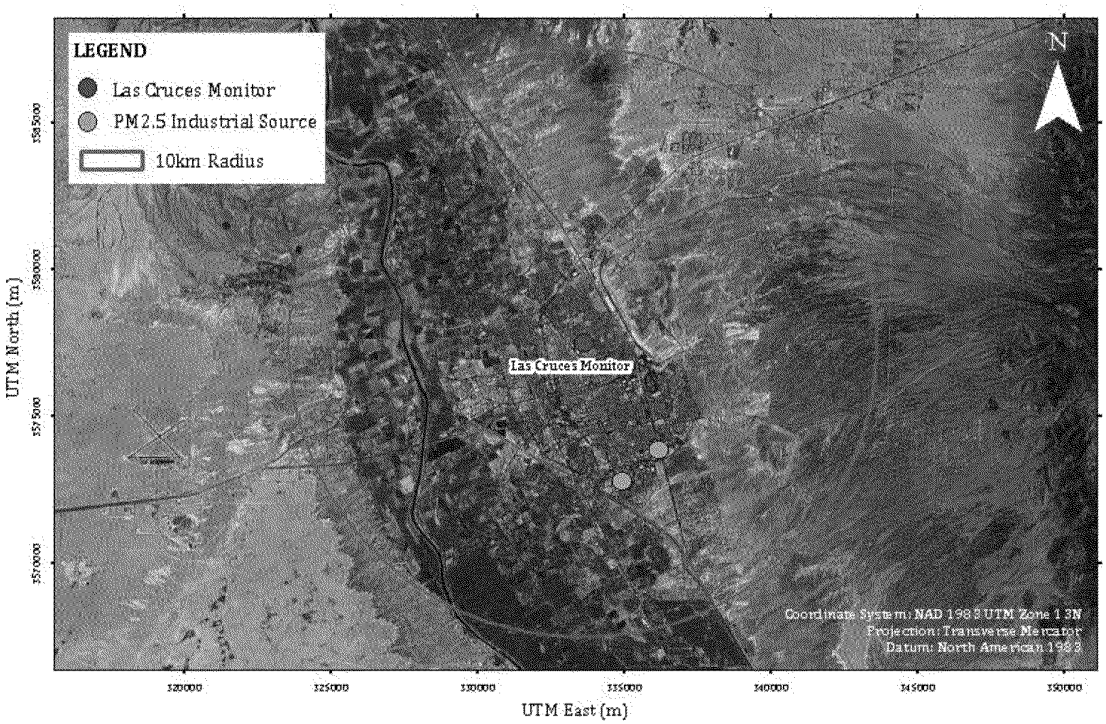
Figure 5-6. $PM_{2.5}$ Sources Near the Las Cruces Monitor



5.4. PROPOSED CO BACKGROUND MONITOR

According to TCEQ guidance, a 1-hour CO monitored background concentration should be developed using the H2H monitored concentration from the most recent complete year of data (where at least 75 percent of the hours in a year are reported).[53]

Xcel proposes U.S. EPA Site No. 48-141-0037 (El Paso University of Texas El Paso [UTEP] Monitor) as the representative CO background monitor for the Gaines County Power Plant. This monitor is located in El Paso County in El Paso, Texas.

As previously discussed, the area surrounding the El Paso UTEP Monitor is more densely populated and has a much greater level of development than the area surrounding the Gaines County Power Plant. Per 2011 NEI data, there are three CO-emitting industrial sources located within six km of the monitor. Among these three sources, the El Paso Electric - Rio Grande Generating Station reported emissions greater than 50 tpy in the 2011 NEI.[54] Per the NEI database, only one industrial source within 10 km of the proposed Gaines County Power Plant reported emissions in 2011, and it reported emissions of only 15 tpy.[55]

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[53] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[54] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm)

[55] Ibid.

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Table 5-15 includes the population of El Paso and Gaines Counties alongside CO emissions for each county as obtained from the NEI database.[56] The total CO emissions reported in 2011 in El Paso County were approximately seven times higher than those reported in Gaines County in the same year.[57] Furthermore, since the population of El Paso County is over 40 times higher than that of Gaines County, the El Paso UTEP Monitor is expected to capture significantly more CO emissions from mobile and residential/industrial sources than are expected in Gaines County. Table 5-16 lists the total CO emissions reported within 10 km of the El Paso UTEP Monitor and the proposed Gaines County Power Plant. The total annual CO emissions reported within 10 km of the monitor are approximately seven times larger than those reported within 10 km of the proposed Gaines County Power Plant. Figure 5-7 and Figure 5-8 show a visual comparison of the areas surrounding the El Paso UTEP Monitor and the Gaines County Power Plant location. The blue circles on these aerial images indicate a 10-km radius surrounding the monitor and the Gaines County Plant, and the yellow points indicate nearby industrial sources as included in the 2011 NEI. Based on the aerial images, population data, and industrial activity in the region of the El Paso UTEP Monitor, Xcel proposes that the monitor offers a conservative representative background concentration for CO at the proposed Gaines County Power Plant location.

The background concentration data completeness and the H2H 1-hour concentration are shown in Table 5-17.

Table 5-15. Population and CO NEI Data for Gaines and El Paso Counties

County	Census 2014 Estimated Population [1]	2011 CO Total Emissions [2] (tpy)
Gaines County	19,425	12,09
El Paso County	833,487	87,56

1 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov, last accessed September 11, 2015.

2 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

Table 5-16. Industrial Sources within 10 km of the El Paso UTEP Monitor and the Gaines County Power Plant

Site	Monitor ID	Number of Industrial Sources within 10 km [1]	2011 CO Emissions within 10 km [1] (tpy)
Xcel Gaines County Power Plant	--	1	14.87
El Paso UTEP Monitor	48-141-0037	5	102.14

1 CO data from 2011 NEI Data obtained from the U.S. EPA: http://www.epa.gov/air/emissions/where.htm, last accessed September 8, 2015. Form options used for the query were Texas, New Mexico, and CO. All source types are queried by the site and included in the results.

[56] Ibid.

[57] Ibid.

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Table 5-17. CO Background Concentration Data Summary for the El Paso UTEP Monitor[1]

Pollutant	Year	Percent Complete [2]	H2H 1-hour Concentration [3,4]	
			(ppm)	(μg/m³)
CO	2014	94.77%	2.1	2,400

1 Data for U.S. EPA Site No. 48-141-0037 obtained from TCEQ website on September 14, 2015 https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 Per TCEQ's Air Quality Modeling Guidelines, APDG 6232v2 (Revised), April 2015, monitoring data is complete if 75% of the period's data is present.

3 The H2H 1-hour concentration is obtained per TCEQ's Air Quality Modeling Guidelines, APDG 6232v2 (Revised), April 2015.

4 The H2H 1-hour concentration is multiplied by 1,143 to convert ppm to μg/m³.

Figure 5-7. CO Sources Near the Gaines County Power Plant

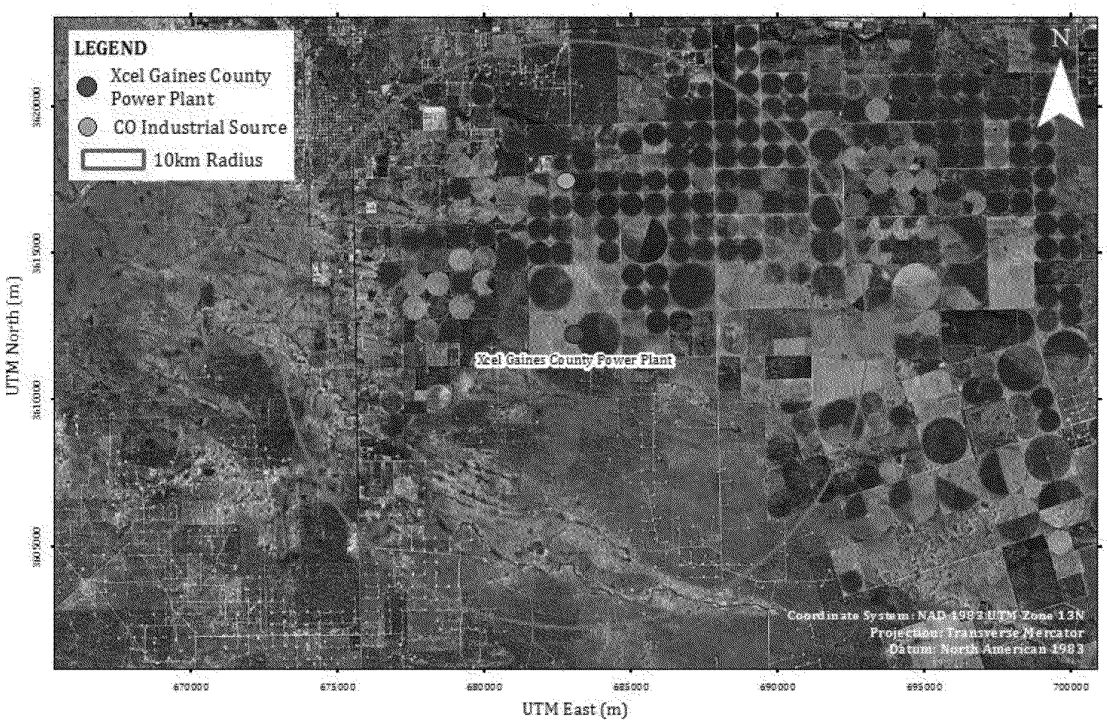

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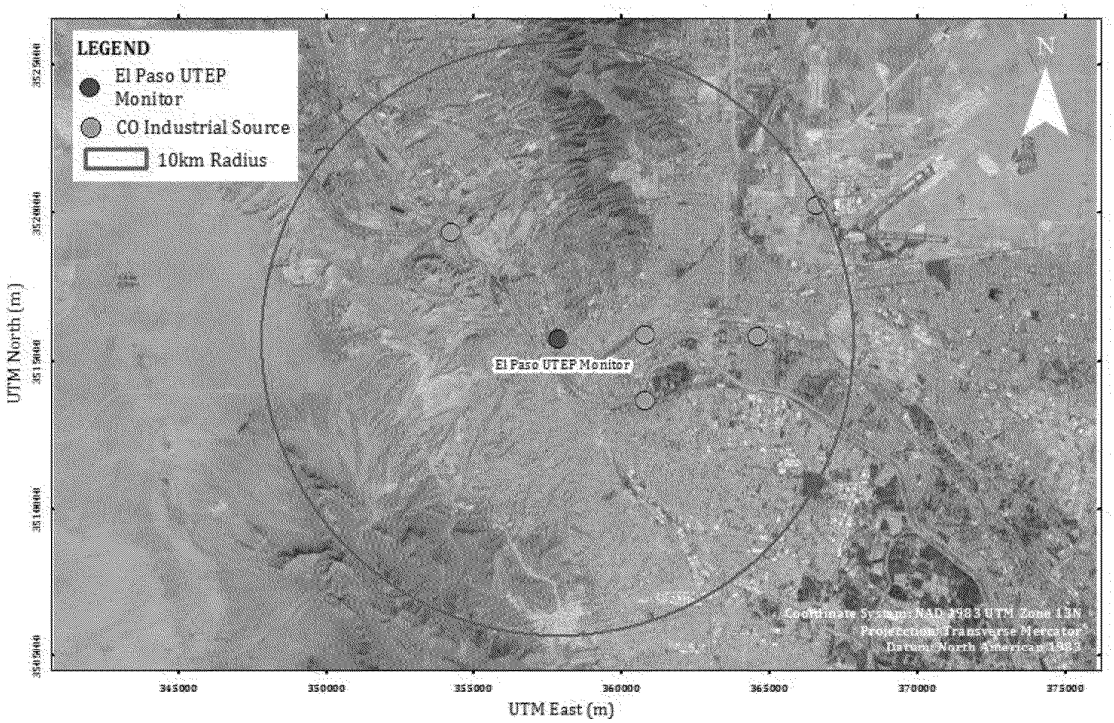
Figure 5-8. CO Sources Near the El Paso UTEP Monitor



5.5. PROPOSED SO_2 BACKGROUND MONITOR

According to TCEQ guidance, a 1-hour SO_2 monitored background concentration should be developed using the most recent 3-year average of the annual 99th percentile daily maximum 1-hour values that encompasses 3 consecutive years of complete data. A year meets completeness requirements when the sampling data in all four quarters is at least 75% complete.[58]

The 3-hour and 24-hour SO_2 monitored background concentrations should both be developed using the data from the most recent complete year (where at least 75 percent of the hourly data are complete in each calendar quarter). The H2H monitored concentration for the 3-hour and 24-hour averaging periods should be selected for the 3-hour and 24-hour analyses, respectively.[59]

Xcel proposes the U.S. EPA Site No. 48-141-0037 (EI Paso UTEP Monitor) as the representative SO_2 background monitor for the Gaines County Power Plant. This monitor is located in EI Paso County in EI Paso, Texas.

As previously discussed, the area surrounding the EI Paso UTEP Monitor is more densely populated and has a much greater level of development than the area surrounding the Gaines County Power Plant. Per 2011 NEI data, three industrial sources within six km of the El Paso UTEP Monitor reported SO_2 emissions in 2011 while

[58] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[59] Ibid.

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only one industrial source within 10 km of the proposed Gaines County Power Plant reported SO_2 emissions in the same year.[60]

Table 5-18 includes the population of El Paso and Gaines Counties alongside SO_2 emissions for each county as obtained from the NEI database.[61] The total SO_2 emissions reported in 2011 in El Paso County were slightly higher than those reported in Gaines County in the same year.[62] Furthermore, since the population of El Paso County is over 40 times higher than that of Gaines County, the El Paso UTEP Monitor is expected to capture significantly more SO_2 emissions from mobile and residential/industrial sources than are expected in Gaines County. Table 5-19 summarizes the industrial SO_2 sources reported within 10 km of the monitor and the site, and

[60] Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm)

[61] Ibid.

[62] Ibid.

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Figure 5-9 and
Figure 5-10 show a visual comparison of the areas surrounding the Gaines County Power Plant location and the El Paso UTEP Monitor. The blue circles on these aerial images indicate a 10-km radius surrounding the monitor and the Gaines County Plant, and the yellow points indicate nearby industrial sources as included in the 2011 NEI. The SO_2 emissions reported within 10 km of the UTEP Monitor are much higher than those reported within 10 km of the proposed Gaines County Power Plant. Based on the aerial images, population data, and industrial activity in the region of the El Paso UTEP Monitor, Xcel proposes that the El Paso UTEP Monitor offers a conservative representation of the SO_2 background concentration at the proposed Gaines County Power Plant location.

The background concentration data completeness and a summary of the concentrations for SO_2 are shown below in Table 5-20 and Table 5-21.

Table 5-18. Population and SO_2 NEI Data for Gaines and El Paso Counties

County	Census 2014 Estimated Population [1]	2011 SO_2 Total Emissions [2] (tpy)
Gaines County	19,425	509
El Paso	833,487	587

1 2014 population estimate data from US Census Quickfacts website: http://quickfacts.census.gov, last accessed September 11, 2015.
2 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

Table 5-19. Industrial Sources within 10 km of the El Paso UTEP Monitor and the Gaines County Power Plant

Site	Monitor ID	Number of Industrial Sources within 10 km [1]	2011 SO_2 Emissions within 10 km [1] (tpy)
Xcel Gaines County Power Plant	--	1	0.016
El Paso UTEP Monitor	48-141-0037	6	73.87

1 SO_2 data from 2011 NEI Data obtained from the U.S. EPA: http://www.epa.gov/air/emissions/where.htm, last accessed September 8, 2015. Form options used for the query were Texas, New Mexico, and SO_2. All source types are queried by the site and included in the results.

Table 5-20. SO_2 Background Concentration Data Completeness for the El Paso UTEP Monitor[1]

Pollutant	Year	Percent Complete [2]			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
SO_2	2012	95.60%	100.00%	98.91%	100.00%
	2013	100.00%	95.60%	93.48%	95.65%
	2014	100.00%	100.00%	78.26%	97.83%

1 Data for U.S. EPA Site No. 48-141-0037 obtained from the TCEQ website on September 14, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).
2 Data is demonstrated to be at least 75% complete to satisfy the requirements of 40 CFR Part 50 Appendix T, Section 3(b).

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Table 5-21. Monitored Background Concentrations for SO_2 1-hour, 3-hour, and 24-hour Averaging Periods for the El Paso UTEP Monitor [1]

Pollutant	Year	99th Percentile 1-hour Concentration [2] (ppb)	H2H 3-hour Concentration [3] (ppb)	H2H 24-hour Concentration [3] (ppb)
SO_2	2012	5.50	--	--
	2013	4.50	--	--
	2014	4.10	3.30	1.70
Three-Year Average Concentration [4]:		***4.7***	**--**	**--**
Three-Year Average Concentration (µg/m³) [5]:		***12.3***		
Most Recent Year Concentrations (µg/m³) [5,6]			***8.6***	***4.4***

1 Data for U.S. EPA Site No. 48-141-0037 obtained from the TCEQ website on September 14, 2015 (https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_year.pl).

2 The 99th percentile 1-hour concentrations were determined using the procedures prescribed in 40 CFR Part 50 Appendix T, Section 5.

3 The H2H 3-hour and 24-hour concentration is obtained per TCEQ Memorandum Background Concentration Determination for Use in NAAQS Analyses; September 2, 1998.

4 The final background monitor 1-hour values are rounded as prescribed in 40 CFR Part 50 Appendix T, Section 4.

5 The concentrations are multiplied by 2.61 to convert ppb to µg/m³.

6 The 3-hour and 24-hour concentrations are reported as the values obtained from the most recent year of complete data.

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Figure 5-9. SO_2 Sources Near the Gaines County Power Plant

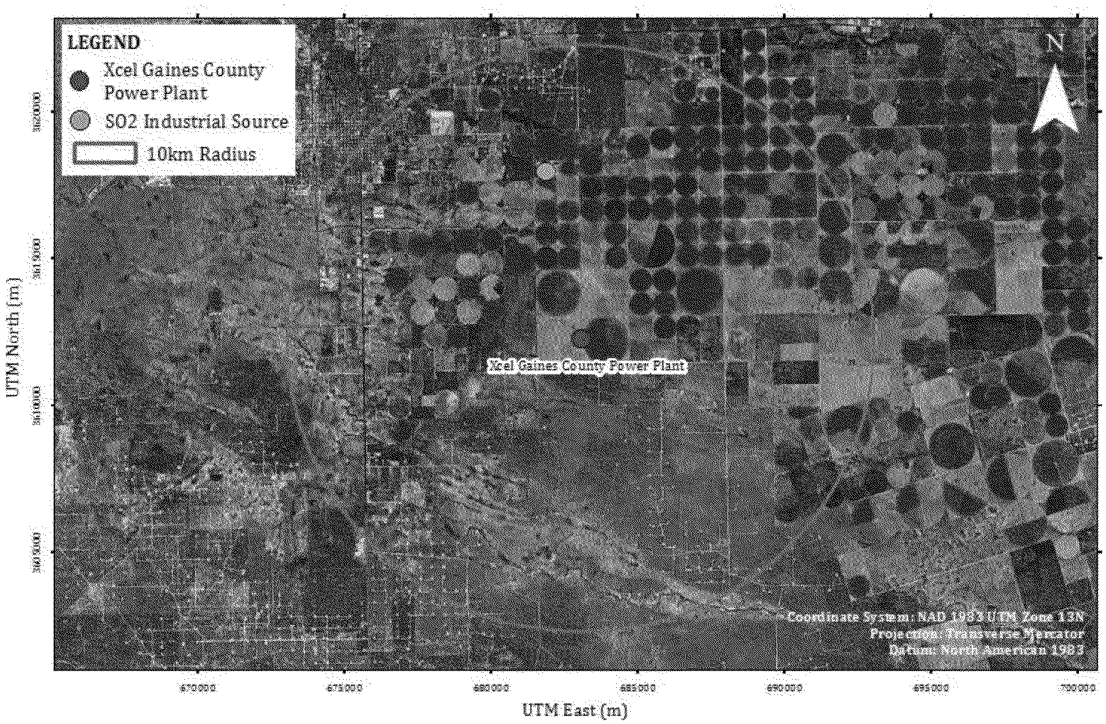
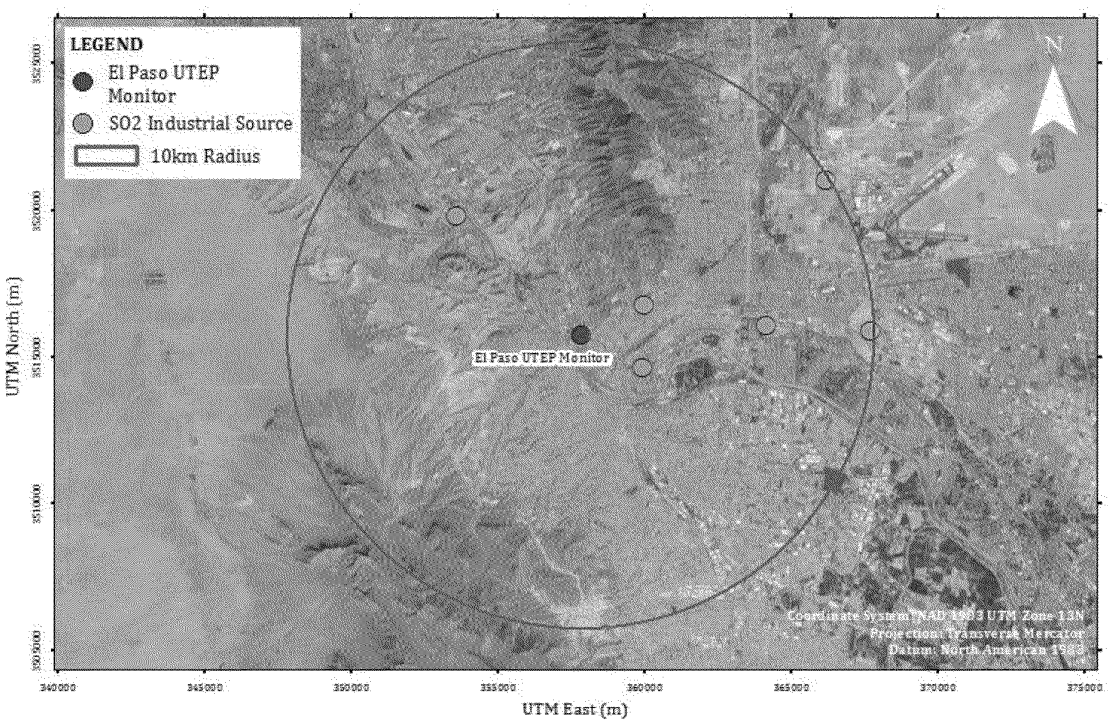


Figure 5-10. SO_2 Sources Near the El Paso UTEP Monitor



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5.6. PROPOSED OZONE BACKGROUND MONITOR

According to TCEQ guidance, an 8-hour ozone monitored background concentration should be developed using the most recent three-year average of the annual fourth-highest daily maximum 8-hour average concentration data that encompasses three consecutive calendar years of complete data for a site. A year meets completeness requirements when sampling data is available for at least 90% of the days within the ozone monitoring season, on average, for the 3-year period, with a minimum data completeness criteria in any one year of at least 75% of the days within the ozone monitoring season.[63]

Xcel proposes U.S. EPA Site No. 35-025-0008 (Lee County Monitor) as the representative ozone background monitor for the Gaines County Power Plant. This monitor is located in Hobbs, Lea County, NM (Lea County Monitor) and is approximately 12.5 km northwest of the proposed Gaines County Power Plant. Due to the proximity of the monitor to the proposed Gaines County Power Plant, the monitor should be similarly impacted by industrial sources surrounding the proposed Gaines County Power Plant. Therefore, Xcel proposes that the Lea County Monitor provides the most representative source of background ozone concentration data for the Gaines County Power Plant.

The Lea County Monitor and its distance from the Gaines County Power Plant is visually represented in Figure 5-11. The blue circle on the aerial image indicates the 15 km radius surrounding the Gaines County Power Plant, which includes the Lea County Monitor.

The most recent three-year average data of the annual fourth-highest daily maximum 8-hour average concentration that encompasses three consecutive calendar years of complete data was evaluated to determine the ozone background concentration at the proposed ozone background monitor.[64] The background concentration as measured by the Lea County Monitor is presented in Table 5-22 below. Xcel proposes to use this representative background monitor data in the AQA.

[63] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

[64] Background ozone monitor data obtained from the U.S. EPA: http://www.epa.gov/airdata/ad_rep_mon.html. Per the U.S. EPA, the data collected for 2012, 2013, and 2014 were 94%, 95%, and 89% complete, respectively. Therefore, completeness requirements for all three years is demonstrated.

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Figure 5-11. Lea County Ozone Monitor and Proposed Gaines County Power Plant

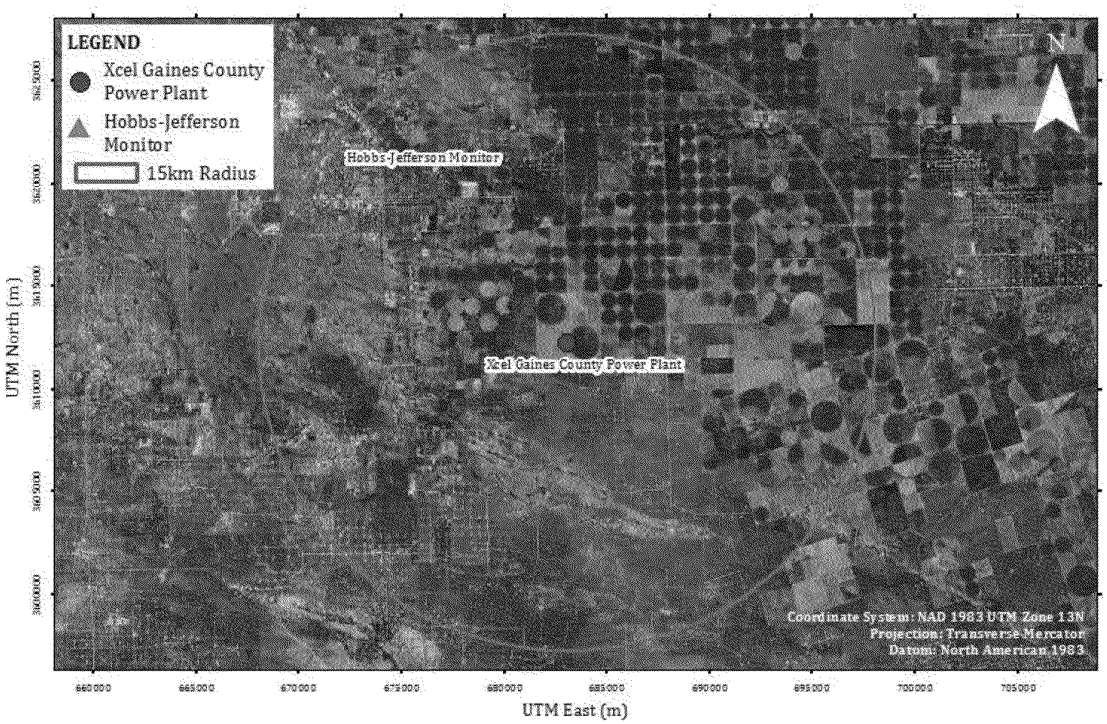

Table 5-22. Representative Ozone Monitor Data

Site ID	County	Approximate Distance to Site [1] (km)	Data Completeness [2]			H4H 8-Hour Concentration (ppb) [2]			
			2012	2013	2014	2012	2013	2014	Average [3]
35-025-0008	Lea	12.5	94%	95%	89%	59	68	68	65

1 Distance to site was calculated according to the coordinates of the monitor and the center of the Gaines County Power Plant.

2 Source: http://www.epa.gov/airdata/ad_rep_mon.html

3 The three-year average concentration is calculated as the arithmetic mean of the three most recent years of the fourth highest daily maximum eight-hour average ozone concentrations.

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6. MODELING RESULTS

The maximum modeled ground-level concentrations obtained using the approach described in Sections 3 and 11 demonstrating compliance with applicable standards for each pollutant will be presented in the AQA.

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7. OZONE AMBIENT IMPACT ANALYSIS

Ozone is formed from precursor emissions of VOC and NO_X. Any site with a net emissions increase of 100 tpy or more of VOC or NO_X that is subject to PSD is required to perform an ozone impact analysis.[65,66] The total NO_X and VOC emissions increases from the proposed project at the Gaines County Power Plant are both anticipated to be greater than 100 tpy.

As previously discussed in Section 5, representative ozone monitoring data was obtained from the Hobbs Jefferson Monitor in New Mexico and is proposed to be used to demonstrate that the location of the project is currently in compliance with the 8-hour ozone standard. The 3-year average of the annual 4th-highest daily maximum 8-hour concentrations at the Hobbs Jefferson Monitor is 65 parts per billion (ppb), which is less than the 8-hour ozone standard of 75 ppb.[67] As previously discussed, this monitor is representative of the Gaines County Power Plant location, therefore Xcel proposes to use the ambient monitoring data from this monitor in lieu of obtaining preconstruction monitoring data.

Formation of ozone is either limited by NO_x emissions (NO_X-limited) or by VOC emissions (VOC-limited). The proposed Gaines County Power Plant will be located in TCEQ Region 7. Gaines County also borders TCEQ Region 2. Consistent with all PSD applications approved by TCEQ in Regions 7 and 2 in 2015, Xcel proposes a conservative screening approach to conduct the ozone impacts analysis, based on the inference that the area is NO_X-limited, as described below.[68]

Based on the methodology recommended by the U.S. EPA Region 6 and TCEQ for previous projects, results from NO_X AERMOD modeling will be used to determine impacts on ozone levels. Because the reaction that forms ozone from NO_X occurs over an extended period of time, the maximum ground-level concentrations of NO_X occurring at distances of 10 km or greater from the Gaines County Power Plant will be used in the evaluation. The standard for ozone is based on an 8-hour averaging period; therefore, the maximum NO_X emissions from the proposed project sources occurring during an 8-hour period will be modeled for the 8-hour averaging period. Emissions from emergency sources and SUSD operations will be modeled as previously described in Section 4.8. For all other sources, the emissions during the 8-hour averaging period will be equivalent to the modeled emissions during the 1-hour averaging period.

Per TCEQ guidance for conducting a conservative ozone screening analysis, 90% conversion of NO_X to NO_2 is conservatively assumed and approximately three moles of ozone are formed for every mole of NO_X.[69]

Following the above conservative screening approach, the expected increase in ozone concentration due to NO_X emissions from the Gaines County Power Plant will be determined by multiplying the maximum ground-level 8-hour NO_X concentration at distances of 10 km or greater from the site by 0.9 to represent the NO_X conversion to NO_2. This result will then be converted from micrograms per cubic meter ($\mu g/m^3$) to ppb and multiplied by three to estimate a conservative ozone concentration for the project. If the sum of the estimated ozone concentration and the representative background concentration is less than the 75 ppb standard based on this

[65] 40 CFR 52.21 (i)(5)(i)(f)

[66] 40 CFR 52.21 (i)(5)(i)

[67] The 3-year average of the annual 4th-highest daily maximum 8-hour concentrations was obtained from the TCEQ website. http://www.tceq.state.tx.us/cgi-bin/compliance/monops/8hr_attainment.pl

[68] Delaware Basin Midstream LLC Ramsey Gas Plant, NSR Permit No. 117323/PSDTX1392

Golden Spread Electric Cooperative, Inc., Gas Turbine Power Plant, NSR Permit No. 109148/PSDTX1358

[69] TCEQ, Modeling Guidance and Examples for Commonly Asked Questions (Part II, Ozone), Advanced Air Permitting Seminar, October 16, 2014, http://www.tceq.state.tx.us/assets/public/permitting/air/info/modeling-guide-part2-ozone-outline.docx

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conservative screening approach, it will be concluded that the proposed project will not cause or contribute to a violation of the 2008 8-hour ozone standard.

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8. SECONDARY $PM_{2.5}$ ANALYSIS

As discussed in Section 3.1.1, Xcel is required to address both direct and secondary $PM_{2.5}$ emissions from the proposed Gaines County Power Plant. Secondary $PM_{2.5}$ is formed when emissions of $PM_{2.5}$ precursor non-particulate gases, such as SO_2 and NO_X, react chemically in the atmosphere to form nitrates and sulfates (particularly ammonium nitrate and ammonium sulfate). The current guideline model for Class II Area air dispersion modeling, AERMOD, does not account for many of the complex atmospheric physical and chemical mechanisms that influence secondary $PM_{2.5}$ formation.

For the proposed Gaines County Power Plant project, emissions of NO_X and/or SO_2, which are precursors of secondary $PM_{2.5}$, exceed the SER of 40 tpy and emissions of direct $PM_{2.5}$ exceed the SER of 10 tpy. This emission profile is referred to Case 3 in the U.S. EPA guidance.[70] Xcel proposes to utilize a qualitative approach to evaluate secondary $PM_{2.5}$ formation for this Case 3 profile.

$PM_{2.5}$ impacts are maximized in the situation where primary $PM_{2.5}$ and secondary $PM_{2.5}$ (as formed by NO_X and SO_2) overlap to cause cumulative impacts. Per a technical review performed by the Indiana Department of Environmental Management, photochemical reactions that transform NO_X and SO_2 into particulate nitrates and sulfates take place over hours or days.[71] Because the transformation of NO_X to nitrates and SO_2 to sulfates are slow processes, nitrates and sulfates will form further downwind of the Gaines County Power Plant. Based on preliminary modeling results, the maximum predicted $PM_{2.5}$ impact from primary $PM_{2.5}$ emissions from the Significance Analysis is anticipated to occur very near to the Gaines County Power Plant fenceline. Therefore, the maximum impacts from secondary $PM_{2.5}$ formation are not expected to occur at the same time or location where maximum impacts of primary $PM_{2.5}$ emissions from the proposed Gaines County Power Plant occur. Since impacts from primary $PM_{2.5}$ emissions from the proposed site will continue to diminish beyond the fenceline and nitrate and sulfate formation is not expected to occur close to the Gaines County Power Plant, maximum $PM_{2.5}$ secondary impacts will likely not occur at the location where primary $PM_{2.5}$ impacts are greatest. This is consistent with U.S. EPA guidance which states that "peak impacts due to facility primary and secondary $PM_{2.5}$ are not likely to be well-correlated in space or time..."[72]

Additionally, in general, it is expected that nitrate secondary $PM_{2.5}$ concentrations will be much lower than primary $PM_{2.5}$ concentrations. Since the proposed Gaines County Power Plant will be located in the southernmost portion of the United States, typical ambient temperatures in this area are relatively warm, which minimizes the impact of nitrate secondary $PM_{2.5}$ from NO_X emissions. Per the TCEQ's Response to Public Comment for the recently permitted La Paloma Energy Center, only a small fraction of ammonium nitrates exists as solid particles in warmer, southern latitudes because at warmer temperatures almost all ammonium nitrate evaporates, thus not contributing to PM mass.[73] Given that maximum impacts from primary $PM_{2.5}$ and secondary $PM_{2.5}$ from the proposed Gaines County Power Plant would not occur at the same time or location and nitrate $PM_{2.5}$ secondary impacts are expected to be much less than primary $PM_{2.5}$ impacts, it is unlikely that secondary $PM_{2.5}$ formation would result in a violation of the $PM_{2.5}$ standards.

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[70] U.S. EPA Publication, *Guidance for $PM_{2.5}$ Permit Modeling*, EPA-454/B-14-001, May 20, 2014.

[71] Air Quality Analysis technical support document for Indiana Gasification, LLC permit, June 2012.

[72] U.S. EPA Memorandum, "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS", from Stephen D. Page, EPA Director of the Office of Air Quality Standards and Planning (e.g., Page memorandum), dated March 23, 2010.

[73] TCEQ Executive Director's Response to Public Comment for Application by La Paloma Energy Center, LLC, Permit Nos 101542 and PSDTX1288.

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8.1. CROSS-STATE AIR POLLUTION RULE DATA REVIEW

As a conservative screening approach, relevant technical data related to the Cross-State Air Pollution Rule (CSAPR), including modeling results at $PM_{2.5}$ monitors throughout the country for various emission scenarios, was also reviewed.[74] CSAPR was developed to assist states with meeting the ozone NAAQS, and is based on achieving emission reductions from Electric Generating Units (EGUs).

As part of the CSAPR development, U.S. EPA used a regional model, Comprehensive Air Quality Model with extensions (CAMx), and the Air Quality Assessment Tool (AQAT) to determine levels of reduction in emissions from EGUs necessary to achieve the NAAQS at each monitoring site evaluated in the CSAPR analysis. The documentation includes tables showing impacts at ozone and $PM_{2.5}$ monitoring sites in the U.S. and emission reduction levels necessary to achieve those results. In order to determine the potential impact of NO_X and SO_2 emissions from the proposed project on the formation of secondary $PM_{2.5}$, results from the modeling U.S. EPA conducted to establish the final 2014 budgets in CSAPR and were used for this analysis. The CSAPR website is located at http://www.epa.gov/airtransport/CSAPR/techinfo.html.

The NO_X and SO_2 emission reduction necessary to achieve the future year modeling design value are summarized in "EmissionsSummaries.xlx" under "Technical Support Documents for the Final Cross-State Air Pollution Rule (CSAPR) and the Supplemental Notice of Proposed Rulemaking (SNPR)." The spreadsheet shows the 2012 and 2014 base case annual NO_X and SO_2 emissions for Texas and remedy control scenario annual NO_X and SO_2 emissions by 2014. In addition, this website includes the average and maximum design values by ozone monitoring site for 8-hour ozone, annual $PM_{2.5}$, and 24-hour $PM_{2.5}$ for the 2003-2007 base period, the 2012 base case, and the 2014 base case and CSAPR control scenario under the "Air Quality Modeling Final Rule TSD" section. This spreadsheet shows the annual and 24-hour $PM_{2.5}$ design values for the 2012 base case, the 2014 base case, and the 2014 remedy case for each monitor.

The closest $PM_{2.5}$ monitor (included in the CSAPR analysis) to the proposed Gaines County Power Plant is located in Ector County. Therefore, data from this monitor is used for the analysis, as shown in the following tables:

Table 8-1. CSAPR Annual $PM_{2.5}$ Model Results at Ector County Monitor

Annual $PM_{2.5}$ Design Values ($\mu g/m^3$)					
Monitor ID	**State**	**County**	**2012 Base Case Maximum Values**	**2014 Base Case Maximum Values**	**2014 Remedy Maximum Values**
481350003	Texas	Ector	7.45	7.34	7.00
Decrease in Modeled Annual Concentrations ($\mu g/m^3$)					
Monitor ID	**State**	**County**	**2012 Base Case - 2014 Base Case**	**2012 Base Case - 2014 Remedy**	**2014 Base Case - 2014 Remedy**
481350003	Texas	Ector	0.11	0.45	0.34

[74] http://www.epa.gov/airtransport/CSAPR/techinfo.html

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Table 8-2. CSAPR 24-hour $PM_{2.5}$ Model Results at Ector County Monitor

24-Hour $PM_{2.5}$ Design Values (μg/m³)					
Monitor ID	**State**	**County**	**2012 Base Case Maximum Values**	**2014 Base Case Maximum Values**	**2014 Remedy Maximum Values**
481350003	Texas	Ector	16.9	16.5	15.2
Decrease in Modeled 24-Hour Concentrations (μg/m³)					
Monitor ID	**State**	**County**	**2012 Base Case - 2014 Base Case**	**2012 Base Case - 2014 Remedy**	**2014 Base Case - 2014 Remedy**
481350003	Texas	Ector	0.4	1.7	1.3

The modeled decrease in NO_X and SO_2 emissions in Texas that corresponds to the decreases in modeled $PM_{2.5}$ concentrations at the ozone monitoring sites is shown in the table below:

Table 8-3. CSAPR NO_X and SO_2 Modeled Emission Reductions for Texas

Pollutant	2012 Base (tpy)	2014 Base (tpy)	2014 Remedy (tpy)	2012 Base - 2014 Base		2012 Base - 2014 Remedy		2014 Base - 2014 Remedy	
				Reduction (tpy)	Reduction (%)	Reduction (tpy)	Reduction (%)	Reduction (tpy)	Reduction (%)
NO_X	1,501,170	1,372,735	1,368,612	128,435	8.6%	132,558	8.8%	4,123	0.3%
SO_2	712,582	704,311	517,627	8,271	1.2%	194,956	27.4%	186,685	26.5%
Total Emissions	**2,213,752**	**2,077,046**	**1,886,239**	**136,706**	**6.2%**	**327,513**	**14.8%**	**190,808**	**9.2%**

Since NO_X and SO_2 emissions from the proposed project exceed PSD SERs, secondary $PM_{2.5}$ formation from both pollutants should be evaluated per U.S. EPA guidance. Therefore, since maximum reduction in total NO_X and SO_2 emissions is realized between the 2012 base case and 2014 remedy case, this scenario is used for evaluating impacts of NO_X and SO_2 emissions from the proposed project on secondary $PM_{2.5}$ formation. In addition, while the 2012 base case – 2014 base case shows significant reduction in NO_X emissions, the 2014 base case – 2014 remedy case show significant reduction in SO_2 emissions. In order to evaluate overall impact for both NO_X and SO_2 emissions, the 2012 base case – 2014 remedy case is used in this analysis, which includes significant reductions in both pollutants.

A decrease in 327,513 tpy NO_X and SO_2 emissions corresponds to a decrease in $PM_{2.5}$ concentration of 0.45 μg/m³ on an annual basis and 1.7 μg/m³ on a 24-hour basis. The total NO_X and SO_2 emissions from the proposed project is approximately 611 tpy, which is 0.19% of the culpable 327,513 tpy of emissions. Because the potential NO_X and SO_2 emissions resulting from the proposed Gaines County Power Plant will represent only a very small fraction of the emissions required to elicit a change in modeled $PM_{2.5}$ concentrations in the CSAPR regional modeling, it is concluded that secondary $PM_{2.5}$ formation resulting from the proposed project will be insignificant.

8.2. SPECIATED $PM_{2.5}$ MONITOR DATA REVIEW

An analysis of speciated $PM_{2.5}$ monitoring data has also been conducted using the El Paso Chamizal Monitor (U.S. EPA Site No.: 48-141-0044) located in El Paso, El Paso County. The El Paso Chamizal Monitor is the closest monitor to the proposed Gaines County Power Plant site that has the most recent speciated $PM_{2.5}$ concentration data. Xcel has selected this monitor for use in the secondary $PM_{2.5}$ formation qualitative analysis because this

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monitor conservatively represents the Gaines County Power Plant site for the purpose of supporting conclusions regarding secondary $PM_{2.5}$ formation.

The El Paso Chamizal Monitor is surrounded by residential and industrial areas. There are several large industrial sources (i.e., two refineries and an army installation) and other industrial sources located within 10 km of the monitor. Conversely, the Gaines County Power Plant site is located in a rural area of Gaines County with few industrial sources reporting either $PM_{2.5}$, NO_X, or SO_2 emissions within 10 km of the site and a low density of residential, commercial, and industrial areas. As indicated inTable 8-4 below, the amount of industrial/commercial $PM_{2.5}$ emissions within 10 km of the El Paso Chamizal Monitor is much greater than within 10 km of the proposed Gaines County Power Plant. In addition, the population of El Paso County is more than 40 times the population of Gaines County. Therefore, the $PM_{2.5}$ concentrations from the El Paso Chamizal Monitor are a conservative representation for the Gaines County Power Plant site for the secondary $PM_{2.5}$ formation analysis.

Table 8-4. Summary of Emissions Surrounding Site Location and El Paso Chamizal Monitor and County Population

Location	County	2014 Estimated County Population [1]	$PM_{2.5}$ Emissions within County (tpy) [2]	$PM_{2.5}$ Industrial Emissions within 10 km (tpy) [2]
Gaines County Power Plant	Gaines	19,425	2,607	0.27
El Paso Chamizal Monitor	El Paso	833,487	3,025	234.16

1 Estimated County population data was obtained from US Census Bureau: http://quickfacts.census.gov/qfd/states/48000.html

2 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

Since both the proposed NO_X and SO_2 emissions from the project exceed the SER of 40 tpy, an analysis for the secondary $PM_{2.5}$ formation from NO_X and SO_2 emissions is performed using the monitor data.

In support of the secondary $PM_{2.5}$ formation analysis from NO_X and SO_2 emissions, the most recent three years (2012–2014) of nitrate $PM_{2.5}$, sulfate $PM_{2.5}$, and total $PM_{2.5}$ monitor data from the El Paso Chamizal Monitor were evaluated. As indicated inTable 8-5, over the three-year period, the average 24-hour total $PM_{2.5}$ concentration from the El Paso Chamizal Monitor is11.25 $\mu g/m^3$, compared to the average 24-hour nitrate $PM_{2.5}$ concentration of 0.45 $\mu g/m^3$ and the average 24-hour sulfate $PM_{2.5}$ concentration of 0.99 $\mu g/m^3$. Therefore, on average, the portion of secondary $PM_{2.5}$ formed from NO_X emissions contributes a very small portion (approximately 3.98%) to the total $PM_{2.5}$ concentration. Similarly, on average, the portion of secondary $PM_{2.5}$ formed from SO_2 emissions also contributes a small portion (approximately 8.79%) to the total $PM_{2.5}$ concentration. Over the three-year period, the average maximum 24-hour nitrate and sulfate $PM_{2.5}$ concentrations are 2.86 $\mu g/m^3$ and 3.21 $\mu g/m^3$, respectively.

Xcel evaluated the proposed project NO_X emissions compared to the magnitude of existing NO_X emissions in the nearby surrounding area (i.e., El Paso County, Texas; Otero and Doña Ana Counties, New Mexico; and Ciudad Juárez, Mexico) that may contribute to the nitrate and sulfate$PM_{2.5}$ formation at the El Paso Chamizal monitor. The region was selected for evaluation of NO_X and SO_2 emissions since the monitor is located in northwest El Paso County, which is in close proximity to adjacent Otero and Doña Ana Counties, New Mexico, and Ciudad Juárez, Mexico, as shown in Figure 8-1. Selection of this area is also reasonable since secondary $PM_{2.5}$ formation recorded at the background monitor occurs from regional transport, in addition to nearby sources.

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A summary of the evaluation provided in Table 8-6 shows that the proposed NO_X and SO_2 emissions associated with the project are a very small fraction (0.60% and 3.60%, respectively) of the total NO_X and SO_2 emitted in the area of the monitor. Given that the proposed NO_X and SO_2 emissions from the project are a small fraction of the NO_X and SO_2 emissions in the air shed and the ambient monitoring shows a relatively low fraction of nitrate and sulfate in the observed $PM_{2.5}$ monitor data, Xcel concludes that secondary formation of nitrate $PM_{2.5}$ from the project's NO_X emissions would be a very small fraction of the monitored nitrate $PM_{2.5}$. Similarly, Xcel also concludes that secondary formation of sulfate $PM_{2.5}$ from the project's SO_2 emissions would be a very small fraction of the monitored sulfate $PM_{2.5}$. This monitoring data further supports the conclusions that secondary $PM_{2.5}$ formation from the proposed project would not cause NAAQS or PSD Increment exceedances in the proposed project area.

Table 8-5. El Paso Chamizal Monitor Summary for Total $PM_{2.5}$, Nitrate $PM_{2.5}$, and Sulfate $PM_{2.5}$

Year	Average 24 hour Total $PM_{2.5}$ Concentration [1] (µg/m³)	Average 24 hour Total Nitrate $PM_{2.5}$ Concentration [2] (µg/m³)	Maximum 24 hour Total Nitrate $PM_{2.5}$ Concentration [3] (µg/m³)	Average 24-hour Sulfate $PM_{2.5}$ Concentration [2] (µg/m³)	Maximum 24 hour Sulfate $PM_{2.5}$ Concentration [3] (µg/m³)
2012	12.04	0.42	2.38	1.04	2.79
2013	10.82	0.46	2.93	0.91	2.83
2014	10.89	0.46	3.26	1.01	4.01
Three-Year Average:	***11.25***	***0.45***	***2.86***	***0.99***	***3.21***

1 Monitor data are obtained from the TCEQ Air Monitoring website (https://www.tceq.texas.gov/cgi-bin/compliance/monops/yearly_summary.pl?cams=41).
The average 24-hour $PM_{2.5}$ concentration is the daily 24-hour average $PM_{2.5}$ concentration averaged over the entire year.

2 Monitor data are obtained from the TCEQ TAMIS website (http://www17.tceq.texas.gov/tamis/).
The average 24-hour Total Nitrate $PM_{2.5}$ concentration is the daily Total Nitrate $PM_{2.5}$ concentration averaged over the entire year.
The average 24-hour Total Sulfate $PM_{2.5}$ concentration is the daily Total $PM_{2.5}$ Sulfate concentration averaged over the entire year.

3 Monitor data are obtained from the TCEQ TAMIS website (http://www17.tceq.texas.gov/tamis/).
The Maximum 24-hour Total Nitrate $PM_{2.5}$ Concentration is the maximum daily Total Nitrate $PM_{2.5}$ concentration over the entire year.
The Maximum 24-hour Total Sulfate $PM_{2.5}$ Concentration is the maximum daily Total Sulfate $PM_{2.5}$ concentration over the entire year.

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Figure 8-1. Location of El Paso Chamizal Monitor

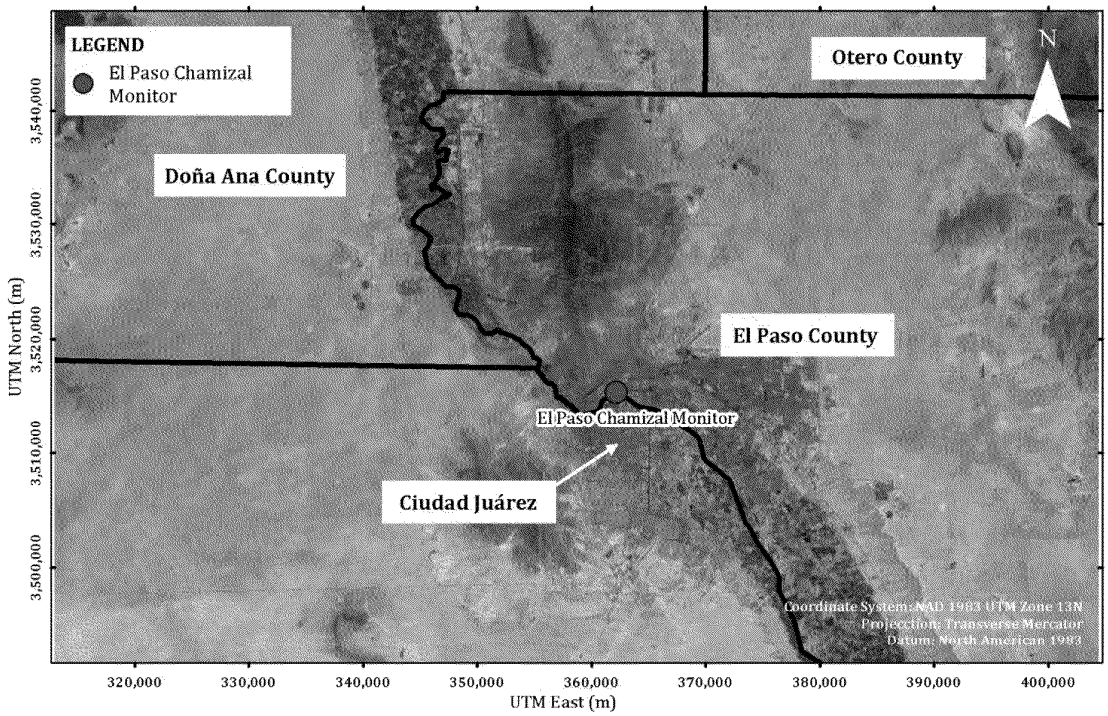

Table 8-6. Area NO_X and SO_2 Emissions Inventory

County	NO_x Emissions (tpy)	SO_2 Emissions (tpy)
El Paso [1]	19,152	587
Doña Ana [1]	11,508	208
Otero [1]	5,533	708
Ciudad Juárez, Mexico [2]	28,787	4,570
Total	**64,980**	**6,074**
Project Emissions [3]	**397.71**	**218.47**
Project Emissions as a Percent of Total Emissions in Air Shed	**0.60%**	**3.60%**

1 Per 2011 U.S. EPA National Emissions Inventory (NEI), State & County Emission Summaries (http://www3.epa.gov/air/emissions/where.htm).

2 Ciudad Juárez data obtained from the Mexico National Emissions Inventory, 1999: Final, as made available by the U.S. EPA. (http://www3.epa.gov/ttn/chief/net/mexico/1999_mexico_nei_final_report.pdf) The Mexico National Emissions Inventory is reported in terms of Mega grams (Mg). 1 Mg = 1.10231 tons.
The emissions inventory includes only data for SO_X. Therefore SO_2 emissions in Ciudad Juárez are represented by SO_X.

3 Project emissions are represented as the tpy emissions when four CCCTs are each operating for 8,760 hours per year.

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9. ADDITIONAL IMPACT ANALYSIS

Pursuant to 40 CFR §52.21(o), three additional impacts analyses will be performed as part of the PSD permitting action. These are: 1) a growth analysis, 2) a soil and vegetation analysis, and 3) a visibility analysis.

9.1. GROWTH ANALYSIS

The elements of the growth analysis include a projection of the associated industrial, commercial, and residential growth that will occur in the area of impact due to the proposed project, including the potential impact on ambient air due to this growth. Xcel anticipates that most of the employees of the proposed facility will be existing residents of Gaines County and nearby counties; therefore, residential growth is expected to be low. Xcel does not anticipate any associated industrial or commercial growth due to the proposed facility. Therefore, negligible growth-related ambient air impacts are expected.

9.2. SOILS AND VEGETATION ANALYSIS

The U.S. EPA developed the secondary NAAQS to protect certain air quality related values (i.e., soil and vegetation) that may not be sufficiently protected by the primary NAAQS. The secondary NAAQS, shown in Table 3-1, represent ambient air concentrations below which most types of soil and vegetation are unaffected by criteria pollutants.

To assess soil and vegetation impacts, the modeling results from the NAAQS analysis will be assessed against the secondary NAAQS standards. If the predicted ambient air concentrations are less than the secondary NAAQS, it can be presumed that emissions from the proposed sources will not result in harmful effects to either soil or vegetation.[75]

9.3. VISIBILITY ANALYSIS

The proposed facility is located in a Class II area. All proposed sources at the Gaines County Power Plant will maintain compliance with applicable visibility and opacity requirements in 30 TAC Chapter 111, which satisfies visibility impairment analysis requirements for Class II areas.[76] If required, the Class I visibility analysis will be submitted under separate cover.

[75] U.S. EPA, Office of Air Quality Planning and Standards, *New Source Review Workshop Manual*, Research Triangle Park, NC, October 1990.

[76] TCEQ, *Air Quality Modeling Guidelines*, APDG 6232v2 (Revised), April 2015.

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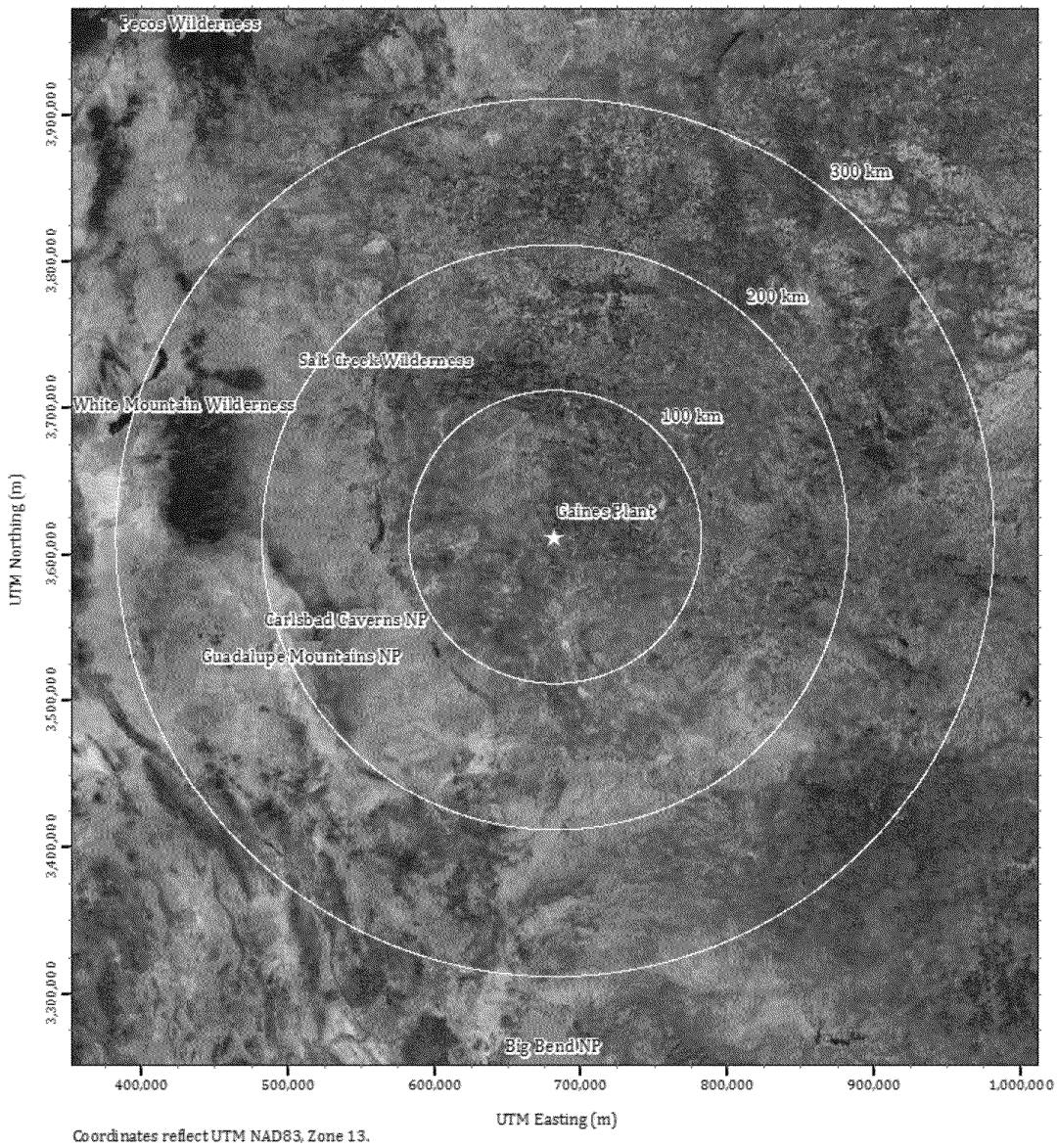
Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. There are four (4) Class I areas located within 300 km of the proposed Gaines County Power Plant. Figure 10-1 shows the location of Class I areas with respect to the proposed Gaines County Power Plant.

Figure 10-1. Location of Class I Areas with Respect to the Gaines County Power Plant



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The Federal Land Managers (FLM) have the authority to protect air quality related values (AQRVs), and to consider in consultation with the permitting authority whether a proposed major emitting facility will have an adverse impact on such values. AQRVs for which PSD modeling is typically conducted include visibility and deposition of sulfur and nitrogen. Table 10-1 summarizes the Class I areas within 300 km of the proposed Gaines County Power Plant.

Table 10-1. Class I Areas within 300 km of the Gaines County Power Plant

Class I Area	Approximate Distance from Xcel Gaines (km)
Carlsbad Caverns National Park	134
Salt Creek Wilderness Area	162
Guadalupe Mountains National Park	175
White Mountain Wilderness Area	261

The FLM's AQRV Work Group (FLAG) 2010 guidance states that a Q/D value of ten or less, where Q is the total annual emissions (tpy) of visibility affecting pollutants and D is the distance to Class I area in km, indicates that AQRV analyses should not be required.[77, 78] Xcel will provide the final Q/D analysis to the FLMs to seek formal concurrence on whether a Class I area modeling analysis is warranted to assess AQRV for the proposed Gaines County Power Plant.

In addition, Xcel is required to assess PSD Increment consumption at all Class I areas within 300 km. Xcel anticipates this evaluation will be completed by placing an arc of receptors in AERMOD at a distance of 50 km to demonstrate impacts below the Class I SILs. This Class I increment "screening" procedure has been discussed with U.S. EPA Region 6 and the TCEQ Modeling group most recently in 2014 and has been used in numerous PSD applications across the U.S. to fulfill the Class I Increment modeling requirements.[79] If modeled concentrations at 50 km exceed the Class I SILs, Xcel will submit a separate Class I modeling protocol to address CALPUFF modeling, as needed.

[77] *The Federal Land Managers Air Quality Related Values (AQRV) Workgroup (FLAG) Phase I Report – Revised* (2010)

[78] Visibility affecting pollutants include SO_2, NO_X, PM_{10}, and H_2SO_4.

[79] January 17, 2014 conference call between Ms. Christine Chambers (Trinity Consultants), Mr. Erik Snyder (U.S. EPA Region 6 Air Quality Modeling), and Mr. Daniel Menendez (TCEQ Air Dispersion Modeling Team).

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11. STATE MODELING REQUIREMENTS

In addition to addressing PSD modeling requirements, Xcel is also required to address TCEQ-specific requirements for the State Property Line Analysis and Heath Effects Review.

11.1. STATE PROPERTY LINE ANALYSIS

An additional air quality dispersion modeling analysis for SO_2 (1-hour) and sulfuric acid (1-hour and 24-hour) will be performed to demonstrate compliance with the state standards for net ground-level concentration of SO_2 and H_2SO_4 based on 30 TAC Chapter 112, Control of Air Pollution from Sulfur Compounds.

The PSD Significance Analysis modeling procedures are generally acceptable to the State Property Line modeling analysis because the standard is expressed as the net contribution from only the on-property sources, while off-property inventory sources and ambient background concentrations are not considered. The State Property Line modeling analysis will include all the on-property sources at the Gaines County Power Plant that emit SO_2 and H_2SO_4. The State Property Line standards for SO_2 and H_2SO_4 are shown in Table 11-1 below. The State Property Line analysis will compare the H1H modeled concentration predicted at each receptor based on one year (2012) of NWS meteorological data to the applicable State Property Line standard. Note that the intermittent source treatment for SO_2 emissions from the emergency equipment proposed for the PSD NAAQS modeling analysis will not be applied in the State Property Line modeling analysis (i.e., the maximum hourly SO_2 emissions from the emergency equipment will be modeled in the State Property Line modeling analysis).

Table 11-1. State Property Line Standards

Pollutant	Averaging Period	Standard (μg/m³)
SO_2	30-min [1]	1,021
H_2SO_4	1-hour	50[2]
	24-hour	15

[1] Per TCEQ guidance, the modeled H1H concentration for 1-hour will be used to compare the 30-minute averaging SO_2 standard.

[2] Not to be exceeded more than once in any consecutive 24-hour period and not to exceed 100 μg/m³ at any time.

11.2. STATE HEALTH EFFECTS EVALUATION

NH_3 emitted from the Gaines County Power Plant will be evaluated per the July 2009 guidance from the TCEQ Toxicology Division.[80] The TCEQ Modeling and Effects Review Applicability (MERA) Guidance package presents a flow chart to evaluate constituents identified as those requiring a state health effects evaluation in this submittal.[81] NH_3 emissions will be evaluated using Step 11 (i.e., site wide modeling) in the flow chart.

For Step 11, Xcel will conduct an air dispersion modeling analysis to determine the off-property impacts of NH_3 from the Gaines County Power Plant. The PSD Significance Analysis modeling procedures are generally applicable to the state health effects modeling analysis, since off-property inventory sources and ambient

[80] TCEQ Modeling and Effects Review Applicability: *How to Determine the Scope of Modeling and Effects Review for Air Permits*, APDG 5874, July 2009. http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/mera.pdf, last accessed August 24, 2015.

[81] Ibid, pages 3-4.

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background concentrations are not considered in the state health effects modeling analysis. All site-wide emission sources of NH_3 will be modeled based on one year (2012) of NWS meteorological data. NH_3 will be modeled for the 1-hour and annual averaging periods and the H1H modeled predicted concentrations will be compared to the applicable Effects Screening Levels (ESLs). For this health effects evaluation, ESLs are obtained from the March 2014 ESL list.[82]

If the modeled H1H concentration for NH_3 is less than the corresponding ESL, no further evaluation will be required. If the modeled H1H concentration is greater than the corresponding ESL, a Tier II or Tier III analysis will be conducted per the MERA guidance. The TCEQ Toxicology Division will determine if the predicted impacts from the Tier II or Tier III analysis are acceptable.

Similarly, Xcel will follow the MERA guidance with regards to evaluating other potential impacts from natural gas combustion.

[82] http://www.tceq.state.tx.us/toxicology/esl/list_main.html, last accessed August 24, 2015.

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12. ELECTRONIC FILES

The air dispersion modeling input and output electronic data files will be provided to the TCEQ with the AQA. The meteorological data files, downwash files, and AERSURFACE output file that will be utilized in the analysis will also be provided in electronic form. A copy of the air dispersion modeling report will be provided in electronic form as well.

ED_001261_00098428

October 15, 2015

Sent via e-mail to DWalden@TrinityConsultants.com and Laura.Gibson@tceq.texas.gov.

Subject: PSD Air Dispersion Modeling Protocol Xcel Energy - Gaines County Power Plant

I have reviewed the modeling protocol for Southwestern Public Service Company, located near Seminole, Gaines County, Texas, dated September 2015, and my comments are provided below. The comments in sections 4.8.2, 4.8.3, 4.8.5, 5.1, 5.2, 5.3, 5.6, 7, and 8.2 should be addressed before the air quality analysis (AQA) is submitted. The remaining comments are reminders for information to be included with the AQA.

2. Project Description - The purpose of any AQA for permitting is for the applicant to make a demonstration that their operation, as represented, would not cause or contribute to a National Ambient Air Quality Standard (NAAQS) or Prevention of Significant Deterioration (PSD) Increment violation or adversely affect public health and welfare. The representation made in the demonstration is typically a worst-case representation of the operation. All representations must be supported with technical justifications. Though assumptions and selections can be made using general guidance, these assumptions and selections must be justified why the particular guidance is appropriate to a specific case. A statement that the guidance has been followed or referencing discussions with TCEQ staff is not sufficient justification.

2.2 Project Description - The plot plan does not depict the locations of the diesel fire pump engine (EPN FPENG) and the inherently low emitting MSS activities (EPN ILE-MSS). Additionally, the plot plan does not depict the horizontal dimensions of the ammonia storage and unloading system (EPN NH3-FUG). Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site fence line, property line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. Also, please note that the plot plan should be independent of any model input software.

3.1.2 Preconstruction Ambient Monitoring Requirements - The protocol notes in Section 1.0 that H_2SO_4 triggers federal review. Since the project triggers PSD review for H_2SO_4, the AQA will need to address the pre-application analysis for H_2SO_4. Currently, NAAQS do not exist for H_2SO_4; however, the TCEQ has discretion on how the pre-application analysis should be conducted. The evaluation for the State Property Line standard for H_2SO_4 is sufficient for the pre-application analysis. The applicant can satisfy the pre-application analysis requirement by acknowledging this in the AQA.

3.1.3 Significant Impact Area and NAAQS/Increment Inventories - The protocol notes that consistent with EPA 1-hr NO_2 modeling guidance and PSD projects approved in EPA Region 6, Xcel proposes to limit the 1-hr NO_2 and SO_2 off-property inventory sources to those located within the area of impact plus 10 kilometers (km). Please include additional justification for the proposed methodology of developing the off-property inventory as part of the documentation

included with the AQA. This could include maps that show distance and magnitude of emissions for the off-property sources.

The Air Permits Allowable Database (APAD) retrieval will include a model-ready text file, and a summary report listing all retrieved sources. Each listed source will have a unique ID number. When modeling the off-property sources included in the APAD retrieval, please use the ID number provided in the APAD retrieval as the modeling ID in the modeling input files. Using the provided ID number as the modeling ID in the input files will allow for a more expeditious review by the ADMT. Be sure to document any changes to the data in the APAD retrieval. Also provide documentation for identified off-property sources that are not listed in the APAD retrieval.

3.2.1 Emissions Inventory Adjustment - A valid source was not provided to support the use of the common industrial stack parameters provided in Table 3-2 of the protocol or the substitutions of a stack height of 10 feet for source types with missing stack heights. The proposed substitution values may be reasonable to update any missing information from the APAD retrieval given proper justification and documentation is provided supporting the appropriateness of each. If justification is not provided for the proposed substitution values, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. As noted above, please note if any updates or corrections are made to the off-property retrieval data, all documentation needs to be provided with the AQA.

3.3 PSD Increment Analysis - The protocol notes that the permit application was declared administratively complete on September 9, 2015; therefore, September 9, 2015 is the $PM_{2.5}$ minor source baseline date for Gaines County. However, the minor source baseline date for $PM_{2.5}$ is set by the date that the application was received, which is August 24, 2015. Additionally, please consider the date of these comments as the cut-off date for identifying potential increment consuming sources. Be sure to document how the sources for the off-property inventory were obtained in the AQA.

The protocol notes that based on preliminary modeling, it is expected that Increment analyses will be performed for SO_2 (short-term), NO_2, PM_{10} (24-hr), and $PM_{2.5}$. Please note that if the preliminary results change and model predictions are greater than or equal to an applicable significant impact level (SIL), then a revised protocol will need to be submitted to the TCEQ and EPA Region 6 that addresses the development of the applicable off-property source inventories.

The protocol notes that if required, minor sources within a given distance of the proposed Gaines County Power plant, as previously described in Section 3.1.3, may also be included in the analysis. As noted in the comments for Section 3.1.3, please include additional justification for the proposed methodology of developing the off-property inventory. This could include maps that show distance and magnitude of emissions for the off-property sources.

4.2 Building Downwash - Provide a table listing all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

Ensure that all GEP heights used in BPIP PRIME are justified according to Guideline for

Determination of Good Engineering Practice Stack Height:

http://www.epa.gov/scram001/guidance/guide/gep.pdf

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

4.6 Receptor Grids - Currently, County Road 347 cuts across the property of where the project site is proposed to be constructed. If public access is allowed to County Road 347 through the project site, please place receptors along the county road.

If significant receptors are relied upon for the full Increment analysis for $PM_{2.5}$, then justification for the use of the $PM_{2.5}$ SILs in the Increment analysis will need to be provided. Please see the comments for section 5.3 for the appropriateness of the proposed approach. Please note that without sufficient justification for applying the $PM_{2.5}$ SILs to the $PM_{2.5}$ Increment analysis, the receptors used in the modeling domain of the $PM_{2.5}$ significance modeling should be used in the $PM_{2.5}$ Increment analysis.

4.8.2 Source Types - The basis of the associated source input parameters for area and volume sources was not provided in the protocol. Please provide the basis of the model input parameters for area and volume sources in a revised protocol.

4.8.3 Treatment of Emergency Sources - The protocol notes that emissions associated with testing from the fire pump engine and emergency generator will be excluded from the modeling demonstration per EPA guidance for intermittent sources. It is not clear from the information provided with the protocol that the equipment qualify as intermittent sources. Please indicate how often the fire pump engine and emergency generator are expected to be operated. In addition, it is not clear if the 100 hours of operation noted in the protocol are for the fire pump engine and emergency generator combined, or whether the hours are for each individual engine. Also, provide more discussion on whether these sources will operate simultaneously with other sources at the project site. Please address these aspects of supporting the use of intermittent guidance prior to submitting the AQA.

The protocol notes that for other short-term averaging periods, the modeled emission rates for the fire pump engine and emergency generator will be determined by multiplying the hourly emission rate by the hours of use per day and dividing by the short-term averaging period. Please provide the calculations used to determine the modeled emission rates for the short term averaging periods with the AQA.

4.8.4 Load Analysis - The protocol notes that several modeling scenarios at reduced operating loads or production rates will be considered to determine the worst-case impacts. Please coordinate with the permit reviewer on the emissions rates and source parameters that will be used for the reduced load scenarios.

4.8.5 Treatment of Startup/Shutdown Emissions - The protocol notes that startup/shut down

(SUSD) emissions for the turbines and generators will be considered for the NO_2 and CO analyses. Please provide a discussion as to whether all turbines and generators will start up or shut down at the same time and whether separate scenarios will be used to determine the worst-case scenario.

The protocol notes that for the hourly NO_2 analysis, annualized emission rates will be used for the SUSD emissions from the turbines and generators. If this statement is meant to represent the application of intermittent guidance, it is not clear from the information provided with the protocol that these activities qualify as intermittent. Please indicate the duration of each event, and how many events per year are expected to occur.

5.0 Ambient Background Monitoring Data - Tables 5-2, 5-6, 5-10, 5-16, and 5-19 of the protocol provide emissions summary information for industrial sources located within 10 km of the selected monitor and the project site. Please provide the full details of how the total pollutant emissions were determined in the AQA, and not just the total values.

5.1 Proposed NO_2 Background Monitor - The protocol notes that the use of data from the EPA AIRS monitor 480391016 (Lake Jackson monitor) was selected for the NO_2 background monitor concentrations. However, sufficient justification was not provided for selecting a monitor in Brazoria County rather than a more local monitor. For example, EPA AIRS Monitor 350250008 (Hobbs –Jefferson monitor) which is located approximately 11 km from the project site and is proposed for this analysis for another pollutant.

5.2 Proposed PM_{10} Background Monitor - The protocol notes that the use of data from the EPA AIRS monitor 481410029 (El Paso Ivanhoe monitor) was selected for the PM_{10} background monitor concentration. However, sufficient justification was not provided for selecting a monitor in El Paso County rather than a more local monitor. For example, EPA AIRS Monitor 350250008 (Hobbs –Jefferson monitor) which is located approximately 11 km from the project site and is proposed for this analysis for another pollutant. Please note that the ADMT has determined that the monitoring data from the Hobbs-Jefferson monitor for 2012 and 2014 are not complete. Since this monitor has data that do not meet the completeness criteria, another monitor with complete data may be considered. Please indicate this as justification for not selecting a more local monitor in the revised protocol.

5.3 Proposed $PM_{2.5}$ Background Monitor - The protocol notes that the use of data from the EPA AIRS monitor 350130025 (Las Cruces monitor) was selected for the $PM_{2.5}$ background monitor concentrations. However, sufficient justification was not provided for selecting this monitor instead of a more local monitor, EPA AIRS Monitor 350250008 (Hobbs –Jefferson monitor), which is located approximately 11 km from the project site and is proposed for this analysis for another pollutant.

The protocol notes that the data for 2012 from the Las Cruces monitor does not meet the completeness criteria as outlined by 40 CFR Part 50 Appendix S Section 3.1(b) and 40 CFR Part 50 Appendix S section 3.2(b). Please note that Appendix S to 40 CFR Part 50 discusses Interpretation of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen Dioxide; while Appendix N to 40 CFR Part 50 discuss the completeness criteria for $PM_{2.5}$.

Please use the appropriate reference for the completeness criteria for $PM_{2.5}$ when documenting the AQA.

The protocol includes an evaluation of the appropriateness of using the $PM_{2.5}$ SILs in the Increment analysis based on the monitored background concentrations considered to be representative of the area surrounding the proposed Gaines County Power Plant (table 5-14 of the protocol). As noted above, sufficient justification was not provided for selecting the Las Cruces monitor instead of a more local monitor. The Las Cruces monitor is located in a different region than the proposed project site; therefore, the use of this monitor is not appropriate for justifying the use of the $PM_{2.5}$ SILs for the Increment analysis.

5.6 Proposed Ozone Background Monitor - The protocol notes that the data from the EPA AIRS monitor 350250008 (Hobbs –Jefferson monitor) were selected for the O_3 background concentrations. The monitor appears to be appropriate based on information reviewed by the ADMT; however, sufficient justification for selecting this monitor was not provided. Please provide a comparison of county-wide population, county-wide NO_x emissions and county-wide VOC emissions for Lea and Gaines Counties.

7. Ozone ambient Impact Analysis - The protocol notes that consistent with all PSD applications approved by TCEQ in Regions 7 and 2 in 2015, the applicant proposes a conservative screening approach to conduct the ozone impact analysis, based on the inference that the area is NO_x-limited. Please provide the technical justification for determining that the area is NO_x-limited. It is not sufficient justification to say that other PSD applications, approved by the TCEQ, in Regions 7 and 2 are NO_x-limited.

The protocol notes emissions from emergency engines and SUSD operations will be modeled as previously described in section 4.8 of the protocol. In section 4.8, there is a discussion of excluding and using annual average hourly emission rates for the emergency engines and SUSD operations, respectively, for the 1-hr NO_2 analysis. Please note that the EPA guidance for intermittent emissions only applies to the 1-hr NO_2 analysis and is not appropriate for use in an ozone analysis (based on modeling NO_x emissions).

Please note the new ozone standard of 70 parts per billion will be in effect 60 days after publication of the final rule in the federal register.

8.2 Speciated $PM_{2.5}$ Monitor Data Review - The protocol notes that the use of data from the EPA AIRS monitor 481410044 (El Paso Chamizal monitor) was selected for the speciated $PM_{2.5}$ background monitor concentrations. For the $PM_{2.5}$ concentrations, the 24-hr block $PM_{2.5}$ data were relied on. In 2014, the 1st quarter of $PM_{2.5}$ data is less than 50% complete and the 2nd quarter is less than 75% complete, but greater than 50% complete. In 2012, the 2nd and 3rd quarters of $PM_{2.5}$ data are less than 75% complete, but greater than 50% complete. The monitor also has a continuous $PM_{2.5}$ sampler. For 2014 and 2012, the continuous $PM_{2.5}$ data are complete for all quarters. It is acceptable to use incomplete data that yield more conservative results than data that is complete. Please discuss how the incomplete data will be addressed in the revised protocol.

10. Class I Area Impact Analysis - The protocol notes that there are four Class I areas within 300 km of the project site. The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal land manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area. The proposed site is located beyond 100 km from the nearest Class I area and therefore would not require a Class I analysis. However, the applicant may contact the applicable Federal land manager to discuss any potential Class I analyses.

11.2 State Health Effects Evaluation - The protocol notes that the effects screening levels (ESLs) will be obtained from the March 2014 ESL list. The most recent ESL list (September 2015) should be used when conducting a health effects evaluation.

The locations of non-industrial and industrial areas were not identified. If a Tier II or Tier III health effects evaluation is conducted, the locations of the non-industrial and industrial areas will need to be identified in the AQA.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions, please contact Bob Castro at (512) 239-1314, by fax at (512) 239-1400, or by email at Roberto.Castro@tceq.texas.gov.

To: Mohr, Ashley[Mohr.Ashley@epa.gov]
Cc: Daniel Jamieson[daniel.jamieson@tceq.texas.gov]; Snyder, Erik[snyder.erik@epa.gov]; Kordzi, Stephanie[Kordzi.Stephanie@epa.gov]
From: Rachel Melton
Sent: Tue 10/13/2015 4:04:42 PM
Subject: Protocol Reponse: TOTAL PETROCHEMICALS & REFINING USA INC
Modeling Protocol Response - TOTAL PETROCHEMICALS & REFINING USA INC.docx
TOTAL Modeling Protocol _SideCracker.pdf

Good morning Ashley,

Attached is the TCEQ's response for TOTAL PETROCHEMICALS & REFINING USA INC Modeling Protocol, Permit No.: 122353. Please respond to verify receipt of this information.

Thanks,

Rachel Melton

Texas Commission on Environmental Quality

Air Permits Division

Air Dispersion Modeling Team

T: 512-239-2358

E: Rachel.Melton@tceq.texas.gov

October 13, 2015

Subject: Total Petrochemicals & Refining USA, Inc. Air Quality Analysis Protocol

I have reviewed the Prevention of Significant Deterioration (PSD) Air Quality Analysis Protocol for the Total Petrochemicals & Refining USA, Inc. Port Arthur Ethane Side Cracker located in Port Arthur, Jefferson County, Texas, dated July 2015, and my comments are provided below. The comments in sections **2.1.3, 2.2, 2.3, 2.4, 6.9.4, 6.9.5, 7.5.1, and 7.6** should be addressed before the air quality analysis (AQA) is submitted. The remaining comments are reminders and recommendations for information to be included with the AQA.

1.1 Scope of Modeling Analyses - The protocol notes that the speciation of non-criteria pollutants may change and will be included in the final report. Please coordinate with the permit reviewer on the scope of the project and be in agreement on the speciation of non-criteria pollutants before submitting the AQA.

1.3 Area Map and Plot Plan - Provide a plot plan with the AQA (electronic format preferred: dwg or dxf autocad format) that depicts the site property line, fence line, locations of production activities, locations of emission sources represented in the AQA, and the locations of any building or structures represented in the AQA. Be sure to clearly label all features included with the plot plan. In addition, be sure that the plot plan is an independent representation and not generated from model input software.

2.1.1 Significant Impact Level (SIL) Analysis - In general, report the predicted high, first high (H1H) concentration for each pollutant. The results of the modeling for the $PM_{2.5}$ and 1-hr NO_2 National Ambient Air Quality Standard (NAAQS) analyses should be presented as the highest five-year average of the maximum modeled $PM_{2.5}$ and 1-hr NO_2 concentrations predicted each year at each receptor, consistent with EPA guidance.

Note that 24-hr and annual $PM_{2.5}$ will need to be evaluated modeling the individual years to determine if a PSD full increment analysis will be required. While the SILs for both the NAAQS and increment are identical for $PM_{2.5}$, the procedures to determine significance (that is, predicted concentrations to compare to the SILs) are different. This difference occurs because the NAAQS for $PM_{2.5}$ are statistically-based, but the corresponding increments are exceedance-based.

2.1.2 Preconstruction Monitoring Analysis - See comment below in section 7.1 *Preconstruction Monitoring Requirements* regarding the appropriate justification for selecting representative monitors.

Table 2-1 of the protocol lists 4.0 μg/m^3 as the$PM_{2.5}$ significant monitoring concentration (SMC). Please note that the SMC for $PM_{2.5}$ was vacated; therefore, this value should be removed from Table 2-1.

2.1.3 Area of Impact (AOI) Analysis - The protocol states that due to the significant amount of ambient air monitoring performed near the facility, Total proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds. Additional justification would need to be provided demonstrating that the background monitor is adequately representing emission from the sources to be excluded from the NAAQS analysis. Depending on where the monitors and source are located, the applicant may be able to use the monitor to represent some sources and model the rest. Please address before submitting the AQA.

The protocol also notes that if the approach mentioned above is not accepted, a retrieval from the TCEQ Air Permits Allowable Database (APAD) will be obtained for NAAQS pollutants that exceed the applicable SIL. In addition, the protocol notes that a search radius of the AOI plus 20 kilometers (km) will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate prior to submitting the AQA. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Be sure to provide all supporting materials with the AQA.

2.2 NAAQS Analysis - See section 2.1.3 *Area of Impact (AOI) Analysis* regarding the approach in which monitoring data are used in lieu of modeling off-property sources.

Please note when modeling PM_{10} with five individual years of meteorological data, the concentration should be reported as the maximum high, second high (H2H). If using five years of concatenated meteorological data, report the maximum high, sixth high (H6H) predicted concentration.

See comment below in section 7.2 *Adjusted Background Concentration* regarding the use of an adjusted background.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

2.3 PSD Increment Analysis - See comment below in section 7.5 *Justification to use $PM_{2.5}$ Significant Impact Level (SIL)* regarding the use of the $PM_{2.5}$ SILs for Increment.

The proposed alternative approach is not acceptable.

Note the minor source baseline date for $PM_{2.5}$ for Jefferson County is January 1, 2013 and the PM_{10} minor source baseline date is November 11, 1977.

The protocol references using actual emission rates; however, it is unclear how these

data will be determined for off-property sources for both the long-term and short-term averaging times. Be aware that the APAD retrieval provides the allowable emission rates, and not actual emission rates. If actual emission rates will be relied on in the PSD Increment analysis, provide the full details on how these data were determined, as well as the justification to support the values prior to submitting the AQA.

The protocol states that a search radius of the AOI plus 20 km will be used for developing the off-property inventory. Be sure to provide justification as to why a specific radius is appropriate. Furthermore, if the applicant is aware of data not contained in the retrieval, such as pending or recently issued permitted facilities, the data should be included as applicable. Any changes to data or exclusion of sources must be clearly documented and justified. Please note, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. If any updates or corrections are made to the off property retrieval data, be sure to provide all supporting materials with the AQA.

The protocol states to reduce the number of sources included in the PSD Increment inventory, the analysis may merge similar off-property emission sources. Note without adequate justification, this approach is not appropriate for Increment modeling. Furthermore, simply providing the title to a guidance document that covers many topics does not justify its use. The applicant should always explicitly explain how the guidance document is applicable to their project and how the approach will be implemented.

If you become aware of any potential Increment exceedances, please contact the ADMT before revising and/or submitting the AQA.

2.4 Ozone Impact Analysis - The protocol notes that the TCEQ's Air Quality Modeling Guidelines (AQMG) from April 2015 will be relied on for conducting the analysis. Please note that Appendix Q of the TCEQ's AQMG has not been finalized and therefore should not be documented as being relied on. In addition, general references to literature or guidance are made throughout the protocol, but no one specific approach is outlined. Be sure to provide details of the analysis and specify a specific approach for estimating ozone impacts in lieu of referencing guidance with the revised protocol.

The protocol states that a conservative screening analysis based on NO_x modeling will be used to estimate the potential impact of ozone levels and that the methodology is only valid if the local atmosphere's ozone formation is NO_x-limited (i.e, the county-wide VOC/NO_x ratio is 1.3 to 1). First, the determination of whether the project area is VOC or NO_x-limited should be established before conducting the screening analysis. Second, supporting information on the relevance of the ratio of 1.3 to 1 was not provided with the protocol. Note that additional technical information and supporting documentation will need to be provided if this ratio is to be relied on to determine if the project area is VOC or NO_x-limited before submitting the AQA.

The protocol also states that the screening approach appears to be conservative given the difference in biogenic VOC emissions found near Cumberland, TN vs. biogenic VOC emissions in Jefferson County. It is unclear what the basis is for making this statement. Additionally, no documentation of the actual biogenic VOC emissions or justification was provided to validate this statement.

As mentioned above, the validation of the area being NO_x-limited should be done ahead of time. The method for determining if the project area is NO_x-limited or VOC-limited should be based on ambient concentrations in the area and not from county emissions inventories. Information from the BPA 1997 Eight-Hour Ozone Redesignation Request and Maintenance Plan SIP could be used to support the ozone analysis, particularly section 4.2 - *FUTURE EMISSIONS AND VERIFICATION OF CONTINUED ATTAINMENT*. This section contains analyses demonstrating that for the Beaumont-Port Arthur (BPA) area, reducing NO_X emissions is more effective in reducing the eight-hour ozone Design Value (DV) than reducing VOC emissions.

The protocol also did not provide justification for the selected ozone monitor. Be sure to provide the justification for the selected monitor and include the monitoring concentration that would be used with the revised protocol. Justification should include more than just proximity of the monitor to the project site or containing sufficient data to meet the completeness criteria. The justification for the monitor should include an analysis of the area surrounding the project site relative to the monitor site with respect to nearby sources of emissions (ozone precursor emissions).

Be aware that the intermittent source guidance should not be used for the ozone screening analysis. Also, be sure to convert the predicted ozone concentration from $\mu g/m^3$ to parts per billion (ppb) before adding to the ozone monitoring concentration for comparison to the NAAQS in the AQA.

A revised protocol will need to be submitted to the TCEQ and EPA Region 6 that outlines a specific methodology for addressing the ozone analysis and also includes a discussion on the monitor selection and whether the area is NO_x-limited or VOC-limited.

Please note the new ozone standard of 70 ppb will be in effect 60 days after publication of the final rule in the federal register.

2.6 Class I Area Analysis - The TCEQ follows 40 Code of Federal Regulations § 52.21(p) which requires the TCEQ to provide written notice of any permit application for a proposed major stationary source which may affect a Class I area to the Federal land manager and the Federal official charged with direct responsibility for management of any lands within any such area. The EPA, through applicable guidance, has interpreted the meaning of the term "may affect" to include all major source or major modifications which propose to locate within 100 km of a Class I area.

The proposed site is located beyond 100 km from the nearest Class I area and would not require a Class I analysis. However, the applicant may contact the applicable federal land manager to discuss any potential Class I analyses.

3.1 State NAAQS Analysis Step 1 - See comments below in section 6.2 *Meteorological Data*, regarding the use of five years of meteorological data versus one year.

Please note the 1-hr SO_2 NAAQS is 196 $\mu g/m^3$.

3.2 State NAAQS Analysis Step 2 - See section 2.1.3 *Area of Impact (AOI) Analysis* regarding the approach in which monitoring data is used in lieu of off-property sources.

Similar to the comment above, if a specific distance is used to develop the off-property inventory, adequate justification should be provided prior to submitting the AQA as to why a specific radius is appropriate.

If you become aware of any potential NAAQS exceedances, please contact the ADMT before submitting the AQA.

Section 4 State Property Line Analyses - Note the state property line standard for sulfur dioxide for Jefferson County is 817 $\mu g/m^3$.

The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a single property line designation (SPLD). Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

Section 5 State Effects Review Analyses - The protocol states since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. Please note the RN referenced on page 1-1 is not new, and is part of a SPLD. Therefore, the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

6.1 Dispersion Models - The most recent version of AERMOD, version 15181, should be used. Additionally, be sure to document and technically justify all model selections in the AQA.

6.2 Meteorological Data - The protocol notes that one or five years of meteorological data may be used for the State NAAQS. It should be noted the meteorological data used must be consistent for all averaging times. For example, when modeling 1-hr SO_2 with five years of meteorological data, the modeling for the 3-hr, 24-hr, and annual averaging times should also use five years.

Additionally, if five years of meteorological data are used and concatenated together, be aware of model limitations when using a concatenated meteorological data set with multiple averaging times in the same model run. For example, when modeling NO_2 with a concatenated five-year meteorological data set in AERMOD and both the 1-hr and annual averaging times are selected, AERMOD will compute five-year average concentrations for both averaging times. This is not appropriate for the NO_2 annual averaging time.

One year of meteorological data (2012) is appropriate for the state health effects review and state property line review.

Be sure to provide the AERSURFACE files and the meteorological data files associated with the modeling analysis with the AQA.

6.4 Building Downwash Analysis - Provide all structure heights used in the downwash analysis and any computer assisted drawing files with the AQA.

For structures not included in the downwash analysis or for air quality analyses conducted without consideration of downwash, please provide technical justification for supporting this approach.

6.6 Receptor Grids - A single property line designation agreement (SPLD) exists between Total Petrochemicals & Refining USA, Inc., Enterprise Refined Products Company LLC, and BASF FINA Petrochemicals LP. Be sure to include a copy of the SPLD agreement, as well as the associated property line map with the AQA.

Please note that receptors will need to be placed on Enterprise Refined Products Company LLC and BASF FINA Petrochemicals LP for all federal (PSD NAAQS and Increment) analyses.

In addition, for all state analyses (minor NSR NAAQS, state property line, and state health effects analyses), the applicant will need to include all applicable sources from the SPLD if site-wide analyses are required.

6.9 Emission Source Characterization - Be sure to include a copy of the Table 1(a), full documentation for each source characterization, and complete technical justification for the associated source parameters in the AQA.

If average emission rates will be modeled instead of the maximum hourly rate, be sure to clearly identify which pollutants/sources this approach will be used and provide the associated calculations in the AQA.

6.9.2 Heater Decoking - The protocol notes the modeling for the heaters will include a reasonable worst-case approach. Be sure to provide full documentation and justification for any worst-case determinations relied on in the analysis.

6.9.4 Multi-Point Ground Flare (Routine Activity and/or Planned MSS Activities) - Please provide the calculation of the effective stack diameter as part of the documentation with the AQA. Additionally, coordinate with the permit reviewer regarding the proposed adjusted method for calculating the individual effective diameter for each active nozzle. Be sure to document how the different operating scenarios are being taken into account; the number of active nozzles and the resulting effective diameter will depend on the flow going to the flare.

For the flaring operations, it is not clear from the information provided that the activity is intermittent. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be

provided prior to submitting the AQA.

6.9.5 Emergency Generator (Engine) - The protocol notes that the emergency engine will be modeled following EPA's intermittent guidance. However, it is not clear from the information provided with the protocol that the emergency engine listed in this section qualifies as an intermittent source. Information such as the number of events per year, the duration for each event, and whether there are simultaneous operations with other sources should be provided prior to submitting the AQA.

Please note if hour-of-day scalars are used in the model, the annual average rate calculations will need to take this into account (i.e. do not rely on 8760 hours).

6.9.6 Cooling Tower - Prior to submitting the AQA, please provide justification for the selected source characterization that will be modeled for each source.

6.9.7 Fugitive (Piping) Components - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

6.9.8.1 Equipment Maintenance - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

6.9.8.4 Inherently Low Emitting Sources - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

6.9.8.5 Catalyst Charging/Handling - See comment in section 6.9.6 *Cooling Tower* regarding justification for the selected source characterization.

7.1 Preconstruction Monitoring Requirements - The protocol includes a discussion on the monitor data that will be used to fulfill the preconstruction monitoring requirement if predicted concentrations from the project exceed the applicable SMC.

The AQA should include documentation explaining why the proposed monitors are appropriate. In addition to the proximity of the monitor to the project site, monitor justification should also include the following:

- Types of sources and amounts of emissions surrounding the monitor site versus the project site.
- Topographic and land-use comparison of areas surrounding the monitor site versus the project site.
- Site location relative to predominant wind direction.

The selected monitors in Table 7-1 of the protocol to represent the project site are reasonable. Be sure to include with the AQA the monitor background concentrations data and the supporting calculations.

7.1.2 Surrogate Monitors for Nitrogen Dioxide - Please note that NO_2 is formed through atmospheric reactions.

7.1.4 Surrogate Monitors for Fine Particulate ($PM_{2.5}$) - Please note the selected monitor (482450021) to represent the project site for 24-hr and annual $PM_{2.5}$ is reasonable and therefore, the additional monitors listed in Table 7-2 of the protocol are not necessary.

7.1.5 Surrogate Monitors for Sulfur Dioxide (SO_2) - Note that SO_2 does not trigger federal review and therefore, preconstruction monitoring is not required.

The selected monitor (482450009) to represent the project site for SO_2 may be reasonable; however, it is unclear why the second closest monitor is being selected. See the comment in section 7.1 *Preconstruction Monitoring Requirements* regarding monitor justification.

7.1.6 Surrogate Monitors for Ozone (O_3) - Please note the selected monitor (482450102) to represent the project site for ozone is reasonable and therefore, the additional monitors listed in Table 7-3 of the protocol are not necessary.

7.2 Adjusted Background Concentration - As mentioned above, the request to use the unadjusted measured monitored concentrations in lieu of modeling off-property sources is not acceptable. Related to this, adjusting the background concentration in which the modeled off-property concentrations at the monitor location are subtracted from the monitor data is also not acceptable.

7.3 Regional Ozone Background Concentration - Please note this analysis is not required.

7.5 Justification to use $PM_{2.5}$ Significant Impact Level (SIL) - The justification provided to use the $PM_{2.5}$ SILs for the NAAQS analysis is appropriate; however please see the comment above in section 7.1 *Preconstruction Monitoring Requirements* regarding the monitor justification.

Before submitting the AQA, please provide a discussion on why the use of the $PM_{2.5}$ SILs for the $PM_{2.5}$ Increment analysis would be considered appropriate. See the following EPA guidance regarding $PM_{2.5}$:

http://www.epa.gov/ttn/scram/guidance/guide/Guidance_for_PM25_Permit_Modeli

ng.pdf

7.5.1 $PM_{2.5}$ Secondary Formation Applicability - Please revise the protocol to address the secondary formation of $PM_{2.5}$ associated with the proposed project emissions.

Additional information is requested since an evaluation of the project emissions of precursor emissions of NO_2 was not discussed. The ADMT recommends that the evaluation be supplemented in the protocol by reviewing speciated $PM_{2.5}$ monitor data from the Port Arthur Memorial School monitor (please note that speciated data are only available through 2010). Begin by reviewing and reporting the nitrate concentrations from the monitor. Then demonstrate how the proposed NO_x project emissions are a small fraction of the NO_x emissions for the air shed, and discuss how secondary formation associated with proposed NO_x emissions would be expected to be considerably smaller than the monitored concentrations of nitrates. This demonstration should also acknowledge that the maximum estimated impacts associated with secondary formation of $PM_{2.5}$ are not expected to occur near the project site nor are they expected to significantly increase the predicted results from the modeling of direct $PM_{2.5}$ emissions. Be sure to provide a conclusion stating why secondary $PM_{2.5}$ formation would not be expected to contribute significantly to the total concentration.

If the Port Arthur Memorial School monitor is used to obtain speciated $PM_{2.5}$ data, be sure to include justification for the selected monitor with the AQA.

7.6 Intermittent Source Policy - The proposed methodology for modeling intermittent sources for both total operational hours and total alternative operating scenario hours is not acceptable in regards to excluding sources which are limited to 100 hours or less of operation.

It is not clear from the protocol what sources qualify as intermittent emissions. Prior to submitting the AQA, information should be provide for each source including the number of operating events per year, the duration for each event, and whether events will occur simultaneously or separately.

Be aware if hour of day scalars are used for intermittent sources, this must be accounted for in the calculation of the annual average emission rates.

7.7 Common Industrial Stack Parameters - A valid source was not provided to support the use of the common industrial stack parameters provided in Table 7-9 of the protocol. The values listed in Table 7-9 may be reasonable to update any missing information from the APAD retrieval given proper justification and documentation is provided supporting the appropriateness of each.

If justification is not provided for the use of these common industrial stack parameters, the ADMT recommends updating any missing information from the APAD retrieval with default parameters as listed in the AQMG. Please note if any updates or corrections are made to the off-property retrieval data, all documentation in which the Air Permits Division can validate should be provided.

Deliverables - All modeling and downwash input and output files should be sent electronically via email, FTP, or CD/DVD. Electronic copies of the modeling report, plot plan, and maps are also preferred.

If you have any questions please contact Rachel Melton at 512-239-2358, by fax at 512-239-1330, or by email at Rachel.Melton@tceq.texas.gov.

SAGE
ENVIRONMENTAL CONSULTING

Total Petrochemicals & Refining USA, Inc.

Air Dispersion Modeling Protocol
for the
Port Arthur Ethane Side Cracker

TOTAL Ethane Side Cracker
Port Arthur, Texas

July 2015

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SECTION 1
PROJECT OVERVIEW

Total Petrochemicals & Refining USA, Inc. (TOTAL) is planning to construct and operate a new Ethane Side Cracker in Port Arthur, Texas. The unit will produce up to 1,000 kilotons per annum (KTA) of ethylene. Table 1-1 provides general information concerning the proposed facility:

Table 1-1
General Information

Applicant:	Total Petrochemicals & Refining USA, Inc. (TOTAL)
Facility:	TOTAL Ethane Side Cracker
TCEQ RN Number:	RN102457520
TCEQ CN Number:	CN604041020
TCEQ Account Number:	JE-0005-H
Street Address:	Interesction of Highway 366 and 32nd Street
Mailing Address:	7600 32nd Street
Facility Location:	Port Arthur, Texas 77642
County:	Jefferson County
Applicant's Modeler:	Sage Environmental Consulting, L.P. (Sage)

On July 31, 2014, TOTAL submitted a permit application to the Texas Commission on Environmental Quality (TCEQ) for the Port Arthur Ethane Side Cracker Plant, which is also referred to as the Ethane Side Cracker project in this protocol. Upon approval, the new facility will be permitted under New Source Review (NSR) Permit No. 122353/PSDTX1426. This modeling protocol discusses the methodology and procedures for an Air Quality Analysis (AQA) to demonstrate compliance with federal Prevention of Significant Deterioration (PSD) and state modeling requirements. Additional information will be provided upon request.

1.1 Scope of Modeling Analyses

Table 1-2 summarizes the applicability of federal PSD and State modeling requirements to the proposed project. Speciation for non-criteria pollutants listed in Table 1-2 is current as of this protocol. The final speciation may be revised, as appropriate, upon further investigation as the modeling analyses progress. Likewise, any changes to the non-criteria pollutants evaluated for the State Effects Review will be noted and the table will be updated in the final modeling report.

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Table 1-2
Compounds That May Require Modeling Analyses

Compound	Federal PSD?	State NAAQS?	State Property Line?	Health Effects?
Carbon Monoxide (CO)	YES	--	--	--
Nitrogen Dioxide (NO_2)	YES	--	--	--
Inhalable Particulate (PM_{10})	YES	--	--	--
Fine Particulate ($PM_{2.5}$)	YES	--	--	--
Sulfur Dioxide (SO_2)	NO	YES	YES	--
Ozone (O_3)	YES	--	--	--
Hydrogen sulfide (H_2S)	--	--	YES	--
Sulfuric Acid (H_2SO_4)	--	--	YES	--
Ammonia (NH_3)	--	--	--	YES
Benzene	--	--	--	YES
Ethylene	--	--	--	YES
1,3-Butadiene	--	--	--	YES
1-Butene	--	--	--	YES
Butane	--	--	--	YES
n-Pentane	--	--	--	YES
Ethyl Benzene	--	--	--	YES
Toluene	--	--	--	YES
Xylene	--	--	--	YES
Naphthalene	--	--	--	YES
Isopropyl Benzene	--	--	--	YES
n-Hexane	--	--	--	YES
Acetylene	--	--	--	YES
Styrene	--	--	--	YES
Heptane	--	--	--	YES
Light VOC	--	--	--	YES
Heavy VOC	--	--	--	YES
Hydrogen Chloride (HCl)	--	--	--	YES
Methanol	--	--	--	YES
Methyl Ethyl Ketone	--	--	--	YES
Methyl Isobutyl Ketone	--	--	--	YES

Because the proposed project triggers federal PSD review for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Inhalable Particulates (PM_{10}), Fine Particulates ($PM_{2.5}$), and volatile organic compounds (VOC). Although EPA has not currently established PSD standards for VOC, VOC is considered a precursor for Ozone (O_3) formation. Section 2 describes the proposed methodology for federal PSD review. Section 6 describes the modeling selection and inputs for this analysis.

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The proposed project does not trigger federal PSD for Sulfur Dioxide (SO_2); therefore, a State NAAQS analyses may be required. Section 3 describes the proposed methodology for a State NAAQS analysis. Section 6 describes the modeling selection and inputs for this analysis.

The proposed project includes the following sulfur containing compounds: Sulfur Dioxide (SO_2), Hydrogen Sulfide (H_2S), and Sulfuric Acid (H_2SO_4). Section 4 describes the proposed methodology for a State Property Line Analysis. Section 6 describes the modeling selection and inputs for this analysis.

The proposed project emits additional non-criteria pollutants that may require a Modeling and Effects Review Applicability (MERA) Analysis and/or sitewide modeling as a part of the State Effects Review (SER) analysis. Section 5 describes the proposed methodology for a SER Analysis. Section 6 describes the modeling selection and inputs for this analysis.

1.2 Modeling Protocol

The modeling protocol describes the procedures used to demonstrate that potential ambient air impacts are acceptable. The modeling protocol incorporates the latest regulatory guidance, compliance methodologies, and agency correspondence. The information sources include, but are not limited to, the following:

- *Air Quality Modeling Guidelines* (further referred to as "AQMG" in this report) (TCEQ, APDG 6232V2, April 2015);
- *Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits* (further referred to as "MERA" in this report) (TCEQ, APDG 5874, July 2009);
- *Guideline on Air Quality Models (Revised)* in 40 Code of Federal Regulations (CFR) §51 Appendix W (further referred to as "Appendix W" in this document) (United States Environmental Protection Agency (EPA), November 2005);
- New Source Review Workshop Manual (DRAFT) (further referred to as "NSR Manual" in this document) (EPA, October 1990);
- U.S. EPA guidance on implementation of 1-Hour National Ambient Air Quality Standards (NAAQS) for Nitrogen Dioxide (NO_2) and Sulfur Dioxide (SO_2) and 24-hour and annual NAAQS for $PM_{2.5}$; and
- Correspondence with EPA Region VI, Louisiana Department of Environmental Quality (LDEQ), and TCEQ relating to other analyses.

Section 7 discusses additional information that may be used in the modeling analyses (e.g., background concentrations retrieval). Section 8 contains additional references for the analysis.

1.3 Area Map and Plot Plan

Figure 1-1 presents a surrounding area map in relation to the fenceline used in the PSD analysis (further referred to as "PSD fenceline" in this document). Figure 1-2 contains a facility plot plan.

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Figure 1-1
Surrounding Area Map

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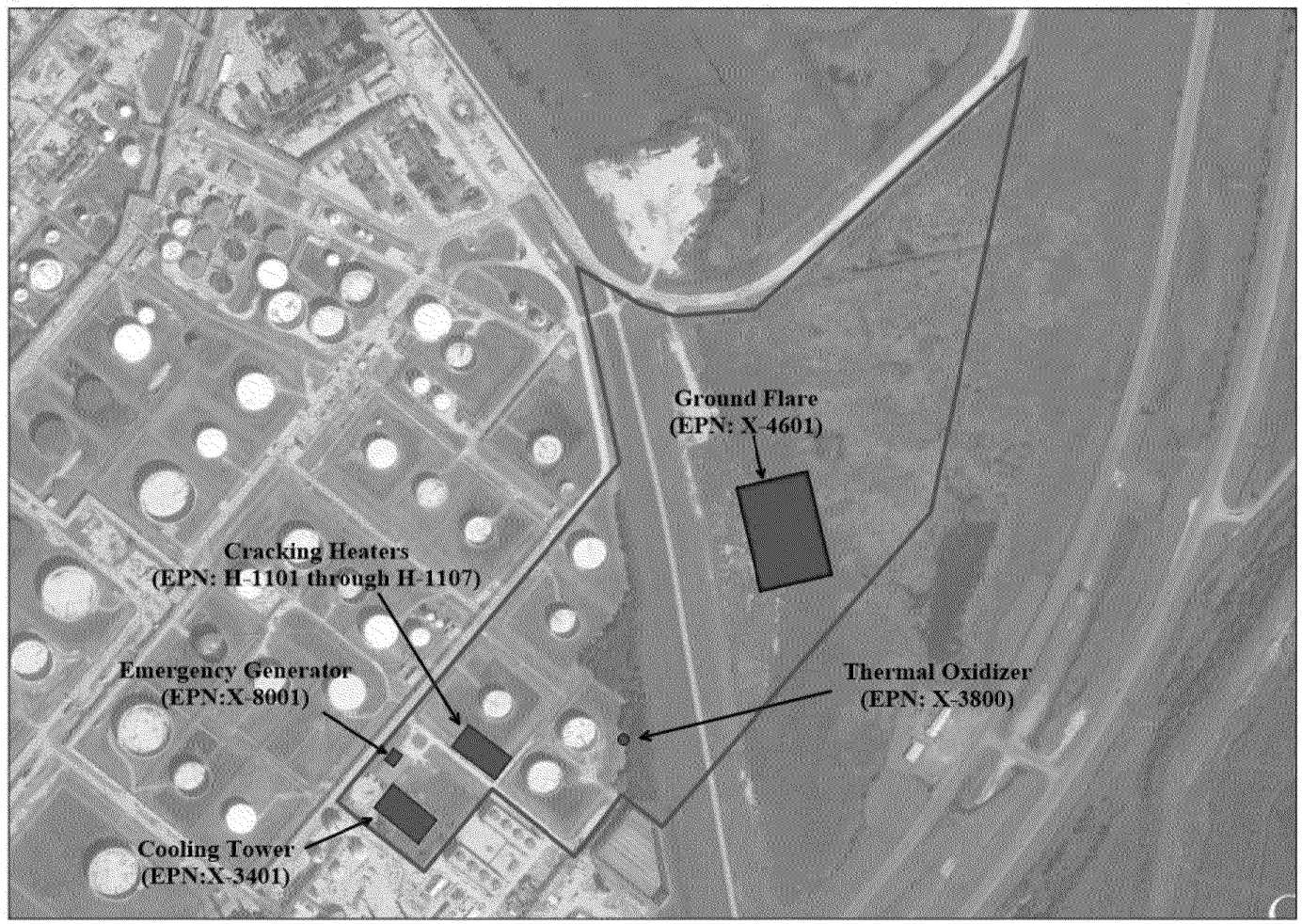

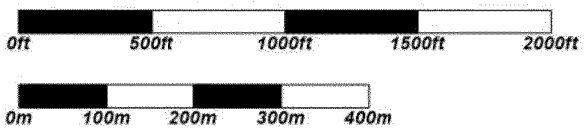

Figure 1-2
Plot Plan
Total Petrochemicals & Refining USA, Inc.

SAGE ENVIRONMENTAL CONSULTING

DATE	June 2015
PROJ. #	400-30-1-134

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SECTION 2
FEDERAL PSD ANALYSES

The proposed facility will be a new major stationary source according to Prevention of Significant Deterioration (PSD) regulations for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Inhalable Particulates (PM_{10}), Fine Particulates ($PM_{2.5}$), and volatile organic compounds (VOC);; therefore, 40 CFR §52.21 requires that an Air Quality Analysis (AQA) demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and PSD Increment standards. Although EPA has not currently established PSD standards for VOC, VOC is considered a precursor for ozone (O_3) formation. According to the AQMG, a PSD AQA may consist of two distinct phases:

- Phase I (a.k.a., Significant Impact Determiantion (SID) and/or Significant Impact Level (SIL) modeling) dicussed in Section 2.1, which determines whether full-impact analyses (i.e., NAAQS and PSD Increment modeling) are required.
- Phase II (a.k.a., full-impact) analyses include NAAQS and PSD Increment demonstrations. Section 2.2 describes the NAAQS analysis that demonstrates compliance with federal ambient air concentration standards. Section 2.3 describes the PSD Increment analysis that demonstrates compliance with federal limits on industrial expansion.

Table 2-1 lists the applicable standards for CO, NO_2, PM_{10}, and $PM_{2.5}$.

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Table 2-1
Federal PSD Review Compounds

			Phase I: Screening Analysis		Phase II: Refined Analysis	
Compounds	**CAS No.**	**Averaging Period**	**Significant Impact Level (□g/m^3)**	**Monitoring Exemption Level (□g/m^3)**	**NAAQS (□g/m^3)**	**Class II PSD Increment (□g/m^3)**
Carbon Monoxide (CO)	630-08-0	1-Hour	2,000.0	--	40,000.0[01]	--
		8-Hour	500.0	575.0	10,000.0[01]	--
Nitrogen Dioxide (NO_2)	10102-44-0	1-Hour	7.5	--	188.0[01]	--
		Annual	1.0	14.0	100.0[02]	25.0
Inhalable Particulate (PM_{10})	--	24-Hour	5.0	10.0	150.0[02]	30.0
		Annual	1.0	--	--	17.0
Fine Particulate ($PM_{2.5}$)	--	24-Hour	1.2	4.0	35.0[02]	9.0
		Annual	0.3	--	12.0[01]/15.0[03]	4.0

Note:
A significant emission rate increase in Nitrogen Dioxide (NO_2) or Volatile Organic Compounds (VOC) greater than 100 tons-per-year (tpy) may require both Ozone (O_3) preconstruction monitoring and Ozone (O_3) Impact Analysis.
[01]. Primary NAAQS.
[02]. Primary NAAQS and Secondary NAAQS.
[03]. Secondary NAAQS.
[04]. The annual PM_{10} SIL analysis will be used only to determine if PSD Increment analysis will be necessary.

2.1 PSD Screening Analysis

The PSD Phase I analysis may consist of three separate determinations: the Significant Impact Level (SIL) Analysis (Section 2.1.1), the Preconstruction Monitoring Exemption Level (Section 2.1.2), and the Area of Impact (AOI) determination (Section 2.1.3).

2.1.1 Significant Impact Level (SIL) Analysis

The Significant Impact Level (SIL) Analysis determines if the proposed project requires a refined analysis (i.e., NAAQS and PSD Increment) to demonstrate compliance with 40 CFR §52.21 regulations. Table 2-1 presents the SILs for compounds that may be subject to PSD review due to the proposed project. For each compound that requires a PSD review, the SIL analysis includes all project sources. Since this project represents a new federal source, there are no existing emission units or emission changes (i.e., increases or decreases) within the project's contemporaneous period. For the proposed project, the modeled emission rate will be the post-project potential-to-emit (PTE) for the new sources matching the values from the Table 1(a) in the permit application).

For CO (1-Hour and 8-Hour), NO_2 (Annual), PM_{10} (24-Hour and Annual), and $PM_{2.5}$ (24-Hour and Annual), the emissions will be modeled using five years of meteorological data. The appropriate off-property concentration represents the maximum from all five years of meteorological data. For NO_2 (Annual), the analysis will use the Ambient Ratio Method (ARM) (Section 7.4).

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For NO_2 (1-Hour), the net emission change (in this case the PTE) will be modeled; however for intermittent sources, the AQA will adjust emission rates for NO_2 based upon intermittent source policy and upon operational hours (Section 7.6). The appropriate off-property concentration represents the average of the maximum concentrations from five years of meteorological data at each receptor location. For NO_2 (1-Hour), the analysis will use the ARM (Section 7.4).

The SIL analysis compares the appropriate modeled concentration to the appropriate Table 2-1 SIL. If the modeled concentration is less than the SIL, the project's impact is insignificant for that pollutant (i.e., the project increases will not cause or significantly contribute to any exceedance of the NAAQS or PSD Increment standards); therefore, no further analysis is required. If the modeled concentration is greater than or equal to the SIL, PSD regulations may require a refined analysis (i.e., NAAQS and PSD Increment models). To account for a recent court decision, Section 7.5 presents additional justification to use the $PM_{2.5}$ SIL based upon EPA guidance.

2.1.2 Preconstruction Monitoring Analysis

For compounds with a modeled concentration from the SIL analysis greater than the Table 2-1 SIL, the PSD regulations require a preconstruction monitoring analysis. A preconstruction monitoring analysis compares the modeled concentration from the SIL analysis to the appropriate Table 2-1 monitoring exemption level. If the modeled concentration is less than its respective monitoring exemption level, the analysis does not require preconstruction monitoring data. If the modeled concentration is greater than or equal to its respective monitoring exemption level, the analysis may require one year of preconstruction monitoring (please note that the minimum duration may be reduced to four months at the discretion of the administrative authority). If the proposed project includes a net Nitrogen Dioxide (NO_2) or Volatile Organic Compound (VOC) emission increase greater than 100 tons-per-year (tpy), 40 CFR §52.21 requires Ozone (O_3) preconstruction monitoring data for the facility.

On a "case-by-case" basis, TCEQ may allow a facility to use existing monitoring data to satisfy preconstruction monitoring requirements. As discussed in Section 7.1, TOTAL proposes to use existing monitors "in lieu" of additional preconstruction monitoring requirements. In 2013, a court decision revoked the current $PM_{2.5}$ monitoring exemption level; therefore based upon recent EPA guidance, Section 7.5 includes an ambient monitoring survey for $PM_{2.5}$ monitors surrounding the facility.

2.1.3 Area of Impact (AOI) Analysis

For compounds with a modeled concentration from the SIL analysis greater than the Table 2-1 SIL, the Area of Impact (AOI) is determined for a refined analysis (i.e., NAAQS and PSD Increment models). The AOI is defined as a circle around the facility that has a radius equal to the distance from the center of the facility to the most distant, significant, off-property receptor in the SIL model. The AOI is used to determine the following:

(1) <u>Define Location of Refined Analysis; and</u>
Typically, the AOI reflects the farthest extent of a refined model for that compound. For NAAQS and PSD Increment models, the dispersion model is limited to receptors that

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exceeded a SIL in the initial screening analysis (Section 2.1.1). Section 6.6 provides additional justification for this approach.

(2) Define off-property inventory.
Due to the significant amount of ambient air monitoring performed near the facility (Section 7.1), TOTAL proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS for all compounds (Section 2.2). If TCEQ requires an off-property inventory to demonstrate compliance with NAAQS and/or PSD Increment, TOTAL proposes that a radius of AOI plus 20-kilometers (km) and not exceeding 50 km from the project sources should be sufficient for the proposed project. EPA's PSD modeling guidance at Section 8.2.3 of Appendix W emphasizes the use of professional judgment in the identification of sources to be included in the modeled emission inventory so that the modeling does not result in a cumulative impact assessment that is overly conservative. EPA has also stated that *"[a] key point to remember when assessing these issues is their interconnectedness – the question of which nearby background sources should be included in the cumulative modeling analysis is inextricably linked with the question of what ambient monitoring data is available and what that data represents in relation to the application."* (March 2, 2011, EPA NO_2 Modeling Guidance).

2.2 NAAQS Analysis

For compounds with a modeled concentration from the SIL analysis greater than the Table 2-1 SIL, the PSD regulations require a National Ambient Air Quality Standards (NAAQS) analysis. Section IV of TCEQ's AQMG provides the general procedure for a PSD NAAQS Analysis. The NAAQS analysis demonstrates that the post-project, ambient concentration (i.e., the sum of the modeled concentration and the adjusted background concentration) will not cause or contribute to an exceedance of the applicable federal air quality standards. Table 2-1 presents the NAAQS for compounds that may be subject to PSD review.

As an alternative to a traditional, cumulative analysis, TOTAL proposes the following alternative procedure for NAAQS compliance:

- The model results from SIL analysis (Section 2.1.1) will be added to measured concentrations from applicable ambient monitoring sites for comparison to NAAQS, without modeling project off-site sources. On a "case by case" basis, TCEQ/EPA may accept this alternative approach based upon the representativeness of nearby ambient monitoring. Due to the significant amount of ambient air monitoring performed near the facility (Section 7.1), TOTAL proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS. The nearby ambient monitors should be sufficient to capture impact of the surrounding inventory; therefore, development of off-property inventory may be considered "double-counting."

If TCEQ/EPA does not accept the alternative approach listed above, TOTAL will perform a traditional, cumulative assessment to demonstrate compliance with NAAQS. As a new facility, the emission rates for the SIL analysis will be used in the NAAQS analysis.

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If TCEQ requires an off-property inventory to demonstrate compliance with NAAQS analysis, the analysis will obtain an off-property inventory from TCEQ. The NAAQS off-property inventory will include all emission sources located within a radius of AOI plus 20 km and not exceeding 50 km from the facility. TCEQ may request that the model incorporate additional off-property sources. The appropriate emission rate will mirror guidelines for emission rates from facility sources.

The appropriate modeled concentration for the NAAQS analysis depends upon the compound and associated averaging period. The following guidelines were applied to select the appropriate modeled concentration:

- For CO (1-Hour and 8-Hour), the appropriate emission rate will be modeled for five years of meteorological data. The appropriate modeled concentration represents the highest-second-high (H2H) concentration from all five years of meteorological data.
- For NO_2 (1-Hour), the appropriate emission rate will be modeled for five years of concatenated meteorological data. For each receptor, the appropriate modeled concentration represents the average of the 98th percentile (i.e., highest-eighth-high (H8H)) of daily maximum concentrations from five years of meteorological data. For NO_2 (1-Hour), the analysis will use the ARM (Section 7.4).
- For NO_2 (Annual) and $PM_{2.5}$ (Annual), the appropriate emission rate will be modeled for five individual years of meteorological data. The appropriate modeled concentration represents the maximum annual concentration from all five years of meteorological data. For NO_2 (Annual), the analysis will use the ARM (Section 7.4).
- For PM_{10} (24-Hour), the appropriate emission rate will be modeled with five individual years of meteorological data. The appropriate modeled concentration represents the highest-sixth-high (H6H) concentration in the NAAQS model over five years.
- For $PM_{2.5}$ (24-Hour), the appropriate emission rate will be modeled for five years of concatentated meteorological data. For each receptor, the appropriate modeled concentration represents the average of the 98th percentile (i.e., highest-eighth-high (H8H) of daily maximum concentrations from five years of meteorological data.

The analysis will compare the post-project, expected ambient concentration to the appropriate Table 2-1 NAAQS threshold. The expected ambient concentration is the appropriate modeled concentration from the NAAQS model added to the adjusted background concentration for the facility (Section 7.2). If the expected ambient concentration is less than the NAAQS standard, the proposed project does not cause or contribute to an exceedance of the NAAQS standard; therefore, no further analysis is required. If the expected ambient concentration is greater than or equal to the NAAQS standard, the AQA must determine the proposed project's contribution to the potential exceedance.

The AQA compares the proposed project's contribution to a potential NAAQS exceedance(s) to the Table 2-1 SIL. If the maximum contribution from the proposed project is less than the SIL at the receptor(s) and time(s) of the potential exceedance(s), the proposed project will not significantly contribute to the potential NAAQS exceedance(s); therefore, no further analysis is required. The AQA will document the potential NAAQS exceedance(s) for TCEQ review. If

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the maximum contribution from the proposed project is greater than or equal to the SIL at the receptor(s) and time(s) of the potential exceedance(s), the analysis will further examine the receptor location(s) of the potential NAAQS exceedance(s).

If the receptor of the potential exceedance(s) is located on another facility's property, the analysis subtracts the other facility's contribution to the potential exceedance(s) from the modeled concentration. If the revised concentration is less than the NAAQS standard, the analysis demonstrates compliance; therefore, no further analysis is required. For any remaining potential NAAQS exceedance(s), the AQA proposes a file review to update any emission sources that may contribute to the potential exceedance(s). The emission source may be updated by either reviewing TCEQ permit files and/or contacting the facility directly. The updates may include stack parameters, emission rates, and/or intermittent source applicability (for 1-Hour NO_2 NAAQS only). Culpable off-property sources will be checked for shutdowns or upset conditions. If TCEQ files do not contain sufficient stack parameters and/or non-TOTAL facility chooses not to provide more accurate data, TOTAL proposes to use common industrial parameters (Section 7.7).

2.3 PSD Increment Analysis

For compounds with a modeled concentration from the SIL analysis greater than the Table 2-1 SIL, the PSD regulations require a PSD Increment analysis. Section IV of TCEQ's AQMG provides the general procedure for a PSD Increment Analysis. The PSD Increment analysis demonstrates that the proposed project will neither cause nor contribute to an exceedance of federal ordinances on industrial expansion. The federal government has three PSD Increment zoning classifications: a Class I area for restricted industrial growth (federal protected lands, etc.); a Class II area for controlled industrial growth; and a Class III area for expanded industrial growth. The facility will be located within a Class II area; therefore, PSD Class II Increment standards apply. Table 2-1 presents the PSD Increment standards for compounds that may be subject to PSD review due to the proposed project.

For each compound that requires a PSD Increment analysis, the model will incorporate both facility-wide and applicable off-property emission sources. As an alternative to a traditional, cumulative analysis, TOTAL proposes the following alternative procedure for PSD Increment compliance:

- The analysis will first estimate PSD Increment change by modeling the post-project PTE rates for applicable sources. If the impacts are below the PSD Increment Standards, then no additional analysis will be necessary.

If TCEQ/EPA does not accept the alternative approach listed above and/or the impacts using the alternative approach exceed any PSD Increment, TOTAL will perform a traditional, cumulative assessment to demonstrate compliance with PSD Increment. For the traditional assessment, the analysis will estimate PSD Increment change by modeling current actual emission rates (as positive entries) and a historical (i.e., baseline) emission rates for the applicable off-site sources (as negative entries). For pre-baseline sources (i.e., emission sources that precede PSD regulations and have not been modified since establishment of the baseline date), the baseline emission rate will be equal to current emission rate. Alternatively, the analysis may model "increment consuming sources" only if approved on a "case-by-case" basis by TCEQ. For new

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or physically modified sources, the following guidelines will be applied to determine the current emission rate:

- For NO_2 (Annual), PM_{10} (Annual), and $PM_{2.5}$ (Annual), the current emission rate reflects the reported annual emissions from latest Emission Inventory Questionnnaire (EIQ), or PTE from the corresponding permit application, whichever is lower.
- For PM_{10} (24-Hour) and $PM_{2.5}$ (24-Hour), the analysis will use the maximum mass emission rate expected during the associated averaging period (please note that, for most sources, the modeled emission rate reflects the maximum, hourly PTE from the latest EIQ and/or pending permit amendments). It should be noted that maximum emission rates may be limited by enforceable permit condition and/or operational limitations.

For all other emission sources, the current emission rate is the latest reported actual emission rate. As appropriate, the modeled emission rate reflects routine operations and/or planned maintenance, startup, and/or shutdown (MSS) activities.

The alternative analysis will model baseline emission rates as negative numbers. For PM_{10} (24-Hour and Annual), the major and minor source baseline date is January 6, 1975. For NO_2 (Annual), the major and minor source baseline date is February 8, 1988. For $PM_{2.5}$ (24-Hour and Annual), TOTAL will request proper major and minor source baseline date for Jefferson County from TCEQ (please note that the federal register lists major and minor source baseline dates of October 20, 2010).

For off-property emission sources, the analysis will obtain an off-property inventory from TCEQ. The PSD Increment off-property inventory will include all emission sources located within a radius of AOI plus 20 km and not exceeding 50 km from the facility. TCEQ may request that the model incorporate additional off-property sources. The retrievals include source parameters and actual emission rates both for the current and baseline years. To reduce the number of sources included in the PSD Increment inventory, the analysis may merge similar off-property emission sources according to the procedures provided in *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (Revised)* (EPA, 1992a).

The appropriate modeled concentration for the PSD Increment analysis depends upon the compound and associated averaging period. The following guidelines were applied to select the appropriate modeled concentration:

- For NO_2 (Annual), PM_{10} (Annual), and $PM_{2.5}$ (Annual), the appropriate emission rate will be modeled for five individual years of meteorological data. The appropriate modeled concentration represents the maximum for all five years of meteorological data. For NO_2 (Annual), the analysis will use the ARM (Section 7.4).
- For PM_{10} (24-Hour) and $PM_{2.5}$ (24-Hour), the appropriate emission rate will be modeled for five individual years of meteorological data. The appropriate modeled concentration represents the highest-second-high (H2H) concentration from the PSD Increment model.

The analysis will compare the appropriate modeled concentration to the Table 2-1 PSD Increment standard. If the appropriate modeled concentration is less than the PSD Increment standard, the proposed project does not cause nor contribute to an exceedance of the PSD

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Increment standard; therefore, no further analysis is required. If the appropriate modeled concentration is greater than or equal to the PSD Increment standard, the AQA must determine the proposed project's contribution to the potential exceedance.

The AQA will compare the proposed project's contribution to a potential PSD Increment exceedance(s) to the Table 2-1 SIL. If the maximum contribution from the proposed project is less than the SIL at the receptor(s) and time(s) of the potential exceedance(s), the proposed project will not cause nor significantly contribute to the potential PSD Increment exceedance(s); therefore, no further analysis is required. The analysis will document any potential PSD Increment exceedance(s) for TCEQ review. If the maximum contribution from the proposed project is greater than or equal to the SIL at the receptor(s) and time(s) of the potential exceedance(s), the analysis will further examine the receptor location(s) of the potential PSD Increment exceedance(s).

If the receptor of the potential exceedance(s) is located on another facility's property, the analysis may subtract the other facility's contribution to the potential exceedance(s) from the modeled concentration. If the revised concentration is less than the PSD Increment standard, the analysis demonstrates compliance; therefore, no further analysis is required. For any remaining potential PSD Increment exceedance(s), the analysis may propose a file review to update any emission sources that contribute to potential PSD Increment exceedance(s). The emission source may be updated by either reviewing TCEQ permit files and/or directly contacting the facility. The updates may include both stack parameters and/or emission rates. Culpable off-property sources will be checked for shutdowns or upset conditions. If TCEQ files do not contain sufficient stack parameters and/or non-TOTAL facility chooses not to provide more accurate data, TOTAL proposes to use common industrial parameters (Section 7.7).

2.4 Ozone Impact Analysis

If the proposed project includes a net VOC or NO_X emission increase greater than 100 tons per year (tpy), 40 CFR §52.21 requires an ozone impact analysis. To date, EPA has not finalized a compliance methodology that is applicable to a single facility for an 8-Hour ozone impact analysis; therefore, EPA reviews an ozone impact analysis on a "case-by-case" basis. Until additional guidance from EPA and/or TCEQ is available, TOTAL proposes to follow Appendix Q of TCEQ's AQMG, which provide general procedure for a PSD Ozone Ambient Impact Analysis. The following methodology is proposed:

- <u>NO_X Dominated Sources,</u>
  If the significant increases from the proposed project are NO_X dominated, no significant increase of ozone would be expected. According to literature sources and regulatory guidance, NO_X dominated emission sources scavenge existing ozone from the atmosphere and compete for the free radicals required by the ozone formation reactions; therefore, no ozone increase is expected from NO_X dominated increases. Please note that the VOC or NO_X dominated determination will be made on a mass basis.

- <u>VOC Dominated Sources.</u>
  If the significant increases from the proposed project are VOC dominated, the proposed methodology depends upon the magnitude of potential net emission increase in VOC. For small potential increases (i.e., less than or equal to 250-tpy), no significant increase

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of ozone would be expected; therefore, no further analysis should be required. For larger potential increases (i.e., greater than 250-tpy), a screening ozone impact analysis would be performed. If a screening analysis is required, TCEQ will be approached for the appropriate path forward.

The proposed screening ozone impact analysis will involve reviewing both nearby and "similar" location ozone data, as well as a review of VOC and NO_X emissions for the counties in which the monitors are located. Initially, ozone monitoring sites will be identified that are reflective of Jefferson County conditions. Such identification will involve checking for similar population, terrain, and emissions density. With population usually being a surrogate for other emissions inventory information (e.g., area, on-road, and non-road emissions), it will be more useful to obtain area, on-road, or non-road data for the counties where monitors are located. The inventory data will be obtained from TCEQ's TexAER system and EPA's National Emissions Inventory (NEI), as applicable. In addition, the analysis will include a review of county-wide biogenic VOC emissions, since this sector plays a very important role in ozone chemistry.

After the background ozone concentrations are established, a screening analysis will be completed to demonstrate that even with the new VOC and NO_X emissions due to the project, operations will not likely substantially increase ozone production.

Ozone formation is a very complex process and depends not only on just new emissions from a proposed source, but existing emissions over a particular geographic area. That is, whether an area is NO_X-limited, VOC-limited, or otherwise ozone-neutral is a function of all local/regional emissions – point sources, area sources, on-road mobile sources, non-road mobile sources, and biogenic emissions. In addition, evidence from aircraft sampling downwind of power plants indicates that the maximum degree of ozone formation from a large NO_X plume occurs 10-11 km downwind.

To support this assumption, a conservative screening analysis based on NO_X modeling will be used to estimate the potential impacts on ozone levels. This methodology is valid, if the local atmosphere's ozone formation is NO_X limited (i.e., the county-wide VOC/NO_X ratio is approximately 1.3 to 1). The validation will be provided in the AQA. Aircraft sampling of a large power plant plume (Tennessee Valley Authority's Cumberland Station) showed that at a distance of approximately 10 km downwind from the source a molecule of NO_X may yield of up to 3 to 5 ozone molecules. This technique appears to be conservative given the difference in biogenic VOC emissions found near Cumberland, TN vs. biogenic VOC emissions in Jefferson County.

Consistent with the referenced screening methodology, NO_X potential emissions from the project sources will be modeled using AERMOD, for an 8-hour averaging period. NO_X sources will be excluded or adjusted based on the U.S. EPA's intermittent emissions guidance. A set of 250-meter spaced receptors shown on a receptor plot will be set to form a circular ring at the distance between 10 and 11 kilometers from the approximate center point of the project NO_X sources. The 8-hour impacts will be then assumed to generate 3 ppb of ozone for each ppb of predicted NO_X concentration. This value will be added to the representative monitored ozone background concentration discussed above.

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The sum of the screening value and the representative background monitored concentration of ozone will be compared to 75 ppb (150 μg/m ^{3}) threshold. This technique is based on a screening procedure designed by U.S. EPA that makes use of a 0.9 scaling factor to account for the conversion of NO_X to NO_2.

2.5 Nonattainment Analysis

Since Jefferson County is currently designated as attainment for all compounds with applicable NAAQS, the AQA will not include a nonattainment new source review (NNSR).

2.6 Class I Area Analysis

The proposed facility will be approximately 472-kilometers from the nearest Class I Area (i.e., Breton Island Area). As the facility is located greater than 300-kilometers (km) from a Class I area, no further action should be required.

2.7 Additional Impact Analysis

40 CFR §52.21 requires an Additional Impacts Analysis for compounds under PSD review. Section IV of TCEQ's AQMG provides general procedure for a PSD Additional Impact Analysis. The additional impact analysis will include the following analyses:

- Project's potential impact on growth, and
  A discussion of the potential impact, along with associated industrial, commercial, and residential growth will be included in the air quality analysis. Emissions from any significant growth may be incorporated in the potential sources of emissions to demonstrate compliance with the NAAQS .
- Project's potential impact on soil and vegetation.
  Impacts on soil and vegetation from the project will also be determined to ensure the proposed emission increases will not adversely impact the surrounding soils and vegetation.
- Project's potential impact on fenceline visibility.
  The visibility impairment analysis evaluates the impact associated with the project on the visibility within the AOI (usually within a Class II Area). The facility can meet the requirements for the Class II visibility analysis by acknowledging compliance with the visibility and opacity requirements in 30 TAC Chapter 111. Additional review for fenceline visibility should not be required.

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SECTION 3
STATE NAAQS ANALYS ES

The purpose of State National Ambient Air Quality Standards (NAAQS) analyses is to demonstrate that proposed emissions of criteria pollutants, which do not trigger a federal PSD review, will not cause nor contribute to an exceedance of the NAAQS. Table 3-1 lists compounds that may require a State NAAQS Analysis.

Table 3-1
Potential Compounds for State NAAQS Analysis

Compounds	CAS No.	Averaging Period	Significant Impact Level (□g/m^3)	NAAQS Conc. (□g/m^3)	NAAQS Demonstration Method	NAAQS Analysis Years
Sulfur Dioxide (SO_2)	7446-09-5	1-Hour	7.82	195.0[01]	99-Percentile	2008-2012
		3-Hour	25.0	1,300.0[02]	Maximum (H2H)	2012
		24-Hour	5.0	365.0[01],[03]	Maximum (H2H)	2012
		Annual	1.0	80.0[01],[03]	Maximum (H1H)	2012

Note:
[01]. Primary NAAQS.
[02]. Secondary NAAQS.
[03]. The EPA revoked the 24-Hour and annual SO_2 NAAQS in 2010. Although revoked, Texas' State Implementation Plan (SIP) revisions to conform to the federal action have not yet received final approval by EPA. Thus, TOTAL's protocol includes procedures for these analyses. TOTAL requests that TCEQ advise if these analyses are required.

Section IV of TCEQ's AQMG provides the general procedure for a State NAAQS analysis. The proposed procedures reflect previous discussions with TCEQ for State NAAQS analyses:

3.1 State NAAQS Analysis Step 1

State NAAQS Analysis Step 1 is a project-level model; therefore, the analysis includes project-related emission sources only. For the proposed project, the modeled emission rate will be the post-project Potential-To-Emit (PTE) for applicable sources.

For SO_2 (3-Hour, 24-Hour, and Annual), the net emission change will be modeled for one year (2012) of meteorological data. The appropriate off-property concentration represents the maximum concentration from one year of meteorological data (five years if SO_2 (1-Hour) analyses use five years, see below).

For SO_2 (1-Hour), the net emission change will be modeled; however for intermittent sources, the AQA may adjust emission rates based upon intermittent source policy and upon operational hours (Section 7.6). The analysis will conduct modeling using one year of meteorological data with the appropriate off-property concentration being the maximum concentration. Alternatively, the analysis may conduct the modeling using using five years of concatenated meteorological data. In the latter case, the appropriate off-property concentration will represent

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the average of the maximum concentrations from five years of meteorological data at each receptor location.

State NAAQS Analysis Step 1 will compare the appropriate modeled concentration to the appropriate Table 2-1 Significant Impact Level (SIL). If the modeled concentration is less than the SIL, the project's impact is insignificant for that pollutant (i.e., the project increases will not cause or significantly contribute to any exceedance of the State NAAQS); therefore, no further analysis will be required for the specific averaging period. If the predicted concentrations are equal to or greater than the SIL, the analysis may require additional review (i.e., refined screening analysis).

3.2 State NAAQS Analysis – Refined Analysis

The purpose of the Refined Screening Analysis is to demonstrate that the post-project, ambient concentration will not exceed the NAAQS based on a conservative screening procedure. The State NAAQS analysis demonstrates that the post-project, ambient concentration (i.e., the sum of the modeled concentration and the adjusted background concentration) will not cause or contribute to an exceedance of the applicable NAAQS. Table 2-1 presents the NAAQS for compounds that may be subject to State NAAQS review.

As an alternative to a traditional, cumulative analysis, TOTAL proposes the following alternative procedure for State NAAQS compliance:

- The model results from SIL analysis (Section 3.1) will be added to measured concentrations from ambient monitoring sites for comparison to State NAAQS, without modeling project off-site sources. On a "case by case" basis, TCEQ may accept this alternative approach based upon the representativeness of nearby ambient monitoring. Due to the significant amount of ambient air monitoring performed near the facility (Section 7.1), TOTAL proposes that development of an off-property inventory may not be required to demonstrate compliance with NAAQS. The nearby ambient monitors should be sufficient to capture impact of the surrounding inventory; therefore, development of off-property inventory may be considered "double-counting."

If TCEQ does not accept the alternative approach listed above, TOTAL will perform a traditional, cumulative assessment to demonstrate compliance with Sate NAAQS. As a new facility, the emission rates for the SIL analysis will be used in the NAAQS analysis.

If TCEQ requires an off-property inventory to demonstrate compliance with State NAAQS analysis, the analysis will obtain an off-property inventory from TCEQ. The State NAAQS off-property inventory will include all emission sources located within the AOI distance from the facility. TCEQ may request that the model incorporate additional off-property sources. The appropriate emission rate will mirror guidelines for emission rates from facility sources.

For the State NAAQS Analysis, the dispersion model will be limited to receptors that exceeded a SIL from the associated model from the State NAAQS Analysis Step 1. The appropriate modeled concentration for the NAAQS analysis depends upon the compound and associated averaging period. The following guidelines will be applied to select the appropriate modeled concentration:

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- For SO_2 (1-Hour), the appropriate emission rate will be modeled for one year of meteorological data and the off-property concentration will be the maximum concentration. Alternatively, the analysis may model the appropriate emission rates with five years of meteorological data. For each receptor, the appropriate modeled concentration will represent the average of the 99th percentile (i.e., highest-fourth-high (H4H)) of daily maximum concentrations from five years of concatenated meteorological data.
- For SO_2 (3-Hour and 24-Hour), the appropriate emission rate will be modeled for one year of meteorological data (five years if five years are used in Step 1 modeling). The appropriate modeled concentration will represent the maximum concentration or H2H concentration if five years of met data are modeled.
- For SO_2 (Annual), the appropriate emission rate will be modeled for one year of meteorological data (five years if five years are used in Step 1 modeling). The appropriate modeled concentration will represent the maximum annual concentration.

The refined analysis will compare the post-project, predicted ambient concentration to the appropriate Table 2-1 NAAQS threshold. The expected ambient concentration is the appropriate modeled concentration from the NAAQS model added to the adjusted background concentration for the facility (Section 7.2). If the resulting ambient concentration is less than the NAAQS standard, the proposed project does not cause or contribute to an exceedance of the NAAQS standard; therefore, no further analysis is required. If the resulting ambient concentration is greater than or equal to the NAAQS standard, the AQA must determine the proposed contribution from the project to the potential exceedance.

The AQA will compare the proposed contribution from the project to a potential NAAQS exceedance(s) to the Table 2-1 SIL. If the maximum contribution from the proposed project is less than the SIL at the receptor(s) and time(s) of the potential exceedance(s), the proposed project will not significantly contribute to the potential NAAQS exceedance(s); therefore, no further analysis will be necessary. The AQA will document the potential NAAQS exceedance(s) for TCEQ review. If the maximum contribution from the proposed project is greater than or equal to the SIL at the receptor(s) and time(s) of the potential exceedance(s), the analysis will further examine the receptor location(s) of the potential NAAQS exceedance(s).

If the receptor of the potential exceedance(s) is located on another facility's property, the analysis will subtract the other facility's contribution to the potential exceedance(s) from the modeled concentration. If the revised concentration is less than the NAAQS, the analysis demonstrates compliance; therefore, no further analysis will be necessary. For any remaining potential NAAQS exceedance(s), the AQA will propose a file review to update any emission sources that may contribute to the potential exceedance(s). The emission source may be updated by either reviewing TCEQ permit files and/or contacting the facility directly. The updates may include stack parameters, emission rates, and/or intermittent source applicability (for 1-Hour SO_2 NAAQS only). Culpable off-property sources will be checked for shutdowns or upset conditions. If TCEQ files do not contain sufficient stack parameters and/or non-TOTAL facility chooses not to provide more accurate data, TOTAL proposes to use common industrial parameters (Section 7.7).

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SECTION 4
STATE PROPERTY LINE ANALYSES

The purpose of State Property Line analyses (also referred to as state regulatory analyses) is to demonstrate compliance with the state standards for net ground-level concentrations of sulfur compounds [30 TAC Chapter 112 (TNRCC, 1997a)]. Table 4-1 lists compounds that may require a State Property Line Analysis.

Table 4-1
Potential Compounds for State Property Line Analyses

Compounds	CAS No.	Averaging Period	State Property Line Standard (□g/m^3)	Applicable Receptors
Sulfur Dioxide (SO_2)	7446-09-5	1-Hour	715.0	All
Hydrogen Sulfide (H_2S)	7783-06-4	1-Hour	108.0	Non-Industrial
		1-Hour	162.0	Industrial
Sulfuric Acid (H_2SO_4)	7664-93-9	1-Hour	50.0	All
		24-Hour	15.0	All

Section IV and Appendix F of TCEQ's AQMG provides the general procedure for a State Property Line analysis. Since the proposed project will be a part of a new facility, the project emissions will be the sitewide emissions which will be evaluated in the sitewide analysis at State Property Line Step 2.

For SO_2 (1-Hour), the PTE will be modeled using one year (2012) of meteorological data (please note that the intermittent source policy will not be used for State Property Line Analyses). For H_2S (1-Hour) and H_2SO_4 (1-Hour and 24-Hour), the PTE will be modeled using one year (2012) of meteorological data. If concentrations are less than the State Property Line Standards, no further analysis will be necessary. If concentrations exceed the State Property Line Standards, TCEQ will be approached to discuss additional analyses needed for the proposed project.

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SECTION 5
STATE EFFECTS REVIEW ANALYSES

The purpose of State Effects Review (SER) analyses is to demonstrate that the public health and welfare are protected. Table 5-1 lists the Effects Screening Level (ESL) for compounds that may require a health effects review. Please note that the list of compounds may change in the final report.

Table 5-1
Potential Compounds for State SER Analyses

Compound	CAS No.	1-Hour ESL (□g/m^3)	Annual ESL (□g/m^3)
Ammonia	7664-41-7	170.0	17.0
Benzene	71-43-2	170.0	4.5
Ethylene	74-85-1	1,400.0	34.0
1,3-Butadiene	106-99-0	510.0	9.9
1-Butene	106-98-9	820.0	1,600.0
Butane	106-97-8	66,000.0	7,200.0
n-Pentane	109-66-0	4,100.0	7,100.0
Ethyl Benzene	100-41-4	740.0	570.0
Toluene	108-88-3	640.0	1,200.0
Xylene	1330-20-7	350.0	180.0
Naphthalene	91-20-3	200.0	50.0
Isopropyl Benzene	98-82-8	230.0	250.0
n-Hexane	110-54-3	5,300.0	200.0
Acetylene	74-86-2	26,600.0	2,660.0
Styrene	100-42-5	110.0	140.0
Heptane	142-82-5	2,750.0	350.0
Hydrogen Chloride	7647-01-0	190.0	7.9
Methanol	67-56-1	3,900.0	2,100.0
Methyl Ethyl Ketone	78-93-3	1,300.0	2,600.0
Methyl Isobutyl Ketone	108-10-1	700.0	82.0
Light VOC	64741-66-8	3,500.0	350.0
Heavy VOC	64742-11-6	1,000.0	100.0

The general procedures for a State SER analyses are discussed in Section IV and Appendix G of TCEQ's AQMG. Since the proposed project is requested under a new TCEQ NSR permit for a new facility, the modeling will start with site-wide analyses. The analysis will include all emission sources at the facility. For each source, the modeled emission rate equals the post-project PTE. Sitewide modeling will include both routine operations and/or planned MSS activities.

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Sitewide modeling will compare predicted off-property concentrations to the TCEQ ESL. If concentrations are equal to or less than the ESL, no further analysis will be necessary. If concentrations are greater than the ESL, additional analyses may be required. For air permitting purposes, TCEQ can approve exceedances of the ESL on "case-by-case" basis based upon (1) the magnitude of the exceedance; (2) the number of exceedances predicted during the year; and (3) location of impact. Section IV of TCEQ's AQMG provides additional discussion on TCEQ approval criteria, which will be followed to complete the analyses.

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SECTION 6
MODEL SELCTION AND I NPUTS

The analysis will use the following inputs in the Air Quality Analysis (AQA):

6.1 Dispersion Models

The AQA proposes to use the latest version of the **A**merican Meteorological Society / **E**nvironmental Protection Agency **R**egulatory **MOD**el (AERMOD). The AERMOD calculates off-property, ground-level concentrations for both short-term (1-Hour, 3-Hour, 8-Hour, and 24-Hour) and annual averaging periods.

6.2 Meteorological Data

The proposed facility will be located in Jefferson County. For Jefferson County, TCEQ recommends surface observations from the Port Arthur Regional Airport (National Weather Service (NWS) Station 12917) and upper air station data from the Lake Charles Regional Airport (NWS Station 03937). Figure 6-1 provides a 5-year windrose for the Port Arthur Regional Airport. Based upon TCEQ information, the profile base elevation for the Port Arthur Regional Airport is 4.9 meters (16.1 feet) above sea level.

TCEQ provides pre-processed meteorological data to the public. On November 22, 2013, TCEQ updated the preprocessed meteorological data using AERMET (Version 12345): https://www.tceq.texas.gov/permitting/air/modeling/aermod-datasets.html. Using a 1-kilometer radius surrounding the facility, the AERSURFACE program (Version 13016) reflected medium surface roughness; therefore, the analysis will use the mdium surface roughness meteorological data sets.

For compounds that are subject to Prevention of Significant Deterioration (PSD) review, the AQA will use five (5) years of meteorological data. For State NAAQS Analyses, the AQA may use either one year (2012) or five (5) years of meteorological data where applicable. For State Property Line and Effects Review Analyses, the AQA will use one year (2012) of met data.

6.3 Land Use and Dispersion Regime

AERMOD automatically uses the "default" rural dispersion coefficients or urban dispersion coefficients. On a "case-by-case" basis, TCEQ may allow AERMOD to use urban dispersion coefficients to evaluate certain sources. At this time, the proposed project does not intend to use this option. If this option is used, the modeling report will include supporting documentation, including a "heat island" analysis, population count, AUER Land Use analysis, etc.

6.4 Building Downwash Analysis

The analysis will include Huber-Snyder and Schulman-Scire building downwash effects. For AERMOD, the analysis will use Building Profile Input Program with Plume Rise Model Enhancement (BPIP-PRIME) to assess wind direction-specific downwash dimensions from downwash structures.

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6.5 Good Engineering Practice (GEP) Stack Height Analysis

The good engineering practice (GEP) regulations require emission sources to be included at the lesser of physical stack height or GEP formula stack height. The GEP formula stack height is expressed as the greater of 65 meters or a "site-specific" value based upon surrounding downwash structures. The analysis may include any stack heights greater than 65-meters in height, if justified by the "site-specific" values.

6.6 Receptor Grids

Initially, the analysis will use an initial Cartesian receptor grid that extends 10-kilometers (km) in all directions from the new facility property boundary boundary/fenceline. The spacing for the initial receptor grid varies with distance from the facility as follows:

- Along the property line and extending 100-meters (m) beyond the property line, the analysis will use 25-meter (m) spacing;
- From 100 meters to 1,000 meters beyond the property line, the analysis will use 100-meter spacing;
- From 1,000 meters to 5,000 meters beyond the property line, the analysis will use 500-meter spacing; and
- From 5,000 meters to 10,000 meters beyond the property line, the analysis will use 1,000-meter spacing.

The initial receptor grid will be used for screening analyses. For dispersion modeling, the first level of sophistication generally involves the use of screening analyses to determine whether refined (i.e., more detailed) analyses are necessary. Typically, refined analyses are required if screening analyses indicate that predicted concentrations may exceed a standard, guideline, a de minimis amount (i.e., SIL for PSD review), or an identified percentage of a standard (i.e., 2.0 % of State Property Line Standards). If predicted concentrations from the screening analysis are below these indicated concentrations, additional review should not be required. If predicted concentrations from the screening analysis are above these indicated concentrations, additional review may be required; however to conserve resources and expedite review, the additional review should focus on locations (or receptors) where screening analyses indicate additional review may be beneficial. In other words, refined analyses will only include receptors for which the preceding screening analyses indicate that additional review is warranted.

For Prevention of Significant Deterioration (PSD) review, the receptor boundary for the Significant Impact Determination (SID) Analysis (Section 2.1.1) represents the facility fenceline. For refined analyses (i.e., NAAQS and PSD Increment models), the dispersion model is limited to receptors that exceeded a SIL from the SID analysis. If required, additional receptors will be added to encompass all locations greater than an associated SIL (please note that receptors will not extend greater than 50 km from the facility due to accuracy constraints of the dispersion models).

For State NAAQS, State Property Line, and/or State Effects Review analyses, the receptor boundary for the initial screening analysis represents the facility property line (which in the case of the project will be the same as the fenceline). For State NAAQS analyses, additional refined

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analyses are limited to receptors that exceed an associated SIL. For State Effects Review, additional discrete receptors may be added to the initial grid to properly evaluate the magnitude and frequency of potential exceedances of the ESL for specific non-industrial receptors.

6.7 Terrain Considerations

The proposed facility will be located in the Texas Gulf Coast region where the surrounding terrain may be described as generally flat with minor elevation changes. However, the analysis will use the "elevated terrain" option. For emission sources, downwash structures, and receptors, the elevations above sea level will be obtained from the National Elevation Dataset (NED) files. To extract heights from the NED files, the analysis will use the latest version of the AERMAP program.

6.8 Coordinate System

The analysis will use Universal Transverse Mercator (UTM) coordinates based upon the North American Datum of 1927 (NAD27) basis. This NAD system is selected to provide compatability with the prior modeling for the TOTAL's PAR sources.

6.9 Emission Source Characterization

Section 6.9.1 through Section 6.9.14 describes the expected source characterizations based upon preliminary information. To incorporate emission sources into the AQA, the analysis will use a "reasonable worst-case approach." If TCEQ requests additional modeling to demonstrate compliance, the analysis may refine any conservative assumption in future modeling. Inherent in these assumptions and stacked conservatism is the anticipation that this modeling may be relevant to circumstances not specifically identified in this report. The final report will contain the final source parameters and emission rates.

6.9.1 Ethane Cracking Heaters

The proposed project will include seven (7) ethane cracking heaters that will be modeled as point sources. Stack parameters will be based upon design information/considerations, process knowledge, and/or operating information from similar equipment. The modeled emission rate will reflect the total mass emitted during the associated averaging period. For the applicable compounds and their averaging periods, an appropriate apportionment of emissions will be used.

6.9.2 Heater Decoking

The proposed project will include two (2) decoking vents that will be modeled as point sources. Stack parameters will be based upon design information/considerations, process knowledge, and/or operating information from similar equipment. Generally, only one (1) or two (2) heaters may be decoked at a time; therefore, the modeling will include a reasonable "worst-case" approach. Each decoke operates in batch model; therefore, for the short-term inhalable particulates (PM_{10}) and fine particulates ($PM_{2.5}$) the modeled emission rate will reflect the total mass emitted during a 24-hour period.

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6.9.3 Thermal Oxidizer

The analysis will include one thermal oxidizer as a point source. Stack parameters will be based upon design information/considerations, process knowledge, and/or operating information. Stack parameters should not vary between different averaging periods.

6.9.4 Multi-Point Ground Flare (Routine Activity and/or Planned MSS Activities)

The proposed project includes a multi-point ground flare (MPGF). The MPGF will be modeled using TCEQ procedures for flares as special point sources. Instead of sending process vents to an elevated flare stack, the MPGF routes process vents to a series of low profile burners that are equally spaced from each other. The number of burners in operation at one time is proportional to the total flow to the MPGF system. The multiple burners are designed to light nearby burners; therefore, the required number of pilots is minimized. The multiple burners are enclosed in a heat containment shroud that accommodates the thermal demands for combustion and that regulates the flow of combustion air; therefore, the MPGF operates with the same heat buoyancy effect as a single flare; therefore, TCEQ flare procedures are appropriate.

The MPGF flare will be modeled according to flare guidance in TCEQ guidelines (AQMG Appendix K). The MPGF may be modeled with a stack height equal to the height of the heat containment shroud (please note that the height of heat containment shroud may include increases in base height required for proper flare operation at the facility). As previously discussed with TCEQ, the calculation of the effective diameter will be adjusted by dividing the gross heat release by the number of active nozzles which provides an individual effective diameter at each nozzle. The individual effective diameter will then be multiplied by the number of active nozzles to get a final value to use as flare effective diameter. The resulting equation used in the effective diameter calculation will be as follows:

$$Q_n = \frac{Q(1 - 0.048\sqrt{MW})}{n}$$

$$D_{eff} = n\sqrt{\frac{Q_n}{10^6}}$$

Where "Q" is the gross heat release (cal/s), "Q_n" is the net heat release (cal/s), "D_{eff}" is the effective diameter (m), "MW" is the weighted molecular weight of flared compounds (lb/mol), and "n" is the number of active ground flare nozzles.

For the 1-Hour NO_2 NAAQS and the 1-Hour SO_2 NAAQS, the modeled emission rate will include intermittent sources at their annualized emission rate (Section 7.6).

6.9.5 Emergency Generator (Engine)

The proposed project will include one engine that will be modeled as a point source. Stack parameters will be based upon design information/considerations, process knowledge, and/or operating information from similar equipment. The authorized non-emergency operation of the

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engines is typically of limited duration; therefore for the short-term averaging periods, the modeled emission rate may reflect the total mass emitted during the averaging period. For the 1-Hour NO_2 NAAQS and the 1-Hour SO_2 NAAQS, the modeled emission rate will include intermittent sources at their annualized emission rate (Section 7.6).

Typically, the permit entry for emergency generators represents testing only. For testing purposes, the emergency generators should not operate more than two hours in any 24-hour period. If the emergency generators are limited to daylight hours only (i.e., between 8 a.m. and 5 p.m.), then the Hour of Day (HROFDY) emission scalar may be used. If operated less than 500 hours-per-year (hrs/yr), the analysis may consider these emergency generators as intermittent sources (Section 7.6).

6.9.6 Cooling Tower

The analysis will include a cooling tower consisting of eight cells. The cells will be modeled as individual point sources or a single representative point source. The stack height will be set equal to the cells height. The stack diameter will be set equal to the cells diameter. The exit temperature and velocity will be based upon design information, process knowledge, and/or operating information. Stack parameters will not vary between different averaging periods. The release temperature will reflect expected temperature based upon operational information.

6.9.7 Fugitive (Piping) Components

Emissions from fugitive equipment component leaks do not emit to the atmosphere through stacks; therefore, these sources are considered fugitive emission sources. The analysis will model these fugitive emission sources as pseudo-point, area or volume sources (AQMG Appendix K). Supplemental justification for each fugitive source characterization will be included in the AQA report.

6.9.8 Planned Maintenance, Startup, and Shutdown

Planned maintenance, startup and shutdown (MSS) activities and associated emissions include equipment degassing/opening, vacuum trucks, frac tanks, and consumables.

6.9.8.1 *Equipment Maintenance*

Emissions from equipment maintenance do not emit to the atmosphere through stacks; therefore, these sources are considered fugitive emission sources. The analysis will model these fugitive emission sources as pseudo-point source, area or volume sources (AQMG Appendix K). Supplemental justification for each fugitive source characterization will be included in the AQA report.

6.9.8.2 *Vacuum Trucks*

Emissions from vacuum trucks emit to the atmosphere through vacuum pump exhausts. The analysis will model vacuum trucks as a point source with parameters specific for the selected trucks or obtained for similar equipment. Additional justification will be provided in the AQA report.

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6.9.8.3 *Temporary Frac Tank*

Emissions from temporary frac tanks do not emit to the atmosphere through openings typically considered stacks; therefore, the analysis will model each portable tank as a pseudo-point source (AQMG Appendix K). Stack parameters should not vary between different averaging periods.

6.9.8.4 *Inheriently Low Emitting Sources*

Sources of inherently low emitting activities may include aerosol cans, calibration of analytical equipment, carbon canister replacement, instrumentation/indicator/analyzer maintenance, meter proving, and replacement of analyzer filters/screens. Emissions from these inheriently low emitting sources are considered fugitive. The analysis will model this fugitive emission source or sources as pseudo-point source, area or volume sources (AQMG Appendix K). Supplemental justification for each source characterization will be included in the AQA report.

6.9.8.5 *Catalyst Charging/Handling*

The analysis will model the catalyst charging/handling sources as either point sources and/or fugitive sources. For point sources, stack parameters will be based upon design information/considerations, process knowledge, and/or operating information from similar equipment. For fugitive sources, the analysis will include as pseudo-point source, area or volume sources (AQMG Appendix K). If required, supplemental justification will be included in the AQA report.

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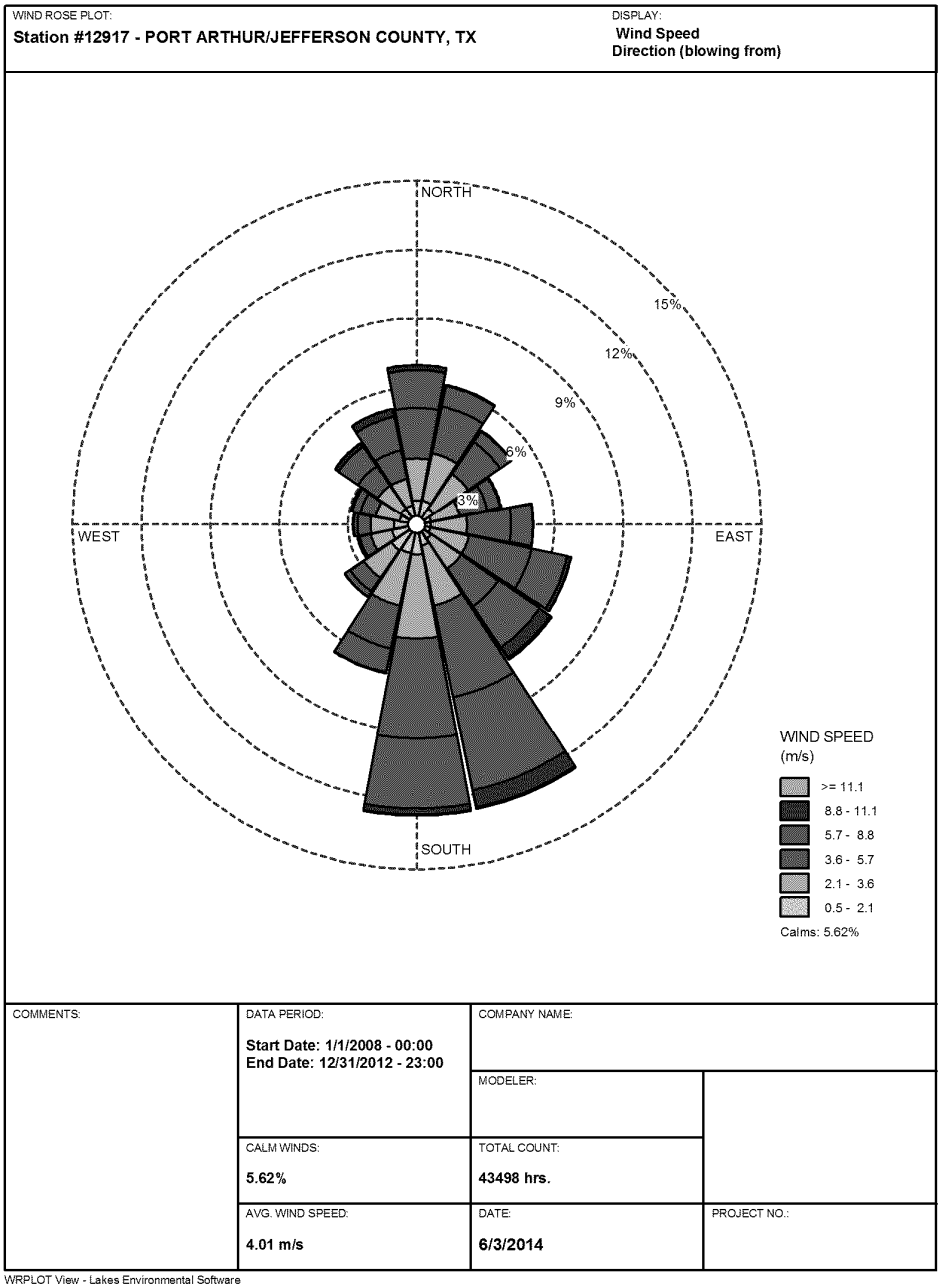
Figure 6-1
Wind Rose for Port Arthur, Texas (2008 – 2012)



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SECTION 7
ADDITIONAL MODELING INFORMATION

TCEQ requires the approval of certain modeling techniques and modeling data sources in the modeling protocol. Section 7.1 discusses preconstruction monitoring requirements. Section 7.2 describes proposed adjustments to background concentration for the NAAQS analyses. Section 7.3 describes regional background concentrations for the Ozone (O_3) Impact Analysis. Section 7.4 describes the Ambient Ratio Method (ARM). Section 7.5 provides justification to use $PM_{2.5}$ Significant Impact Level (SIL) and discusses $PM_{2.5}$ secondary formation applicability. Section 7.6 discusses intermittent source policy for 1-Hour NO_2 NAAQS and 1-Hour SO_2 NAAQS. Section 7.7 proposes common industrial stack parameters for missing information in the non-TOTAL inventory (if applicable).

7.1 Preconstruction Monitoring Requirements

On a "case-by-case" basis, TCEQ may allow a facility to use existing ambient monitoring data to satisfy preconstruction monitoring requirements. Table 7-1 lists existing ambient monitoring sites that are proposed as surrogates to additional preconstruction monitoring.

Table 7-1
Proposed Ambient Monitors for the Proposed Facility

Compounds	Monitor Number	Location	Distance (km)[1]	Surrounding Land Use	Monitor Location Type
CO	482451035	Nederland	12.1	Residential	Urban and Center City
NO_2	482451035	Nederland	12.1	Residential	Urban and Center City
PM_{10}	481670004	Texas City	119.1	Residential	Suburban
$PM_{2.5}$[2]	482450021	PAM School	4.5	Residential	Urban and Center City
SO_2	482450009	Beaumont	19.7	Residential	Suburban
O_3[3]	482450102	Airport	11.0	--	--

Note:
[1]. Distance to the indicated ambient monitor from the project location.
[2]. If TCEQ is primarily concerned with Fine Particulate concentrations near the facility, the Port Arthur Memorial (PAM) School monitor should be considered as the primary monitor for the facility. If TCEQ considers Fine Particulate to be a regional pollutant, a regional air monitoring survey of surrounding counties may be performed to supplement the PAM monitor.
[3]. If TCEQ is primarily concerned with ozone concentrations near the facility, the Jefferson County Airport monitor should be considered as the primary monitor for the facility. If TCEQ considers ozone to be a regional pollutant, a regional ozone analysis of surrounding counties may be performed to supplement the Jefferson County Airport monitor.

7.1.1 Surrogate Monitor for Carbon Monoxide

As a primary pollutant, Carbon Monoxide (CO) is not formed by atmospheric reactions; therefore, the measured concentration depends upon location and prevalence of emission sources to the ambient monitor. As a surrogate to additional preconstruction monitoring requirements, Table 7-1 proposes an existing TCEQ ambient monitor at Nederland, Texas (Monitor Id. 482451035). At 12.1-kilometers from TOTAL, the Nederland monitor is closest ambient monitor for CO to the facility. The annual capture efficiency for the Nederland monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years).

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This ambient monitor is located predominantly crosswind of the facility. The land use and location type surrounding this ambient monitor is similar to the region surrounding the facility. The industrial base that surrounds this monitor is very similar to the industrial base that surrounds the facility.

7.1.2 Surrogate Monitors for Nitrogen Dioxide

As a primary pollutant, Nitrogen Dioxide (NO_2) is not formed by atmospheric reactions; therefore, the measured concentration depends upon location and prevalence of emission sources to the ambient monitor. As a surrogate to additional preconstruction monitoring requirements, Table 7-1 proposes an existing TCEQ ambient monitor at Nederland, Texas (Monitor Id. 428451035). At 12.1-kilometers from TOTAL, the Nederland monitor is closest ambient monitor for NO_2 to the facility. The annual capture efficiency for the Nederland monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). This ambient monitor is located predominantly crosswind of the facility. The land use and location type surrounding this ambient monitor is similar to the region surrounding the facility. The industrial base that surrounds this monitor is very similar to the industrial base that surrounds the facility.

7.1.3 Surrogate Monitors for Inhalable Particulates

As a primary pollutant, inhalable particulates (PM_{10}) are not formed by atmospheric reactions; therefore, the measured concentration depends upon location and prevalence of emission sources to the ambient monitor. As a surrogate to additional preconstruction monitoring requirements, Table 7-1 proposes an existing TCEQ ambient monitor at Texas City, Texas (Monitor Id 481670004). At 119.1-kilometers from TOTAL, the Texas City monitor is closest ambient monitor to the facility. The annual capture efficiency for the Texas City monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). The land use and location type surrounding this ambient monitor is similar to the region surrounding the facility. The industrial base that surrounds this monitor is very similar to the industrial base that surrounds the facility.

7.1.4 Surrogate Monitors for Fine Particulate ($PM_{2.5}$)

Fine Particulates ($PM_{2.5}$) may be emitted directly from a facility (i.e., primary pollutant) and/or formed from a complex that includes Nitrogen Dioxide (NO_2) and Sulfur Dioxide (SO_2) in the atmosphere (i.e., secondary pollutant). For primary compounds, measured concentration depends upon location and prevalence of emission sources to the ambient monitor. For secondary pollutants, the measured concentration depends upon regional atmospheric factors.

If TCEQ is primarily concerned with atmospheric factors near the facility, Table 7-1 proposes an existing TCEQ ambient monitor at the Port Arthur Memorial (PAM) School (Monitoring Id 482450021) as a surrogate to additional preconstruction monitoring requirements. At 4.5-kilometers, this monitor is the closest ambient $PM_{2.5}$ monitor to the facility. The annual capture efficiency for the PAM monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). The ambient monitor is located predominantly upwind of the facility. The land use and location type surrounding this ambient monitor is similar to the

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region surrounding the facility. The industrial base that surrounds this monitor is very similar to the industrial base that surrounds the facility.

If TCEQ is also concerned with atmospheric factors on a regional basis, Table 7-2 lists potential ambient monitors to supplement the PAM monitor.

Table 7-2
Additional Nearby $PM_{2.5}$ Ambient Monitors

Compound	Monitor Number	Location	Distance (km)	Surrounding Land Use	Monitor Location Type
$PM_{2.5}$	482450021	Port Arthur	4.49	Residential	Urban and City Center
	482451050	Beaumont	22.70	--	--
	483611100	Mauriceville	26.16	Residential	Suburban
	220190009	Vinton	28.16	Agricultural	Rural
	482450022	Hampshire	42.54	Residential	Suburban
	220190010	McNeese	56.37	Commercial	Suburban

The selection methodology focused upon ambient monitors that reflected the attainment status of Jefferson County. The annual capture efficiency for these monitors is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). These ambient monitors are located within a reasonable distance of the facility. Using these monitors, an ambient survey of $PM_{2.5}$ concentrations may provide qualitative insight into the applicability of $PM_{2.5}$ Secondary Formation (Section 7.6).

7.1.5 Surrogate Monitors for Sulfur Dioxide

As a primary pollutant, Sulfur Dioxide (SO_2) is not formed by atmospheric reactions; therefore, the measured concentration depends upon location and prevalence of emission sources to the ambient monitor. As a surrogate to additional preconstruction monitoring requirements, Table 7-1 proposes an existing TCEQ ambient monitor in Beaumont, Texas (Monitor Id 428450009). At 19.61-kilometers from the project location, the Beaumont monitor is the 2nd closest ambient monitor to the facility. The annual capture efficiency for the Beaumont monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). This ambient monitor is located predominantly crosswind of the facility. The land use and location type surrounding this ambient monitor is similar to the region surrounding the facility. The industrial base that surrounds this monitor is very similar to the industrial base that surrounds the facility.

7.1.6 Surrogate Monitors for Ozone (O_3)

Ozone (O_3) forms from a complex "free-radical" reaction of Volatile Organic Compounds (VOC) and Nitrogen Oxides that are catalyzed by atmospheric factors (i.e., secondary pollutant). For secondary pollutants, the measured concentration depends upon regional atmospheric factors (i.e., sunlight, the –OH radical formation, the conversion of NO to NO_2, etc.).

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If TCEQ is primarily concerned with atmospheric factors near the facility, Table 7-1 proposes the Jefferson County Airport (Monitoring Id 482450102) as a surrogate O_3 preconstruction monitor. This ambient monitor is located in Jefferson County; therefore, the ambient monitor reflects the county's attainment status. The annual capture efficiency for the Jefferson County Aiport monitor is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). At 11.0-kilometers, the monitor is the closest ambient monitor to the facility. The land use and location type surrounding the ambient monitor is similar to the region surrounding the facility. The industrial base that surrounds the monitor is very similar to the industrial base that surrounds the facility.

If TCEQ is also concerned with atmospheric factors on a regional basis, Table 7-3 lists existing ambient monitors to supplement the Jefferson County Airport monitor.

Table 7-3
Additional Nearby O_3 Ambient Monitors

Compound	Monitor Number	Location	Distance (km)	Surrounding Land Use	Monitor Location Type
O_3	482450102	Port Arthur	10.97	--	--
	482450011	Port Arthur	11.97	Industrial	Urban and City Center
	482451035	Nederland	12.03	Residential	Urban and City Center
	482450628	--	12.21	Residential	Urban and City Center
	483611001	Mauriceville	19.63	Residential	Urban and City Center
	482450009	Beaumont	19.61	Residential	Suburban
	483611100	West Orange	26.26	Residential	Suburban
	482450101	Port Arthur	26.70	Commercial	Suburban
	482450022	Hampshire	42.67	Residential	Suburban

The selection methodology focused upon ambient monitors that reflected the attainment status of Jefferson County. The annual capture efficiency for these monitors is sufficient for EPA requirements (i.e., 75% capture per quarter for three (3) consecutive years). These ambient monitors are located within a reasonable distance of the facility. Using these monitors, a regional ozone analysis may combine the existing ozone concentrations in a region into a "practical worst-case" background estimate for the facility (Section 7.3). Ozone concentrations may be downloaded either from EPA (http://www.epa.gov/airdata/) and/or TCEQ website (http://www.tceq.state.tx.us/cgi-bin/compliance/monops/yearly_summary.pl).

7.2 Adjusted Background Concentration

On a "case-by-case" basis, TCEQ may allow a facility to use the adjusted background concentration in the National Ambient Air Quality Standards (NAAQS) analysis for CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. The adjusted background concentration evaluates the influence of the surrounding industry on the measured background concentration. The adjusted background concentration is calculated by the following formula:

$$\textit{Adjusted Background Conc.} = \textit{Monitored Conc.} - \textit{Modeled Conc. at Monitor}$$

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In this equation, the monitored concentration represents recent measurements from representative ambient monitors. Table 7-4 lists recent monitored concentrations from proposed preconstruction monitors.

Table 7-4
Potential Background Concentrations

Compounds[1]	Averaging Period	Measured Background (□g/m^3)	Measurement Type	Measurement Years
Carbon Monoxide (CO)	1-Hour	813.3	High-Second-High (H2H)	2012 – 2014
	8-Hour	537.3	High-Second-High (H2H)	2012 – 2014
Nitrogen Dioxide (NO_2)	1-Hour	48.7	98th Percentile	2012 – 2014
	Annual	8.8	Maximum	2012 – 2014
Inhalable Particulates (PM_{10})	24-Hour	72.0	High-Fourth-High (H4H)	2012 – 2014
	Annual	15.5	Maximum	2012 – 2014
Fine Particulates ($PM_{2.5}$)	24-Hour	20.8	98th Percentile	2012 – 2014
	Annual	9.5	Weighted Mean	2012 – 2014
Sulfur Dioxide (SO_2)	1-Hour	68.0	99th Percentile	2012 – 2014
	3-Hour	73.2	High-Second-High (H2H)	2012 – 2014
	24-Hour	16.2	High-Second-High (H2H) [1]	2012 – 2014
	Annual	2.0	Maximum	2012 – 2014]

Note:
[1]. Criteria compounds that are modeled using AERMOD procedures.

In the equation above, the modeled concentration represents AERMOD modeling results at the ambient monitor receptor as predicted in the NAAQS analysis. The modeled concentrations reflect both the compound and associated averaging period according to the following guidelines:

- For CO (1-Hour and 8-Hour) and SO_2 (3-Hour and 24-Hour), the appropriate modeled concentration represents the highest-second-high (H2H) concentration for five years of meteorological data;
- For NO_2 (1-Hour), the appropriate modeled concentration represents the average of the 98th percentile (i.e., highest-eighth-high (H8H)) of daily maximum concentrations from five years of meteorological data. For NO_2 (1-Hour), the analysis will use the ARM (Section 7.4);
- For NO_2 (Annual), PM_{10} (Annual), $PM_{2.5}$ (Annual), and SO_2 (Annual), the appropriate modeled concentration represents the maximum concentration from five years of meteorological data. For NO_2 (Annual), the analysis will use the ARM (Section 7.4);
- For PM_{10} (24-Hour), the appropriate modeled concentration represents the highest-sixth-high (H6H) concentration in the NAAQS model over five years;

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- For $PM_{2.5}$ (24-Hour), the appropriate modeled concentration represents the average of the 98th percentile (i.e., highest-eighth-high (H8H)) of daily maximum concentrations from five years of meteorological data; and
- For SO_2 (1-Hour), the appropriate modeled concentration represents the average of the 99th percentile (i.e., highest-fourth-high (H4H)) of daily maximum concentrations from five years of meteorological data.

The adjustments for modeled concentrations will be only used if the requested use of the unadjusted measured monitored concentrations in lieu of modeling the off-site sources is disallowed. Please note that the adjusted background concentration will be set to zero if the results are negative. Alternatively, the new percentile standards (i.e., 1-Hour SO_2, 1-Hour NO_2, and 24-Hour $PM_{2.5}$) may calculate an hourly adjusted background concentration that is added to hourly modeled concentrations before annual percentiles of daily maximum value are determined.

7.3 Regional Ozone Background Concentration

Ozone may be considered a regional pollutant; therefore, TCEQ may require a regional ozone analysis to supplement a single ambient monitor. A regional ozone background concentration combines the existing ozone monitors in a region into a "practical worst-case" background estimate for a facility. The Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA, 1987) state that regional monitoring data should *"be characteristic of air quality across a broad region including that in which the proposed source or modification is located*...[and] *must be similar in nature to the impact area"* (EPA, 1987). Section 7.1.6 lists potential ambient monitors that may be consolidated into a regional background concentration.

To consolidate the ozone data from each ambient monitor into a single regional background concentration, the analysis will use a procedure that was previously approved by USEPA Region VI (Willamette 2001). The procedure involves two distinct steps:

- <u>Step 1: Calculate a reasonable "worst-case" ozone concentration for each monitor.</u>
  For each monitor, the "reasonable worst case" ozone concentration represents the maximum monthly average of the daily maximum, ozone concentrations during the year. It should be noted that, as an alternative to entire year, these values may be determined for only months in the ozone season.

- <u>Step 2: Weight the "worst case" concentrations with meteorological data.</u>
  The analysis conglomerates "reasonable worst-case" ozone concentrations from various ambient monitors into a single background estimate. The procedure requires meteorological data from the Port Arthur Regional Airport (NWS 12917). From the meteorological data, the wind frequency distribution summarizes the time that the wind blows in a certain direction. The analysis weights the concentration data based upon the location from the facility and the frequency distribution during the year (please note that the frequency is based upon the wind blowing from the monitor towards the facility). It should be noted that this distribution may potentially be restated for only months in the ozone season.

If required, TCEQ will be consulted to determine if this procedure would be accepted.

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7.4 Ambient Ratio Method (ARM)

Many facilities report Nitrogen Oxide (NO_X) emission rates based upon stack testing results. Due to the instability of NO_X compounds in the atmosphere, the PSD program regulates ambient concentrations of Nitrogen Dioxide (NO_2). The AQA proposes to use the Ambient Ratio Method (ARM) to convert modeled NO_X concentrations to the PSD NO_2 standard. The AQA will use the ARM for each of the following PSD analyses: PSD Screening Analysis (Section 2.1), National Ambient Air Quality Standard (NAAQS) analysis (Section 2.2), and PSD Increment analysis (Section 2.3). Table 7-5 presents a general overview of ARM options by averaging period.

Table 7-5
General Overview of ARM Options by Averaging Period

ARM Method	Annual Period	1-Hour Period
Tier I	ARM of 1.0 (i.e., 100-% conversion of NO_X to NO_2).	ARM of 1.0 (i.e., 100-% conversion of NO_X to NO_2)
Tier II	EPA National Default ARM of 0.75.	EPA National Default ARM of 0.80.
Tier III	Site-specific value determined from actual ambient monitoring.	Site-specific value determined from actual ambient monitoring [1]and "in-stack" NO_2/NO_X ratios[2].

Note:
[1]. For Tier III analysis relating to the 1-Hour averaging period, the analysis will obtain hourly ozone measurements from nearby ambient monitors as discussed in Section 7.1.6.
[2]. For Tier III analysis relating to the 1-Hour averaging period, the In Stack Ratios (ISR) will reflect the following: EPA's ISR database (http://www.epa.gov/ttn/scram/no2_isr_database.htm), stack testing results from actual (or similar) process units, or National Default ISR of 0.5.

Based upon current information, TOTAL expects to use a Tier II methodology that corresponds to EPA National Default ARM values. If TOTAL determines that Tier III may be required for 1-Hour or Annual averaging periods, TCEQ and/or EPA will be consulted to verify the appropriate path forward.

7.5 Justification to use $PM_{2.5}$ Significant Impact Level (SIL)

In 2013, the United States Court of Appeals for the District of Columbia Circuit Court issued a decision regarding $PM_{2.5}$ SILs. To provide guidance on impacts of this decision (further referred to as "Court Decision" in this discussion), EPA published guidance that may be obtained from http://www.epa.gov/nsr/documents/20130304qa.pdf. According to this guidance, the United States Environmental Protection Agency (EPA) *"does not interpret the Court's decision to preclude the use of SILs for $PM_{2.5}$ entirely but additional care should be taken by permitting authorities in how they apply those SILs so that the permitting record supports a conclusion that the source will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS."*. In other words, the concept of the SILs is valid; however, the permitting authority should not be limited by the SILs from requesting more comprehensive modeling if warranted.

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To determine if more comprehensive modeling is warranted (i.e., justify the use of SILs), EPA proposes that representative $PM_{2.5}$ monitoring data may be used. According to the court decision, *"If the preconstruction monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the EPA's $PM_{2.5}$ SIL value, then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a proposed source with a $PM_{2.5}$ impact below the $PM_{2.5}$ SIL value will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and to forego a more comprehensive cumulative modeling analysis for $PM_{2.5}$."* Instead of installing and/or operating a new $PM_{2.5}$ preconstruction monitor, the facility proposes the Port Arthur Memorial (PAM) School ambient monitor (Monitor Id 482450021) as a surrogate monitoring location (Section 7.1.4). Based upon this monitor, the following observations may be drawn:

- For the 24-Hour averaging period, the $PM_{2.5}$ NAAQS is 35.00 micrograms per cubic meter ($\mu g/m^3$). For the existing monitor, the appropriate background concentration would be 20.55 $\mu g/m^3$ [or average of 20.86 $\mu g/m^3$ (2012), 20.80 $\mu g/m^3$ (2013), and 20.00 $\mu g/m^3$ (2014)]. The difference between the NAAQS [35.00 $\mu g/m^3$] and the background concentration [20.55 $\mu g/m^3$] is 14.44 $\mu g/m^3$. This difference is greater than the associated SIL [1.20 $\mu g/m^3$].
- For the annual averaging period, the $PM_{2.5}$ NAAQS is 12.00 $\mu g/m^3$. For the existing monitor, the appropriate background concentration would be 8.89 $\mu g/m^3$ [or average of 9.58 $\mu g/m^3$ (2012), 8.50 $\mu g/m^3$ (2013), and 8.58 $\mu g/m^3$ (2014)]. The difference between the NAAQS [12.00 $\mu g/m^3$] and the background concentration [8.89 $\mu g/m^3$] is 3.1 $\mu g/m^3$. This difference is greater than the associated SIL [0.30 $\mu g/m^3$].

The observations show that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations is greater than the EPA's $PM_{2.5}$ SIL value. According to EPA guidance, the proposed source with a $PM_{2.5}$ impact below the $PM_{2.5}$ SIL value will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS. In addition, a more comprehensive cumulative modeling analysis for $PM_{2.5}$ should not be required if the SID modeling indicates no exceedances of the $PM_{2.5}$ SIL.

Table 7-6 summarizes measured 24-Hour concentrations based upon the ambient monitoring survey. Table 7-7 summarizes measured annual concentrations based upon the ambient monitoring survey. The 24-Hour and Annual $PM_{2.5}$ concentration were downloaded from EPA (http://www.epa.gov/airdata/) and/or TCEQ website (http://www.tceq.state.tx.us/cgi-bin/compliance/monops/yearly_summary.pl).

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Table 7-6
$PM_{2.5}$ Regional Air Monitoring Survey (24-Hour Period)

Monitor	PAM School	Mary	Hamshire
Monitor Id	482450021	482451050	482450022
County	Jefferson	Jefferson	Jefferson
Distance (km)	4.49	22.70	42.54
24-Hour 98th Percentile Concentration (Per Monitor Per Year)			
2014 Conc. ($\mu g/m^3$)	20.00	17.80	16.70
2013 Conc. ($\mu g/m^3$)	20.80	19.10	18.60
2012 Conc. ($\mu g/m^3$)	20.86	19.82	19.30
2011 Conc. ($\mu g/m^3$)	21.29	21.66	19.58
2010 Conc. ($\mu g/m^3$)	25.74	--	19.45
2009 Conc. ($\mu g/m^3$)	22.81	--	19.62
2008 Conc. ($\mu g/m^3$)	25.84	--	23.24

Table 7-7
$PM_{2.5}$ Regional Air Monitoring Survey (Annual Period)

Monitor	PAM School	Mary	Hamshire
Monitor Id	482450021	482451050	482450022
Parish	Jefferson	Jefferson	Jefferson
Distance (km)	4.49	22.70	42.54
Annual 98th Percentile Concentration (Per Monitor Per Year)			
2014 Conc. ($\mu g/m^3$)	8.58	9.10	7.48
2013 Conc. ($\mu g/m^3$)	8.50	9.70	8.70
2012 Conc. ($\mu g/m^3$)	9.58	9.78	9.41
2011 Conc. ($\mu g/m^3$)	9.99	10.00	9.19
2010 Conc. ($\mu g/m^3$)	10.65	--	9.52
2009 Conc. ($\mu g/m^3$)	9.93	--	9.37
2008 Conc. ($\mu g/m^3$)	10.34	--	10.07

7.5.1 $PM_{2.5}$ Secondary Formation Applicability

The proposed project is subject to PSD review for Fine Particulates ($PM_{2.5}$) and Nitrogen Dioxide (NO_2). It should be noted that Sulfur Dioxide (SO_2) does not trigger PSD review for the proposed project. Based upon EPA guidance, Table 7-7 summarizes *EPA Recommended Approaches for Assessing Primary and Secondary $PM_{2.5}$ Impacts by Assessment Case*. Currently, the proposed project corresponds to EPA's Case 3 (Primary and Secondary Air Quality Impacts).

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Table 7-7
EPA Recommended Approaches for $PM_{2.5}$ Impacts Assessment

Assessment Case	Description of Assessment Case	Primary Impacts Approach	Secondary Impacts Approach
Case 1: No Air Quality Analysis	Direct $PM_{2.5}$ emissions <10 tpy SER NOx and SO_2 emissions <40 tpy SER	N/A	N/A
Case 2: Primary Air Quality Impacts Only	Direct $PM_{2.5}$ emissions ≥10 tpy SER NOx and SO_2 emissions <40 tpy SER	**Appendix W preferred or approved alternative dispersion model**	N/A
Case 3: Primary and Secondary Air Quality Impacts	Direct $PM_{2.5}$ emissions ≥10 tpy SER NOx and SO_2 emissions ≥40 tpy SER	**Appendix W preferred or approved alternative dispersion model**	☐ **Qualitative** ☐ **Hybrid qualitative/ quantitative** ☐ **Full quantitative photochemical grid modeling**
Case 4: Secondary Air Quality Impacts Only	Direct $PM_{2.5}$ emissions <10 tpy SER NOx and SO_2 emissions ≥40 tpy SER	N/A	☐ **Qualitative** ☐ **Hybrid qualitative/ quantitative** ☐ **Full quantitative photochemical grid modeling**

Note:
In this table, SER (Significant Emission Rate) corresponds to definitions in PSD netting analyses.
In this table, tpy stands for "tons per year".

Based upon this table, the following methodology is proposed:

- Primary Impacts Approach, and
  For direct emissions of $PM_{2.5}$, the measured concentration depends upon the location and prevalence of emission sources. TOTAL proposes AERMOD modeling consistent with AERMOD (i.e., Appendix W) requirements.

- Secondary Impacts Approach.
  TOTAL proposes a qualitative approach based upon a survey of existing ambient monitors that surround the facility. Secondary $PM_{2.5}$ forms from a complex reaction of NO_2 and SO_2 in the atmosphere that depends upon regional atmospheric factors. A survey of measurements from existing ambient monitors displayed similar $PM_{2.5}$ concentrations throughout the survey area. This observation may be interpreted to indicate similar atmospheric chemistry is present throughout the region. Because potential changes at any one facility should not be sufficient to change regional atmospheric chemistry, additional review of secondary $PM_{2.5}$ formation should not be required.

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7.6 Intermittent Source Policy

In the March 01, 2011 memorandum from Tyler Fox, EPA clarified the intent of intermittent sources as an emission source that does not have a set operating schedule and that operates for short periods of time during the year. Based upon this operation, an intermittent emission source should not significantly contribute to an annual distribution of the appropriate maximum daily values as used in 1-Hour Nitrogen Dioxide (NO_2) NAAQS and 1-Hour Sulfur Dioxide (SO_2) NAAQS analyses. The following methodology is proposed for intermittent sources based upon total operational hours:

- If a permit condition limits an emission source to less than or equal to (≤) 100 hours-per-year (hrs/yr), the emission source will not be included in the 1-Hour NO_2 NAAQS and/or 1-Hour SO_2 NAAQS analyses.
- If a permit condition limits an emission source to greater than (>) 100-hrs/yr and ≤ 500-hrs/yr, the emission source will be included in the 1-Hour NO_2 NAAQS and/or 1-Hour SO_2 NAAQS analyses using the annualized emission rate.

The following similar methodology is proposed for "bona-fide" alternative operating scenarios (i.e., planned maintenance, startup, and shutdown (MSS) activities and/or alternative operational conditions) that are limited by total alternative operating scenario hours:

- If a permit condition limits an alternative operating scenario to ≤ 100-hrs/yr, emission rates from the alternative operating scenario will not be included in the 1-Hour NO_2 NAAQS and/or 1-Hour SO_2 NAAQS analyses.
- If a permit condition limits an alternative operating scenario to > 100-hrs/yr and ≤ 500-hrs/yr, the emission rates from alternative operating scenario will be included in the 1-Hour NO_2 NAAQS and/or 1-Hour SO_2 NAAQS analyses using the annualized emission rate.

All other emission sources will be included at their maximum 1-Hour PTE. For applicable sources that are considered intermittent sources in the project, the following equation will be used to calculate the annualized emission rate:

Annualized Rate (lb/hr) = [Annual Rate (tpy)]x[(2,000 lb/ton/8760 hr/yr)]

7.7 Common Industrial Stack Parameters

TOTAL may need to request an off-property inventory from TCEQ. TCEQ's database may not contain complete stack parameters for emission sources. TOTAL proposes to populate these stack parameters by reviewing TCEQ permit files and/or directly contacting the facility. If TOTAL cannot locate TCEQ files and/or the non-TOTAL facility chooses not to provide more accurate data, TOTAL proposes to use common industrial parameters in the analysis. Table 7-9 summarizes common industrial stack parameters based upon prior reviews of industrial sources.

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Table 7-9
Common Industrial Stack Parameters

Emission Source	Height (ft)	Temp. (F)	Velocity (ft/s)	Diameter (ft)
Cooling Tower	32.79	98.63	41.63	17.47
Thermal Oxidizer	85.97	903.97	43.51	5.06
Flare	134.74	1832.00*	65.60*	3.21
Boiler / Heater	96.51	441.91	43.70	6.06
Engine	12.86	809.64	153.63	0.74

Note:
* TCEQ flare default parameters from recent guidance.

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SECTION 8
MODELING SUBMITTAL

Section 8.1 describes the modeling report requirements. Section 8.2 describes the electronic modeling files for the proposed project. Additional supporting documentation may be provided upon request.

8.1 Modeling Report

The Air Quality Analysis (AQA) will submit a clear, concise report presenting the modeling results that includes following (please note that additional information may be submitted upon request):

- Brief overview of the proposed project;
- Facility plot plan;
- Emission rate summary for applicable facility sources;
- Stack parameter summary for applicable facility sources;
- Approved modeling protocol;
- Results summary for all dispersion models (including figures if needed); and
- Electronic copies of all modeling files.

8.2 Electronic Modeling Files

The AQS will include electronic modeling files to support the proposed project. Table 8-1 describes the file extensions potentially applicable to many AERMOD modeling projects.

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Table 8-1
Modeling File Extensions

File extension	Contents
BST	BEESTWIN setup files
DTA	BEESTWIN actual input files
RUN	BEESTWIN run log files
SUM	BEESTWIN summary of the results files
LST	BEESTWIN output files
PRW	BEESTWIN GEP/BPIP-PRIME input file
PIP	BEESTWIN BPIP-PRIME actual input files
BAK	BEESTWIN GEP/BPIP-PRIME code file
TAB	BEESTWIN BPIP-PRIME summary of input files
SUM	BEESTWIN BPIP-PRIME output detailed summary files
SO	BEESTWIN BPIP-PRIME output files (for insertion in the model)
BLN	BEESTWIN boundary blanking files
BND	BEESTWIN boundary files
DAT	Surfer/Scripter data files
TXT	Surfer Source Location files
GR1	BEESTWIN graphic files
GRF	BEESTWIN output plot files

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SECTION 9
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To: Snyder, Erik[snyder.erik@epa.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]
From: Rheaume, Thomas
Sent: Wed 8/19/2015 6:19:24 PM
Subject: RE: Potential R6 Modeling workshop in Dallas in early November

I'm not sure who would attend from here, but just make sure its not the same time as the audit that Ashley is planning

Thomas Rheaume

Permit Branch Manager

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501 682 0880 Fax

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Wednesday, August 19, 2015 11:16 AM
To: Daniel Menendez; Daniel Jamieson; Dom Ruggeri; Ron Thomas; Zarena Post; Jeff Stonesifer; Sufi Mustafa; Eric Peters; Gi-Dong; Eric Milligan; Lee Warden; Rheaume, Thomas; vennetta.hayes@la.gov; Tien Nguyen; Yvette Olmos; Jim Smith (jim.smith@tceq.texas.gov)
Cc: Mohr, Ashley; Feldman, Michael; Robinson, Jeffrey; Donaldson, Guy
Subject: Potential R6 Modeling workshop in Dallas in early November

Hi,

We haven't had a Region 6 modelers workshop in Dallas in a while. With the final DRR and proposed changes in App. W, thought it might be a good time to have a meeting here in Dallas. I am not planning on discussing photochemical issues other than maybe secondary pollutant analysis for permits. The main focus would be modeling for the SO2 sources as part of the SO2

Phase 3 and 4 designations process (either modeling directly or modeling for monitor locations around a facility). We could also discuss other issues if there is interest. I was thinking some discussion on ozone and PM2.5 impacts from single source for permitting might and what sources should be included in cumulative analysis are two topics that might also be beneficial. At this time I am targeting the first week in November (11/2-11/5) as possible date(s). Would only plan for 1 or two days within this period but we have locked meeting space for M-R currently. I think we will be able to get one or two people from OAQPS that week to come to Dallas (James Thurman and/or George Bridgers most likely). They are available for travel and this would be after the close of the proposed changes to App. W, so we could talk about any of the proposed changes.

Please let me know your interest and availability (if this week works and if M-T, T-W or W-R is best). Also any ideas for specific topics/issues.

Thanks,

Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

To: Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Daniel Jamieson[daniel.jamieson@tceq.texas.gov]; Dom Ruggeri[Dom.Ruggeri@tceq.texas.gov]; Ron Thomas[RTHOMAS@tceq.texas.gov]; Zarena Post[zarena.post@tceq.texas.gov]; Jeff Stonesifer[jstonesifer@cabq.gov]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Peters[eric.peters@state.nm.us]; Gi-Dong[gi-dong.kim@state.nm.us]; Eric Milligan[Eric.Milligan@deq.ok.gov]; Lee Warden[lee.warden@DEQ.OK.gov]; Thomas Rheaume[rheaume@adeq.state.ar.us]; vennetta.hayes@la.gov[vennetta.hayes@la.gov]; Tien Nguyen[tien.nguyen@LA.GOV]; Yvette Olmos[Yvette.Olmos@LA.GOV]; Jim Smith (jim.smith@tceq.texas.gov)[jim.smith@tceq.texas.gov]
Cc: Mohr, Ashley[Mohr.Ashley@epa.gov]; Feldman, Michael[Feldman.Michael@epa.gov]; Robinson, Jeffrey[Robinson.Jeffrey@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Snyder, Erik
Sent: Wed 8/19/2015 4:16:01 PM
Subject: Potential R6 Modeling workshop in Dallas in early November

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Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Treece, Tricia
Location: Mtg Rm 4th Floor Large, ADEQ will call Ashley at her desk
Importance: Normal
Subject: 2010 Threshold SIP Modeling Questions
Start Date/Time: Thur 3/9/2017 8:00:00 PM
End Date/Time: Thur 3/9/2017 9:30:00 PM

;
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6. Combined Near-Field/Regional Modeling Summary – September 2015 document (Page 30) indicates that CMAQ predicated concentrations were used to represent background when combined with the AERMOD modeling results. Why did ADEQ choose to use the CMAQ model predicted concentrations instead of existing ambient monitoring concentrations? Has ADEQ completed a comparison of the CMAQ derived "background concentrations" and ambient monitor to see how the values compare?
7. Combined Near-Field/Regional Modeling Meteorological Data – September 15 document (Page 30) states that the AERMOD meteorological inputs were derived from the WRF meteorological data used in the CMAQ simulations for the 2008 base year. Why did ADEQ choose to use the simulated meteorological data in lieu of actual NWS meteorological data? Was any additional AERMOD modeling conducted using actual monitored meteorological data and compared to that using the WRF derived AMEROD inputs?
8. Statewide FDV Determinations –2014 ICF Statewide modeling report (Page 37) indicates that as part of the criteria pollutant assessment in unmonitored areas, the current year DV was set equal to the value for the nearest monitor or an interpolated value based on several neighboring sites. This approach used in the 2014 statewide modeling appears to differ from that used in the more recent 2015 Minor NSR thresholds modeling analyses when determining FDVs. Please explain how these approaches compare and why different approaches were used in the different modeling studies.
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To: Treece, Tricia[treecep@adeq.state.ar.us]
Cc: Clark, David[CLARKD@adeq.state.ar.us]; Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 3/9/2017 8:02:18 PM
Subject: RE: Technical Analysis Questions - 2010 Minor NSR Thresholds SIP Revision

I am getting an error message with I dial into the conference line with the following access code: Ex. 6 - Personal Privacy

Is this the correct code?

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Treece, Tricia [mailto:treecep@adeq.state.ar.us]
Sent: Wednesday, March 08, 2017 7:21 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Clark, David <CLARKD@adeq.state.ar.us>; Montgomery, William <Montgomery@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Technical Analysis Questions - 2010 Minor NSR Thresholds SIP Revision

Ashley,

We have pulled together some information in response to your questions in preparation for tomorrow's call. See attached. We will have our modeling contractors on the line with us so we will need to use a conference call line. The call-in number will be Ex. 6 - Personal Privacy

Ex. 6 - Personal Privacy

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, February 27, 2017 9:59 AM
To: Treece, Tricia
Cc: Clark, David; McCorkle, Mark
Subject: Technical Analysis Questions - 2010 Minor NSR Thresholds SIP Revision

Tricia,

As promised, here is a list of additional questions that I have put together based on my review of the technical analysis conducted in support of the Minor NSR Thresholds SIP revision.

1. CO Modeling Results Summary – November 2015 document (Page 20) indicates that AERMOD + Background is 0.972 ppm while the 2015 FDV is 1.927 ppm. Please explain the differences between these two values and how they are individually determined.

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Please let me know if you need me to clarify any of the questions. Otherwise, I would like to set up a time to discuss with you and others at ADEQ this week, if schedules allow. Please let me know what days/times might work best for this discussion based on your schedules.

Thanks again for your assistance with the questions related to the technical analysis conducted in support of the submitted SIP revision.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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To: Treece, Tricia[treecep@adeq.state.ar.us]
Cc: Clark, David[CLARKD@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]; Montgomery, William[Montgomery@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Tue 2/28/2017 3:43:32 PM
Subject: RE: Technical Analysis Questions - 2010 Minor NSR Thresholds SIP Revision

Tricia,

Thanks for following up with me. The afternoon of March 9th will work for me, too. I am typically available until 4 PM and my schedule is completely open that afternoon.

Thanks,

Ashley

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From: Treece, Tricia [mailto:treecep@adeq.state.ar.us]
Sent: Tuesday, February 28, 2017 8:12 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Clark, David <CLARKD@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>; Montgomery, William <Montgomery@adeq.state.ar.us>
Subject: RE: Technical Analysis Questions - 2010 Minor NSR Thresholds SIP Revision

Ashley,

Thank you for sending this list of additional questions. Given the other projects we have going on right now, it would be better for us if we had a little bit more time to review your questions so that we can be prepared to address each question with you. Would you be available to discuss this the afternoon of March 9th? Our schedules look fairly clear that afternoon.

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, February 27, 2017 9:59 AM
To: Treece, Tricia
Cc: Clark, David; McCorkle, Mark
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Thanks again for your assistance with the questions related to the technical analysis conducted in support of the submitted SIP revision.

Thanks,

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Cc: Montgomery, William[Montgomery@adeq.state.ar.us]; Spencer, Stuart[SPENCER@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Fri 2/24/2017 8:45:29 PM
Subject: RE: Minor Source Permit Thresholds - Stack Parameters

David,

Thanks for the additional information. I will let you all know if I have any questions about the data.

Also just to keep you guys updated on my status, I plan to send out the additional questions related to the Minor NSR Thresholds modeling early next week.

Hope you all have a nice weekend!

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, February 24, 2017 10:38 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; Treece, Tricia <treecep@adeq.state.ar.us>
Cc: Montgomery, William <Montgomery@adeq.state.ar.us>; Spencer, Stuart <SPENCER@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Minor Source Permit Thresholds - Stack Parameters

Hello Ashley,

Sorry for the delay, we had to get the attached information you were interested in regarding the theoretical minor source modeling from a contractor.

The master list of SCC-based stack parameters contained in EPA's SMOKE database was pared down and eliminated about 60% of the larger sources (e.g., EGU's, petroleum refining, etc.) or others that would not be appropriate as a minor source (e.g., aircraft, marine vessels, coal mining, etc.). This resulted in the calculations of median stack parameters used in the modeling effort:

Height (m): 12.7

Diameter (m): 0.67

Temperature (K): 337.8

Exit velocity (m/s): 9.2

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Wednesday, February 22, 2017 2:41 PM
To: Treece, Tricia
Cc: Montgomery, William; Spencer, Stuart; Clark, David; McCorkle, Mark
Subject: RE: Minor Source Permit Thresholds - Stack Parameters

Tricia,

Thanks to you and others for taking the time to discuss the questions I had regarding the modeling analyses. I believe one of the modeling contacts indicated that the 2011 NEI information in spreadsheet format was available. Is that something ADEQ could provide to us?

Also as I mentioned on the call yesterday, I have some additional technical questions that I will plan to send out via email and we can set up a time for follow-up as needed. I hope to get that list pulled together and sent out this week. Do you think that you and others may have availability to discuss at some point next week? Again, this information is mostly related to the 2010 Minor NSR Thresholds SIP revision that EPA currently has in house for review.

Thanks,

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To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Montgomery, William <Montgomery@adeq.state.ar.us>; Spencer, Stuart <SPENCER@adeq.state.ar.us>; Clark, David <CLARKD@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: Minor Source Permit Thresholds - Stack Parameters

Ashley,

This information is in follow up to yesterday's call. We reached out to our modeling contractor and they confirmed the following information.

For the permit threshold and De Minimis level evaluation (Appendix C, Appendix D, and NAAQS SIP pages 100 – 109), the stack parameters were set equal to the median values of stack height, stack diameter, exit temperature, and exit velocity of all minor point sources in Arkansas, based on the 2011 National Emission Inventory (NEI). These values are as follows:

- Stack height: 12.7 meters (m)
- Stack diameter: 0.67 m
- Temperature: 337.8 degrees Kelvin
- Exit velocity: 9.2 meters per second (m/s)

These parameters were not varied by pollutant.

For the NOx, SO2, and PM10 NAAQS Evaluation Requirements Study (Appendix I), pollutant-specific stack characteristics inputs were derived from the top 10 plants with emissions up to 100 tpy. The spreadsheets used to derive the stack characteristics used as inputs can be found in Appendix I starting after page 9.

Thanks,

Tricia Jackson Treece

SIP/Planning Section Supervisor, Policy and Planning Branch

Office of Air Quality

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR 72118

501-682-0055 (office)

To: Treece, Tricia[treecep@adeq.state.ar.us]
Cc: Montgomery, William[Montgomery@adeq.state.ar.us]; Spencer, Stuart[SPENCER@adeq.state.ar.us]; Clark, David[CLARKD@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Wed 2/22/2017 8:40:56 PM
Subject: RE: Minor Source Permit Thresholds - Stack Parameters

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Office of Air Quality

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5301 Northshore Drive

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To: Clark, David[CLARKD@adeq.state.ar.us]; Snyder, Erik[snyder.erik@epa.gov]
Cc: McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 12/1/2016 10:21:11 PM
Subject: RE: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

David,

We were able talk with George and others at HQs regarding general ideas and questions related to Adjusted U* during the RSL Modelers Workshop in New Orleans. To date, I do not believe they have had a chance to complete a detailed review of the Independence County submittal, but they did provide additional feedback and suggestions during our discussions. Based on this information and information shared by other Regions at the workshop, I am will be working this week and next on the documents to be submitted by the Regional Office to the MCH regarding approval of a beta option in the Independence County modeling analysis. I will keep you updated on the status as those documents are drafted.

From HQs side of things, I did want to share that we received an update from them regarding their Appendix W activities and based on current status they anticipate continued limited availability for the next 2 weeks as they continue their work on the final revision rulemaking. Just wanted to give you a heads up since their availability will impact the timing of reviews and potential concurrence.

Don't hesitate to let me know if you have any questions. Again, I will update you with any additional information, especially as we received updates and feedback from HQs.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Wednesday, November 30, 2016 9:30 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>
Cc: McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

Hello Ashley,

Any updates for us?

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

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U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Clark, David
Sent: Thursday, November 10, 2016 8:17 AM
To: 'Mohr, Ashley'; Snyder, Erik

Cc: McCorkle, Mark
Subject: RE: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

Thank you Ashley.

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, November 10, 2016 8:14 AM
To: Clark, David; Snyder, Erik
Cc: McCorkle, Mark
Subject: RE: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

David,

Thanks for following up. I had planned to send you an update today since Erik and I will be out on travel next week. We spoke with OAQPS earlier this week regarding availability for a call to

discuss pending Model Clearinghouse requests, including the one for Independence County. They have indicated that they do not have any availability until after next week's RSL Modelers' Workshop because of workload associated with Appendix W and workshop prep. We have started looking at the request and do not have any specific questions at the moment. Initially, it appears that the additional information has attempted to address the questions and concerns we had based on the initial MCH request. We will try to touch base with HQs next week since we will have some face time while at the workshop and let you know if anything comes up or if we have any questions/requests. We will also keep you updated on any information we receive regarding the final revisions to Appendix W.

We appreciate you staying on top of this with us, and we will continue our review and push for some time with OAQPS to discuss.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Thursday, November 10, 2016 7:25 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>
Cc: McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

Hello Ashley & Erik,

We just wanted to check on the status of our SO_2 R6/MCH ADJ_U* sensitivity analysis submission for Independence County and see if you had any updates. If the modeling files or any other information is needed, as always feel free to reach out to us.

David

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To: Clark, David[CLARKD@adeq.state.ar.us]; Snyder, Erik[snyder.erik@epa.gov]
Cc: McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 11/10/2016 2:14:01 PM
Subject: RE: ADEQ ADJ_U* Sensitivity Analysis - Independence County AR

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To: Clark, David[CLARKD@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Tue 10/18/2016 3:44:05 PM
Subject: RE: Independence County - DRR Source SO2 Modeling Discussion

David,

I have been out of the office and just received your email. I will check with HQs regarding a call time but may not have information available during today's conference call. Just wanted to give you a heads up.

Thanks,

Ashley

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To: Mohr, Ashley <Mohr.Ashley@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>; Grady, James <Grady.James@epa.gov>; Donaldson, Guy <Donaldson.Guy@epa.gov>; Haney, Jay (Jay.Haney@icf.com) <Jay.Haney@icf.com>; Charles R. "Chuck" Buttry (CButtry@trinityconsultants.com) <CButtry@trinityconsultants.com>; Antici, Philip <philipantici@ffcmail.com>; David Triplett (dtripl1@entergy.com) <dtripl1@entergy.com>
Cc: Montgomery, William <Montgomery@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Independence County - DRR Source SO2 Modeling Discussion

Ashley,

We would also like to have a discussion with Headquarters and the MCH. I am thinking it is

probably best to set this up as a separate call for later next week, so could you explore the availability of these folks and maybe we can finalize this during next Tuesday's call?

David

David W. Clark, M.S.

Epidemiologist

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Thanks,

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Cc: Montgomery, William <Montgomery@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Independence County - DRR Source SO2 Modeling Discussion

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David

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Thank you again,

David

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From: McCorkle, Mark
Sent: Tuesday, October 11, 2016 3:34 PM
To: Mohr, Ashley
Cc: Snyder, Erik; Grady, James; Donaldson, Guy; Clark, David; Montgomery, William
Subject: RE: Independence County - DRR Source SO2 Modeling Discussion

Hi Ashley,

A draft response, prepared by David Clark, is under in-house review. We will send it shortly and set up a good time for a call. Thanks for your assistance in this. - Mark

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Tuesday, October 11, 2016 1:34 PM
To: McCorkle, Mark

Cc: Snyder, Erik; Grady, James; Donaldson, Guy
Subject: Independence County - DRR Source SO2 Modeling Discussion

Mark,

Guy asked us to contact you to set up a time to discuss the comments we provided on September 29, 2016 on the modeling protocol for the Independence County SO2 modeling. Please let me know who should be included in this call and what days/times might be a good target. FYI – I am out of the office this upcoming Friday (10/14) and Monday (10/17).

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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Cc: Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 10/13/2016 12:54:46 PM
Subject: RE: Independence County - DRR Source SO2 Modeling Discussion

David,

That sounds great. I will look forward to the call in number from Jay and go ahead to set up a meeting and conference room for our folks.

Thanks,

Ashley

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(214) 665-7289
FAX (214) 665-6762
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Cc: Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
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To: McCorkle, Mark
Cc: Snyder, Erik; Grady, James; Donaldson, Guy
Subject: Independence County - DRR Source SO2 Modeling Discussion

Mark,

Guy asked us to contact you to set up a time to discuss the comments we provided on September 29, 2016 on the modeling protocol for the Independence County SO2 modeling. Please let me know who should be included in this call and what days/times might be a good target. FYI – I am out of the office this upcoming Friday (10/14) and Monday (10/17).

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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To: mac@adeq.state.ar.us[mac@adeq.state.ar.us]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Grady, James[Grady.James@epa.gov]; Donaldson, Guy[Donaldson.Guy@epa.gov]
From: Mohr, Ashley
Sent: Tue 10/11/2016 6:33:52 PM
Subject: Independence County - DRR Source SO2 Modeling Discussion

Mark,

Guy asked us to contact you to set up a time to discuss the comments we provided on September 29, 2016 on the modeling protocol for the Independence County SO2 modeling. Please let me know who should be included in this call and what days/times might be a good target. FYI – I am out of the office this upcoming Friday (10/14) and Monday (10/17).

Thanks,

Ashley

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FAX (214) 665-6762
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To: Clark, David[CLARKD@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Tue 9/20/2016 3:07:49 PM
Subject: RE: SO2 Designations Modeling Question ?

David,

I was able to check with HQs on this issue, and they echoed that using the more conservative approach shouldn't be an issue. But they did want some additional information on why the more conservative approach is being used just to ensure there are no data gap issues for the chosen monitor. Also, it would be helpful as part of the analysis to include a comparison of the actual value used and the DV, which would lend itself to supporting the fact that the approach is conservative.

Feel free to provide additional information regarding why this approach is being chosen via email response or give me a call if it's easier to discussion.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Tuesday, September 20, 2016 9:56 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Subject: RE: SO2 Designations Modeling Question ?

Thank you for the response Ashley. We recognize the data needs to be from the latest 3-year

period and we do intend to emphasize the conservatism of our approach.

Thank you again,

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, September 19, 2016 3:37 PM
To: Clark, David; Snyder, Erik
Subject: RE: SO2 Designations Modeling Question ?

David,

Not sure if Erik has had an opportunity to provide a direct response, but I thought I would weigh-in. I do not see any issue in using the highest hourly concentration instead of using the design value. I would encourage ADEQ to clearly note that this approach is being used, as well as, a statement regarding the conservatism of this approach. That said, I did want to clarify that the

Modeling TAD (draft document dated August 2016) recommends "… a less conservative "first tier" approach for a uniform monitored background concentration based on the monitored design values for the **latest 3-year period**, regardless of the years of meteorological data used in the modeling. " Therefore, consistent with the TAD one should be looking at the most recent air monitoring data to determine the background concentration and not necessarily the 3 years being modeled. Of course, in many cases these are the same since the most recent meteorological/emissions data are being used, but I at least wanted to provide that clarification.

Link to Modeling TAD → https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf

Erik may provide additional information/feedback, but I at least wanted to get you a response. I can also check with our SO2 modeling contact to confirm and let you know if they have any additional feedback.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, September 16, 2016 12:52 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>
Subject: SO2 Designations Modeling Question ?

Eric & Ashley,

My question is regarding AERMOD modeling per the Modeling TAD and the August 23, 2010

clarification memo (Applicability of Appendix W Modeling Guidance for the 1-hour SO2 NAAQS) for the 2010 SO2 NAAQS. For Background Concentrations the TAD discusses (p 29) the approach of adding the overall highest hourly concentration from the monitor "that could be overly conservative". Then the TAD also "recommends" the less conservative approach of using monitored design values for the three year period being modeled. If the facility's emissions are low enough that we wanted to use the first approach "that could be overly conservative" of adding the highest hourly concentration from the three year period being modeled, would this be acceptable for the model run that would be submitted to EPA as support for our designation recommendation?

Thank you in advance for any information and if you need to discuss this, feel free to contact me.

David

David W. Clark, M.S.

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To: Clark, David[CLARKD@adeq.state.ar.us]; Snyder, Erik[snyder.erik@epa.gov]
From: Mohr, Ashley
Sent: Mon 9/19/2016 8:37:22 PM
Subject: RE: SO2 Designations Modeling Question ?

David,

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To: Clark, David[CLARKD@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Mon 8/15/2016 8:24:53 PM
Subject: RE: Model Clearing House Adj_U* request

Thank you David. I have sent out an internal meeting invite to block off EPA folks' calendars. I will pass along the call-in details to everyone here, too. Please feel free to provide any additional information or call related materials in advance of Thursday. Otherwise, we will talk to you then!

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, August 15, 2016 3:26 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Subject: RE: Model Clearing House Adj_U* request

Here is ours we can use **Ex. 6 - Personal Privacy**

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch

Arkansas Department of Environmental Quality

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, August 15, 2016 3:20 PM
To: Clark, David
Cc: McCorkle, Mark
Subject: RE: Model Clearing House Adj_U* request

If you have a call-in handy that would work. Otherwise, I will need to coordinate to get one here since I do not have one assigned directly to me.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, August 15, 2016 3:11 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Model Clearing House Adj_U* request

Thank you for your efforts Ashley. Yes, 3 PM Central on Thursday August 18 will work. Would you like to us an EPA or ADEQ call in number?

David

David W. Clark, M.S.

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Monday, August 15, 2016 3:04 PM
To: Clark, David
Subject: RE: Model Clearing House Adj_U* request

David,

I am trying to coordinate schedules for the requested call later this week. Thursday (8/18) is the preferred day, but I am having trouble lining up a full hour for a call with the exception of a 3 PM (central) start time. Let me know if this time is acceptable.

Thanks,

Ashley

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From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Wednesday, August 10, 2016 9:26 AM
To: Donaldson, Guy <Donaldson.Guy@epa.gov>
Cc: Mohr, Ashley <Mohr.Ashley@epa.gov>; Bridgers, George <Bridgers.George@epa.gov>; Imhoff, Robert <imhoff.robert@epa.gov>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Model Clearing House Adj_U* request

Hello Guy, George & Others,

Regarding the need for ADEQ to provide additional data for Model Clearinghouse consideration of our ADJ_U* request, we would like to set up a call (involving: R6, MCH, ADEQ, Entergy, FutureFuel & consultants) so we can be sure we understand the details of what is needed to be able to recommend a SO2 attainment designation by the rapidly approaching deadline of January 13, 2017. Would you please see if your calendars are open next Wednesday or Thursday (August 17th or 18th) any time from 10am--3pm (CST) to accommodate the three time zones that would be involved in this call?

Thank you in advance for your efforts,

David

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From: Imhoff, Robert [mailto:imhoff.robert@usepa.onmicrosoft.com]
Sent: Thursday, July 14, 2016 2:22 PM
To: Clark, David
Cc: Donaldson, Guy; Mohr, Ashley
Subject: Model Clearing House Adj_U* request

David,

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You may elect to submit an unsolicited amendment to your current application to the MCH with additional information if you choose. Based on what George told us today he is unlikely to be able to approve your current application without the additional supporting sensitivity study. Please let us know if you have any additional questions or concerns.

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U.S. EPA Region 6

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Dallas TX 75202

Ph: (214) 665 7262

Email: Imhoff.Robert@epa.gov

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Cc: McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
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Region 3 -
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Fugitive releases:

Region 10 -
http://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=16-X-01

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Best regards,

Bob

Robert Imhoff

Environmental Engineer

U.S. EPA Region 6

1445 Ross Ave

Dallas TX 75202

Ph: (214) 665 7262

Email: Imhoff.Robert@epa.gov

To: Daniel Menendez[daniel.menendez@tceq.texas.gov]
From: Mohr, Ashley
Sent: Thur 5/19/2016 5:30:51 PM
Subject: RE: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Daniel,

Thanks again for providing the revised AERMOD files for Sandy Creek SO2 modeling. Could you also provide the AERSURFACE and AERMET files? I don't need the actual met input data since those files might be too large – more just wanting to verify how the AERMOD met data input was generated to confirm the approach outlined in the modeling report. Hopefully those file sizes aren't too large for email. If so, let me know if we need to go another route.

Thanks again for your assistance!

Ashley

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From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Friday, May 13, 2016 1:16 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Subject: RE: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Hi Ashley,

Attached are the files. Please let me know if you have any questions.

Daniel

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Wednesday, May 11, 2016 8:54 AM
To: Daniel Menendez
Cc: Snyder, Erik
Subject: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Daniel,

Forgive me if TCEQ has already provided these files to the Region. I have been reviewing the most recent submittal from Texas related to the CD sources that included revised modeling results for Sandy Creek, but I have not been able to locate the actual modeling files. Could you provide these files? Not sure if email will allow or not based on file size. Let me know if you have any questions or how to best obtain the files.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

To: Daniel Menendez[daniel.menendez@tceq.texas.gov]
From: Mohr, Ashley
Sent: Fri 5/13/2016 6:20:26 PM
Subject: RE: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Thanks Daniel. We will let you know if we have any questions. Have a nice weekend!

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Daniel Menendez [mailto:daniel.menendez@tceq.texas.gov]
Sent: Friday, May 13, 2016 1:16 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Subject: RE: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Hi Ashley,

Attached are the files. Please let me know if you have any questions.

Daniel

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Wednesday, May 11, 2016 8:54 AM
To: Daniel Menendez
Cc: Snyder, Erik

Subject: SO2 Modeling for Sandy Creek - Request for Recent Revised Modeling Files

Daniel,

Forgive me if TCEQ has already provided these files to the Region. I have been reviewing the most recent submittal from Texas related to the CD sources that included revised modeling results for Sandy Creek, but I have not been able to locate the actual modeling files. Could you provide these files? Not sure if email will allow or not based on file size. Let me know if you have any questions or how to best obtain the files.

Thanks,

Ashley

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(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

To: Clark, David[CLARKD@adeq.state.ar.us]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Montgomery, William[Montgomery@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Mon 2/29/2016 4:17:34 PM
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Thanks David. I have passed along the attendee list and the figure to the folks who will be joining us from EPA HQs.

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Monday, February 29, 2016 10:19 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Montgomery, William <Montgomery@adeq.state.ar.us>; McCorkle, Mark <MAC@adeq.state.ar.us>
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley & Erik,

Attached is a figure provided by Trinity (working for FutureFuel) that they say may be useful during this afternoon's call.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

Fax: 501 682-0753

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From: Clark, David
Sent: Monday, February 29, 2016 9:10 AM
To: 'Mohr, Ashley'
Cc: Snyder, Erik; Montgomery, William; McCorkle, Mark
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley & Eric,

Today's call attendees include:

Mark, Will Montgomery, and myself for ADEQ.

Representing Entergy will be David Tripplet and Tracy Johnson with Entergy, Rich Hamel with ERM, Debra Jezouit with Baker Botts, and Chad Wood with the Gill Law firm.

Representing Future Fuel will be Philip Antici, Chuck Buttry and Sarah Haley from Trinity Little Rock, and Jon Hill from Trinity NC.

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 9:23 AM
To: Clark, David; McCorkle, Mark
Cc: Snyder, Erik
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Thanks David. We will use the same call in details that we used yesterday (provided below). I will send out the invite to the HQs folks to get on their calendar. Let me know if you have questions. Otherwise, we will talk again on Monday.

Conference Line

Conference Code

Ex. 6 - Personal Privacy

Have a nice weekend!

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, February 26, 2016 8:27 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; McCorkle, Mark <MAC@adeq.state.ar.us>
Cc: Snyder, Erik <snyder.erik@epa.gov>
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley,

Monday February 29 from 2-3 works for us. Let me verify who will be on the call on our end and what information we have put together at this point that we can provide in advance.

I'll be back in touch,

David

David W. Clark, M.S.

Epidemiologist

Air Division – Planning & Air Quality Analysis Branch
Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR. 72118

U.S.A.

Voice: 501 682-0070

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 7:55 AM
To: McCorkle, Mark; Clark, David
Cc: Snyder, Erik
Subject: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Mark & David,

I spoke with George Bridgers regarding setting up a time to discuss the use of Adjusted U* and the Model Clearinghouse approval process. Below are the best times for the first part of the week (proposed 1 hour block for the call). If these do not work, I can coordinate with George to see what times later in the week might work.

Monday: 2:00 – 3:00 PM

Wednesday: 8:00 – 9:00 AM; 8:30 – 9:30 AM; 9:00 – 10:00 AM; 9:30 – 10:30 AM

We anticipate the following to participate in the call from EPA: Myself, Erik Snyder, George Bridgers, and James Thurman. Let me know what time works best for you and the company/consultants. Please also provide any additional project specific information you may have available in advance of the call.

Once we have a day/time set, I will send out call in details. Let me know if you have any questions.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

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To: Clark, David[CLARKD@adeq.state.ar.us]; McCorkle, Mark[MAC@adeq.state.ar.us]
Cc: Snyder, Erik[snyder.erik@epa.gov]
From: Mohr, Ashley
Sent: Fri 2/26/2016 3:22:42 PM
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Thanks David. We will use the same call in details that we used yesterday (provided below). I will send out the invite to the HQs folks to get on their calendar. Let me know if you have questions. Otherwise, we will talk again on Monday.

Conference Line

Conference Code

Ex. 6 - Personal Privacy

Have a nice weekend!

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: Clark, David [mailto:CLARKD@adeq.state.ar.us]
Sent: Friday, February 26, 2016 8:27 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>; McCorkle, Mark <MAC@adeq.state.ar.us>
Cc: Snyder, Erik <snyder.erik@epa.gov>
Subject: RE: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Ashley,

Monday February 29 from 2-3 works for us. Let me verify who will be on the call on our end and what information we have put together at this point that we can provide in advance.

I'll be back in touch,

David

David W. Clark, M.S.

Epidemiologist

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From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Friday, February 26, 2016 7:55 AM
To: McCorkle, Mark; Clark, David
Cc: Snyder, Erik
Subject: Potential Call Times - Adj U* Discussion for Independence County SO2 Modeling

Mark & David,

I spoke with George Bridgers regarding setting up a time to discuss the use of Adjusted U* and the Model Clearinghouse approval process. Below are the best times for the first part of the week (proposed 1 hour block for the call). If these do not work, I can coordinate with George to see what times later in the week might work.

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Wednesday: 8:00 – 9:00 AM; 8:30 – 9:30 AM; 9:00 – 10:00 AM; 9:30 – 10:30 AM

We anticipate the following to participate in the call from EPA: Myself, Erik Snyder, George Bridgers, and James Thurman. Let me know what time works best for you and the company/consultants. Please also provide any additional project specific information you may have available in advance of the call.

Once we have a day/time set, I will send out call in details. Let me know if you have any questions.

Thanks,

Ashley

Ashley N.Q. Mohr
Environmental Scientist
Air Permits Section (6MM-AP)
U.S. Environmental Protection Agency
1445 Ross Avenue
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(214) 665-7289
FAX (214) 665-6762
mohr.ashley@epa.gov

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

To: McCorkle, Mark[MAC@adeq.state.ar.us]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Clark, David[CLARKD@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 2/25/2016 4:23:14 PM
Subject: RE: SO2 Designations

We will plan to take the call in one of our conference rooms. So, lets plan on using the following call-in:

Conference Line

Conference Code

Ex. 6 - Personal Privacy

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: McCorkle, Mark [mailto:MAC@adeq.state.ar.us]
Sent: Thursday, February 25, 2016 10:22 AM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>
Subject: RE: SO2 Designations

Sounds good Ashley. We'll ring you up then.

From: Mohr, Ashley [mailto:Mohr.Ashley@epa.gov]
Sent: Thursday, February 25, 2016 9:26 AM
To: McCorkle, Mark

Cc: Snyder, Erik; Clark, David
Subject: RE: SO2 Designations

Mark,

I spoke with Erik, and we should have some time today. Would 2 PM work for you all?

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: McCorkle, Mark [mailto:MAC@adeq.state.ar.us]
Sent: Wednesday, February 24, 2016 2:26 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>
Subject: SO2 Designations

Hi Ashley,

I've tried to call Eric but his phone message hasn't updated for a while and I don't like leaving messages. David Clark and I have a few questions regarding modeling for SO2 designations. We would like to have a short conference call with you and/or Eric at your earliest convenience. Please advise regarding a good time for us to call. Thanks – Mark

Mark McCorkle

Environmental Program Coordinator

Planning and Air Quality Analysis. Air Division

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR 72118

Tel: (501) 682-0736

To: McCorkle, Mark[MAC@adeq.state.ar.us]
Cc: Snyder, Erik[snyder.erik@epa.gov]; Clark, David[CLARKD@adeq.state.ar.us]
From: Mohr, Ashley
Sent: Thur 2/25/2016 3:26:07 PM
Subject: RE: SO2 Designations

Mark,

I spoke with Erik, and we should have some time today. Would 2 PM work for you all?

Thanks,

Ashley

THE POSITIONS or VIEWS CONTAINED IN THIS EMAIL DO NOT REPRESENT OFFICIAL EPA POLICY.

From: McCorkle, Mark [mailto:MAC@adeq.state.ar.us]
Sent: Wednesday, February 24, 2016 2:26 PM
To: Mohr, Ashley <Mohr.Ashley@epa.gov>
Cc: Snyder, Erik <snyder.erik@epa.gov>; Clark, David <CLARKD@adeq.state.ar.us>
Subject: SO2 Designations

Hi Ashley,

I've tried to call Eric but his phone message hasn't updated for a while and I don't like leaving messages. David Clark and I have a few questions regarding modeling for SO2 designations. We would like to have a short conference call with you and/or Eric at your earliest convenience. Please advise regarding a good time for us to call. Thanks – Mark

Mark McCorkle

Environmental Program Coordinator

Planning and Air Quality Analysis. Air Division

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR 72118

Tel: (501) 682-0736

To: Roth, John A - DNR[John.Roth@wisconsin.gov]
Cc: Portanova, Mary[portanova.mary@epa.gov]
From: Robinson, Randall
Sent: Fri 2/3/2017 3:47:01 PM
Subject: Re: Final Revision to EPA's Guideline on Air Quality Models

Appreciate the input, John. We'll be sure to have discussion of those items.

Thanks, Randy

From: Roth, John A - DNR <John.Roth@wisconsin.gov>
Sent: Friday, February 3, 2017 9:25 AM
To: Robinson, Randall
Cc: Portanova, Mary
Subject: RE: Final Revision to EPA's Guideline on Air Quality Models

Thanks Randy. Will the conference call agenda contain some discussion on Tier 3 NOx-to-NO2 conversion, specifically how R5 wants to be/define "in consultation" on the approval for all types of permits (major construction, minor construction, Title V operation, non-Title V operation)?

Sorry to throw this at you out of the blue, and you probably already have this topic, but AERSURFACE and Tier 3 approval are my only two agenda suggestions.

John

From: Robinson, Randall [mailto:robinson.randall@epa.gov]
Sent: Friday, February 03, 2017 9:20 AM
To: Roth, John A - DNR
Cc: Portanova, Mary
Subject: Re: Final Revision to EPA's Guideline on Air Quality Models

Hi John,

Been trying to nail down an answer on AERSURFACE and the GFT. Based on initial

feedback from OAQPS, I don't think the release of either is in the immediate future but I haven't received detailed info. For sure, we'll get the lowdown for the call next Thursday.

Thanks for the question.

Randy

From: Roth, John A - DNR <John.Roth@wisconsin.gov>
Sent: Wednesday, February 1, 2017 11:04 AM
To: Robinson, Randall
Cc: Portanova, Mary
Subject: RE: Final Revision to EPA's Guideline on Air Quality Models

Randy and Mary, in light of the upcoming Region V modeling conference call, do you have any further information on AERSURFACE?

From: Robinson, Randall [mailto:robinson.randall@epa.gov]
Sent: Friday, December 23, 2016 9:04 AM
To: Roth, John A - DNR
Cc: Portanova, Mary
Subject: RE: Final Revision to EPA's Guideline on Air Quality Models

Hi John,

I know AERSURFACE is in the queue to get updated (has been for a while) but I have not heard a specific schedule lately. I'll send along a question to OAQPS. However, we may not get an immediate answer. I think many of them are out for the holidays, on a well-deserved, post Appendix W break. I'm also out next week and back in on Jan. 5th. I'm cc'ing Mary, and will cc her on my email to OAQPS so she can respond if we get an answer in the interim.

Regarding the gust factor tool, I wouldn't use it at this point as the sole method for generating

surface roughness. Remember, technically, the GFT hasn't even been released yet. You have a "secret" copy. AERSURFACE is being updated to incorporate a new method for determining surface roughness, based on internal boundary layer theory. The GFT has been helpful as an independent method for evaluating various AERSURFACE results. Our position on AERSURFACE and the GFT for the last few years, as shown in Roger's AERMOD Update R/S/L presentations from 2014, has been to release the tool for use with 1-minute ASOS data at some point. It can be useful in identifying land use/land cover issues and tower location issues that come to light in AERSURFACE. It's use as the sole basis for generating surface roughness values needs more discussion/validation. However, it may be useful in generating values in areas where significant NLCD issues exist.

As part of my email to OAQPS, I'll ask about the GFT. I've always thought that if it's a method that we ultimately have confidence in, it seems like a much more straight-forward approach to generating surface roughness values.

Hope you and yours have a happy, peaceful, holiday season.

Randy

Randy Robinson

Air and Radiation Division

EPA Region 5

312 353-6713

From: Roth, John A - DNR [mailto:John.Roth@wisconsin.gov]
Sent: Thursday, December 22, 2016 3:28 PM
To: Robinson, Randall <robinson.randall@epa.gov>
Subject: Re: Final Revision to EPA's Guideline on Air Quality Models

Hi Randy, thanks for the information on AERMOD. I am planning on updating our

meteorological data from 2006-2010 to 2011-2015 to match the years from the SO2 analyses. Prior to processing all that data, can you provide any information on the status of AERSURFACE? There had been 'threats' to update that tool to better match the Gust Factor Tool, but I have heard and seen nothing. How confident would you be if I used GFT for all roughness calculations?

Thanks for any information you can uncover.

We are committed to service excellence.

Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

John A. Roth
Dispersion Modeling Team Leader – Air Management
Wisconsin Department of Natural Resources
Phone: (608) 267-0805
john.roth@wisconsin.gov

dnr.wi.gov

From: Robinson, Randall <robinson.randall@epa.gov>
Sent: Thursday, December 22, 2016 8:01 AM
To: Alex Cohan; brian Callahan; Chris Beekman; Cody Jones; Daniel Dix; Houtler, Emily L - DNR; Holly Kaloz; Jeffrey Sprague; Sims, Jeffrey R - DNR; Jennifer VanVlerah; Jim Haywood; Jim Sullivan; Roth, John A - DNR; Laura Woods; Mark Derf; Mark Neyman; Mat Hollinger; Matt Will; Mengyu Cai; Mike Mosier; Rob Kaleel; Ruth Roberson; Scott Leopold; Stephanie Hengesbachs; Steve Irwin; Steve King; Steve Sherman; William Kenny
Subject: FW: Final Revision to EPA's Guideline on Air Quality Models

Hello,

You've likely already seen this notice but if not, here you go. And if you have, it's worth repeating.

Let us know if you have any questions.

Thanks, Randy

Randy Robinson

Air and Radiation Division

EPA Region 5

312 353-6713

From: Bridgers, George
Sent: Wednesday, December 21, 2016 5:08 PM
To: Timin, Brian <Timin.Brian@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Arnold, Anne <Arnold.Anne@epa.gov>; Kelly, Bob <Kelly.Bob@epa.gov>; Stackhouse, Butch <Stackhouse.Butch@epa.gov>; Bohnenkamp, Carol <Bohnenkamp.Carol@epa.gov>; Doty, Edward <Doty.Edward@epa.gov>; Snyder, Erik <snyder.erik@epa.gov>; Tonnesen, Gail <Tonnesen.Gail@epa.gov>; Simon, Heather <Simon.Heather@epa.gov>; Feingersh, Henry <Feingersh.Henry@epa.gov>; Kelly, James <kelly.james@epa.gov>; Summerhays, John <Summerhays.John@epa.gov>; Pepple, Karl <Pepple.Karl@epa.gov>; Baker, Kirk <Baker.Kirk@epa.gov>; South, Mia <South.Mia@epa.gov>; Feldman, Michael <Feldman.Michael@epa.gov>; Possiel, Norm <Possiel.Norm@epa.gov>; Dolwick, Pat <Dolwick.Pat@epa.gov>; Robinson, Randall <robinson.randall@epa.gov>; Matichuk, Rebecca <Matichuk.Rebecca@epa.gov>; Damberg, Rich <Damberg.Rich@epa.gov>; Burkhart, Richard <burkhart.richard@epa.gov>; Monteith, Richard <Monteith.Richard@epa.gov>; Gillam, Rick <Gillam.Rick@epa.gov>; Elleman, Robert <Elleman.Robert@epa.gov>; Kotchenruther, Robert <Kotchenruther.Robert@epa.gov>; Bohning, Scott <Bohning.Scott@epa.gov>; Leon-Guerrero, Tim <Leon-Guerrero.Tim@epa.gov>; ellsworth, todd <ellsworth.todd@epa.gov>; Hawes, Todd <Hawes.Todd@epa.gov>; Misenis, Chris <Misenis.Chris@epa.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>; Fox, Tyler <Fox.Tyler@epa.gov>; Jones, Rhea <Jones.Rhea@epa.gov>; Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Simcox, Alison <simcox.alison@epa.gov>; Biton, Leiran <biton.leiran@epa.gov>; Liljegren, Jennifer <Liljegren.Jennifer@epa.gov>; Kay, Rynda <Kay.Rynda@epa.gov>; Avey, Lance <Avey.Lance@epa.gov>; Lessard, Patrick <Lessard.Patrick@epa.gov>; Herrington, Leigh <Herrington.Leigh@epa.gov>; Imhoff, Robert <imhoff.robert@epa.gov>; Carlton-Carew, Njeri <carlton-carew.njeri@epa.gov>; Kayin, Serpil <Kayin.Serpil@epa.gov>
Subject: Final Revision to EPA's Guideline on Air Quality Models
Importance: High

Regional Office Modeling Contacts (Photochemical Modelers' List),

On December 20, 2016, the Administrator signed a final rule that revises the Guideline on Air Quality Models. The Guideline provides EPA-recommended models and other techniques, as well as guidance for their use, for predicting ambient concentrations of air pollutants. EPA's finalized changes enhance the formulation and application of the agency's AERMOD dispersion model, prescribe modeling techniques for secondarily formed fine particle and ozone pollution for single sources and makes various editorial improvements.

A Fact Sheet for the final rule and the pre-Federal Register version of the Final Rule are attached to this email for easy reference. Additionally, there is an informational 2016 Appendix W Final Rule webpage available on the EPA's SCRAM website at the following link: https://www3.epa.gov/ttn/scram/appendix_w-2016.htm. This webpage provides access to updated model code, documentation, and technical guidance related to this final action.

The EPA will be scheduling webinars and other outreach to the stakeholder community in January 2017. Information on these webinars and other engagements will be posted to the EPA's SCRAM website once scheduled. In the interim, direct all questions to Mr. George M. Bridgers, email: Bridgers.George@epa.gov.

Please share this announcement and information with your respective tribal, state, and local air agencies and any other colleagues and interested parties as soon as possible.

Happy Holidays!

George Bridgers

George M. Bridgers, CPM, Environmental Scientist
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
AQAD - Air Quality Modeling Group
109 TW Alexander Drive
Room C431B - Mail Drop C439-01
Research Triangle Park, NC 27711
Phone: 919-541-5563
Fax: 919-541-0044

To: Snyder, Erik[snyder.erik@epa.gov]
From: Mustafa, Sufi A., NMENV
Sent: Mon 3/13/2017 7:18:06 PM
Subject: RE: Clarification on the AERMOD Modeling System Version for Use in SO2 Implementation Efforts and Other Regulatory Actions

Thank you Erik for looking into it. I am glad that Dave Heath did not use the option for SO2 attainment demonstration.

Sufi A. Mustafa, Ph.D.

Manager Air Dispersion Modeling and Emission Inventory Section

New Mexico Environment Department's Air Quality Bureau

Phone: 505 476 4318

525 Camino de los Marquez

Suite 1

Santa Fe, New Mexico, 87505

From: Snyder, Erik [mailto:snyder.erik@epa.gov]
Sent: Monday, March 13, 2017 11:32 AM
To: vennetta.hayes@la.gov; Daniel Menendez <Daniel.Menendez@tceq.texas.gov>; Dianne Anderson <dianne.anderson@tceq.texas.gov>; Daniel Jamieson - TCEQ - Permit modeling (Daniel.Jamieson@tceq.texas.gov) <Daniel.Jamieson@tceq.texas.gov>; Mustafa, Sufi A., NMENV <sufi.mustafa@state.nm.us>; Eric Milligan <Eric.Milligan@deq.ok.gov>
Subject: FW: Clarification on the AERMOD Modeling System Version for Use in SO2 Implementation Efforts and Other Regulatory Actions

FYI – You may have seen this week from others but forwarding in case you didn't. This memo is directed at the Adj_U* and the bug in the AERMOD (2015 version), so don't think this impacts any of you.

Let me know if you have questions.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Bridgers, George
Sent: Thursday, March 09, 2017 2:30 PM
To:
Subject: Clarification on the AERMOD Modeling System Version for Use in SO2 Implementation Efforts and Other Regulatory Actions

Regional Office Modeling Contacts,

Please find the attached "Clarification on the AERMOD Modeling System Version for Use in SO_2 Implementation Efforts and Other Regulatory Actions" memorandum that was signed by Chet Wayland earlier today. This is a clarification memorandum concerning which version of the AERMOD Modeling System code is the most appropriate for modeling to be considered by the EPA in the upcoming the Round 3 – SO_2 designations process. This clarification memorandum is also applicable for other current and future regulatory applications and compliance demonstrations.

Because of potentially time sensitive implications regarding the modeling already submitted to the EPA for a selection of SO_2 sources to be included in the Round 3 – SO2 designations, we encourage you to share the attached memorandum to your respective state, local, and tribal air agencies and all interested colleagues at your earliest convenience. If there are any questions, concerns, or needed additional clarifications on this memorandum, please do not hesitate to

contact James Thurman or me.

My regards,
George

P.S. - For convenience, the clarification memorandum is also available on the EPA's SCRAM website at the following web address:
https://www3.epa.gov/ttn/scram/guidance/clarification/SO2_DRR_Designation_Modeling_Clarificaiton_Memo-03082017.pdf

---

George M. Bridgers, CPM, Environmental Scientist
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
AQAD - Air Quality Modeling Group
109 TW Alexander Drive
Room C431B - Mail Drop C439-01
Research Triangle Park, NC 27711
Phone: 919-541-5563
Fax: 919-541-0044

To: Bohning, Scott[Bohning.Scott@epa.gov]; Snyder, Erik[snyder.erik@epa.gov]
From: Bates, Rita, NMENV
Sent: Tue 10/18/2016 4:46:23 PM
Subject: RE: SJGS call today...

Hi Scott,

Yes, the call is at 11:00 MDT (12:00 CDT, 10:00 PDT). Thanks for talking with us this morning.

Rita

From: Bohning, Scott [mailto:Bohning.Scott@epa.gov]
Sent: Tuesday, October 18, 2016 10:43 AM
To: Snyder, Erik <snyder.erik@epa.gov>; Bates, Rita, NMENV <Rita.Bates@state.nm.us>
Subject: SJGS call today...

Erik -

I just spoke with Rita & others at NMED about SJGS - FCPP coordination (a follow-up from message I left her last week). She invited me to be on the call you guys are having, which I think makes sense, but if that call is at 11 am MDT (10 am PDT), then I cannot make it as I have a meeting then.

Rita - could you confirm the time of the call?

FYI, here are some notes on what NMED and I discussed, I would welcome your feedback.

- Even though FCPP is a tribal source, and tribes get come flexibility, in this case the deadline for the modeling is still Jan. 2017 just as for other sources, since that date comes from a Consent Decree.

- For modeling SJGS, NMED has been including FCPP, and using its maximum actual emissions. Given that OAQPS has been a stickler about language in SO2 DRR about either actual or an enforceable limit, I wondered if that would be an issue. I personally think using max actual is OK: actual is are OK, and this would be more conservative. Also, Rita pointed out that the rule language may not be directly applicable to the *nearby* sources like FCPP anyway.

- We all seem to be in agreement that FCPP and SJGS should be included in each other's modeling. But not sure how much the modeling needs to actually match in other ways. Currently NMED is using 2013-2015 (the most recent) for emissions and meteorology, whereas the modeling I have for FCPP has 2012-2014 (which we think is OK given this is a tribal area). I could use the 2013-2015, but would have to process another year of met data, which I was not planning on. Also, I agree with NMED that each source's modeling should use the met data available nearest to it, so the modeling would already not be matching up. Overall this make me want to stick with what I have.

- Scott B.

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"Scott Bohning" <bohning.scott@epa.gov>

U.S. EPA Region 9, AIR-7

415/947-4127 fax-3579

To: Vennetta Hayes[vennetta.hayes@la.gov]; Daniel Menendez[Daniel.Menendez@tceq.texas.gov]; Dianne Anderson[dianne.anderson@tceq.texas.gov]; Daniel Jamieson - TCEQ - Permit modeling (Daniel.Jamieson@tceq.texas.gov)[Daniel.Jamieson@tceq.texas.gov]; Sufi Mustafa[Sufi.Mustafa@state.nm.us]; Eric Milligan[Eric.Milligan@deq.ok.gov]
From: Snyder, Erik
Sent: Mon 3/13/2017 5:32:09 PM
Subject: FW: Clarification on the AERMOD Modeling System Version for Use in SO2 Implementation Efforts and Other Regulatory Actions
SO2_DRR_Designation_Modeling_Clarificaiton_Memo-03082017.pdf

FYI – You may have seen this week from others but forwarding in case you didn't. This memo is directed at the Adj_U* and the bug in the AERMOD (2015 version), so don't think this impacts any of you.

Let me know if you have questions.

-Erik

Erik Snyder

Lead Regional Air Quality Modeler
EPA Region 6
Phone: 214-665-7305
Fax: 214-665-7263
email: snyder.erik@epa.gov

From: Bridgers, George
Sent: Thursday, March 09, 2017 2:30 PM
To:
Subject: Clarification on the AERMOD Modeling System Version for Use in SO2 Implementation Efforts and Other Regulatory Actions

Regional Office Modeling Contacts,

Please find the attached "Clarification on the AERMOD Modeling System Version for Use in SO_2 Implementation Efforts and Other Regulatory Actions" memorandum that was signed by Chet Wayland earlier today. This is a clarification memorandum concerning which version of the AERMOD Modeling System code is the most appropriate for modeling to be considered by the EPA in the upcoming the Round 3 – SO_2 designations process. This clarification memorandum is also applicable for other current and future regulatory applications and compliance demonstrations.

Because of potentially time sensitive implications regarding the modeling already submitted to the EPA for a selection of SO_2 sources to be included in the Round 3 – SO2 designations, we encourage you to share the attached memorandum to your respective state, local, and tribal air agencies and all interested colleagues at your earliest convenience. If there are any questions, concerns, or needed additional clarifications on this memorandum, please do not hesitate to contact James Thurman or me.

My regards,
George

P.S. - For convenience, the clarification memorandum is also available on the EPA's SCRAM website at the following web address:
https://www3.epa.gov/ttn/scram/guidance/clarification/SO2_DRR_Designation_Modeling_Clarificaiton_Memo-03082017.pdf

---

George M. Bridgers, CPM, Environmental Scientist
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
AQAD - Air Quality Modeling Group
109 TW Alexander Drive
Room C431B - Mail Drop C439-01
Research Triangle Park, NC 27711
Phone: 919-541-5563
Fax: 919-541-0044

To: Raju Bisht[rbisht@navajo-nsn.gov]
Cc: Viswanathan, Krishna[Viswanathan.Krishna@epa.gov]; Lee, Anita[Lee.Anita@epa.gov]; Michael Z. King[mzking@navajo-nsn.gov]; Prashanth Subburam[psubburam@navajo-nsn.gov]; eugeniaquintana@navajo-nsn.gov[eugeniaquintana@navajo-nsn.gov]
From: Bohning, Scott
Sent: Thur 10/20/2016 3:50:55 PM
Subject: RE: NGS_SO2_DRR_Modeling

Raju -

Thanks for looking into this!

- Scott B.

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Thursday, October 20, 2016 7:50 AM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam <psubburam@navajo-nsn.gov>; eugeniaquintana@navajo-nsn.gov
Subject: RE: NGS_SO2_DRR_Modeling

Scott,

The person coordinating these modeling studies at SRP will only be back at work on Monday. We won't know till next week what they have to say.

Thanks.

From: Bohning, Scott [mailto:Bohning.Scott@epa.gov]
Sent: Wednesday, October 19, 2016 5:32 PM
To: Raju Bisht <rbisht@navajo-nsn.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam

<psubburam@navajo-nsn.gov>; Eugenia Quintana <eugeniaquintana@navajo-nsn.gov>
Subject: RE: NGS_SO2_DRR_Modeling

Raju -

It would be nice to get something comparable to the attached for NGS.

Attached is a "readme" and listing of zipped modeling file archive that AECOM provided for Four Corners Power Plant. It includes the hourly emissions data, the original meteorological data used before it was processed, and also the inputs & outputs to terrain and meteorological data and building dimension (BPIP) processing steps.

- Scott B.

Attachments

FCPP Modeling Archive Readme.doc

FCPP_archive_listing.txt

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Wednesday, October 19, 2016 12:52 PM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam <psubburam@navajo-nsn.gov>; eugeniaquintana@navajo-nsn.gov
Subject: RE: NGS_SO2_DRR_Modeling

Hi Scott,

Please see if this works for you and let me know if there are any more specific files that you require. I will wait for your reply before I reach out to SRP.

Thanks. Raju

From: Bohning, Scott [mailto:Bohning.Scott@epa.gov]
Sent: Wednesday, October 19, 2016 1:33 PM
To: Raju Bisht <rbisht@navajo-nsn.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam <psubburam@navajo-nsn.gov>; Eugenia Quintana <eugeniaquintana@navajo-nsn.gov>
Subject: RE: NGS_SO2_DRR_Modeling

Raju -

I guess Anita called you about the additional modeling files.... Thanks for these, and actually I think I just had the ".recs" and ".in" files.

By the way, the attachment "2008-2012_aermet.zip" was removed... - our e-mail system strips all incoming and outgoing ".zip" and ".jpg" files on the dubious grounds that they may contain a virus. I'd appreciate if you'd resend that, but with renamed to have a different extension, like ".zi".

I'd like to be able to at least rerun the model if needed, for which I would need KPGA.2008.SFC and KPGA.2008.PFL in addition to the ones I already have. But also would like to check how the meteorological data processing was done, and also check various things against the description in the EIS modeling report.

But I think it would be best for our records to just request all the input files.

- Scott B.

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Wednesday, October 19, 2016 12:20 PM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam <psubburam@navajo-nsn.gov>; eugeniaquintana@navajo-nsn.gov
Subject: NGS_SO2_DRR_Modeling

Hi Scott,

Did you have any particular additional input files in mind that you want from SRP or should we just generally reach out and request them for all the input files used in their modeling? I have also attached all the files that were forwarded to you so far.

Thanks. Raju

To: Raju Bisht[rbisht@navajo-nsn.gov]
Cc: Viswanathan, Krishna[Viswanathan.Krishna@epa.gov]; Lee, Anita[Lee.Anita@epa.gov]; Michael Z. King[mzking@navajo-nsn.gov]; Prashanth Subburam[psubburam@navajo-nsn.gov]; eugeniaquintana@navajo-nsn.gov[eugeniaquintana@navajo-nsn.gov]
From: Bohning, Scott
Sent: Wed 10/19/2016 7:33:15 PM
Subject: RE: NGS_SO2_DRR_Modeling

Raju -

I guess Anita called you about the additional modeling files.... Thanks for these, and actually I think I just had the ".recs" and ".in" files.

By the way, the attachment "2008-2012_aermet.zip" was removed... - our e-mail system strips all incoming and outgoing ".zip" and ".jpg" files on the dubious grounds that they may contain a virus. I'd appreciate if you'd resend that, but with renamed to have a different extension, like ".zi".

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- Scott B.

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Wednesday, October 19, 2016 12:20 PM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Lee, Anita <Lee.Anita@epa.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Prashanth Subburam <psubburam@navajo-nsn.gov>; eugeniaquintana@navajo-nsn.gov
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Thanks. Raju

To: Raju Bisht[rbisht@navajo-nsn.gov]
Cc: Michael Z. King[mzking@navajo-nsn.gov]; Viswanathan, Krishna[Viswanathan.Krishna@epa.gov]; Tennille B. Begay[tbbegay@navajo-nsn.gov]; prashanth subburam[subburamp1@gmail.com]; eugeniaquintana@navajo-nsn.gov[eugeniaquintana@navajo-nsn.gov]
From: Bohning, Scott
Sent: Mon 9/12/2016 4:29:53 PM
Subject: RE: FCPP SO2 modeling files

Raju -

Thanks for the reply... I will confer with Krishna and others here tomorrow (9/13) when I am back in the office.

- Scott B.

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Monday, September 12, 2016 8:02 AM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Cc: Michael Z. King <mzking@navajo-nsn.gov>; Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Tennille B. Begay <tbbegay@navajo-nsn.gov>; prashanth subburam <subburamp1@gmail.com>; eugeniaquintana@navajo-nsn.gov
Subject: RE: FCPP SO2 modeling files

Scott,

Let us know when you want the call to happen and we can reach out to APS or provide you with their contact info to set this up. Since none of us here at NNEPA or APS have extensive knowledge of modeling, I would prefer to have the folks at AECOM that did the work on the call as well so that we don't miss anything that you are requiring us to do moving forward if it is fine with you.

Thanks. Raju

From: Bohning, Scott [mailto:Bohning.Scott@epa.gov]
Sent: Sunday, September 11, 2016 8:40 PM
To: Samani, Olga <Olga.samani@aecom.com>; Raju Bisht <rbisht@navajo-nsn.gov>; Michael

Z. King <mzking@navajo-nsn.gov>
Cc: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>
Subject: FCPP SO2 modeling files

Olga -

Thanks for your reply & for the files. I guess I have missed something here. The link to these files was originally sent to me in late July, and that was just after communication with Navajo Nation about how we were thinking SO2 DRR modeling could mainly follow EIS work, so I assumed the modeling files were from the EIS.

But looking back at a 7/20 email from Raju (see thread below), I see "I know APS has carried out some modeling using the 2012-2014 emissions and have agreed to share that with us. I will share that with you once I hear from them." so I guess these files are what that email referred to, and is new work relevant to the SO2 DRR.

It seems like EPA will have to have a call soon with Navajo Nation (& APS) so we're all clear on the status and what needs to happen next.

- Scott B.

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"Scott Bohning" <bohning.scott@epa.gov>

U.S. EPA Region 9, AIR-7

415/947-4127 fax-3579

From: Samani, Olga [mailto:Olga.samani@aecom.com]
Sent: Friday, September 09, 2016 10:19 AM
To: Bohning, Scott <Bohning.Scott@epa.gov>
Subject: RE: Notification: Olga Samani has sent you files

Scott,

No, the 1-hour SO2 DRR modeling was not based on the EIS we did in 2014. There were many updates since 2014, such as emissions, met years, fenceline. So the modeling files are not the same.

Olga Samani

Air Quality Specialist

Environment

Direct 978.905.2275

olga.samani@aecom.com

AECOM

250 Apollo Drive,

Chelmsford, MA 01824

Phone 978.905.2100

www.aecom.com

Please consider the environment before printing this e-mail

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Wednesday, July 20, 2016 3:51 PM
To: LIMAYE, VIJAY <Limaye.Vijay@epa.gov>
Cc: Lo, Doris <Lo.Doris@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Bohning, Scott <Bohning.Scott@epa.gov>; McKaughan, Colleen <McKaughan.Colleen@epa.gov>; eugeniaquintana@navajo-nsn.gov; Michael Z. King

<mzking@navajo-nsn.gov>; Tennille B. Begay <tbbegay@navajo-nsn.gov>; Withey, Charlotte <Withey.Charlotte@epa.gov>; CHANG, RANDALL <Chang.Randall@epa.gov>
Subject: RE: Implementation of SO2 DRR on Navajo Nation

Hi Vijay,

I have little or practically no experience regarding modeling. Gaurav worked on developing those protocols and he and Mike were on the call on June 9th and 16th. Gaurav has since moved on and is no longer with NNEPA. I know APS has carried out some modeling using the 2012-2014 emissions and have agreed to share that with us. I will share that with you once I hear from them. Is it fine if I share the contents of your email with FCPP and NGS so that they have an idea as to what is required for the SO2 DRR and the difference as to what was done for EIS and what is now required. I would prefer setting up a call the first week of August if that is not a problem at your end.

Thanks. Raju

From: LIMAYE, VIJAY [mailto:Limaye.Vijay@epa.gov]
Sent: Tuesday, July 19, 2016 5:50 PM
To: Raju Bisht <rbisht@navajo-nsn.gov>
Cc: Lo, Doris <Lo.Doris@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Bohning, Scott <Bohning.Scott@epa.gov>; McKaughan, Colleen <McKaughan.Colleen@epa.gov>; Eugenia Quintana <eugeniaquintana@navajo-nsn.gov>; Michael Z. King <mzking@navajo-nsn.gov>; Tennille B. Begay <tbbegay@navajo-nsn.gov>; Withey, Charlotte <Withey.Charlotte@epa.gov>; CHANG, RANDALL <Chang.Randall@epa.gov>
Subject: RE: Implementation of SO2 DRR on Navajo Nation

Hi Raju,

EPA Region 9 does have the modeling protocols for both FCPP and NGS, and we believe that most of the procedures followed would be appropriate for modeling performed for the SO2 DRR, though there would have to be some differences to address emissions and AERMOD model options.

The June 6th draft protocol sent by Gaurav Rajen covered many of the AERMOD inputs, borrowing from the EIS protocol; either an updated version of the draft or an abbreviated version

that just cited the EIS protocols would be suitable as the basis for a protocol. However, per our previous conversations (including conference calls on June 9th and June 16th), we believe that the emission scenarios used in the EIS protocols may not be appropriate for the SO2 DRR. Under the SO2 DRR, modeled emissions are required to be either actual emissions for recent years (e.g. 2012-2014, or 2013-2015), or else allowed emissions under federally enforceable limits in place and effective by January 13, 2017. The emissions to be modeled should be spelled out in protocol(s) for the two facilities.

In addition, for the EIS reports, the "adjusted u-star" beta option in AERMOD was used. At this time, until the Guideline on Air Quality Models ("GAQM", 40 CFR Part 51, Appendix W) is updated, the use of the adjusted u-star for modeling for permits or SIPs requires an alternative model demonstration under GAQM 3.2, which must be approved by the EPA Model Clearinghouse. It would be simpler not to go through that procedure, so we recommend that the protocol(s) for the two facilities reflect the standard AERMOD model. This could be revisited at a later date if necessary.

We would like to set up a call with you and your team for next week to discuss the emissions limits, to make sure that we are all on the same page--please let us know a good time to reach you.

Best,

Vijay

Vijay Limaye, Ph.D.

U.S. Environmental Protection Agency, Region 9

Air Planning Office (AIR-2)

75 Hawthorne St. San Francisco, CA 94105

Limaye.Vijay@epa.gov / 415.972.3086

From: Raju Bisht [mailto:rbisht@navajo-nsn.gov]
Sent: Thursday, July 14, 2016 10:03 AM
To: LIMAYE, VIJAY <Limaye.Vijay@epa.gov>

Cc: Lo, Doris <Lo.Doris@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Bohning, Scott <Bohning.Scott@epa.gov>; Strauss, Alexis <Strauss.Alexis@epa.gov>; McKaughan, Colleen <McKaughan.Colleen@epa.gov>; eugeniaquintana@navajo-nsn.gov; Michael Z. King <mzking@navajo-nsn.gov>; Tennille B. Begay <tbbegay@navajo-nsn.gov>; Withey, Charlotte <Withey.Charlotte@epa.gov>
Subject: RE: Implementation of SO2 DRR on Navajo Nation

Hello Vijay,

I would like to follow up on our effort to meet the DRR for NGS. The facility has informed us that Region 9 should have the protocol and the final report for the near field modeling conducted for the EIS. I believe Jeanne Geselbracht is the Region 9 contact for the EIS study. If you don't have access to these documents, please let us know and we will provide them to you. Would the protocol and the report done for the EIS be sufficient to make a determination for the SO2 DRR? If not, could you provide us with some guidance on what changes you would like to see be made before running the model again so that we could start having a dialogue with the facility and their consultants to see how they can help us with this moving forward.

Thanks. Raju

To: Roland Gutierrez[roland.gutierrez@epa.guam.gov]
Cc: McKaughan, Colleen[McKaughan.Colleen@epa.gov]; YOSHIMURA, GWEN[Yoshimura.Gwen@epa.gov]; Kurpius, Meredith[Kurpius.Meredith@epa.gov]; Wehling, Jefferson[Wehling.Jefferson@epa.gov]
From: Viswanathan, Krishna
Sent: Tue 9/20/2016 2:24:16 PM
Subject: RE: U.S. EPA - Updated Guidance on Round 3 Designations for the SO2 Data Requirements Rule
RE: U.S. EPA - Updated Guidance on Round 3 Designations for the SO2 Data Requirements Rule
Yakima PM10 SIP Development Plan.pdf
Cache Valley SIP Development Plan.doc

Hi Roland,

The attached email provides all the required ingredients for a redesignation of the area, which are largely a redesignation request accompanied by a maintenance plan. When you are starting to work on the maintenance plan, we usually advice our states and territories to work closely with EPA to develop a plan that gets the job done but also meets Clean Air Act requirements.

We typically ask the agency developing the SIP prepare a SIP Development Plan that outlines the major steps in the plan and a schedule for doing so. I've attached two example of SIP Development Plans here. One is brief with the schedule in reverse chronological order and the other is slightly more detailed. Once you have drafted a SIP development plan we also suggest setting up regular meetings for the duration of the SIP development, which may take several months to a year.

Thanks,

Krishna

Krishna Viswanathan

520.999.7880

From: Roland Gutierrez [mailto:roland.gutierrez@epa.guam.gov]
Sent: Monday, September 19, 2016 9:51 PM
To: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>

Cc: McKaughan, Colleen <McKaughan.Colleen@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Kurpius, Meredith <Kurpius.Meredith@epa.gov>; Wehling, Jefferson <Wehling.Jefferson@epa.gov>
Subject: Re: U.S. EPA - Updated Guidance on Round 3 Designations for the SO2 Data Requirements Rule

Krishna,

For the Tanguisson Re-designation, other than the updated SIP and SIP Maintenance plan, are there any other requirements we should be aware

Roland T. Gutierrez Jr., MPA
EHS Supervisor, Air Pollution Control Program - Guam EPA
roland.gutierrez@epa.guam.gov
Ph. 1-671-300-4751/2/3
Fax: 1-671-300-4531

epa.guam.gov - facebook.com/Guam EPA - twitter.com/GuamEPA

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On Wed, Sep 14, 2016 at 9:39 AM, Viswanathan, Krishna <Viswanathan.Krishna@epa.gov> wrote:

> Hi Roland,
>
> We'll take a quick look and get back to you whether these are sufficient for us to approve the modeling protocol.

Thanks,

Krishna

Krishna Viswanathan

520.999.7880

From: Roland Gutierrez [mailto:roland.gutierrez@epa.guam.gov]
Sent: Tuesday, September 13, 2016 4:24 PM
To: Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>
Cc: McKaughan, Colleen <McKaughan.Colleen@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Kurpius, Meredith <Kurpius.Meredith@epa.gov>; Wehling, Jefferson <Wehling.Jefferson@epa.gov>

Subject: Re: U.S. EPA - Updated Guidance on Round 3 Designations for the SO2 Data Requirements Rule

Please advise if the response to these comments are sufficient.

1. Section 5: Please clarify how Guam EPA/EPA will be notified of re-located receptors, and whether an explanation of the reasons for relocation (characteristics of the locations, etc) will be included.

In response to item #1: We are not proposing to relocate receptors that, according to the EPA guidance, would not be practical locations for monitor placement. Those receptors will continue to be evaluated for potential site access, and if it is determined that safe and practical access to those locations cannot be achieved, we will add receptors to the nearest points where access is possible. all receptors in the modeling analyses that are judged to be non-representative for potential monitor locations will be clearly identified by UTM coordinates and on topographical maps, showing the original and relocated receptor position. The criteria relied upon to relocate each receptor will be documented in a memorandum and submitted to GEPA and USEPA for review and concurrence before the final modeling analyses and design concentration is determined.

2. Section 7: We have reviewed Section 7: Background Concentrations and Appendix D. and we continue to have concerns about the supporting information that was provided in the protocol.

- Shipping emissions: As discussed in the protocol, the allowable sulfur content in fuel may not be reduced if fuels are not reasonable available. Therefore, the background concentration should account for the effect of shipping emissions.

- Ambient air monitoring: Although there may be are a number of hours with values of zero, the data in Appendix D. shows that there are high short term (3 hour) values that were measured at some of the monitoring site. Since the standard looks at 1-hour concentrations, specifically the 99th percentile of 1-hour daily maximum concentrations averaged over 3 years, the analysis should discuss the appropriate background for 1 hour maximum concentrations (99th percentile per year).

In Response to item #2: Please see attached excerpt from a draft report on "Assessment of background air quality concentration on Guam". Section 2.0 elaborates in more detail sulfur dioxide Background Concentrations.

Roland T. Gutierrez Jr., MPA
EHS Supervisor, Air Pollution Control Program - Guam EPA
roland.gutierrez@epa.guam.gov
Ph. 1-671-300-4751/2/3
Fax: 1-671-300-4531

epa.guam.gov - facebook.com/Guam EPA - twitter.com/GuamEPA

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On Wed, Sep 14, 2016 at 4:55 AM, Viswanathan, Krishna <Viswanathan.Krishna@epa.gov> wrote:

Hi Roland,

You may have met with or are probably meeting with GPA as you receive this message. As I mentioned earlier, I am transitioning into the role as the main planning point of contact for SO2 SIPs for EPA Region 9 and as such for Guam also. Unfortunately, due to staff and management transitions some responses are taking more time than usual but this will improve. I hope these responses are helpful and timely but if you have questions please just call me.

In response to your queries.

1. We are meeting with GPA tomorrow and would like to know if the final submission to the USEPA comments for the DRR were sufficient to approve the modeling plan. We are almost half way through December and want to start the modeling to meet the next submission deadline.

a. EPA sent you an email (Michael Mann dated August 16, 2016) that forwarded comments on the modeling protocol from Carol Bohnenkamp. Addressing those comments will advance your interest in seeing the modeling protocol approved and modeling started. See email attached.

2. Additionally, are the comments to our request for re-designation of Tanguisson approved or is there a way to get unofficial comments to us? We would like to discuss with GPA.

a. The email from Meredith Kurpius, September 2, 2016 communicated that EPA cannot act on Guam EPA's redesignation request until a maintenance plan is received. See email attached.

3. Lastly, I am requesting for a sample or samples of approved SIP maintenance plans we can model are submission after.

a. The general requirements for redesignations are described in the attached 1992 Calcagni memo and our policy regarding redesignation without monitoring for single-source SO2 NAAs are described in the attached 2000 Seitz memo.

b. There are a few of examples of previous R9 redesignations relying on the Seitz policy. I think this one for Douglas, AZ is the most recent and may be a good model: http://www.regulations.gov/#!documentDetail;D=EPA-R09-OAR-2005-AZ-0008-0002

c. Lastly, based on your situation the modeling GPA will perform for the Data Requirements Rule due in January will give you an idea of the modeled ambient values of SO2 in the area at present. This will be helpful for you as you develop the redesignation request and maintenance plan. Please check in with us to discuss the best and most efficient way to develop a maintenance plan.

Again, if you have questions, please call me at the number below.

Thanks and looking forward to working with you,

Krishna

Krishna Viswanathan

520.999.7880

From: Roland Gutierrez [mailto:roland.gutierrez@epa.guam.gov]
Sent: Sunday, September 11, 2016 9:34 PM
To: Nazmi, Niloufar <Nazmi.Niloufar@epa.gov>
Cc: McKaughan, Colleen <McKaughan.Colleen@epa.gov>; YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>; Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>; Kurpius, Meredith <Kurpius.Meredith@epa.gov>
Subject: Re: U.S. EPA - Updated Guidance on Round 3 Designations for the SO2 Data Requirements Rule

All,

We are meeting with GPA tomorrow and would like to now if the final submission to the USEPA comments for the DRR were sufficient to approve the modeling plan. We are almost half way through December and want to start the modeling to meet the next submission deadline.

Additionally, are the comments to our request fro re-designation of Tanguisson approved or is there a way to get unofficial comments to us? We would like to discuss with GPA.

Lastly, I am requesting for a sample or samples of approved SIP maintenance plans we can model are submission after.

Thank you,

Roland T. Gutierrez Jr., MPA
EHS Supervisor, Air Pollution Control Program - Guam EPA
roland.gutierrez@epa.guam.gov
Ph. 1-671-300-4751/2/3
Fax: 1-671-300-4531

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On Sat, Sep 10, 2016 at 7:17 AM, Nazmi, Niloufar <Nazmi.Niloufar@epa.gov> wrote:

Dear Colleagues,

As the next step in the implementation of the SO2 Data Requirements Rule (DRR), you chose to either model or monitor to characterize air quality in support of Round 3 designations for the 2010 SO2 NAAQS per the DRR. Your chosen pathway was published at the "SO2 Data Requirements Rule State Pathway Notifications" website at https://www.epa.gov/so2-pollution/so2-data-requirements-rule-state-pathway-notifications.

As you are aware, agencies that chose monitoring are required to have new monitors installed and operational by January 1, 2017. For air agencies that chose modeling to comply with the DRR, we have been working with you to support your submission of modeling analyses to the EPA by January 13, 2017.

The attached guidance provides more detail on the schedule and process for area designations for Round 3 of the 2010 SO2 NAAQS, which EPA will designate by December 31, 2017. It also clarifies that although Clean Air Act section 107(d) does not require states, tribes or territories to submit updated recommendations, we are inviting such air agencies to submit updated designation recommendations for the EPA to consider in Round 3 of designations. Air agencies that wish to update their recommendations should do so no later than January 13, 2017, and address them to Alexis Strauss, Acting Regional Administrator, EPA Region 9 with an electronic copy to Gwen Yoshimura (yoshimura.gwen@epa.gov) and Krishna Viswanathan (viswanathan.krishna@epa.gov).

Please contact Krishna Viswanathan (520-999-7880) or Gwen Yoshimura (415-947-4134) of our office if you have questions about this guidance.

Thank you,

Niloufar

Niloufar Nazmi

Air Division, EPA Region 9

Desk: 415-972-3684; Cell: 415-328-1143

To: lisa.alam@nebraska.gov[lisa.alam@nebraska.gov]; Avey, Lance[Avey.Lance@epa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
From: Krzak, Jennifer [DNR]
Sent: Tue 10/18/2016 7:11:10 PM
Subject: RE: normalized SO2 modeling
removed.txt

Here is the info for the Walter Scott sources direct from our input file. All units are of course in meters and listed in order of X, Y and Elevation.

SO LOCATION EP003 POINT 261898.22 4562476.92 294.72

SO LOCATION EP141 POINT 262145.9 4562589.8 294.7

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 1:48 PM
To: Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Jennifer:

Please send coordinates (XUTMs and YUTMs) and elevations in WGS84 or NAD83, for point sources, EP003 and EP141. Please label the coordinates

and include the units.

As a result of this issue, I will take a closer look at NAD83. The USGS Web site says NED GeoTIFF files use datum NAD83. However, I have

read that you need to go out to the 4th or 5th decimal point before you begin to see a

difference between WGS84 and NAD83. NAD83 was originally

set up in the 1980s to measure movement of the North American plate. Maybe now these two datum have larger differences than they once had.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Krzak, Jennifer [DNR] [mailto:Jennifer.Krzak@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance; Ashton, Brad [DNR]; Alam, Lisa
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: normalized SO2 modeling

It is not the receptor elevations where we are seeing a difference, since we have not generated a 20 km receptor grid like that which has been created for OPPD we cannot compare those values. The point source elevations are where we initially saw a difference. The source locations are the same but our elevations range from about 2 to 4 meters higher, depending on whether it's a WSEC or OPPD source. We generally use NAD83.

Jennifer

JENNIFER KRZAK Environmental Specialist
Iowa Department of Natural Resources

P 515.725.9532 | F 515.725.9501 |jennifer.krzak@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Road, Suite 1 | Windsor Heights, IA 50324

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, October 18, 2016 11:34 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Hi All,

Is it the receptor elevations that are different? If Lisa's and Brad's receptor locations differ, wouldn't the elevations potentially differ? p.s., I see Lisa just asked this question.

Pasted below is the 1 arc second NED file and the elevation within 20 km of OPPD. Also, on the left, it gives the maximum, minimum, and specific source elevation in meters. Does this look like the terrain file you all are using?

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avcy.lancc@cpa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: lisa.alam@nebraska.gov

Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: normalized SO2 modeling

Lisa,

The elevation data we used are also 1-arc second files. I'm not sure of the reason for this discrepancy. You might check your AERMAP files to confirm the correct datum is being used. Beyond that I'm not sure why we would be getting different elevations.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 10:31 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Mathew:

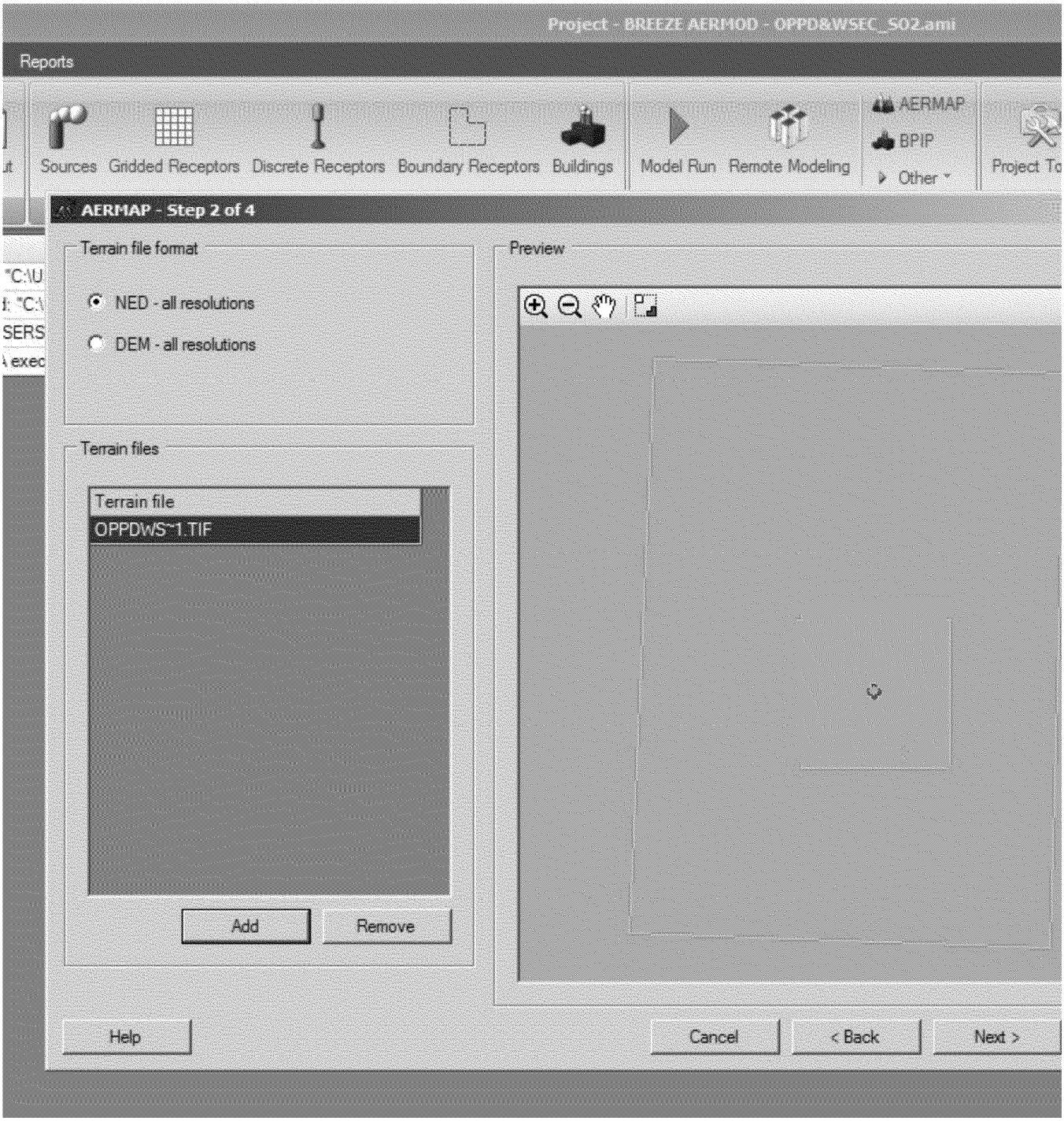
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid


Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
Project To
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Preview
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 9:29 AM
To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

It sounds like you understand our concerns, so we feel a call is no longer necessary. Unfortunately we don't have a receptor to grid that would suit your purposes, our grid is focused on Walter Scott.

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 9:05 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

Yes, that can work for but might be unnecessary.

Looking through the original emission files from OPPD, I do have emission rates that vary hourly for OPPD Units 4 & 5, but somehow when combining OPPD and WSEC in Excel to create a single hourly emission rate file, there appears to be an error. Thank you for pointing that out. I intend to rerun the OPPD model, combined with WSEC emissions today, correcting the emissions from OPPD.

As to the elevations, I could rerun AERMAP, but the results won't be any different. There are difficulties when as area is located in two Zones. I have rarely encounter this situation. I choose Zone 15, which is Iowa and part of Eastern Nebraska, including a large part of Douglas County. Do you have a problem with that approach? Do you want to send me your receptor grid?

Lance, do you have a problem with me using IDNR's receptor grid?

It' unlikely these changes will alter the results of the final product, but there's only one way to find out.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 8:36 AM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

Does this work for you Lisa?

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, October 18, 2016 8:17 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Alam, Lisa <lisa.alam@nebraska.gov>
Cc: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

This Wednesday would be better for me; next Wednesday I will be out of the office.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 7:34 AM
To: Wiese, Carrie; Alam, Lisa
Cc: Ashton, Brad [DNR]; Krzak, Jennifer [DNR]; McGraw, Jim [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

We'd like to have a call to discuss this further. Would any of these times work for you and Carrie?

Tomorrow (Wed 10/19) at 1 or 2 pm

Wed 10/26 at 2 pm?

Thank you,

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, October 17, 2016 4:28 PM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

That's a big difference. I ran AERMAP using an NED GeoTIFF elevation file downloaded from the USGS Website, **WGS 84, Zone 15**

I can send the *.tif file to you, although it's 100mb file. Some of the receptors are in Zone 14, but most of the receptors were in Zone 15, and I made a simplifying assumption that all were in Zone 15, but that would have effected only those receptors 6 to 7 km West of OPPD No Omaha.

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

I'm not certain I followed your comment #2, maybe it's just too late in the day.

•□□□□□□□□ WSEC - each of the two emission units were normalized independently of each other (2013-15) using the largest emission rate from each emission unit, with a focus on modeling only the two largest emission units.

•□□□□□□□□ OPPD provided the normalized emission rates to NDEQ, along with the varying temperature and velocity rates. They provided these values using their CEMs data, which might not match up exactly with the Air Markets Program Data. Initially, OPPD sent 2012-14 emission rates, and later sent 2015 emissions and parameters.

•□□□□□□□□ I'm not aware of an additional hourly file, since I used only one hourly file in the AERMOD run. I believe you received your data package from Lance Avey at Region 7, and there may be some confusion that happen in the transfer of files. Let me speak to Lance tomorrow morning.

If you have any questions, comments, clarifications, feel free to give me a call.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]

Subject: normalized SO2 modeling

Hello Carrie,

We've reviewed the OPPD and Walter Scott normalized modeling analysis used to support the Nebraska SO2 monitor siting analyses (EPA sent us a copy). A couple of items caught our attention.

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

We'd be happy to discuss this further and to set up a call when you're ready.

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

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www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692
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Leading Iowans in Caring for Our Natural Resources.

To: Wiese, Carrie[carrie.wiese@nebraska.gov]
Cc: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 10/18/2016 7:05:08 PM
Subject: RE: normalized SO2 modeling
removed.txt

Carrie:

I won't have results until tomorrow morning, at the earliest.

Lance agrees with me on two points:

1. whether we're using a fixed emission rate or a variable emission rate, there shouldn't be any big changes to locations already identified as suitable for an additional SO2 monitor.

2. NAD83 and WGS84 are, for all practical purposes, are identical, at least that is what the literature says. NAD83 was intended to track the movement of the North American plate, and since the early 1980s, differences of several feet may have evolved, but you need to go out to the 4th or 5th decimal point to discern any difference between the two datum. AERMOD has little sensitivity to a few feet or a few meters.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Tuesday, October 18, 2016 12:58 PM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

OK, thanks Lisa. Please let me know if anything would change; I'm to visit the site Thursday a.m.

From: Alam, Lisa
Sent: Tuesday, October 18, 2016 11:23 AM
To: Ashton, Brad [DNR]
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Krzak, Jennifer [DNR]; Johnson, Matthew [DNR]; Avey, Lance
Subject: RE: normalized SO2 modeling

Brad:

Thank you for your response.

I did check the run to make sure the correct datum was used. I opened the AERMAP processor within Trinity Breeze's AERMOD GUI, and all of the correct values were there, including zone 15. The "Projection tab" was correctly set at Zone 15. I'm generally running zone 14, so seeing zone 15 gives me confidence. I always use WGS 84, and that was set correctly.

It's unlikely we have identical receptor locations, even where the receptor grid overlaps. Perhaps that is why you feel the elevations are off?

I'll rerun the model using the corrected OPPD emission rates.

Carrie: I'm using normalized emission rates, so using varying emission rates will probably not change the locations identified as possible sites for an additional SO2 monitor near North Omaha OPPD.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: Alam, Lisa
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Krzak, Jennifer [DNR]; Johnson, Matthew [DNR]; Avey, Lance
Subject: RE: normalized SO2 modeling

Lisa,

The elevation data we used are also 1-arc second files. I'm not sure of the reason for this discrepancy. You might check your AERMAP files to confirm the correct datum is being used. Beyond that I'm not sure why we would be getting different elevations.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 10:31 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Mathew:

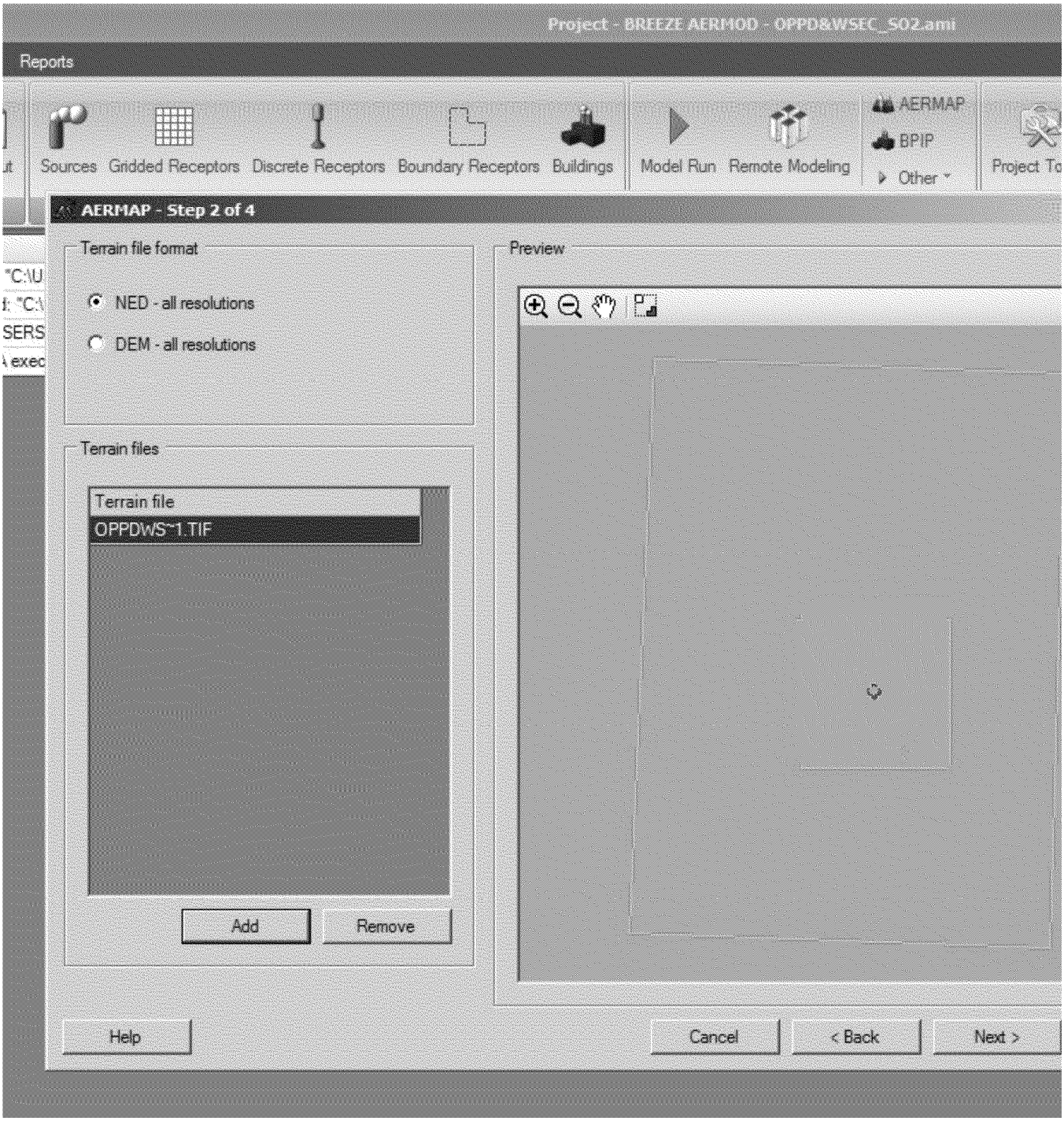
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid


Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
Project To
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Preview
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

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Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 9:29 AM
To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: RE: normalized SO2 modeling

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To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
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To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Alam, Lisa <lisa.alam@nebraska.gov>
Cc: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
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Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
From: Alam, Lisa
Sent: Tue 10/18/2016 6:47:37 PM
Subject: RE: normalized SO2 modeling
removed.txt

Jennifer:

Please send coordinates (XUTMs and YUTMs) and elevations in WGS84 or NAD83, for point sources, EP003 and EP141. Please label the coordinates

and include the units.

As a result of this issue, I will take a closer look at NAD83. The USGS Web site says NED GeoTIFF files use datum NAD83. However, I have

read that you need to go out to the 4th or 5th decimal point before you begin to see a difference between WGS84 and NAD83. NAD83 was originally

set up in the 1980s to measure movement of the North American plate. Maybe now these two datum have larger differences than they once had.

****

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Air Program Planning and Development Team, Air Quality Division

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Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance; Ashton, Brad [DNR]; Alam, Lisa

Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
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Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: lisa.alam@nebraska.gov
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Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

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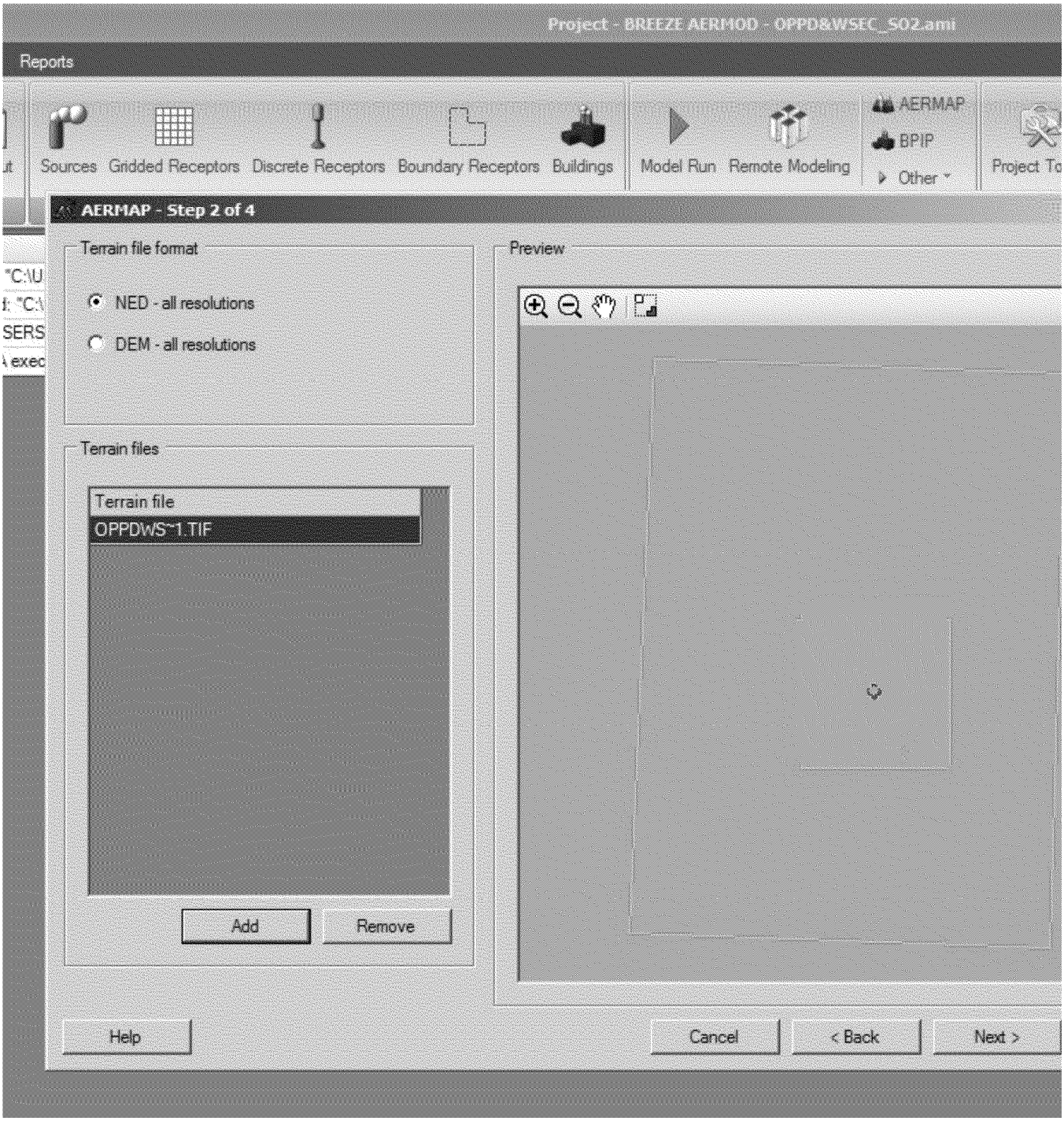
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
Project To
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Preview
Terrain files
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OPPDWS~1.TIF
Add
Remove
Help
Cancel
< Back
Next >

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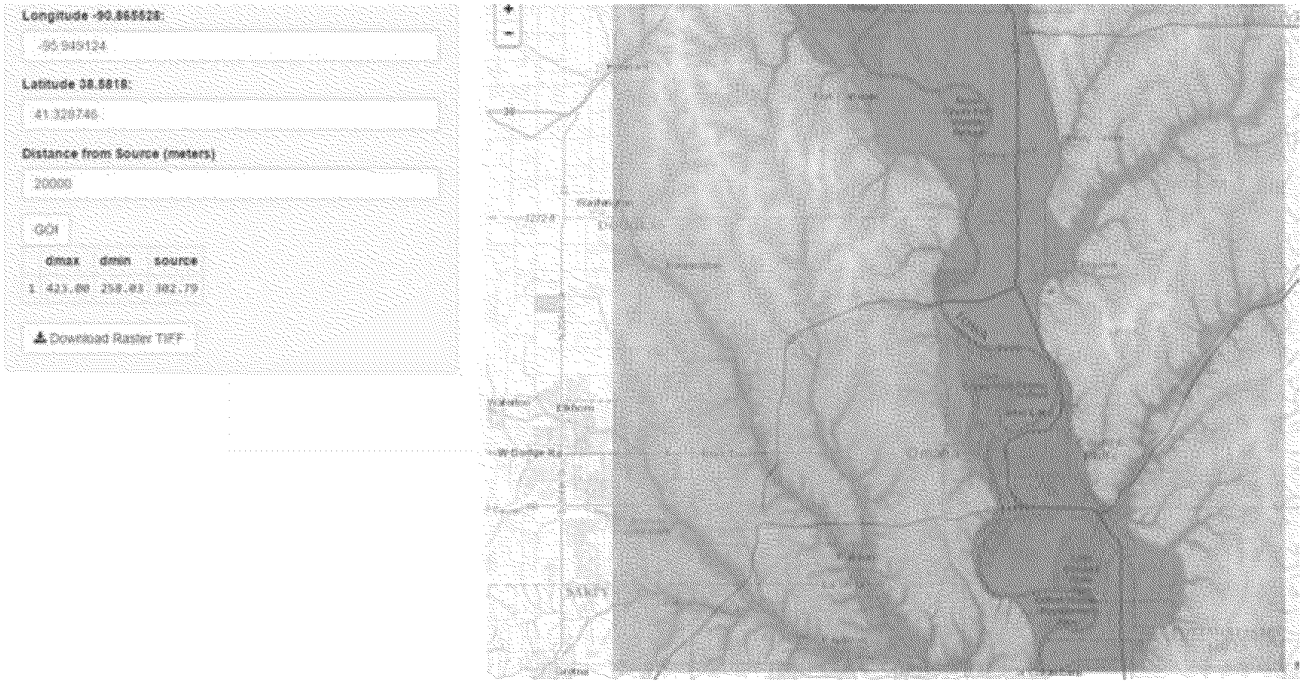

Thanks

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EPA Region 7

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Lenexa, Kansas 66219

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Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
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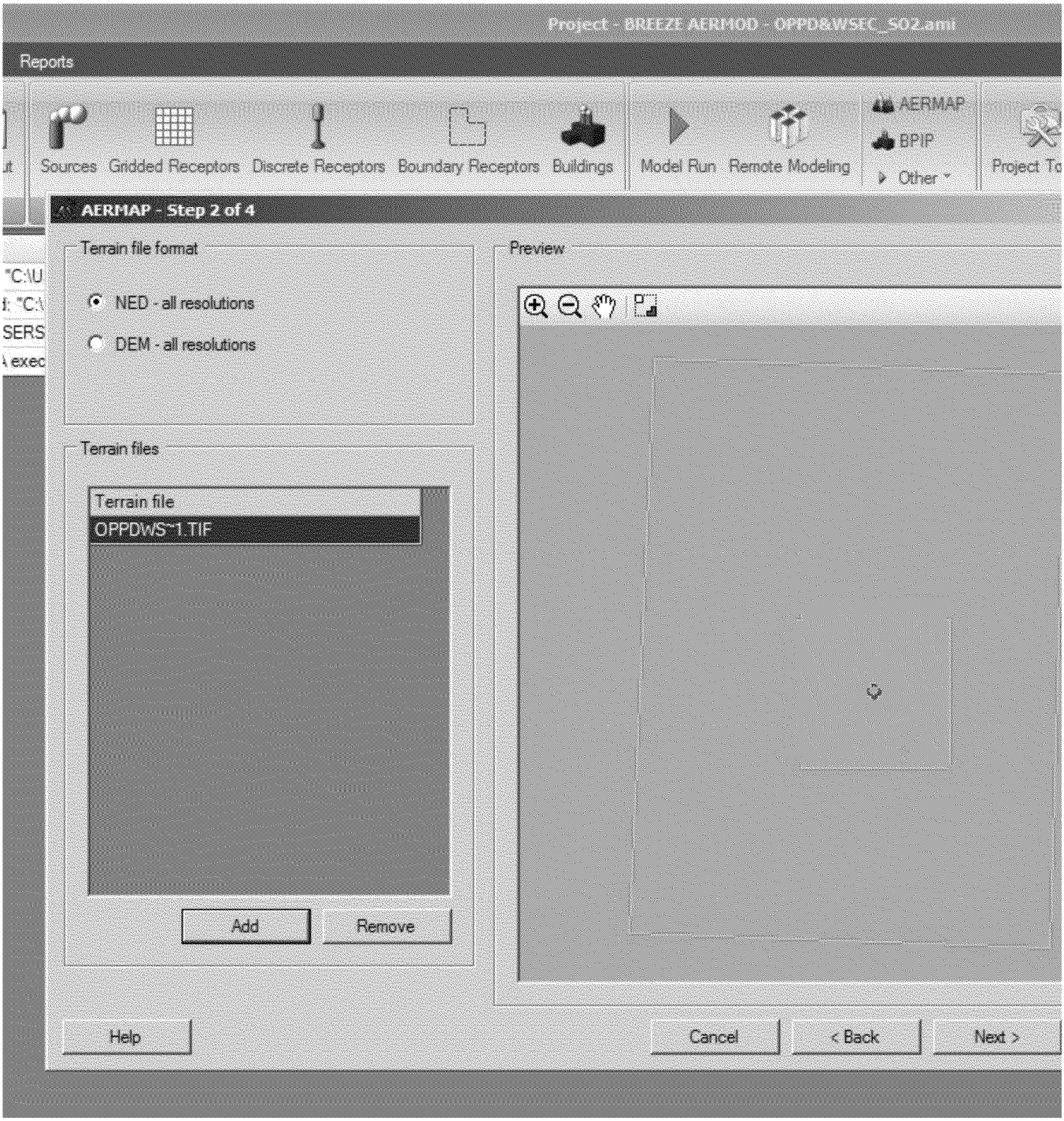
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
Project To
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Terrain file format
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OPPDWS~1.TIF
Add
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Next >

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Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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Brad:

Thank you for your response.

I did check the run to make sure the correct datum was used. I opened the AERMAP processor within Trinity Breeze's AERMOD GUI, and all of the correct values were there, including zone 15. The "Projection tab" was correctly set at Zone 15. I'm generally running zone 14, so seeing zone 15 gives me confidence. I always use WGS 84, and that was set correctly.

It's unlikely we have identical receptor locations, even where the receptor grid overlaps. Perhaps that is why you feel the elevations are off?

I'll rerun the model using the corrected OPPD emission rates.

Carrie: I'm using normalized emission rates, so using varying emission rates will probably not change the locations identified as possible sites for an additional SO2 monitor near North Omaha OPPD.

****

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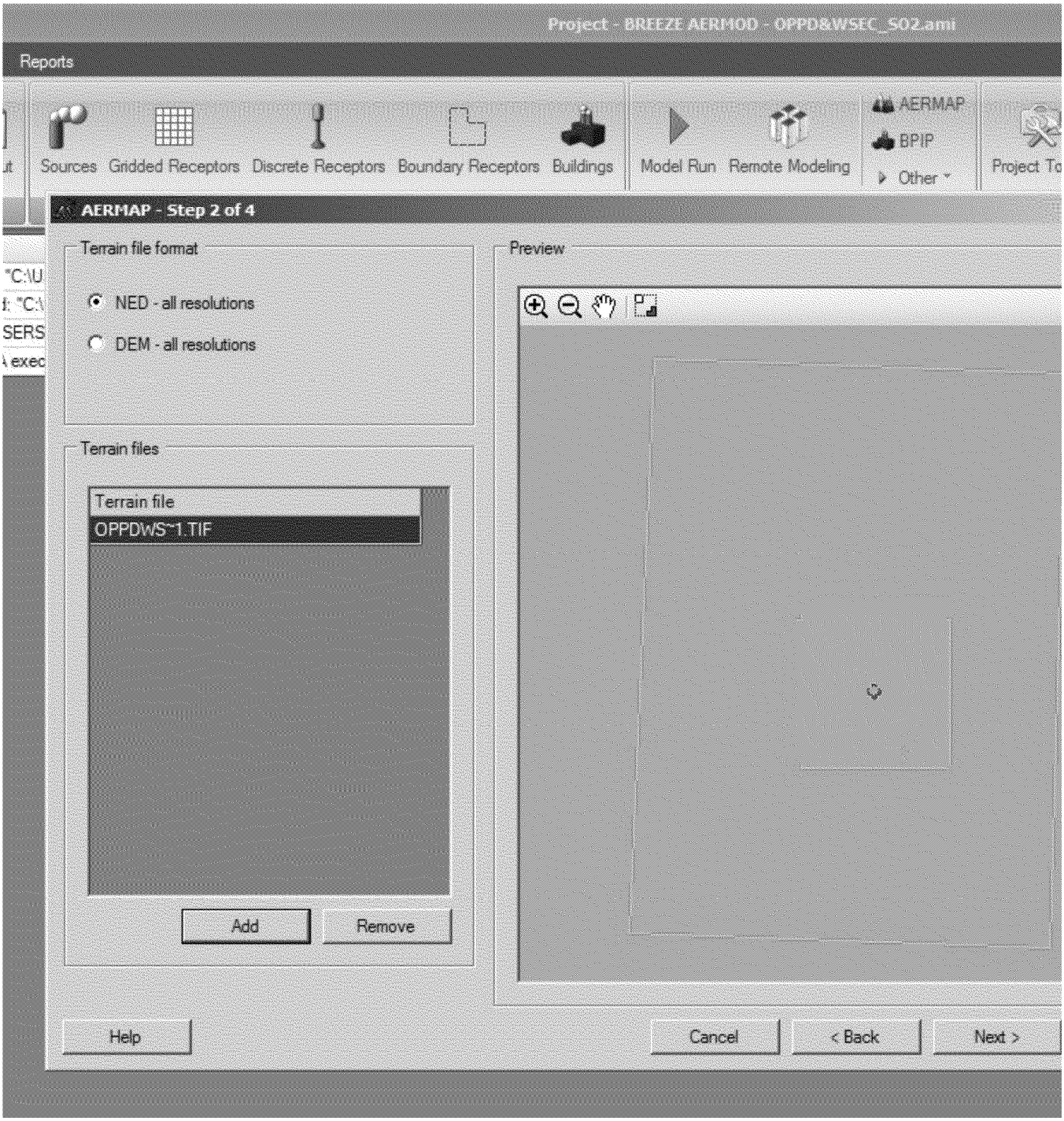
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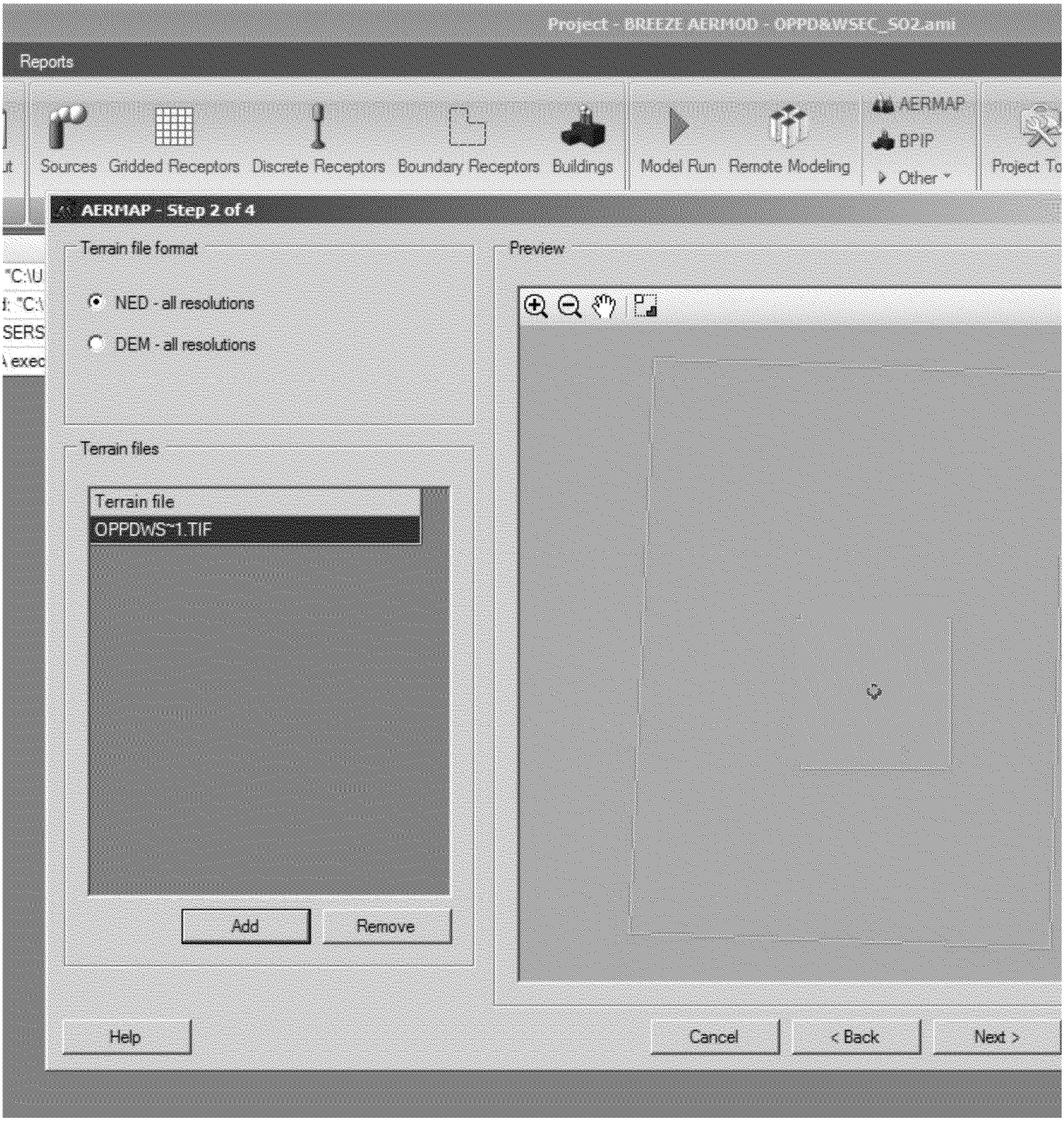
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(402) 471-2925

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Sent: Tue 10/18/2016 3:30:57 PM
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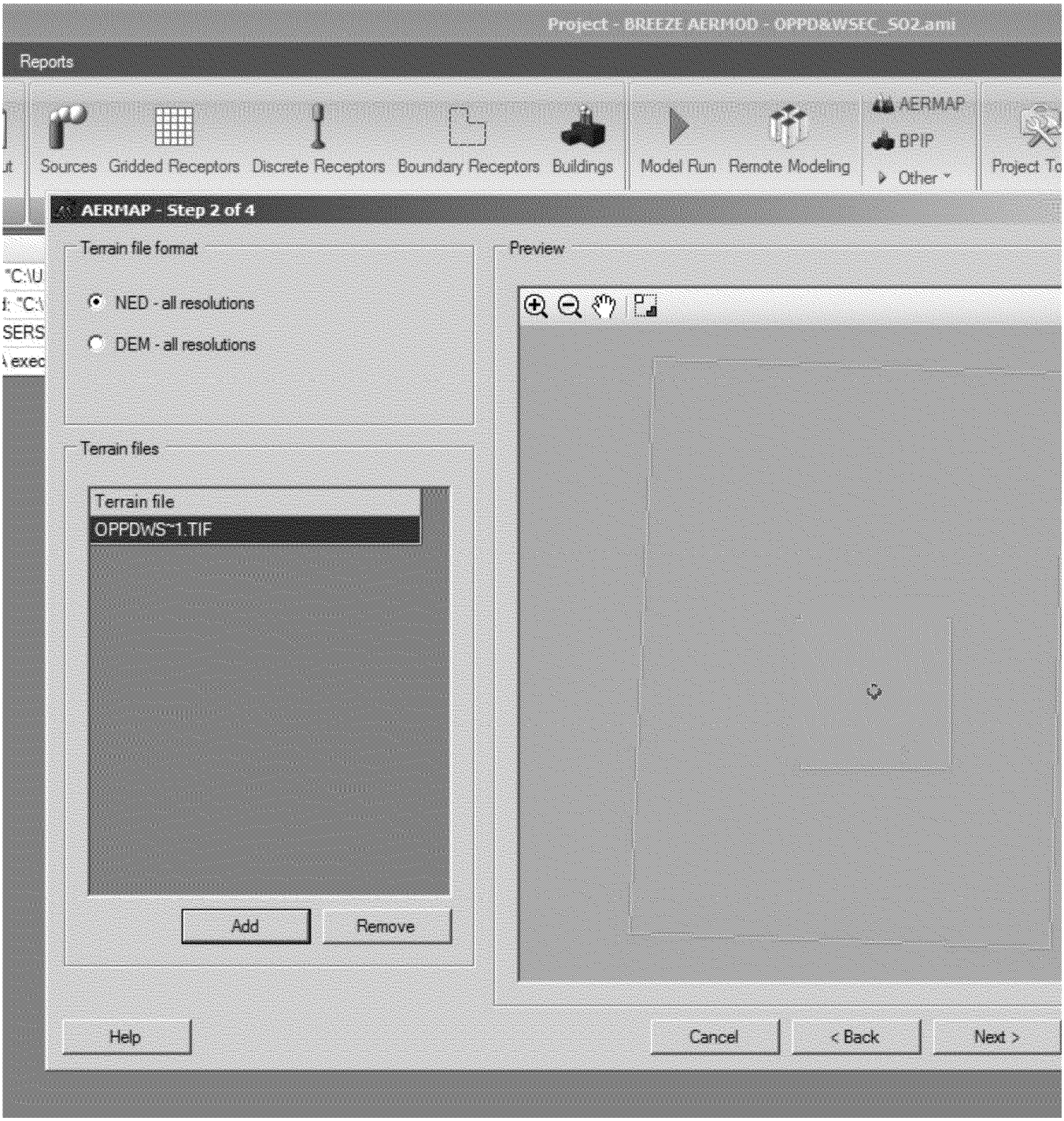
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid


Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
Project To
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Preview
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

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I can send the *.tif file to you, although it's 100mb file. Some of the receptors are in Zone 14, but most of the receptors were in Zone 15, and I made a simplifying assumption that all were in Zone 15, but that would have effected only those receptors 6 to 7 km West of OPPD No Omaha.

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

I'm not certain I followed your comment #2, maybe it's just too late in the day.

•□□□□□□□□ WSEC - each of the two emission units were normalized independently of each other (2013-15) using the largest emission rate from each emission unit, with a focus on modeling only the two largest emission units.

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If you have any questions, comments, clarifications, feel free to give me a call.

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Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: normalized SO2 modeling

Hello Carrie,

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1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

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We'd be happy to discuss this further and to set up a call when you're ready.

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Matthew.Johnson@dnr.iowa.gov[Matthew.Johnson@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; jennifer.krzak@dnr.iowa.gov[jennifer.krzak@dnr.iowa.gov]; jim.mcgraw@dnr.iowa.gov[jim.mcgraw@dnr.iowa.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]
From: Alam, Lisa
Sent: Mon 10/17/2016 9:27:42 PM
Subject: RE: normalized SO2 modeling
removed.txt

Mathew:

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Cc: brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]
From: Zayudis, Peter [DNR]
Sent: Thur 10/6/2016 6:15:23 PM
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion
removed.txt
DNR_PCS #1 and #2 1-hr SO2 data.xlsx
DNR_PCS #3 1-hr SO2 data.xls

Good afternoon Lance,

Find attached to this e-mail, the SO2 data for Boilers 1 &2 (EP001) and Boiler 3 (EP003) at IPL-Prairie Creek Generating Station as requested during our call today. Each data set represents Boilers, 1, 2 and 3 operation on ultra-low sulfur coal. If you have any questions, please let me know.

Thanks

Pete

PETER ZAYUDIS Environmental Engineer Senior
Iowa Department of Natural Resources

P 515.725.9578 | F 515.725.9501 | Email. peter.zayudis@dnr.iowa.gov

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Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion

Hi Matthew,

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Thanks for setting this up,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

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Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>
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Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: DRR modeling questions

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Lenexa, Kansas 66219

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avey.lance@epa.gov

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Sent: Tuesday, September 20, 2016 8:36 AM

To: Avey, Lance <Avey.Lance@epa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: DRR modeling questions

Lance,

Please see my responses in bolded red text below.

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Sent: Tuesday, September 13, 2016 10:08 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
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Thanks for any information, and please let me know of questions.

Lance

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********** ATTACHMENT REMOVED **********

This message contained an attachment which the administrator has caused to be removed.

********** ATTACHMENT REMOVED **********

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Avey, Lance[Avey.Lance@epa.gov]
From: Wiese, Carrie
Sent: Thur 9/22/2016 7:30:49 PM
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Hi Lance,

OK, thank you for confirming! This is very helpful as we discuss amongst ourselves and with OPPD our plans to move forward.

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 22, 2016 11:12 AM
To: Wiese, Carrie
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Hi Carrie,

Yes, it appears you have your understanding correct. The Whitmore site is the blue tab in the lower right of the image, and OPPD North Omaha is about 1 km to the northwest of the Whitmore tab (and yes the coal pile is a good marker for North Omaha and OPPD's property). And yes, the area referenced to the south as a potential good location is directly due south of the North Omaha Station, just beyond the OPPD property boundary in that direction.

The other blue tab to the northwest does represent the old monitor location. I agree that siting a monitor to the northwest could have issues with interference. Really the only good placement to the northwest may be just across from the OPPD property (I think from the map there is a park over there), but at the same time the modeling results really do not support that location. At one time there was a sense to place a monitor to the northwest as that would a location that would potentially see the downwind impacts of both OPPD and WSEC. But if there are siting interference from trees and the modeling analysis puts more emphasis on the area due south of North Omaha, then I would think the area to the south would be more than justified.

Let me know of any more questions,

Lance

Lance Avey

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Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Thursday, September 22, 2016 10:39 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Lance, thanks very much for your assistance with this. Looking at the map with the top 50, I just want to be sure I understand what I'm seeing – it looks like the Whitmore monitor is marked with the blue tab to the lower right/middle, and then North Omaha Station is NW of there (the coal pile appears to be visible, along the river). The area you're referencing to the south as a good placement option would be just west/northwest of Whitmore, and almost due south of North Omaha station?

As for the area to the northwest, I'm not sure but I think the other blue tab may mark our old monitor location that we determined was experiencing too much interference from trees in the area. Is there a strong sense that we would need a monitor to the NW of North Omaha station? It looks like most, if not all, of those areas would experience similar interference as our old monitor.

Thanks again!
Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 22, 2016 10:00 AM
To: Wiese, Carrie
Subject: Results of modeled scoring ranking following SO2 TAD

Hi Carrie,

Attached are 2 images of the "scoring" ranking using modeled normalized emissions from OPPD and WSEC. The dots give the locations of the top 50 scoring receptors based on the modeling. The lower the score (i.e., the redder the dots) gives the highest ranked receptors. I also attached the results for the top 100 scoring receptors so you can see the difference as you trim from a top 100 scoring to top 50 scoring. The blue markers on the image give the location of the current Whitmore site and the past site to the northwest that was discontinued in 2010.

You can see the model clusters the best ranked areas just to the south and north of OPPD. Obviously just to the north is the Missouri River, and that area would likely not be able site a monitor. So I would think the areas for a best possible new site are:

1) Just to the south of OPPD, which would be a few blocks to the northwest of the current Whitmore monitor.

2) Somewhere just to northwest of OPPD; somewhere in the top 100 receptors in that area could possible give a good location that is downwind of both OPPD and WSEC.

Lastly I attached the spreadsheet of the results of the top 100 receptors; this is what was provided to Lisa. It gives the location (in UTM coordinates) in Column A and the "Score" in Column F.

Please let me know of questions,

Thanks

Lance

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To: Avey, Lance[Avey.Lance@epa.gov]
From: Johnson, Matthew [DNR]
Sent: Wed 9/21/2016 5:43:09 PM
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion

Sounds good, here's the conf call:

1-866-685-1580

Ex. 6 - Personal Privacy

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 21, 2016 11:52 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>
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Thanks for setting this up,

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From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 21, 2016 9:09 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: DRR modeling questions

Thank you, Brad. Just quickly, for ADM/Prairie Creek, are the actuals emissions being used from the 2012-14 timeframe? I could see some push-back that the 3 most recent available years (2013-15) are not being used. Maybe just a note that the 2015 operations fall in line with what is seen in the 2012-14 timeframe would suffice.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, September 20, 2016 8:36 AM
To: Avey, Lance <Avey.Lance@epa.gov>

Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: DRR modeling questions

Lance,

Please see my responses in bolded red text below.

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From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, September 13, 2016 10:08 AM
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Subject: DRR modeling questions

Hi Brad,

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2) For ADM Cedar Rapids, are the five boilers being modeled with actual emissions? The protocol mentions a mix of potential and actuals for ADM sources.

The boilers were modeled using emission rates that are approximately 5-10% higher than the maximum annual average actuals for the period 2012-2014.

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We are still deciding how to proceed.

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From: Ashton, Brad [DNR]
Sent: Wed 9/21/2016 4:04:57 PM
Subject: RE: DRR modeling questions

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From: Ashton, Brad [DNR]
Sent: Tue 9/20/2016 1:36:29 PM
Subject: RE: DRR modeling questions

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From: Avey, Lance [mailto:Avey.Lance@epa.gov]
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avey.lance@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 9/14/2016 3:12:29 PM
Subject: RE: OPPD monitoring mxd file
OPPD&WSEC_SO2.abc

This is Breeze's *.amz file, without the max daily files

I sent you the max daily file for the all source group, a very large (>150 MB) file

I also have max daily files for source groups OPPD and WSCE if you want them

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 14, 2016 10:02 AM
To: Alam, Lisa
Subject: RE: OPPD monitoring mxd file

Yep! I was just about to respond. It looks like it went through and downloaded without any problems. Can you also send me the file for 4th Highest Max 1-hr averaged over the 3 years? I believe I just have the MAXDAILY file.

Thanks

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, September 14, 2016 9:57 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: OPPD monitoring mxd file

did you receive file?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 14, 2016 8:53 AM
To: Alam, Lisa
Subject: RE: OPPD monitoring mxd file

Let's try Google Drive. I need permission to download GSplit and they will hassle me when I ask. Let me know if the Google Drive option gives you problems.

Thanks

Lance

Lance Avey

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avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, September 14, 2016 8:43 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: OPPD monitoring mxd file

The file size is too large on my end –

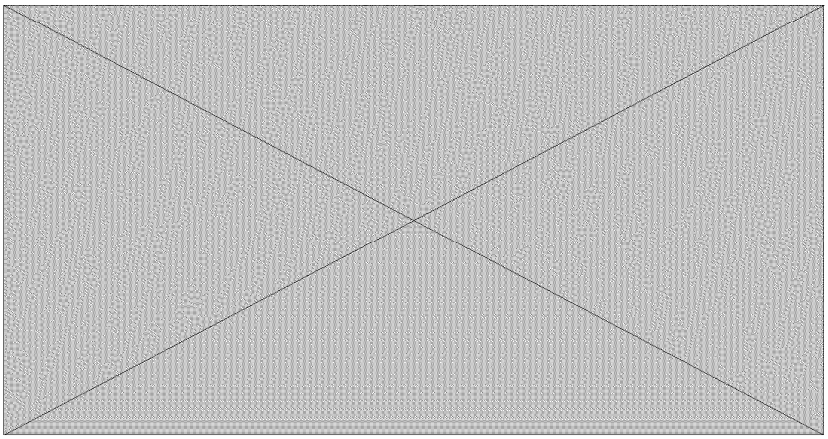
I have two choices

1. Use a file-splitter GSplit

a. http://www.gdgsoft.com/gsplit/

2. Send it through my Google email account – which means I have to use Google Drive. I've never used Google Drive before to share large files, but it shouldn't be too hard

Let me know what you think is best.



****

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Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925 FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"